Flight Crew Operating Manual

FCOM

A330

Volume 4

Customer Services

AIRBUS

FLIGHT CREW OPERATING MANUAL

A330

FMGS

PILOT'S GUIDE

4

AIRBUS®

00.00 CONTENTS

FOREWORD

This manual complements the approved Flight Manual. Airbus has attempted to ensure that the data contained in this manual agrees with the data in the Flight Manual. If there is any disagreement, the Flight Manual is the final authority.

COMMENTS - QUESTIONS - SUGGESTIONS

All manual holders and users are encouraged to submit any Flight Crew Operating Manual questions and suggestions to :

AIRBUS - BP N°33
1 ROND POINT MAURICE BELLONTE
31707 BLAGNAC CEDEX - FRANCE
TELEX TLSBI7X or 530526F
FAX 33.5.61.93.29.68
ATTN. Flight Operations Support - STL
EMAIL : fltops.fbwstd@airbus.com

FOR TECHNICAL OR PROCEDURAL CONTENT

AIRBUS - BP N°33
1 ROND POINT MAURICE BELLONTE
31707 BLAGNAC CEDEX - FRANCE
TELEX TLSBP7X or 530526F
FAX 33.5.61.93.28.06
ATTN. Technical Documentation Services - SDC
EMAIL : sb.reporting@airbus.com

FOR PRINTING AND DISTRIBUTION

FFC5-04-00010-001-A001AA

CONTENT

The Flight Crew Operating Manual (FCOM), and the associated Quick Reference Handbook (QRH), are developed specifically for flight crews, in order to provide them with all of the necessary information about the operational, technical, procedural, and performance characteristics that are required for the safe and efficient aircraft operation. These manuals take into account all of the operational procedures to be applied during normal and abnormal/emergency situations that may occur on ground or in flight.
The manuals are not designed to provide basic airmanship skills or piloting techniques. They are intended for flight crews that have already been trained to fly this type of aircraft, and are familiar with the aircraft's handling characteristics.
In addition, the purpose of the FCOM is to :
- Be used as a comprehensive reference guide during initial and refresher flight crew training. Practical and training-related information is addressed in the Flight Crew Training Manual (FCTM).
- Provide Airbus operators with a basis for their development of a customized airline operations manual, in accordance with applicable requirements.

The content is divided into four volumes :
Vol 1 = Systems' description (description of the aircraft systems).
Vol 2 = Flight preparation (performance information, plus loading data).
Vol 3 = Flight operations (operating procedures, techniques, and performance information).
Vol 4 = FMGS pilot's guide (procedures for FMGS use).

USE

As a comprehensive set of references, the FCOM :
- can be used by an operator's flight operations department to supplement its own crew manual
- can be issued directly to crew members for training and subsequently for line operations.

WARNINGS, CAUTIONS AND NOTES

WARNING : an operating procedure, technique, etc, which may result in personnel injury or loss of life if not carefully followed.
CAUTION : an operating procedure, technique, etc, which may result in damage to equipment if not carefully followed.
NOTE : an operating procedure, technique, etc, considered essential to emphasize.

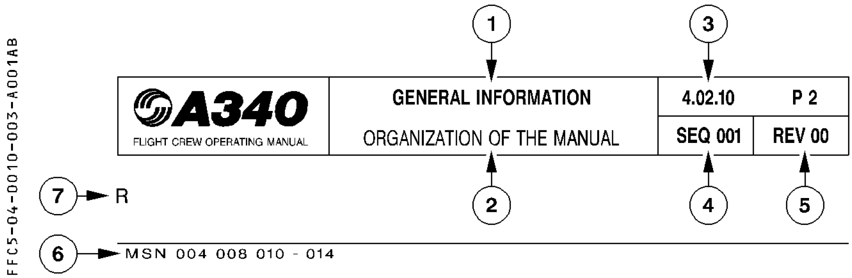
COMPLEMENTARY INFORMATION

The manual includes technical information required for training as well as complementary information.
- Where a paragraph or schematic is preceded by the heading **FOR INFO** the details given are considered to be "nice to know". Knowledge of these items is not required for the type rating qualification.
- ECAM warnings and cautions are summarized in a table at the end of each chapter of volume 1. Numeric values are given for information only.

OPTIONAL EQUIPMENT

The legend "⩤" indicates that a paragraph or a shematic is applicable only if the related equipment is installed.

PAGINATION



1. Chapter title

2. Subchapter title

3. FCOM volume number, chapter number, section number, page number.

4. Sequence number is used for Airbus Industrie management of different aircraft configurations and allows to enter into list of effective pages.

5. Revision number of the manual at which the page has been revised.

6. Aircraft MSN
   – 004 008 means that the page is applicable to aircraft MSN 004 and MSN 008
   – 010-014 means that the page is applicable from aircraft MSN 010 to MSN 014
   – ALL means that the page is applicable to all aircraft covered by the manual.
   Correspondance between MSN and registration may be found in the cross reference table.

7. An R in front of a line indicates that the line has been revised.

REVISIONS

NORMAL REVISIONS

There are issued periodically to cover non-urgent corrections and changes, and to add new data.
They are accompanied by filing instructions and an updated List of Effective Pages that includes customized pages.
A normal revision record sheet is at the front of each volume.
In addition, each volume has a "List of MOD/MP affecting the manual", that gives a simple explanation of the technical content of each MOD/MP incorporated and its validity per aircraft.

INTERMEDIATE REVISIONS

R They are issued between normal revisions to cover changes in the definition of the aircraft
R or changes in the composition of the fleet of an airline.
R They are numbered in ascending sequence e.g. 20A, 20B, 20C ... for intermediate revisions
R issued between normal revisions 20 and 21.
R They are accompanied by filing instructions and an updated list of effective pages.

TEMPORARY REVISIONS

Printed on yellow paper these are issued to cover urgent matters arising between normal revisions. They are accompanied by filing instructions and an updated customized list of effective TR.
A yellow temporary revision record sheet is at the front of each volume.

INCORPORATION OF SERVICE BULLETINS IN THE MANUAL

When a Service Bulletin (SB) has been accomplished on one or more aircraft of the operator fleet, and notified to Airbus Industrie, all affected manuals will reflect the new aircraft configuration at next revision. If judged necessary by Airbus Industrie, or requested by the operator, a "Temporary Revision" is issued between normal revisions.

OPERATIONS ENGINEERING BULLETINS

These are issued as the need arises to give operators revised or new, but significant, technical and procedural information.
OEBs come with an OEB record sheet. This record sheet is re-issued with each normal revision to update the bulletin embodiment status.
They are accompanied by filing instructions and an updated customized list of effective OEB.

HOW TO INSERT A REVISION

FILING INSTRUCTIONS

Use the filing instructions as follows :

REMOVE : The page must be removed. It may be replaced by a new page if associated with an INSERT instruction. If not, the page is cancelled.

INSERT : The page must be inserted. If not associated with a "REMOVE" instruction, the page is new for the operator fleet and does not replace an existing one.

The column NOTE indicates EFFECTIVITY CHANGE ONLY if the page is revised due to an effectivity change and not due to technical content.

LIST OF EFFECTIVE PAGES (LEP)

The manual after revision must comply with the LEP, which lists all the pages that are in the manual. The new pages are indicated by N and the revised pages by R.

BEST WAY TO GET UPDATED DOCUMENTATION

As soon as any change has been completed on any airplane, the best way to get updated documentation is to advise :

AIRBUS INDUSTRIE
BP 33
31707 BLAGNAC CEDEX
FRANCE
Telex : TLSBP7X.. or 530526F
FAX 33.5.61.93.28.06
ATTN : Customer Service Directorate – Technical Documentation Services (AI/SE – D)

To simplify automatic LEP processing some modifications have been grouped under a common code.

	CODE	DESIGNATION
	0001	STD = Mod : (45265+47002+47482) = (45265+50859+50860) = (40085+45265+50859+50860)
	0002	Mod : 40085 = 45265 = (40085+45265) = (45265+47002+47482+47484) = (45265+50859+50860+50861)
	0003	Mod : 40542 = 46514 = 46742 = (40542+46742) = (46514+46742)
R	0004	Mod : 47457 = 47462 = 51138 = 51139 = 47990 = 50321 = 50982 = (47462+51138)
	0006	Mod : 44308 = 44339 = 46572 = 46893 = (46572+46893) = (44308+44724+44907) = (44339+44724+44907)
R	0007	Mod : 55351 = 55352 = 55353 = 55354 = 55778
R	0008	Mod : 47457 = 47462 = 51138 = 51139 = 47990 = 50321 = 50982
	0009	Mod : 50321 = 50716 = 50717 = 50718 = 50982 = (47457+50717) = (47462+50716) = (47990+50718)
	0011	STD = Mod : 44724 = (44308+44724) = (44724+44907) = (44339+44724)
	0012	Mod : 44308 = 44339 = 46572 = 46893 = (44308+44724+44907) = (44339+44724+44907) = (46711+46893+46929)
	0014	STD = Mod : 44724 = (44724+44907) = (44308+44724) = (44339+44724)
	0015	Mod : 44308 = 44339 = 46572 = 46893 = (44308+44724+44907) = (44339+44724+44907)
	0016	STD = Mod : (47002+47482) = (50859+50860)
	0018	STD =46266 = (41150+46266)
	0022	Mod : 50321 = 50716 = 50717 = 50718 = 50982
	0023	Mod : 47457 = 47462 = 47990 = 50321 = 50982 = 51138 = 51139
	0025	Mod : 41150 = 43037 = 44629 = 45055 = (41150+50718) = (41150+50982) = (43037+50716) = (44629+50716) + (45055+50717)
	0026	Mod : 47457 = 47462 = 47990 = 51138 = 51139
	0027	Mod : (47244+47457) = (47244+47462) = (47244+47990) = (47244+50321) = (47244+50982) = (47244+51138) = (47244+51139)
	0028	Mod : 50716 = 50717 = 50718 = 50982 = (46742+50716) = (46742+50717) = (46742+50718) = (46742+50982) = (40542+46742+50718) = (40542+46742+50982) = (46514+46742+50716) = (46514+46742+50718) = (40542+46742+50716) = (40542+46742+50717)
	0030	Mod : 47457 = 47462 = 47990 = 51138 = 51139 = (SAS+47462) = (SAS+47990)
	0031	Mod : 50716 = 50717 = 50718 = 50982 = (47457+50717) = (47462+50716) = (47990+50718) = (SAS+50716) = (SAS+50718) = (SAS+47462+50716) = (SAS+47990+50718)
	0032	Mod : (SAS+51138) = (SAS+47462) = (SAS+47990) = (SAS+50982)
	0033	STD = Mod : 44724 = (44724+44907) = (44308+44724) = (44339+44724) = (44308+44724+50982)
	0034	Mod : 47457 = 47462 = 47990 = 50321 = 50982 = 51138 = 51139 = (43724+47457) = (43724+51139) = (44495+47990) = (44495+50321) = (44495+50982) = (44661+47462) = (44661+51138) = (44662+47462) = (44662+51138)
	0035	STD = Mod : (45265+47002+47482) = (45265+50859+50860)
	0036	Mod : 40085 = 45265 = (45265+47002+47482+47484) = (45265+50859+50860+50861)
	0037	Mod : (45265+47002) = (45265+47245) = (45265+50859)

	CODE	DESIGNATION
	0038	Mod : 50716 = 50717 = 50718 = 50982 = (50716+SAS) = (50718+SAS)
	0039	Mod : 47457 = 47462 = 47990 = 50321 = 50982 = 51138 = 51139 = (43724+47457) = (43724+51139) = (44495+47990) = (44495+50321) = (44495+50982) = (44661+47462) = (44661+51138) = (44662+47462) = (44662+51138)
	0047	Mod : 47457 = 47462 = 47990 = 50321 = 50982 = 51138 = 51139 = (47244+50321+52166)
	0048	Mod : 47457 = 47462 = 47990 = 50321 = 50982 = 51138 = 51139
	0050	STD = Mod : 50716 = 50717 = 50718 = 50982 = (41150+46266+50718) = (41105+46266+50982)
	0052	Mod : 47457 = 47462 = 47456 = 51138 = 51139 = 47990 = 40321 = 50982 = (47462+51138) = (48767+50982)
	0054	Mod : (41150+49192+50718) = (43037+49193+50716) = (44629+49193+50716) = (45055+49193+50717) = (41150+50718+52306) = (41150+50962+52306) = (43037+54786+50716) = (44629+54786+50716) = (45055+54786+50717)
	0055	STD = Mod : 46266 = (43037+46266) = (45055+46266) = (41150+46266)
	0056	STD = Mod : (43037+46266) = (45055+46266) = (41150+46266) = (46266+47002)
R R	0063	Mod : 48765 = 48766 = 48767 = 55354 = (48767+50982) = (48765+50716) = (48766+50717)
R	0064	Mod : 55351 = 55352 = 55353 = 55354 = 55778 = (50716+55351) = (50717+55352)
	0065	Mod : (46893+51139) = (46893+51138) = (46893+47462) = (46893+47457) = (46893+50321) = (46893+47990) = (44308+51138) = (44308+47990) = (44339+47990) = (46893+50982) = (44308+50982) = (44308+47462) = (46572+46893+47990) = (46572+46893+50982) = (44308+44724+44907+47990) = (44308+44724+44907+51138) = (46572+46893+47462+51138) = (44308+44724+44907+47462)
R R	0079	Mod : 48765 = 48766 = 48767 = 55354 = (46893+49767) = (46893+48765) = (46893+48766) = (46572+46893+48765) = (46572+46893+48766)
R R	0080	Mod : 48765 = 48766 = 48767 = (48767+50982) = (47457+48766+50717) = (47462+48765+50716)
R R	0081	Mod : 55351 = 55352 = 55353 = 55354 = 55778 = (50321+55354) = (47457+48766+50717+55352) = (47462+48765+50716+55351)
R	0082	Mod : 48765 = 48766 = 48767 = (48767+50982) = (48765+50716) = (48766+50717)
R R	0083	Mod : 55351 = 55352 = 55353 = 55354 = 55778 = (48765+50716+55351) = (48766+50717+55352)
R R	0084	Mod : 48765 = 48766 = 48767 = (46742+48765+50716) = (46742+48766+50717) = (40542+46742+48767+50982)
R R	0085	Mod : 55351 = 55352 = 55353 = 55354 = 55778 = (46742+50321+55354) = (46742+48765+50716+55351) = (46742+48766+50717+55352)
R R	0086	Mod : (47002+47524) = (47002+50161) = (47524+50859) = (47002+47524+50161) = (47524+50161+50859)
R R	0087	Mod : 50161 = (47524+50161) = (47524+50161+50859+50860) = (47002+47524+50161+47482)
R	0088	Mod : 40542 = 46514 = 46742 = 48765 = 48766 = 46767 = 55354
R	0089	Mod : 48765 = 48766 = 48767 = 55354 = (45237+48767+50982)
R R R R R R R	0090	Mod : (46893+51139) = (46893+51138) = (46893+47462) = (46893+47457) = (46893+50321) = (46893+47990) = (44308+51138) = (44308+47990) = (44339+47990) = (46893+50982) = (44308+50982) = (44308+47462) = (46572+46893+47990) = (46572+46893+50982) = (46572+46893+47457) = (46572+46893+47462) = (46572+46893+51138) = (44308+44724+44907+47990) = (44308+44724+44907+51138) = (46572+46893+47462+51138) = (44308+44724+44907+47462)

CODE	DESIGNATION
0091	Mod : 48765 = 48766 = 48767 = 55354 = (46893+48767) = (46893+48765) = (46893+48766) = (46572+46893+48765) = (46572+46893+48766)
0092	Mod : 48765 = 48766 = 48767 = 55354 = (43724+48766) = (44661+48765) = (44495+48767+50982) = (44662+47462+48765)
0093	Mod : (44629+48765) = (45055+48766) = (41150+48767) = (43037+48765)
0094	Mod : 48765 = 48766 = 48767 = 55354 = (44629+48765+49193) = (45055+48766+49193) = (43037+48765+49193+50716)
0095	Mod : 50321 = (50716+49193) = (50717+49193) = (50718+49192) = (50982+49192) = (50718+52306) = (50982+52306) = (46266+50321) = (48767+52306) = (54786+50717) = (54786+50716) = (41150+16266+50718+52306) = (41150+46266+50982+52306)
0096	Mod : 48765 = 48766 = 48767 = 55354 = (48767+50982) = (47457+48766+50716) = (47462+48765+50716)
0097	Mod : 48765 = 48766 = 48767 = 55354 = (46893+48767) = (46893+48765) = (46893+48766) = (46572+46893+48765) = (46572+46893+48766)
0098	Mod : 48765 = 48766 = 48767 = 55354 = (48767+50982) = (47462+48765) = (47457+48766)
0099	Mod : 48765 = 48766 = 48767 = 55354 = (48765+50859+50860) = (48766+50859+50860)
0100	Mod : 48765 = 48766 = 48767 = 55354 = (46932+48765) = (47233+48766) = (44495+48767+49103) = (44661+46932+48765) = (43724+46180+47233+48766)
0101	Mod : 55351 = 55352 = 55353 = 55354 = 55778 = (47233+48766+55352) = (46932+48765+55351)

R

N°	ISSUE DATE	
00	AUG 92	
01	JAN 93	
02	JUN 93	
03	OCT 93	
04	MAR 94	
05	OCT 95	
06	MAR 97	
07	JUL 98	
08	DEC 98	
09	SEP 99	
10	MAR 00	
11	SEP 00	
12	APR 01	
13	OCT 01	
14	MAR 02	
15	DEC 02	
16	AUG 03	
17	MAY 04	
18	JUL 05	
19	JUN 06	
20	JAN 07	

N° TITLE	STATUS	LOCATION
To be filled by the operator, if needed.		

LIST OF EFFECTIVE TEMPORARY REVISIONS

M	TR NO	-DATE--	-----------TITLE-----------	-----EFFECTIVITY-----
	074-1A	AUG2006	MAX ALT WITH PDB -905	ALL
	076-1A	NOV2006	WRONG PREDICTIVE GPS PAGE	ALL
	102-1A	FEB2007	FMS2 HONEYWELL SPEC	ALL
	106-1A	FEB2007	ENG OUT AFTR DIVERSION POINT	ALL

SUBJECT :

HONEYWELL PERFORMANCE DATABASE "-905"

REASON FOR ISSUE :

This Temporary Revision is issued to replace TR 68-1 that was inadvertently cancelled.
This TR, just as TR 68-1, indicates that HONEYWELL FMS2 that have Performance Database (PDB) "-905" may display REC MAX and OPT values exceeding FL411. Due to the fact that A330 aircraft are certified up to FL411, values exceeding FL411 should be disregarded.

VALIDITY :

A330 aircraft with Performance Database PS4087705-905 (MOD 52936) on HONEYWELL Pegasus FMS2.

FILING INSTRUCTIONS :

Update the Record of Temporary Revisions, and insert the following pages :

TR N° 74-1, Page 1 of 2, following 4.00.36.
TR N° 74-1, Page 2 of 2, facing 4.03.20, Page 105.

This Temporary Revision has been issued after normal revision N° 19.
Do not remove it until instructed to do so.

SUBJECT :

MCDU PREDICTIVE GPS PAGE
GPS AVAILABILITY DETERMINATION

REASON FOR ISSUE :

This Temporary Revision is issued to inform Operators that on the MCDU PREDICTIVE GPS page, the predictive GPS status may spuriously appear as, for example, "N N N Y N N N", when the status should appear as "Y Y Y Y Y Y Y" for the following Estimated Times of Arrival (ETAs) : +/– 15, 10, 5, 0.

This TR provides Operators with a recovery procedure in the case of a spurious predictive GPS status.

VALIDITY :

Applicable : FMS HONEYWELL PEGASUS, P2
Associated to MMR Collins P/N : 822-1152-121
MMR Collins P/N : 822-1152-130
MMR Thales P/N : TLS755-01-0101B

FILING INSTRUCTIONS :

Update the Record of Temporary Revisions, and insert the following pages :

TR N° 76-1, Page 1 of 2, following 4.00.37.
TR N° 76-1, Page 2 of 2, facing 4.03.20, Page 108.

This Temporary Revision has been issued after normal revision N° 19.
Do not remove it until instructed to do so.

SUBJECT :

FMS 2 HONEYWELL SPECIFICITIES

REASON FOR ISSUE :

The Temporary Revision (TR) is issued for Operators of aircraft that have the FMS 2 Honeywell in order to include information about the dual FMS reset after a "CLEAR FROM" in the F-PLN, in FCOM Volume 4. This TR also provides the associated, recommended procedures.

VALIDITY :

A330 aircraft that have FMS 2 Honeywell

FILING INSTRUCTIONS :

Update the Record of Temporary Revisions, and insert the following pages :

TR N° 102-1, Page 1 of 3, following 4.00.36.
TR N° 102-1, Page 2 of 3, facing 4.06.00, Page 1.
TR N° 102-1, Page 3 of 3, following 4.06.20, Page 8.

This Temporary Revision has been issued after normal revision N° 20.
Do not remove it until instructed to do so.

SUBJECT :

Engine out after Diversion Point.

REASON FOR ISSUE :

This Temporary Revision is issued in order to describe that, if an engine-out occurs while flying a SID when the aircraft is after the diversion point, then the aircraft shall remain on the SID. Indeed, by definition, the diversion point is the last common point of the SID and the EOSID, and it allows obstacle clearance on the SID if the engine out occurs after it. Directing the aircraft to the EOSID should not be performed except in some very particular cases and after having checked obstacle clearance on the way to the EOSID.

VALIDITY :

All A330 aircraft.

FILING INSTRUCTIONS :

Update the Record of Temporary Revisions, and insert the following pages :

TR N° 106-1, Page 1 of 2 following 4.00.36
TR N° 106-1, Page 2 of 2 facing 4.04.30 Page 8.

This Temporary Revision has been issued after normal revision N° 20
Do not remove it until instructed to do so.

THIS TABLE GIVES, FOR EACH AIRCRAFT INCLUDED IN THE MANUAL, THE CROSS REFERENCE BETWEEN :

- THE MANUFACTURING SERIAL NUMBER (MSN) WHICH APPEARS IN THE LIST OF EFFECTIVE PAGES
- THE REGISTRATION NUMBER OF THE AIRCRAFT AS KNOWN BY AIRBUS INDUSTRIE.

MSN	REGISTRATION
0341	SIM2.2

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V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA-----
                        -----------------------REASONS OF CHANGE-------------------
-------------------------------------------------------------------------------------

4 02 20  012       100  REV012  CODE:0023

                      - INCORPORATION OF MOD 51139

4 03 00  001       100  REV020  CODE 0023

                      - INCORPORATION OF MOD 51139

4 03 00  002       100  REV019  CODE:0023

                      - INCORPORATION OF MOD 51139

4 03 20  042       100  REV010  CODE:0023

                      - INCORPORATION OF MOD 51139

4 03 20  043       100  REV010  CODE:0023

                      - INCORPORATION OF MOD 51139

4 03 20  044       100  REV010  CODE:0023

                      - INCORPORATION OF MOD 51139

4 03 20  062       100  REV016  CODE 0023

                      - INCORPORATION OF MOD 51139

4 03 20  064       100  REV014  CODE:0023

                      - INCORPORATION OF MOD 51139

4 03 20  065       100  REV014  CODE:0023

                      - INCORPORATION OF MOD 51139

4 03 20  065A      100  REV014  CODE:0023

                      - INCORPORATION OF MOD 51139

4 03 20  066       100  REV010  CODE:0023

                      - INCORPORATION OF MOD 51139

4 03 20  066A      100  REV010  CODE:0023

                      - INCORPORATION OF MOD 51139

4 03 20  067       100  REV010  CODE:0023

                      - INCORPORATION OF MOD 51139

4 03 20  068       100  REV018  CODE 0023

                      - INCORPORATION OF MOD 51139

4 03 20  069       201  REV018  CODE 0090

                      - INCORPORATION OF MOD 51139

4 03 20  074       102  REV012  CODE:0034

                      - INCORPORATION OF MOD 51139
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V	CH	SEC	---PAGE--	SEQ-	--REV--	----VALIDATION CRITERIA----- / ---REASONS OF CHANGE---
4	03	20	077	102	REV012	CODE:0039
						- INCORPORATION OF MOD 51139
4	03	20	091	100	REV015	CODE:0023
						- INCORPORATION OF MOD 51139
4	03	20	094	100	REV012	CODE:0023
						- INCORPORATION OF MOD 51139
4	03	20	124	100	REV012	CODE:0023
						- INCORPORATION OF MOD 51139
4	03	20	125	100	REV012	CODE:0023
						- INCORPORATION OF MOD 51139
4	03	30	003	001	REV020	CODE 0008
						- INCORPORATION OF MOD 51139
4	03	30	006	100	REV017	CODE 0048
						- INCORPORATION OF MOD 51139
4	04	00	001	100	REV020	CODE:0023
						- INCORPORATION OF MOD 51139
4	04	20	001	100	REV012	CODE:0023
						- INCORPORATION OF MOD 51139
4	04	20	002	100	REV018	CODE:0023
						- INCORPORATION OF MOD 51139
4	04	20	002A	100	REV010	CODE:0023
						- INCORPORATION OF MOD 51139
4	04	20	011	100	REV012	CODE:0023
						- INCORPORATION OF MOD 51139
4	04	30	015	100	REV013	CODE:0023
						- INCORPORATION OF MOD 51139
4	04	30	021	100	REV018	CODE:0023
						- INCORPORATION OF MOD 51139
4	04	30	025	100	REV018	CODE:0023
						- INCORPORATION OF MOD 51139
4	04	30	026	100	REV018	CODE:0023
						- INCORPORATION OF MOD 51139

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V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA-----
                            ----------------------REASONS OF CHANGE-------------------
--------------------------------------------------------------------------------------

4 04 30  027       100  REV018  CODE:0023

                      - INCORPORATION OF MOD 51139

4 04 60  004       100  REV020  CODE 0004

                      - INCORPORATION OF MOD 51139

4 04 60  006       100  REV020  CODE 0004

                      - INCORPORATION OF MOD 51139

4 05 10  014       100  REV012  CODE:0023

                      - INCORPORATION OF MOD 51139

4 05 10  016       100  REV019  47457=47462=50982=51138=5113

                      - INCORPORATION OF MOD 51139

4 05 10  017       100  REV019  47457=47462=51138=51139=5098

                      - INCORPORATION OF MOD 51139

4 05 10  017A      100  REV019  47457=47462=51138=51139

                      - INCORPORATION OF MOD 51139

4 05 15  002       100  REV012  CODE:0023

                      - INCORPORATION OF MOD 51139

4 05 30  007       200  REV016  CODE:0027

                      - INCORPORATION OF MOD 51139
                      - DELETION OF MOD 47457

4 05 60  005       105  REV019  CODE 0052

                      - INCORPORATION OF MOD 51139

4 06 30  001       100  REV019  CODE 0023

                      - INCORPORATION OF MOD 51139

4 06 30  002       100  REV013  CODE:0023

                      - INCORPORATION OF MOD 51139
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M	V	CH	SEC	---PAGE--	SEQ-	--REV--	----VALIDATION CRITERIA-----	-----EFFECTIVITY-----
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	4	00	10	001	001	REV019		ALL
	4	00	10	002	001	REV019		
	4	00	10	003	001	REV007		ALL
	4	00	10	004	001	REV007		
	4	00	10	005	001	REV007		ALL
	4	00	20	001	001	REV020	LIST OF CODES	ALL
	4	00	20	002	001	REV020	LIST OF CODES	
	4	00	20	003	001	REV020	LIST OF CODES	ALL
	4	00	30	001	001	REV020	LIST OF NORMAL REVISIONS	ALL
	4	00	35	001	001	REV007	RECORD OF TR A330	ALL
	4	00	36	001-LTR	002	REV020	LIST OF T.R. A330	ALL
	4	00	70	CRT	002	REV020	CROSS REFERENCE TABLE	ALL
	4	00	75	HL	002	REV020	HIGHLIGHTS A330	ALL
	4	00	80	LEP	001	REV020	LIST OF EFFECTIVE PAGES	ALL
	4	00	85	LOM	002	REV020	LIST OF MOD/MP/SB	ALL
	4	01	00	001	001	REV007		ALL
	4	01	10	001	001	REV007		ALL
	4	01	10	002	001	REV007		
	4	02	00	001	001	REV019		ALL
	4	02	10	001	001	REV007		ALL
	4	02	20	001	100	REV007	43724=44495=44661=44662	ALL
	4	02	20	002	100	REV016	M.43724=44495=44661=44662	
	4	02	20	003	001	REV009		ALL
	4	02	20	004	110	REV016	CODE 0002	
	4	02	20	004A	001	REV020		ALL
	4	02	20	005	001	REV007		ALL
	4	02	20	006	105	REV016	CODE 0038	
	4	02	20	007	105	REV017	CODE 0038	ALL
	4	02	20	008	001	REV007		
	4	02	20	009	001	REV007		ALL
	4	02	20	010	001	REV019		
	4	02	20	011	100	REV007	M.43724=44495=44661=44662	ALL
	4	02	20	012	100	REV012	CODE:0023	

M V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA----- -----EFFECTIVITY-----

M	V	CH	SEC	---PAGE--	SEQ-	--REV--	----VALIDATION CRITERIA-----	-----EFFECTIVITY-----
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	4	02	20	015	001	REV007		ALL
	4	02	20	016	001	REV007		
	4	02	20	017	001	REV007		ALL
	4	02	20	018	001	REV018		
	4	02	20	019	001	REV007		ALL
	4	02	20	020	001	REV007		
	4	02	20	021	001	REV007		ALL
	4	02	20	022	001	REV007		
	4	02	30	001	001	REV007		ALL
	4	02	30	002	001	REV007		
	4	02	30	003	100	REV016	CODE 0022	ALL
	4	02	30	004	001	REV007	STD=40815+47865	
	4	02	30	005	001	REV016		ALL
	4	02	30	006	001	REV007		
	4	02	30	007	001	REV015		ALL
	4	02	30	008	001	REV007	STD=M:40815+47865	
	4	02	30	009	001	REV007		ALL
	4	02	30	010	001	REV007		
	4	02	30	011	001	REV007	STD=M:40815+47865	ALL
	4	02	30	012	001	REV015		
	4	02	30	013	001	REV007		ALL
	4	02	30	014	001	REV009		
	4	03	00	001	100	REV020	CODE 0023	ALL
	4	03	00	002	100	REV019	CODE:0023	
	4	03	10	001	100	REV007	46086	ALL
	4	03	10	002	001	REV015		
	4	03	10	003	001	REV007		ALL
	4	03	10	004	001	REV007	STD=40815+47865	
	4	03	10	005	001	REV007		ALL
	4	03	10	006	001	REV007		
	4	03	20	001	001	REV007		ALL
	4	03	20	002	001	REV010		
	4	03	20	003	110	REV019	CODE 0031	ALL
	4	03	20	004	105	REV016	M:50716=50717=50718=50982	
	4	03	20	005	110	REV016	CODE 0028	ALL
	4	03	20	006	001	REV007		
	4	03	20	007	100	REV015	CODE:0022	ALL
	4	03	20	008	001	REV010		

M V	CH	SEC	---PAGE--	SEQ-	--REV--	----VALIDATION CRITERIA-----	-----EFFECTIVITY-----
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4	03	20	011	001	REV010		ALL
4	03	20	012	001	REV015		
4	03	20	013	100	REV015	45237=45238=45239	ALL
4	03	20	014	001	REV007		
4	03	20	015	001	REV007		ALL
4	03	20	016	100	REV017	M.45237=45238=45239	
4	03	20	017	001	REV019		ALL
4	03	20	017A	001	REV019		ALL
4	03	20	018	001	REV007		ALL
4	03	20	019	001	REV007		ALL
4	03	20	020	001	REV007		
4	03	20	021	001	REV007		ALL
4	03	20	022	001	REV009		
4	03	20	023	001	REV007		ALL
4	03	20	024	001	REV007		
4	03	20	025	001	REV007		ALL
4	03	20	026	001	REV007		
4	03	20	027	001	REV007		ALL
4	03	20	028	001	REV007		
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4	03	20	030	001	REV007		
4	03	20	031	001	REV007		ALL
4	03	20	032	001	REV007		
4	03	20	033	001	REV007		ALL
4	03	20	034	001	REV007		
4	03	20	035	001	REV007		ALL
4	03	20	036	001	REV007		
4	03	20	037	001	REV007		ALL
4	03	20	038	001	REV007		
4	03	20	039	001	REV007		ALL
4	03	20	040	001	REV017		
4	03	20	041	001	REV007		ALL
4	03	20	042	100	REV010	CODE:0023	
4	03	20	043	100	REV010	CODE:0023	ALL
4	03	20	044	100	REV010	CODE:0023	
4	03	20	045	001	REV007		ALL
4	03	20	046	001	REV018		

M	V	CH	SEC	---PAGE--	SEQ-	--REV--	----VALIDATION CRITERIA-----	-----EFFECTIVITY-----
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	4	03	20	049	001	REV007		ALL
	4	03	20	050	001	REV007		
	4	03	20	051	001	REV007		ALL
	4	03	20	052	001	REV007		
	4	03	20	053	001	REV007		ALL
	4	03	20	054	001	REV007		
	4	03	20	055	001	REV007		ALL
	4	03	20	056	001	REV016		
	4	03	20	057	001	REV016		ALL
	4	03	20	058	001	REV019		
	4	03	20	059	001	REV007		ALL
	4	03	20	060	001	REV007		
	4	03	20	061	001	REV007		ALL
	4	03	20	062	100	REV016	CODE 0023	
	4	03	20	063	001	REV007		ALL
	4	03	20	064	100	REV014	CODE:0023	
	4	03	20	065	100	REV014	CODE:0023	ALL
	4	03	20	065A	100	REV014	CODE:0023	ALL
	4	03	20	066	100	REV010	CODE:0023	ALL
	4	03	20	066A	100	REV010	CODE:0023	ALL
	4	03	20	067	100	REV010	CODE:0023	ALL
	4	03	20	068	100	REV018	CODE 0023	
	4	03	20	069	201	REV018	CODE 0090	ALL
	4	03	20	070	110	REV009	CODE 0006	
	4	03	20	071	001	REV007		ALL
	4	03	20	072	001	REV007		
	4	03	20	073	100	REV013	43724=44495=44661=44662	ALL
	4	03	20	074	102	REV012	CODE:0034	
	4	03	20	075	001	REV007		ALL
	4	03	20	076	100	REV007	43724=44495=44661=44662	
	4	03	20	077	102	REV012	CODE:0039	ALL
	4	03	20	078	100	REV013	43724=44495=44661=44662	
	4	03	20	079	100	REV011	43724=44495=44661=44662	ALL
	4	03	20	080	100	REV007	40542=46514=46742	
	4	03	20	081	100	REV007	40542=46514=46742	ALL
	4	03	20	082	100	REV007	40542=46514=46742	

M	V	CH	SEC	---PAGE--	SEQ-	--REV--	----VALIDATION CRITERIA-----	-----EFFECTIVITY-----
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4		03	20	085	100	REV007	40542=46514=46742	ALL
4		03	20	086	100	REV015	40542=46514=46742	
4		03	20	087	100	REV015	40542=46514=46742	ALL
4		03	20	088	100	REV007	40542=46514=46742	
4		03	20	089	001	REV007		ALL
4		03	20	090	001	REV007		
4		03	20	091	100	REV015	CODE:0023	ALL
4		03	20	092	100	REV018	41150=43037=44629=45055	
4		03	20	093	300	REV018	CODE 0054	ALL
4		03	20	094	100	REV012	CODE:0023	
4		03	20	095	001	REV013		ALL
4		03	20	096	001	REV007		
4		03	20	097	001	REV012		ALL
4		03	20	098	001	REV007		
4		03	20	099	001	REV007		ALL
4		03	20	100	001	REV009		
4		03	20	101	001	REV007		ALL
4		03	20	102	103	REV016	CODE 0009	
4		03	20	103	001	REV013		ALL
4		03	20	104	001	REV019		
4		03	20	105	001	REV019		ALL
4		03	20	106	001	REV019		
4		03	20	107	001	REV019		ALL
4		03	20	108	110	REV009	CODE 0015	
4		03	20	109	110	REV009	CODE 0015	ALL
4		03	20	110	100	REV007	43724=44495=44661=44662	
4		03	20	111	001	REV007		ALL
4		03	20	112	110	REV020	CODE 0002	
4		03	20	113	110	REV016	CODE 0036	ALL
4		03	20	114	001	REV019		
4		03	20	115	001	REV019		ALL
4		03	20	116	001	REV007		
4		03	20	117	100	REV007	40542=46514=46742	ALL
4		03	20	118	001	REV007		
4		03	20	119	001	REV007		ALL
4		03	20	120	001	REV007		
4		03	20	121	001	REV007		ALL
4		03	20	122	001	REV007		

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	4	03	20	125	100	REV012	CODE:0023	ALL
	4	03	30	001	100	REV015	CODE:0022	ALL
	4	03	30	002	001	REV015		
	4	03	30	003	001	REV020	CODE 0008	ALL
	4	03	30	004	001	REV013		
	4	03	30	005	001	REV013		ALL
	4	03	30	006	100	REV017	CODE 0048	
	4	03	30	007	001	REV013		ALL
	4	03	30	008	001	REV013		
	4	03	30	009	001	REV013	CODE 0016	ALL
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	4	03	30	011	001	REV013		ALL
	4	03	40	001	001	REV007		ALL
	4	03	40	002	001	REV007		
	4	03	40	003	001	REV007		ALL
	4	03	40	004	001	REV010	CODE 0016	
	4	03	40	005	001	REV007		ALL
	4	03	40	006	001	REV007		
	4	03	40	007	001	REV007		ALL
	4	03	40	008	100	REV007	43724=44495=44661=44662	
	4	03	40	009	001	REV007		ALL
	4	03	40	010	100	REV007	43724=44495=44661=44662	
	4	03	40	011	001	REV007		ALL
	4	04	00	001	100	REV020	CODE:0023	ALL
	4	04	00	002	001	REV018		
	4	04	10	001	001	REV007	STD	ALL
	4	04	10	002	001	REV007		
	4	04	10	003	001	REV007		ALL
	4	04	10	004	001	REV007		
	4	04	10	005	001	REV007		ALL
	4	04	10	006	001	REV007		
	4	04	10	007	001	REV007		ALL
	4	04	10	008	001	REV007		
	4	04	10	009	001	REV007		ALL
	4	04	10	010	001	REV007		
	4	04	10	011	001	REV007		ALL
	4	04	10	012	001	REV007		

M V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA----- -----EFFECTIVITY-----

M	V	CH	SEC	---PAGE--	SEQ-	--REV--	----VALIDATION CRITERIA-----	-----EFFECTIVITY-----
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4	04	10		018	001	REV007		
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4	04	10		021	001	REV018		ALL
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4	04	10		026	001	REV020		
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4	04	10		029	001	REV007		ALL
4	04	10		030	001	REV007		
4	04	10		031	001	REV007		ALL
4	04	10		032	001	REV007		
4	04	10		033	100	REV007	43724=44495=44661=44662	ALL
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4	04	10		035	001	REV007		ALL
4	04	10		036	001	REV017		
4	04	10		037	001	REV007		ALL
4	04	10		038	001	REV007		
4	04	10		039	001	REV013		ALL
4	04	10		040	001	REV013		
4	04	10		041	001	REV007		ALL
4	04	10		042	001	REV007		
4	04	10		043	001	REV007		ALL
4	04	20		001	100	REV012	CODE:0023	ALL
4	04	20		002	100	REV018	CODE:0023	
4	04	20		002A	100	REV010	CODE:0023	ALL
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4	04	20		003A	001	REV019		ALL
4	04	20		004	001	REV019		ALL

M	V	CH	SEC	---PAGE--	SEQ-	--REV--	----VALIDATION CRITERIA-----	-----EFFECTIVITY-----
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	4	04	20	007	001	REV007		ALL
	4	04	20	008	001	REV016		
	4	04	20	009	001	REV019		ALL
	4	04	20	010	001	REV019		
	4	04	20	011	100	REV012	CODE:0023	ALL
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	4	04	30	002	001	REV014		
	4	04	30	003	001	REV007	STD=40815+47865	ALL
	4	04	30	004	001	REV007		
	4	04	30	005	001	REV007		ALL
	4	04	30	006	103	REV019	46180=46181=46932=47233	
	4	04	30	006A	001	REV019		ALL
	4	04	30	007	001	REV015		ALL
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	4	04	30	010	001	REV019		
	4	04	30	011	001	REV016		ALL
	4	04	30	012	001	REV016		
	4	04	30	013	001	REV012		ALL
	4	04	30	014	001	REV020		
	4	04	30	014A	001	REV020		ALL
	4	04	30	015	100	REV013	CODE:0023	ALL
	4	04	30	016	001	REV007		
	4	04	30	017	001	REV007		ALL
	4	04	30	018	001	REV007		
	4	04	30	019	100	REV007	43724=44495=44661=44662	ALL
	4	04	30	020	001	REV018	STD	
	4	04	30	021	100	REV018	CODE:0023	ALL
	4	04	30	022	001	REV018		
	4	04	30	023	001	REV018		ALL
	4	04	30	024	001	REV018		
	4	04	30	025	100	REV018	CODE:0023	ALL
	4	04	30	026	100	REV018	CODE:0023	
	4	04	30	027	100	REV018	CODE:0023	ALL
	4	04	30	028	001	REV018		
	4	04	30	029	001	REV018		ALL
	4	04	30	030	100	REV018	43724=44495=44661=44662	

M V	CH	SEC	---PAGE--	SEQ-	--REV--	----VALIDATION CRITERIA-----	-----EFFECTIVITY-----
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4	04	30	034	001	REV018		
4	04	30	035	001	REV018		ALL
4	04	30	036	001	REV018		
4	04	30	037	001	REV018		ALL
4	04	40	001	001	REV014		ALL
4	04	40	002	001	REV007		
4	04	40	003	001	REV007		ALL
4	04	40	004	001	REV017		
4	04	40	005	100	REV019	50161=47524+50161	ALL
4	04	40	006	100	REV019	50161=47524+50161	
4	04	40	007	105	REV019	50161=47524+50161	ALL
4	04	40	008	105	REV020	CODE 0087	
4	04	40	009	100	REV019	50161=47524+50161	ALL
4	04	40	010	001	REV017	STD	
4	04	40	011	100	REV019	50161=47524+50161	ALL
4	04	40	012	105	REV020	CODE 0087	
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4	04	40	014	001	REV017		
4	04	40	015	001	REV017		ALL
4	04	40	016	001	REV017		
4	04	40	017	001	REV007		ALL
4	04	40	018	001	REV007		
4	04	40	019	001	REV007		ALL
4	04	40	020	001	REV007		
4	04	40	021	001	REV007		ALL
4	04	40	022	001	REV007		
4	04	40	023	001	REV007		ALL
4	04	40	024	001	REV007		
4	04	50	001	100	REV018	40542=46514=46742	ALL
4	04	50	002	100	REV020	40542=46514=46742	
4	04	50	003	100	REV018	40542=46514=46742	ALL
4	04	50	004	100	REV018	40542=46514=46742	
4	04	50	005	102	REV019	CODE 0088	ALL
4	04	50	006	100	REV020	40542=46514=46742	
4	04	50	007	100	REV018	40542=46514=46742	ALL
4	04	50	008	100	REV018	40542=46514=46742	

M	V	CH	SEC	---PAGE--	SEQ-	--REV--	----VALIDATION CRITERIA-----	-----EFFECTIVITY-----
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	4	04	60	003	100	REV018	43724=44495=44661=44662	ALL
	4	04	60	004	100	REV020	CODE 0004	
	4	04	60	005	100	REV020	43724=44495=44661=44662	ALL
	4	04	60	006	100	REV020	CODE 0004	
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	4	05	00	002	001	REV020		
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	4	05	10	001	001	REV007		ALL
	4	05	10	002	001	REV007		
	4	05	10	003	105	REV016	M:50716=50717=50718=50982	ALL
	4	05	10	004	105	REV016	M:50716=50717=50718=50982	
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	4	05	10	006	001	REV007		
	4	05	10	007	001	REV007		ALL
	4	05	10	008	001	REV007		
	4	05	10	009	001	REV007		ALL
	4	05	10	010	001	REV015		
	4	05	10	011	001	REV007		ALL
	4	05	10	012	001	REV007		
	4	05	10	013	001	REV007		ALL
	4	05	10	014	100	REV012	CODE:0023	
	4	05	10	015	110	REV016	CODE 0002	ALL
	4	05	10	016	100	REV019	47457=47462=50982=51138=5113	
	4	05	10	017	100	REV019	47457=47462=51138=51139=5098	ALL
	4	05	10	017A	100	REV019	47457=47462=51138=51139	ALL
	4	05	10	018	001	REV018		ALL
	4	05	10	019	100	REV008	43037=44629=45055	ALL
	4	05	10	020	100	REV016	43037=44629=45055	
	4	05	10	021	001	REV008		ALL
	4	05	10	022	001	REV008		
	4	05	10	023	001	REV008		ALL
	4	05	15	001	001	REV012		ALL
	4	05	15	002	100	REV012	CODE:0023	
	4	05	20	001	100	REV007	43724=44495=44661=44662	ALL
	4	05	20	002	001	REV010		

M V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA----- -----EFFECTIVITY-----
M V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA----- -----EFFECTIVITY-----

M	V	CH	SEC	PAGE	SEQ	REV	VALIDATION CRITERIA	EFFECTIVITY
	4	05	30	001	001	REV012		ALL
	4	05	30	002	001	REV012		
	4	05	30	003	001	REV007		ALL
	4	05	30	004	001	REV012		
	4	05	30	005	001	REV007		ALL
	4	05	30	006	001	REV007		
	4	05	30	007	200	REV016	CODE:0027	ALL
	4	05	40	001	001	REV007		ALL
	4	05	40	002	001	REV007		
	4	05	40	003	001	REV007		ALL
	4	05	40	004	001	REV007		
	4	05	40	005	001	REV007		ALL
	4	05	40	006	001	REV007		
	4	05	40	007	001	REV007		ALL
	4	05	40	008	001	REV007		
	4	05	50	001	001	REV007		ALL
	4	05	50	002	001	REV019		
	4	05	50	003	110	REV016	CODE 0015	ALL
	4	05	50	004	001	REV007		
	4	05	50	005	001	REV016		ALL
	4	05	50	006	001	REV016		
	4	05	50	007	001	REV018		ALL
	4	05	50	008	001	REV007		
	4	05	50	009	001	REV007		ALL
	4	05	50	010	001	REV007		
	4	05	50	011	001	REV019		ALL
	4	05	50	012	001	REV007		
	4	05	50	013	001	REV007		ALL
	4	05	50	014	001	REV016	CODE 0016	
	4	05	50	015	001	REV019		ALL
	4	05	60	001	100	REV011	43724=44495=44661=44662	ALL
	4	05	60	002	001	REV007	STD=40815+47865	
	4	05	60	003	001	REV007	STD=40815+47865	ALL
	4	05	60	004	001	REV007	STD=40815+47865	
	4	05	60	005	105	REV019	CODE 0052	ALL
	4	05	60	006	001	REV007	STD=40815+47865	
	4	05	60	007	001	REV007		ALL
	4	05	60	008	001	REV016		

M V	CH	SEC	---PAGE--	SEQ-	--REV--	----VALIDATION CRITERIA-----	-----EFFECTIVITY-----
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4	05	60	010	001	REV011		
4	05	70	001	001	REV013		ALL
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4	05	70	003	001	REV007		ALL
4	05	70	004	001	REV019		
4	05	70	005	001	REV007		ALL
4	05	70	006	001	REV007		
4	05	70	007	100	REV007	43724=44495=44661=44662	ALL
4	05	70	008	002	REV018	A330	
4	05	70	009	001	REV007		ALL
4	05	70	010	001	REV019		
4	05	70	011	001	REV020		ALL
4	05	70	012	001	REV020		
4	05	70	013	001	REV020		ALL
4	05	70	013A	001	REV020		ALL
4	05	70	014	001	REV007		ALL
4	05	70	015	001	REV014		ALL
4	05	70	015A	100	REV014		ALL
4	05	70	016	002	REV012		ALL
4	05	70	017	001	REV012		ALL
4	05	70	018	001	REV012		
4	05	70	019	001	REV012		ALL
4	05	70	020	001	REV007		
4	05	70	021	100	REV015	47244	ALL
4	05	70	022	001	REV007		
4	05	70	023	110	REV017	CODE 0012	ALL
4	05	70	024	001	REV016		
4	05	70	024A	001	REV016		ALL
4	05	70	024B	001	REV016	STD=40815+47865	ALL
4	05	70	025	001	REV009		ALL
4	05	70	026	001	REV009		
4	05	70	027	001	REV020		ALL
4	05	70	028	001	REV015	CODE 0016	
4	05	70	029	001	REV020	STD	ALL
4	05	70	030	001	REV007		
4	05	70	031	001	REV007	STD=40815+47865	ALL

M	V	CH	SEC	---PAGE--	SEQ-	--REV--	----VALIDATION CRITERIA-----	-----EFFECTIVITY-----
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4		05	80	001A	001	REV018		ALL
4		05	80	002	100	REV016	CODE 0022	ALL
4		05	80	003	001	REV007		ALL
4		05	80	004	001	REV020		
4		06	00	001	001	REV020		ALL
4		06	10	001	110	REV009	CODE 0015	ALL
4		06	10	002	001	REV007		
4		06	10	003	001	REV007		ALL
4		06	20	001	001	REV007		ALL
4		06	20	002	100	REV007	43724=44495=44661=44662	
4		06	20	003	100	REV016	43724=44495=44661=44662	ALL
4		06	20	003A	001	REV019		ALL
4		06	20	004	001	REV019		ALL
4		06	20	005	001	REV013		ALL
4		06	20	006	001	REV020		
4		06	20	007	001	REV017		ALL
4		06	20	008	001	REV012		
4		06	30	001	100	REV019	CODE 0023	ALL
4		06	30	002	100	REV013	CODE:0023	
4		06	40	001	001	REV013		ALL
4		06	40	002	001	REV012		
4		07	00	001	001	REV007		ALL
4		07	10	001	001	REV008	.	ALL
4		07	10	002	001	REV016		
4		07	10	003	001	REV008		ALL
4		07	10	004	001	REV010		
4		07	10	005	001	REV010		ALL
4		07	10	006	001	REV008		
4		07	10	007	001	REV008		ALL
4		07	10	008	001	REV010		
4		07	10	009	001	REV010		ALL
4		07	10	010	001	REV008		
4		07	10	011	001	REV019		ALL
4		07	10	012	001	REV019		
4		07	10	013	001	REV016		ALL
4		07	10	014	001	REV010		

M V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA----- -----EFFECTIVITY-----

M	V	CH	SEC	---PAGE--	SEQ-	--REV--	----VALIDATION CRITERIA-----	-----EFFECTIVITY-----
	4	07	10	015	001	REV010		ALL
	4	07	10	016	001	REV008		

M V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA----- -----EFFECTIVITY-----

M V T	REV	MOD MP SB	TITLE	VALIDITY
.	020	40085	NAVIGATION-DEFINE SECOND ADF RECEIVER INSTALLATION	ALL
.	020	40542	AUTOFLIGHT -FMGES- DEFINE INTERFACE WITH ACARS	ALL
.	020	43724	AUTOFLIGHT - FMEGC - INSTALL IMPROVED AUTOPILOT FOR GE ENGINES	ALL
.	020	44339	NAVIGATION-GPS-INTRODUCE PRIMARY MEANS OF NAVIGATION USING HONEYWELL GPS (SFE)	ALL
.	020	45055	ENGINE FUEL AND CONTROL - GENERAL - PROVIDE DERATED TAKE-OFF FACILITIES FOR G.E. ENGINES	ALL
.	020	45238	AUTO FLIGHT - FMGEC - INSTALL STD L7 - B4 FOR A330 WITH GE ENGINES	ALL
.	020	45265	NAVIGATION- ADF - INSTALL SECOND ADF RECEIVER	ALL
.	020	46086	AUTO FLIGHT - MCDU - INSTALL 2ND GENERATION FMS MCDU (HONEYWELL)	ALL
.	020	46180	AUTO FLIGHT - FMGEC - INSTALL STD L7-B5 FOR A330 WITH GE ENGINES	ALL
.	020	46742	INFORMATION SYSTEMS - AIR TRAFFIC AND INFORMATION MANAGEMENT SYSTEM - ACTIVATE ATSU	ALL

M V T	REV	MOD	MP SB	TITLE	VALIDITY
.	020	46893	....	NAVIGATION - MMR - INSTALL COLLINS MULTI-MODE RECEIVERS P/N 822-1152-121	ALL
.	020	47233	....	AUTO FLIGHT - FMGEC - INSTALL A NEW STANDARD FMGEC L9B6 FOR GE ENGINE	ALL
.	020	47244	....	NAVIGATION-STANDBY NAVIGATION SYSTEMS- INSTALL SEXTANT AVIONICS INTEGRATED STANDBY INSTRUMENT SYSTEM (ISIS)	ALL
.	020	47457	....	AUTO FLIGHT - FMGEC - INSTALL FMGEC P1-B7 FOR GE ENGINES	ALL
.	020	47524	....	INDICATING/RECORDING SYSTEMS-ELECTRONIC INSTRUMENT SYSTEM - INSTALL NEW DISPLAY SYSTEM (EIS2) EQTS (DMC/DU/DISKETTES)	ALL
.	020	49193	....	INDICATING/RECORDING SYSTEMS - FWC - INSTALL NEW STANDARD K7	ALL
.	020	50140	....	NAVIGATION - ILS - INSTALL MMR COLLINS A340-500/600 CERTIFICATION STANDARD (130)	ALL
.	020	50161	....	INDICATING/RECORDING SYSTEM - EIS - INSTALL NEW EIS2 STANDARD L3-1 (DMC, DU AND DISKS)	ALL
.	020	50717	....	AUTO-FLIGHT - FMGEC - INSTALL FMGEC P2B7 FOR GE ENGINES	ALL
N	020	51139	....	AUTO FLIGHT - FMGEC - INSTALL STANDARD P1B7 (FROM LEGACY) FOR GE ENGINES	ALL

M V T	REV	MOD	MP SB	TITLE	VALIDITY
.	020	52331	....	AUTO-FLIGHT - FMGEC - INSTALL NEW FMGEC STANDARD P2B8 (A330GE)	ALL
.	020	52936	....	AUTO FLIGHT - FMGEC - INSTALL NEW HONEYWELL PERFORMANCE DATA BASE (-905)	ALL

01.00 CONTENTS

01.10 GENERAL

PREAMBLE

The Auto Flight System is described in the volume 1 and volume 4.The Auto Flight System is described in the volume 1 and volume 4.
The volume 1 gives a general description of the system and its functions
- Architecture
- Function description
- Basic principle of systems
  * Reversion
  * Protection
  * Managed and selected guidance modes
- Mode information
- Display characteristics (chapter 1.22 and 1.31)

The volume 4 is devoted to the FMGS operational information
- Operational principles
- Pilot interface (MCDU pages)
- Procedural material including :
  * FMGS procedures on ground and in flight
  * mode annunciation in flight
  * typical flight profiles
- Irregularities
  * Degraded modes of operations
  * FMGS failures and procedures
  * FMGS behaviour following failures of other systems

GENERAL PHILOSOPHY

The Flight Management Guidance System (FMGS) operates as follows :

· During cockpit preparation the crew uses the Multifunction Control and Display Unit (MCDU) to insert a preplanned route from origin to destination. This route includes SID, EN ROUTE, WAYPOINTS, STAR, APPROACH, MISSED APPR, and ALTN route as available from the navigation data base.
· Subsequently the system defines a vertical profile and a speed profile, taking into account ATC requirements and performance criteria.

The FMGS computes the aircraft position continually, using stored aircraft performance data and navigation data. Therefore it can steer the aircraft along a preplanned route and vertical and speed profiles. This type of guidance is said to be “managed”.

If the pilot wants to modify any flight parameter (SPD, V/S, HDG, etc.) temporarily, he may do so by using the various Flight Control Unit (FCU) selectors. The FMGS then guides the aircraft to the target value of this parameter that he has selected. This type of guidance is said to be “selected”.

The two available types of guidance, then, are :

– Managed guidance guides the aircraft along the preplanned route and the vertical and speed/Mach profile. (The FMGS computes the target values of the various flight parameters).
– Selected guidance guides the aircraft to the target values of the various flight parameters the pilot selects by using the FCU selectors.

Selected guidance always has priority over managed guidance.

SYSTEM DESCRIPTION

Please refer to 1.22.10.

02.00 CONTENTS

INTRODUCTION

The flight management and guidance system (FMGS) performs navigation functions and lateral and vertical flight planning functions. The FMGS also computes performance parameters and guides the aircraft along a preplanned route.
Each FMGC is divided into three main parts :
- The Flight Management (FM) controls :
  - Navigation
  - Management of flight planning
  - Prediction and optimization of performance
  - Management of navigation radios
  - Management of displays
- The Flight Guidance (FG) performs :
  - Autopilot (AP) command
  - Flight director (FD) command
  - Autothrust (A/THR) command
- The Flight Envelope (FE) provides :
  - Speed envelope computation
  - Monitoring of parameters used by FG and FE parts
  - Windshear and aft Center of Gravity (CG) detection
  - Computation of GW and CG information

This chapter (4.02) describes the operational principles of flight management and flight guidance in order to help the reader understand how the FMGS functions.

NAVIGATION

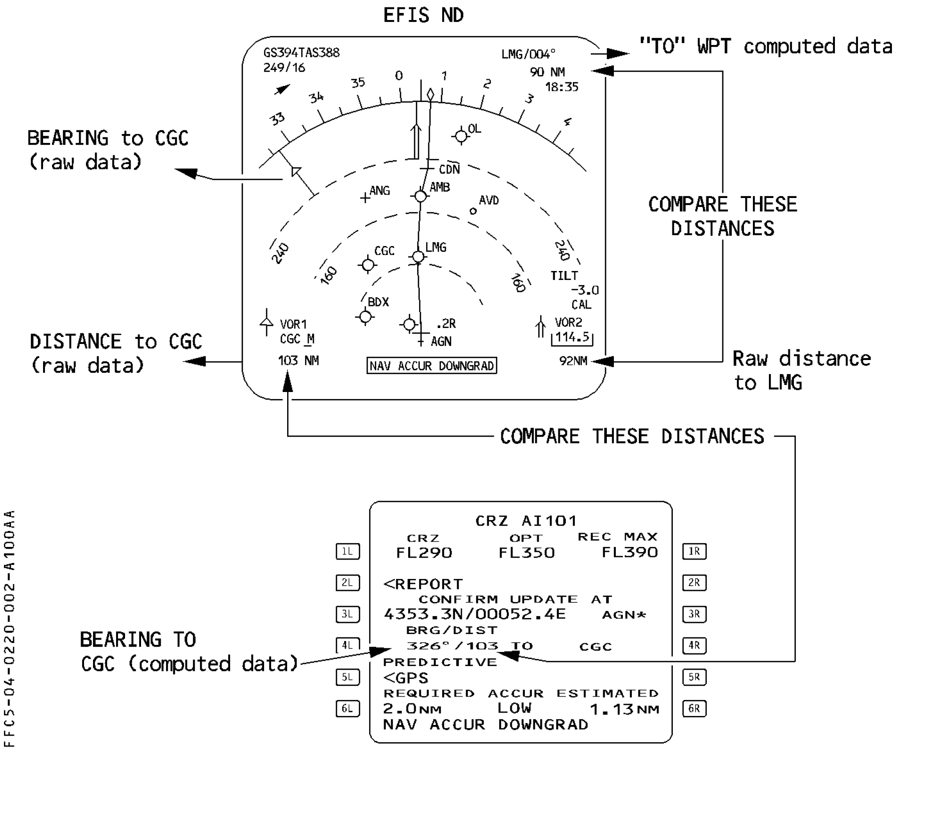
Essential navigation functions are described in the volume 1 (1.22.20) but some principles are reemphasized in this chapter due to their operational impact.

POSITION ACCURACY (PROG PAGE)

The HIGH or LOW accuracy is indicated on the PROG page.
This display is the result of the comparison between the estimated position error (EPE) displayed in 6R field and the required navigation accuracy displayed in 6L field.
The required navigation accuracy are defaulted values, defined by airworthiness authorities for various flight areas.
The pilot can modify the required navigation accuracy.
The pilot, when the aircraft is not fitted or not using the GPS primary function, must check the navigation accuracy periodically to confirm the system computation.
When the accuracy changes from low to high (or high to low), both MCDUs and NDs display the message "NAV ACCUR UPGRAD" (or "NAV ACCUR DOWNGRAD").

NAVIGATION ACCURACY CHECK

When GPS primary is available, the navigation accuracy check is not required.
When GPS primary is not available, the pilot must perform this essential check :
· Periodically in cruise
R · At 10000 feet in descent.
R When entering a terminal/approach area, the pilot must monitor navigation accuracy only.
The procedure is :
· While en route, check the HIGH/LOW accuracy information.
  – If accuracy is “LOW” (and whenever “NAV ACCUR DOWNGRAD” appears), compare raw data from the tuned navaids with the corresponding FM-computed data on the navigation display or the MCDU PROG page.
  – If accuracy is “HIGH”, periodically perform the comparison (about once per hour).
· In descent and in terminal and approach areas, validate the estimated accuracy, whether it is “HIGH” or “LOW”, by comparing the FM data with the raw data from the VOR/DME at the destination airfield, if available.



This check verifies and quantifies the FM accuracy. It confirms the reliability of FMGS data itself and of the navigation display presentation. This check also validates the use of the NAV mode.
By comparing the bearing, the pilot may evaluate the validity of the overall check.
In area with high magnetic variation change, this comparison of bearings may not be adequate.

RADIO NAVIGATION TUNING

Each FMGC tunes the navaids it uses for display and computing position.
The FM may tune navaids for display automatically, using an internal logic, or the pilot may tune them manually on the RADIO NAV page.
The FM tunes automatically the DMEs used for position update. It scans them constantly.

NAVAIDS USED FOR DISPLAY

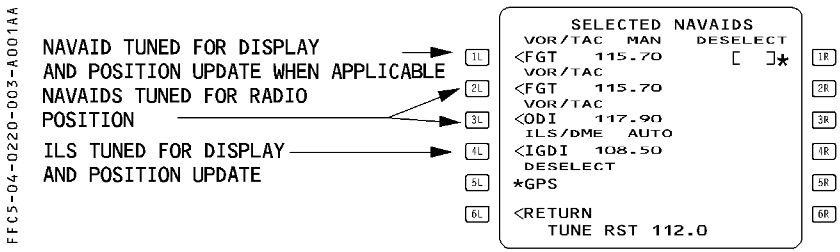
The RADIO NAV page, and the ND show which navaids have been tuned for display.

R *Note : All navaids tuned on RAD NAV page are used for display purpose.*

NAVAIDS USED FOR POSITION UPDATE

Navaids used for aircraft's position update are displayed on the SELECTED NAVAIDS page.
If a NAVAID is unreliable, the pilot should deselect it manually.

Note : When the FMGC uses the VOR/DME for radio position, it also uses the related VOR/DME for display.
If the crew has selected manually the VOR/DME for display, and if it is not convenient for the FMGC to use it for position update, the FMGC will require the crew to select another VOR/DME. The MCDU will display the message "TUNE BBB FFF.F", BBB is the navaid identifier and FFF.F the VOR frequency.



MANUAL TUNING

– **WRITE the identifier on the RAD NAV page.**
Use the identifier preferably.

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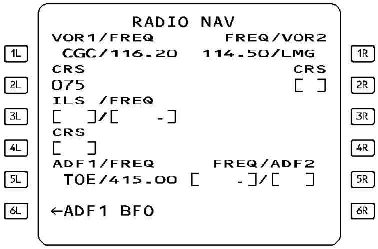

● **If the MCDU displays "NOT IN DATA BASE" :**

– **WRITE the frequency**

– **DISREGARD the ident that comes up in small font on the MCDU.**
When a frequency is entered in the VOR field, the FMGC automatically associates the tuned frequency to the closest navaid identifier with the same frequency, and displays it on the RAD NAV page. This identifier may not be corresponding to the tuned navaid.
If the closest navaid found in the database is of a different type (e.g. VOR instead of VOR/DME), the crew will obtain a partial tuning (e.g. VOR indication instead of VOR/DME indication).

NAVAID IDENTIFICATION

– **CHECK the decoding of the ILS identifier on PFD and the VOR or ADF identifier on ND.**
<u>When the navaid identifier is decoded in agreement with that published, no audio check is necessary.</u>
When the decoding is different from the published one, check the audio. Due to Morse coding inaccuracy, wrong decoding may sometimes occur.

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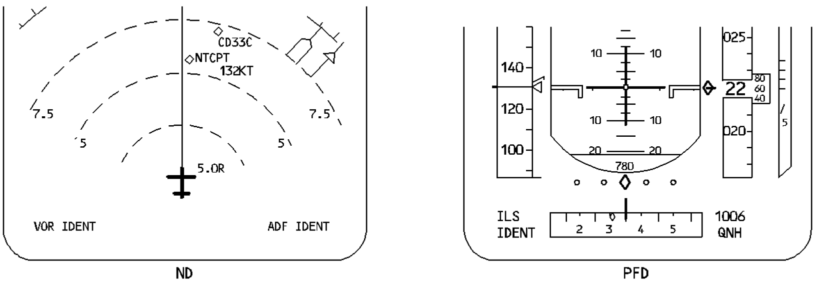


NAVIGATION DATABASE

Overall navigation performance is mainly based on two elements : First, the accuracy of the aircraft position calculation and, second, the validity of the flight path definition, as extracted from the navigation database.
The level of validation depends on the type of operations. For example, JAA TGL 10 requires that, for Precision RNAV in terminal area, providers and operators implement a quality assurance program for the navigation database, which may include a navigation database validation process. The highest level of validation is required for RNAV approach, with lateral and vertical navigation.
The navigation databases are revised every 28 days (ARINC cycle).
Flights should be conducted with a navigation database that is within its cycle.
This should be checked on the MCDU AIRCRAFT STATUS PAGE.

R **OPERATIONS WITH AN OUTDATED NAVIGATION DATABASE**

Airbus recommends flying with an updated navigation database. However, in exceptional circumstances, and for a limited period of time, an aircraft can continue to operate beyond the end data of the database cycle, provided it is approved by the national authorities.
The following precautions need to be considered :

- Prior to flight, identify recent changes on the intended route, with the navigation charts and manuals. Some "strategic" new waypoints, not in the navigation database, may be worth entering as DEFINED WAYPOINT on MCDU.

  Note : *Flying with an outdated database, in an airspace that was recently restructured with numerous new waypoints, should be avoided.*

- Check SID, STAR, and approach procedures of departure, destination and required alternates for recent changes.
  Do not attempt to modify, or manually construct, terminal instrument procedures or approaches.
- Fly terminal instrument procedures, and approaches with managed guidance, that are in the navigation database and that have been checked for accuracy. Otherwise, fly the procedure, or the approach, in selected guidance with conventional radio navaid raw data.

FLIGHT PLANNING

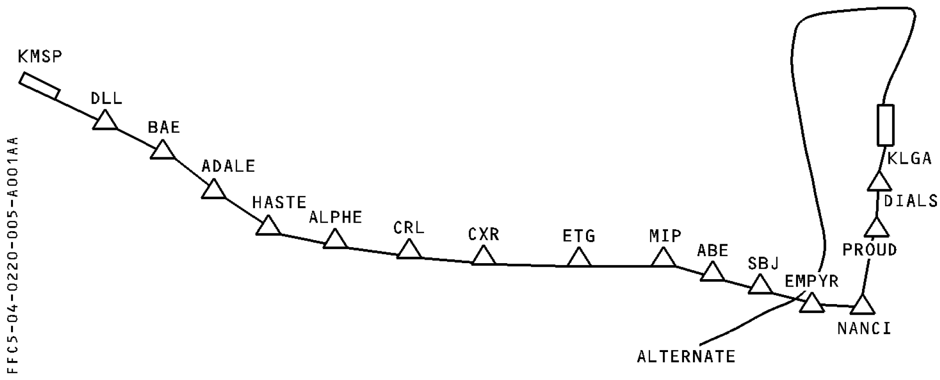
The pilot uses the MCDU to insert flight plans into the FMGS :
– a lateral flight plan that defines the intended horizontal flight path
– a vertical flight plan that defines the intended speed and altitude profile for the aircraft to follow while flying the lateral flight plan.

Note : The flight planning function is available for both the primary and secondary flight plans.

LATERAL FLIGHT PLANNING

To insert the lateral flight plan, the pilot can use either a company route number or an ICAO four-letter city pair. The lateral flight plan includes the following elements :
– Takeoff runway
– Standard instrument departure (SID) and transition to en route mode
– En route waypoints and airways
– Transition from en route mode to standard terminal arrival route (STAR)
– Landing runway with selected approach and approach via
– Missed approach
– Alternate flight plan

EXAMPLE



The FMGS is able to string together different types of legs, corresponding to specific patterns (such as DME arc legs, or procedure turns), that are heading or track-referenced. These are defined in the database : The pilot cannot create these legs.
Departure and arrival procedures, that are defined in the database, may be divided into several parts, as shown in the following illustration :

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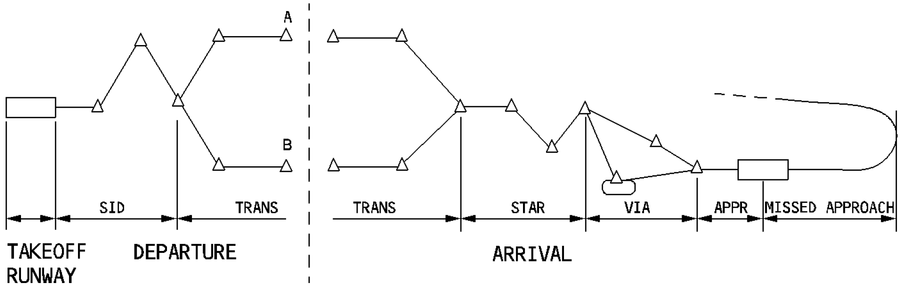

FLIGHT PLAN CONSTRUCTION

There are three ways of defining the route :

(1) It is a company route, it is in the database, and it is known by the crew.
The pilot enters the name of the CO RTE in the 1L field of the INIT A page, and this action enters all the elements of the flight plan. The database usually includes an alternate route associated with the destination.

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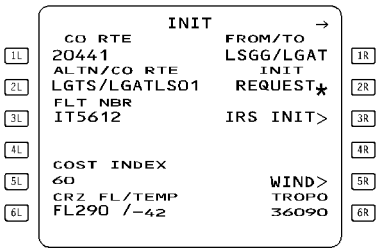
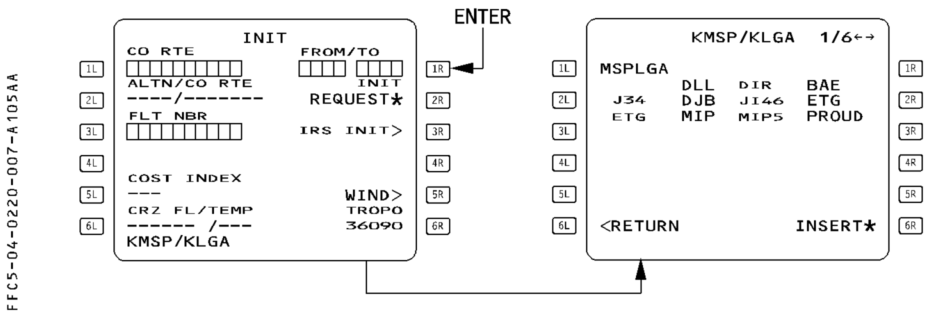


(2) It is a company route, and it is in the database, but the crew does not know it is there :
The pilot enters a city pair in the 1R field. The ROUTE SELECTION page automatically appears and enables the crew to review all stored routes between the two cities, prior to selecting one of them.

R

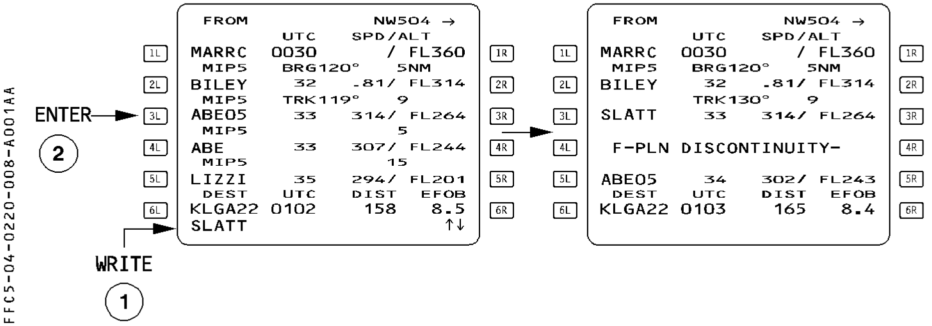


(3) There is no company route between the two cities :
The pilot enters the city pair in the 1R field.
The ROUTE SELECTION page appears and displays “NO ROUTE”.
The pilot has to construct the entire flight plan manually.
Refer to 4.05.10 for the procedure.

LATERAL REVISION

The crew can revise the lateral flight plan in three ways :

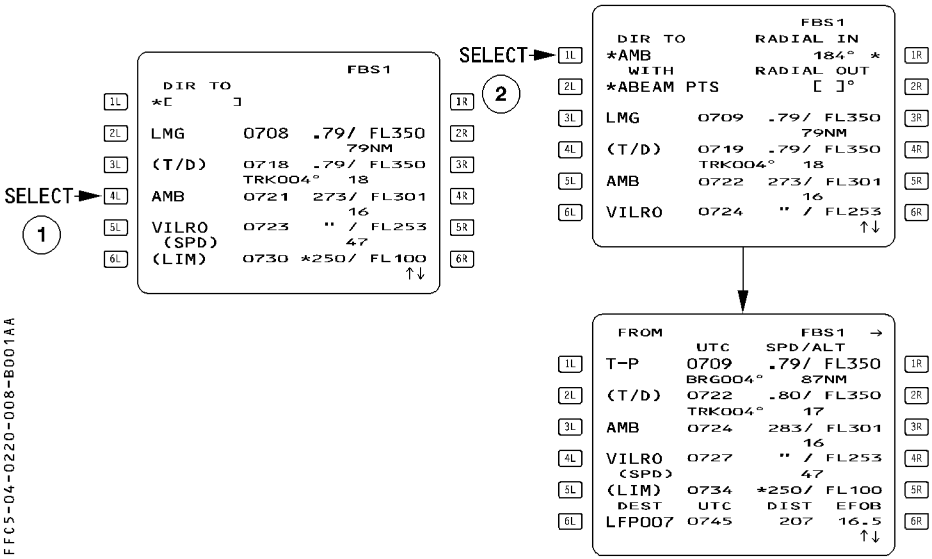
(1) Insert a new waypoint directly on the F-PLN page, or delete a waypoint from it.



When the pilot enters a new waypoint, the following waypoint moves down the flight plan, with a discontinuity shown between it and the new one.

(2) Add a DIR TO.

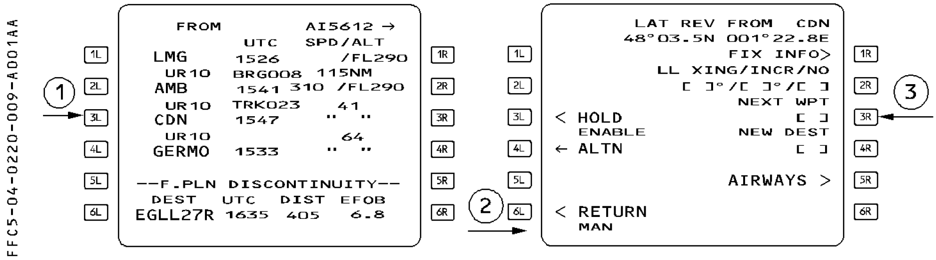
The crew can change the "TO" waypoint of the active leg. The DIR TO function gives access to DIR TO, DIR TO ABEAM or DIR TO/INTERCEPT. The active leg then goes from present position (T/P) to the waypoint selected or inserted as the new "TO" waypoint.



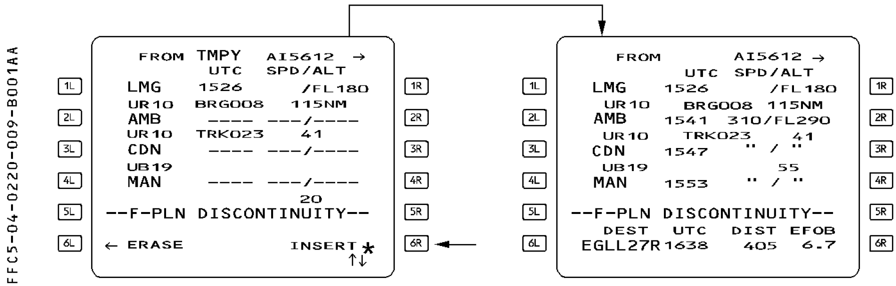
<u>(3) Create a temporary flight plan and then insert it as a revision to the active flight plan.</u>

The crew does this when selecting, deleting, or modifying several waypoints of an airway or procedure at once.

The purpose of the temporary flight plan is to allow the pilot to review the revision on the MCDU and ND before inserting it into the active flight plan.



A temporary revision is displayed for a check and/or new modification.
Inserting it will modify the active flight plan.



For detailed explanation please refer 4.04.10.

VERTICAL FLIGHT PLANNING

Data entry

The vertical flight plan gives the FMGS all the data required to calculate performance and predictions.

R These data are either entered by the flight crew or calculated by the FMS.

There are three categories of data :

- **Strategic data, which applies to the overall flight profile (pilot-entered data)**
  Cost Index (CI)
  Cruise Flight Level (CRZ FL), and STEP ALT if any
  Zero-Fuel Weight (ZFW)
  R Zero-Fuel Weight Center of Gravity (ZFWCG)
  Block Fuel
- R **Weather data (pilot-entered or measured data)**
  R Winds (for climb, cruise, descent, approach)
  R Sea level atmospheric pressure (QNH) at destination
  R Surface temperature (TEMP) at destination
  R Temperature in cruise phase
  R The Tropopause altitude
- **Tactical data for the flight phases**
  - Phase switching conditions
    Setting of the thrust levers to takeoff-go-around (TOGA) or FLEX positions
    Reaching acceleration altitude (ACCEL ALT)
    Entering cruise (top of climb, T/C)
    Initiation of descent (top of descent, T/D)
    Passing a deceleration pseudo waypoint (DECEL PSEUDO WPT)
    Touchdown
  - Speed profile
    V2
    Economy climb speed or Mach (ECON CLB SPD/MACH)
    Preselected speed or Mach (SPD/MACH PRESELECTION)
    Economy cruise Mach (ECON CRZ MACH)
    Economy descent Mach or speed (ECON DES MACH/SPD)
    Approach speed (VAPP)
  - Vertical limitations
    Speed limits (SPD LIMIT)
    Speed and altitude constraints (SPD AND ALT CSTR), time constraint if any.

R In addition to the pilot-entered data, the FMS uses some real flight data parameters (CRZ
R SAT, actual wind) to improve the accuracy of the computed predictions.

FLIGHT PHASES

The vertical flight plan is divided into flight phases. For each phase, the FMGS computes the optimum speed or Mach profile.
The flight phases are :
Preflight - Takeoff - Climb - Cruise - Descent - Approach - Go-Around - Done.

FLIGHT PHASES	OPTIMUM SPEED PROFILE	SWITCHING CONDITIONS TO NEXT PHASE
PREFLIGHT	/	SRS takeoff mode engaged and N1 > 85 % (EPR ≥ 1.25) or Ground Speed > 90 kt
TAKEOFF	V2 (V2 + 10)	At acceleration altitude or by engagement of another vertical mode.
CLIMB	ECON CLB SPD / MACH	Reaching cruise FL
CRUISE	ECON CRZ MACH	No step descent, and distance to destination < 200 NM, or all engine operative and selected altitude below Max [FL 200, highest DES ALT CSTR]
DESCENT	ECON DES MACH / SPD	– Overflying (DECEL) pseudowaypoint with NAV (or LOC*/LOC) mode engaged and altitude < 7200 ft AGL – Manual activation of the approach phase.
APPROACH	Vapp (GS Min)	1. to Go Around : when thrust levers at TO.GA detent or 2. to Done : 30 seconds after landing or 3. to Climb : when inserting a new CRZ FL
GO AROUND	Vapp or current SPD whichever is greater. Green Dot at ACC ALT	1. to Approach : Manual activation of the approach phase or 2. to Climb : Above acceleration altitude by – selecting ALTN or – inserting NEW DEST and CRZ FL
DONE	/	To preflight when INIT or PERF key depressed.

Note : During the preflight phase, the pilot inserts the flight plan, which includes all data needed for the flight.
During the done phase, the FMGC erases the data entered for the flight.
R *If the descent or the approach phase is activated inadvertently (manual approach*
R *phase activation, for example), the pilot may reselect a CRZ FL on the PROG page*
R *to reactivate the CRZ phase.*

VERTICAL REVISION

The pilot uses vertical revisions to enter or modify :
- The speed limit in climb and descent phases
- Constraints on altitude or speed
- A step climb or a step descent
- New wind data
- A time constraint

The vertical revision page is accessed by pressing a right hand select key of the flight plan page.

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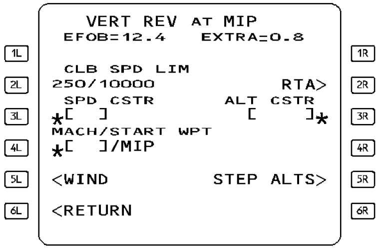

VERT REV AT CRUISE WPT

VERTICAL CONSTRAINTS (SPEED, ALTITUDE, TIME)

The pilot enters speed and altitude constraints to either comply with ATC requests and specified procedures, or in response to operational judgment.

Speed limit

A speed limit is associated with altitude, as a maximum speed below a specified altitude (only one in climb and one in descent).

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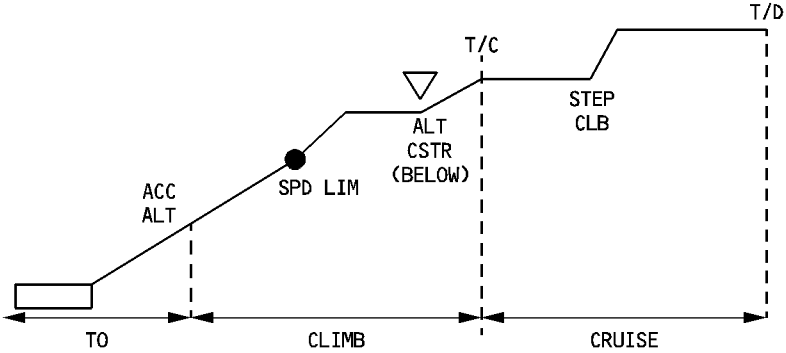
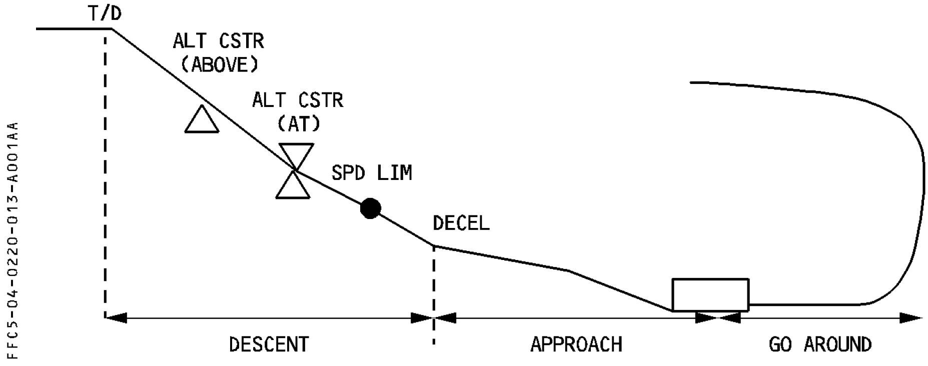




Altitude constraint

Altitude constraints may be attached to specific waypoints in the climb, descent, or approach phases.
To meet the altitude constraint, the aircraft must fly over the waypoint at an altitude equal, above or below the altitude constraint as specified by the pilot or the database.
An altitude constraint is considered as missed if the system predicts more than 250 feet of difference between the constraint value and the predicted aircraft altitude.
Altitude constraints are observed in CLB or DES or APP NAV-FINAL modes.

Note : *The database may contain an altitude constraint window (two altitudes between which the aircraft must fly passing over a given waypoint), but the pilot cannot enter such a constraint manually.*

Speed constraint

Speed constraints may be attached to specific waypoints in the climb, descent or approach phases. To meet the speed constraint, the aircraft must fly over the waypoint with a speed equal or less than the speed constraint.
A speed constraint is considered as missed if the system predicts an aircraft speed 10 knots greater than the speed constraint.
Speed constraints are observed when NAV mode is engaged and speed target is managed. Otherwise speed constraints are disregarded.

Time constraint

Time constraint may be attached to any waypoint except the "from" waypoint. It may be entered in cruise or descent phase.

Note : *No constraint can be associated with go around waypoints.*

PERFORMANCE FUNCTION

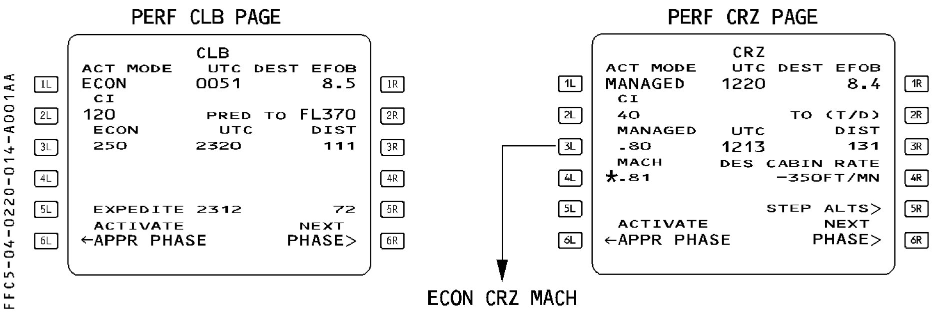
The performance function :
- Optimizes a flight plan
- Computes predictions

FLIGHT OPTIMIZATION

The optimization function computes :
- The best target speed for climb, cruise, and descent (ECON SPD/MACH)
- The best descent path from the cruise flight level to the destination airfield
- An optimum flight level (for pilot's information)

BEST TARGET SPEED

Computed by the FMGS (except for V2), the best target speed (ECON SPD/MACH) is the basis for the managed speed profile.
ECON SPD/MACH is a function of :
· Cost index (CI)
· Cruise flight level (CRZ FL)
· Gross weight and CG location
· Wind and temperature models
The computer processes the ECON SPDs for the climb and descent phases before the initiation of the flight phase, and freezes the values once the flight phase becomes active.
The computer updates ECON CRUISE MACH (SPD) continually, taking into account current weather conditions and modifications to the flight plan.
If the cruise FL is below FL 250, ECON CRUISE SPEED is computed.
If the cruise FL is above FL 250, ECON CRUISE MACH is computed.



WIND PROFILE

To obtain the best predictions, the pilot must enter the wind for various flight phases and specifically for waypoints in cruise.
ON GROUND : During flight planning initialization, enter the winds for climb and cruise phases using HISTORY WIND and WIND pages. You will enter, manually or with ACARS, different wind values in climb and cruise phases. The system will compute a wind for all waypoints of the F-PLN using linear interpolation between manual/ACARS entries.
This wind profile will be displayed on F-PLN B page and is called forecast wind profile. Pilot or ACARS entries are displayed in large font, system computed winds in small font.
The forecast wind profile will be used to compute fuel and time predictions as well as econ speed/Mach targets.
IN FLIGHT : the system updates the predictions and the current econ speed, using the measured wind at present position. It mixes actual wind and forecast winds to compute the wind ahead of the aircraft but this is totally transparent to the crew.
During cruise, the pilot will enter descent winds and approach wind. The system will update the final predictions, compute the best descent profile and best speed in descent and approach.

OPTIMUM FLIGHT LEVEL

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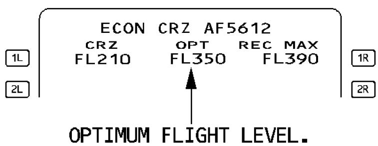
PROG PAGE (CRZ PHASE)



The optimum flight level indicates the most economic flight level for a given cost index, weight, weather data. It is continuously updated in flight.
It ensures a 15 minute minimum cruise time. It is continuously updated in flight until 15 NM from the top of descent. It is dashed after this point.
You may observe a discrepancy between FMGS and FCOM/QRH value : this is due to the fact that the FMGS computes the optimum flight level with a given cost index where as the FCOM value is computed at a given Mach number.
The optimum flight level is a compromise between fuel and time saving : its computation may show steps due to slight GW, ISA or wind changes. As a consequence, the pilot may observe jumps in optimum flight level.
The computation of the OPT FL considers the wind entries made at the different altitudes (normally at the different CRZ FL).
When flying the subsequent CRZ FL, the OPT FL proposed by the PROG page may be affected by the wind entries made at the previous CRZ FL ; these winds are propagated automatically and may be significantly different from the actual winds.

BEST DESCENT PATH

The vertical flight path is computed to minimize fuel consumption while satisfying the various altitude constraints and the descent speed profile in order to reach VAPP at 1000 feet.
The computer calculates the descent profile before the descent phase is initiated, taking into account :
- All the lateral and vertical flight plan data
- The descent and approach winds, as inserted into the WIND DES page and PERF APPR page, and the required maximum cabin rate of descent.

During descent, the descent profile is updated only if the flight plan is modified or if data for the APPR phase (WIND, VAPP, or LDG CONF) are changed.

COST INDEX (CI)

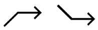
This is a fundamental input for the computation of the ECON SPEED or MACH. ECON SPEED and ECON MACH reduce the total cost of a flight in terms of flight time and fuel consumption (and not only in terms of fuel saving).
The operations department of the airline usually defines the cost index so as to optimize each company route.
The pilot does not ordinarily modify the cost index during a flight.
CI = 0 corresponds to minimum fuel consumption (Max Range)
CI = 999 corresponds to minimum time
CI = Long Range Cruise (Refer to 4.05.50).

COMPUTATION OF PREDICTIONS

The system calculates various predictions for the active flight plan and updates them continually during flight as functions of :
— Revisions to the lateral and vertical flight plans
— Current winds and temperature
— Present position versus lateral and vertical flight plans
— Current guidance modes
The MCDU and the ND show these predictions, each of which is based on specific assumptions.

Predicitions displayed on the Navigation Display (ND)

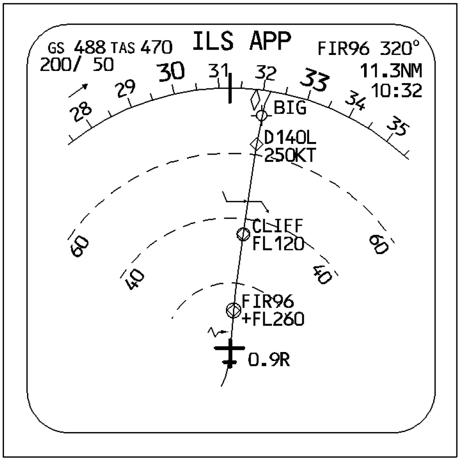
These predictions consist of :
· symbols positioned along the lateral flight plan (NAV mode engaged) or the track line (NAV mode not engaged). These symbols (named as pseudo waypoints) and their meanings are :

Pseudo waypoint	**Definition**
	Level symbol (top of climb or level-off), at the position where the aircraft will reach : — the FCU selected altitude (blue arrow) or — the constrained altitude, if it is more restrictive than the FCU altitude and if appropriate modes are engaged (magenta arrow).
	Top of descent or continue descent symbol : — top of descent (always white) — continue descent symbol (white if DES is not armed, blue if it is)
	Start of climb symbol : — white if CLB is not armed — blue if CLB is armed
	Intercept point symbol : — the point where the aircraft is predicted to intercept the descent path, if there is any vertical deviation when the aircraft is in DES mode (white if DES is not engaged, blue if it is)
●	Speed change symbol : — the point at which the aircraft will initiate an automatic ACCEL or DECEL from current speed to a new computed speed if it encounters a SPD LIM, SPD CSTR, or HOLDING SPD (magenta)

R

Pseudo Waypoint	**Definition**
D	Decelerate point symbol : · Indicates the point at which the aircraft is predicted to decelerate for approach (and therefore switch to the approach phase) · Magenta, if in managed speed and NAV or approach mode is engaged · White, if in selected speed or HDG/TRK mode · Automatic decelerations only occur when displayed in magenta.
	ALT CSTR symbol set around the constrained waypoint : — Magenta when the ALT CSTR is predicted to be satisfied — Amber when the ALT CSTR is predicted to be missed — White when the ALT CSTR is not taken into account by the guidance, and the NAV mode is engaged.
	Energy circle symbol (green arc) centered on the a/c position and oriented to the current track line. Represents the Required Distance to Land. Only displayed if the lateral guidance mode is heading or track, current FMS flight phase is cruise, descent or approach, and the aircraft is within 180 NM of the destination.
Crosstrack error XX.X R or XX.XL (X is a number	The crosstrack error displays the lateral deviation between the aircraft position and the track of the F-PLN active leg. The value is limited to 99.9 NM left or right.
INTCPT	Intercept waypoint : Is displayed on the ND at the point at which the present track intercepts the F-PLN.

· predicted time of arrival at the TO WPT (upper right hand corner of the ND), assumes that the aircraft flies direct from present position to the TO WPT at present ground speed.



FFC5-04-0220-018-A001AA

As a general rule the ND indicates what the aircraft will fly with the current active FG modes.

For example :

- The continuous green line on the ND represents the track the aircraft is currently flying :
  - If HDG/TRK is engaged, the track line is green and the flight plan is dashed.
  - If NAV mode is engaged, the green line is the flight plan.
- If the speed target is manually selected, the speed-change symbol is no longer displayed because it will not be taken into account.
- When the aircraft is not following the vertical flight plan (OPCLB, OPDES, V/S) but the NAV mode is engaged, the system disregards any altitude constraints and puts white circles around the waypoints that have these constraints and positions level symbols accordingly.
- Pseudo waypoints are adjusted each time predictions are updated.

PREDICTIONS DISPLAYED ON THE MCDU

The predictions displayed on the MCDU assume that AP (or FD order) is controlling the aircraft and flying it along the preplanned lateral and vertical flight plan.

Therefore :

- If the aircraft is guided along the flight plan (managed guidance), the MCDU predictions correspond exactly to what the aircraft is doing.
- If the aircraft is not guided along the flight plan (selected guidance), the MCDU predictions assume that it will return immediately to the flight plan, intercepting at a predetermined angle, and will then proceed under managed guidance.
- If the aircraft does not fly the managed speed profile (ECON, SPD CSTR ...), the MCDU predictions assume that it will remain at the present selected speed/Mach until it reaches the next SPD CSTR or SPD LIM or enters the next flight phase.
- The TO waypoint information in the right upper corner are updated as if the aircraft would still fly toward it.

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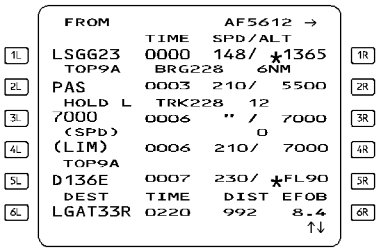
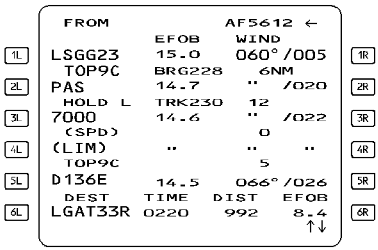


F-PLN A



F-PLN B

TYPE OF PREDICTIONS

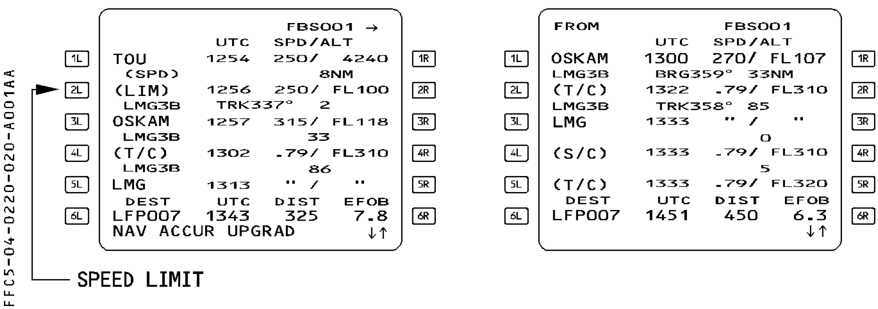
	MCDU PAGE :
Pseudo waypoints : T/C, T/D, S/C, S/D, I/P, SPD LIM, DECEL	F-PLN A and B
TIME / SPD / ALT at each WPT and pseudo-WPT	F-PLN A
ETA / DIST TO DEST along F-PLN / EFOB at destination	F-PLN A and B
EFOB / T-WIND at each WPT and pseudo-WPT	F-PLN B
Constraint symbol * at each constrained WPT (TIME / SPD / ALT)	F-PLN A and B
Altitude error in case of missed ALT constraint	VERT REV
EFOB / EXTRA FUEL at each WPT	VERT REV
TIME / EFOB at destination	FUEL PRED / PERF CLB / CRZ / DES
TIME / DIST to a selected altitude	PERF CLB or DES
Fuel prediction prior engine start	INIT B
REC MAX FL	PROG
TIME / EFOB at Alternate	FUEL PRED
XTRA FUEL for various Alternates	ALTN
VDEV vertical deviation from vertical flight path	PROG
Required Distance to Land ⊲	PROG
Direct Distance to Destination ⊲	PROG

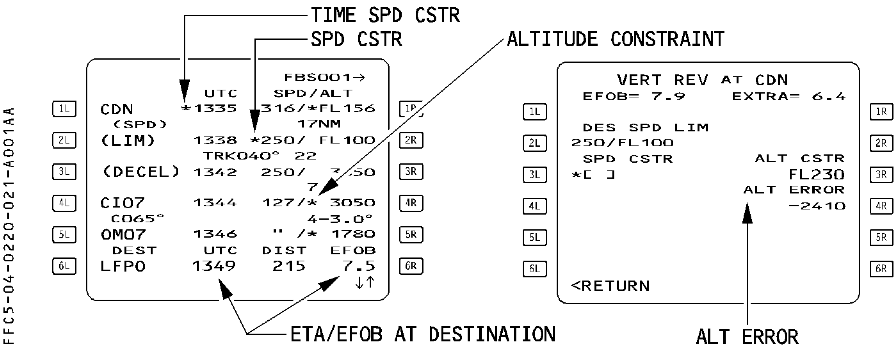
EXAMPLES OF MCDU PREDICTIONS

The following MCDU pages display some of the prediction types.

Pseudo-waypoints :
Top of climb (T/C), top-of-descent (T/D), start of climb (S/C) or start of descent (S/D) for step climb/descent, speed limit (SPD LIM), deceleration to approach phase (DECEL)

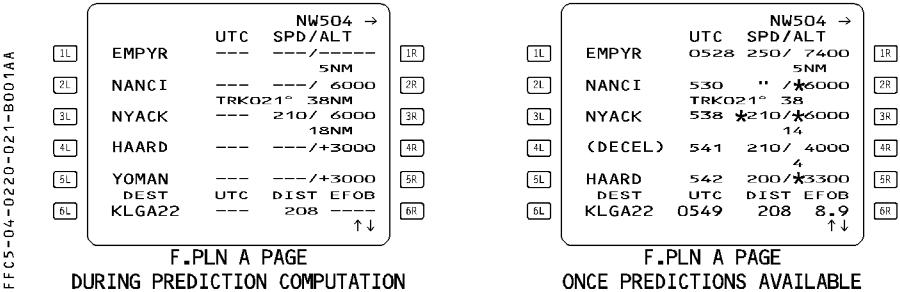
Time, speed and altitude predictions
TIME/SPD/ALT for all waypoints and pseudo waypoints.





CONSTRAINT SYMBOLS (star)

When a time speed or an altitude constraint is part of the vertical flight plan, it appears on F-PLN A page only at the time of insertion or while predictions are not yet available. Once available, time, speed and altitude predictions are displayed for all F-PLN waypoints: when a speed or an altitude constraint is in effect at a waypoint, a star symbol appears adjacent to the speed or altitude prediction. If the star is magenta the constraint is predicted to be matched. If the star is amber, the constraint is predicted to be missed.



Note : If an altitude constraint is predicted as missed, the system tells you what will be the error at the specific waypoint.

VERTICAL DEVIATION

During the descent, the system tells you, how far you are from the computed descent profile (PFD and MCDU) and predicts where you may rejoin it. VDEV on PFD, predictions on MCDU F-PLN page, symbols on ND display allows you to assess your vertical position versus the computed flight profile.
The energy circle displayed on ND, representing the required distance to land from present position and current speed down to destination at VAPP, may also be used to tell you if you need to modify the flight path you intend to fly.

OPERATION RULES CONCERNING PREDICTIONS

- The pilot must keep the flight plan data properly updated during the flight in order to get accurate and meaningful predictions.
- The pilot should rely on the navigation display for short-term predictions. It indicates what the aircraft will do under the currently engaged modes (selected or managed).
- The pilot should rely on the MCDU for long-term predictions when managed guidance is active or about to be reengaged.

MANAGED TARGETS

When the aircraft is using managed targets, the flight management and guidance system (FMGS) guides it along lateral and vertical flight paths and speed profiles computed by the flight management function (FM) from data in the MCDU.
FM manages the guidance targets.

SELECTED TARGETS

When the pilot is using selected targets, the FMGS guides the aircraft along lateral and vertical flight paths and speed profiles to meet targets that the pilot has selected manually on the FCU.
The pilot selects the guidance targets.

FLIGHT GUIDANCE MODES

Lateral and vertical modes may be :
- armed
- engaged
- disengaged

Autothrust modes may be :
- armed
- active
- disconnected

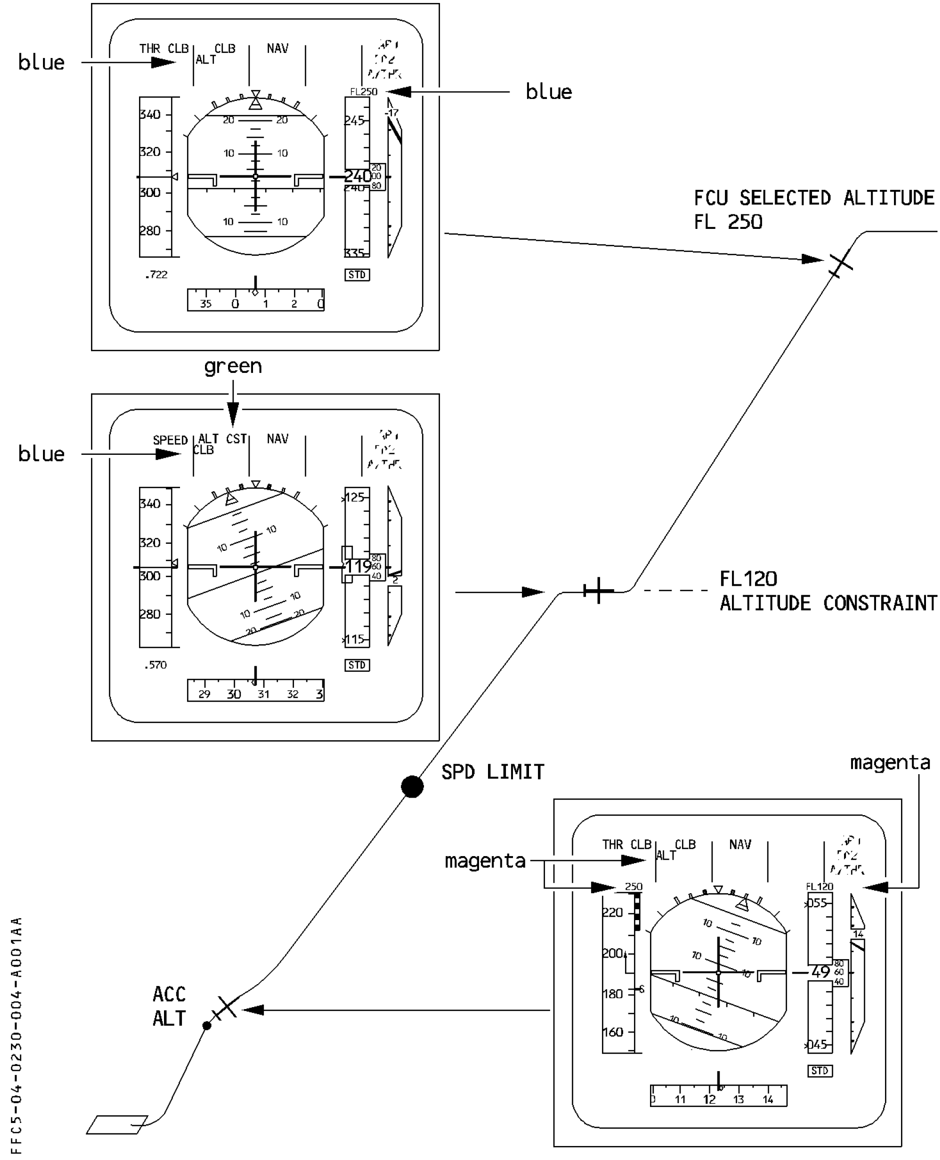
LATERAL MODES

MODE	TYPE	GUIDANCE	REMARK
RWY	MANAGED	Mode used at takeoff to guide the a/c along the runway center line using LOC.	Triggered by the thrust levers at FLX or TOGA position.
RWY TRK	MANAGED	Mode used to guide the aircraft along the track the aircraft was following at the mode engagement.	
GA TRK	MANAGED	Mode used to guide the aircraft along the track the aircraft was following at the mode engagement.	Triggered by the thrust levers at TOGA with Slats/Flaps in, at least CONF 1.
NAV	MANAGED	Mode used to guide the a/c along the lateral F-PLN. Available above 30 ft after takeoff.	Automatically armed at takeoff unless HDG/TRK is preset. In that case RWY TRK engages after takeoff.
HDG-TRK	SELECTED	Mode used to guide the a/c on a heading or a track selected by the crew. The target value is displayed in the FCU window.	*Note : HDG/TRK is called "basic mode" because it is a back up mode for certain situations :* *– F-PLN discontinuity entry.* *– AP engagement with no FD.* *– Loss of F-PLN* *– MCDU NAV BACK UP*
LOC* LOC APP NAV	MANAGED	Mode used to guide the a/c on the lateral approach path (LOC or F-PLN approach path).	Selected by pressing APPR pb on the FCU ; the mode that engages depends upon the selected approach in the F-PLN.
LAND	MANAGED	Common mode engaged below 400 ft RA during an automatic ILS approach.	Engaged only if LOC mode and G/S mode are already engaged.
ROLL OUT	MANAGED	Mode used to guide the a/c on the runway following an automatic landing.	FD roll out symbol is displayed on PFD at touch down.
LOC B/C* LOC B/C	MANAGED	Mode used to guide the aircraft on the back beam of a localizer.	Selected by LAT REV at destination. Activated by pressing the LOC pushbutton on the FCU

VERTICAL MODES

MODE	TYPE	GUIDANCE	REMARK
SRS	MANAGED	Mode used at takeoff, or Go-Around to maintain SRS speed (V2, V2+10, VAPP ...).	Triggered by the thrust levers at FLX or TOGA position. Automatically disengages at ACC ALT (at takeoff only), or when another VERT mode is engaged.
CLB	MANAGED	Mode used to climb towards FCU SEL ALT along VERT F-PLN, taking into account ALT CSTR. Available, only if NAV engaged. The A/THR is in THRUST, mode (CLB).	The speed target may either be selected or managed. If managed, SPD CSTR, SPD LIM, and HOLD SPD are taken into account. ALT mode is always armed ; displayed in magenta, if the next level off is predicted at an ALT CSTR ; and in blue, if the next level off is predicted at the FCU-selected altitude.
DES	MANAGED	Mode used to descend towards FCU SEL ALT along the computed descent path, taking into account ALT CSTR. Available, only if NAV engaged. The A/THR may be in THRUST, or SPD mode.	
OPEN CLB OPEN DES	SELECTED	Mode used to climb/descend directly to the FCU-selected ALT. These modes disregard all ALT CSTR. The A/THR is in THRUST mode (CLB/IDLE)	The speed target may either be selected or managed. ALT mode is systematically armed and blue. Altitude target is blue on the PFD.
ALT CSTR* ALT CSTR	MANAGED	Mode automatically engaged when reaching an ALT CSTR before the FCU SEL ALT.	CLB/DES mode are systematically armed (blue).
ALT* ALT ALT CRZ* ALT CRZ	SELECTED	Mode used to maintain a level flight at the FCU-selected altitude.	A/THR SOFT mode engages when FCU-selected altitude = CRZ FL. A/THR SOFT is part of the managed guidance.
V/S-FPA	SELECTED	Mode used to guide the a/c along a vertical speed, or a selected flight path angle.	Altitude target is blue on PFD. V/S-FPA is a basic mode. (Refer to HDG/TRK remark).
GS* G/S FINAL	MANAGED	Mode used to guide the a/c along the final approach path (GS or non ILS)	Selected by pressing the FCU's APPR pb. The mode engaged depends upon the selected approach in the F-PLN. Linked to APPR common mode (APPR pb).
FLARE	MANAGED	Common mode which provides alignment to the runway centerline on the yaw axis, and flare on the pitch axis.	Engages below 50 ft RA, based on the current vertical speed.

CLIMB MODE


blue
THR CLB
ALT
CLB
NAV
FL250
blue
FCU SELECTED ALTITUDE
FL 250
green
blue
SPEED
CLB
ALT CST
NAV
FL120
ALTITUDE CONSTRAINT
SPD LIMIT
magenta
magenta
THR CLB
ALT
CLB
NAV
250
FL120
ACC
ALT
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When CLIMB mode is engaged (always associated with lateral NAV mode), the system takes into account all constraints either defined by the database, or manually entered by the crew.
Nevertheless this mode has the following particularity :
When, in climb mode, the system predicts it will miss an altitude constraint, the system will not modify the target speed.
In this case, the pilot may select an appropriate speed, in order to meet the ALT CSTR.

SPECIFIC MODES IN CRUISE PHASE

· A/THR SOFT MODE

The autothrust soft mode engages when the aircraft is in ALT CRZ mode with the autopilot engaged, autothrust engaged in MACH mode, and is within a ± 3 knot range of the target speed. This mode decreases the autothrust gains, to reduce thrust variation in cruise with turbulence.
The autothrust soft mode disengages, when the speed deviation from the target becomes too large or the target is modified ; autothrust transition from soft to basic mode may lead to transient thrust variation. This mode is inhibited with speedbrakes extended, or with engine-out, or when mach target is below 0.65, or with slats extended, or with landing gear down.

R

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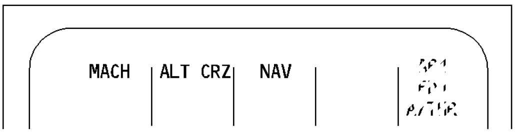


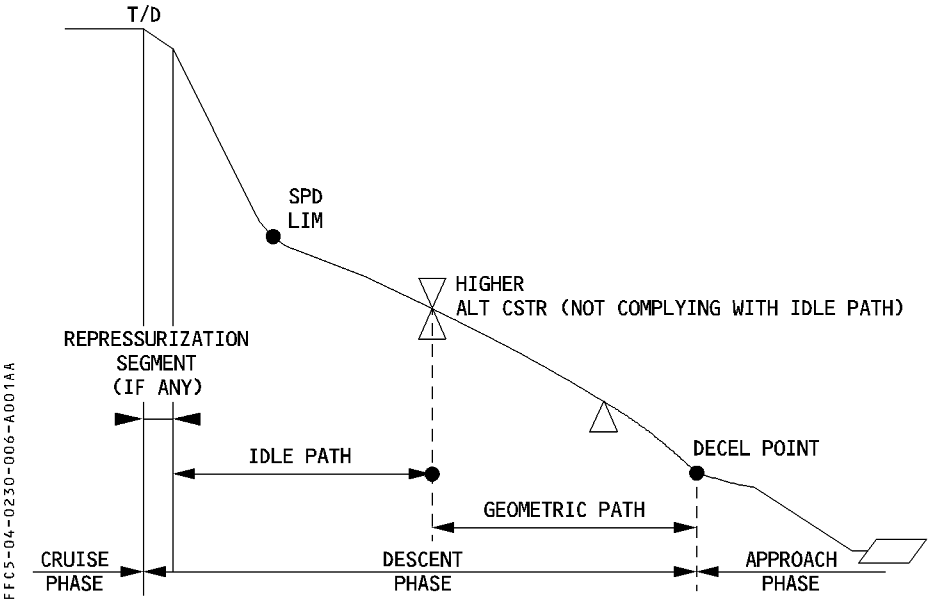
Typical FMA in CRZ with Autothrust soft mode engaged

· STEP CLB or STEP DES

The pilot inserts a step when planning to change the cruise flight level. The system responds by displaying predictions for the new situation.
R If the pilot inserts an optimum or geographic step to an altitude, the system displays a start-of-climb or descent (S/C or S/D) pseudowaypoint on the ND and the MCDU.
The minimum step size is 1 000 feet.
R The STEP automatically reassigns the new CRZ FL, and A/THR SOFT mode reengages when reaching the new altitude.

DES MODE

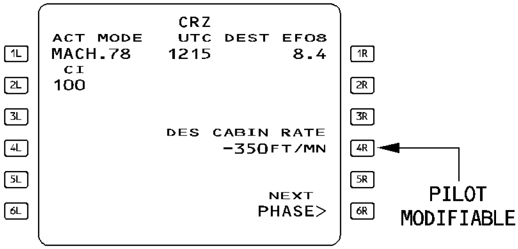
The DES mode guides the aircraft along the descent path computed by the FMGS.
The system computes this flight path backwards from the deceleration point up to the top of descent (T/D) with respect to the speed and altitude constraints .
Internally, the computer divides the descent path into various segments, depending on the relative positions of the constraints. It starts at top of descent (T/D) by setting up an “idle” segment that takes the aircraft down to the first constraint, and follows this with “geometric” segments between constraints.



REPRESSURIZATION SEGMENT

The top of descent (T/D) may be updated if the pilot modifies the cabin rate of descent (default rate is – 350 feet/minute).
If the flight crew enters a lower cabin rate, the system computes a repressurization segment that takes into account the additional time needed for repressurization.

FFC5-04-0230-007-A001AA



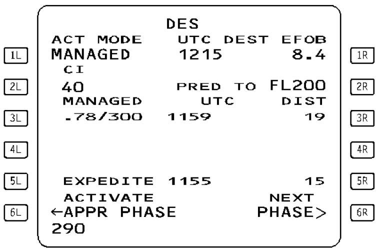
PERF CRUISE PAGE

DESCENT SPEED PROFILE

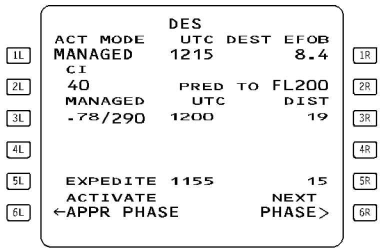
The descent speed profile is usually the economical speed profile, amended by any speed constraints and speed limits contained in the flight plan.
Before the descent phase is active, if the pilot does not intend to fly the ECON speed/Mach
R profile, a different speed or Mach can be entered to amend the speed profile.
R The pilot may enter a Mach number and/or a speed in the MANAGED field of the PERF DES
R page. (3L key).

PERF DES PAGE (ECON SPD)

FFC5-04-0230-007-B001AA



PERF DES PAGE



R If the pilot reverts to the SELECTED speed/Mach mode during descent, the profile is not
R modified and the aircraft flies the same profile at the FCU-selected speed/Mach.
Basic managed SPD/MACH profile in DES mode is :
* Economical Mach, or selected Mach
* Economical speed, or selected speed
* SPD CSTR (if any)
* SPD LIMIT
* GD/S/F/VAPP
* VAPP TARGET

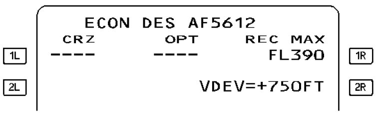
GUIDANCE IN DES MODE

The aircraft will not start its descent automatically when reaching the top of descent (T/D). In order to initiate the descent, the pilot will set the clearance altitude then push the ALT selector knob. The aircraft will descend immediately.

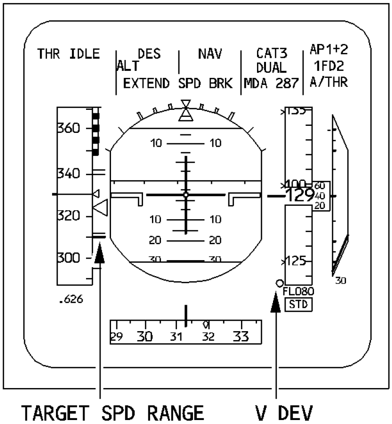
* If the top of descent is not reached, the aircraft descends at a constant V/S converging on the descent path.
* If the aircraft is at or beyond T/D, it descends at idle thrust.

· During the descent :
The pilot will see a vertical deviation symbol (VDEV) along the ALT scale on the PFD and a VDEV value on the PROG page, so that the aircraft's vertical position can be monitored versus the calculated descent profile.
The aircraft may deviate from the DES profile while DES mode is engaged if :
— unexpected wind conditions is encountered.
— anti-icing is turned on.
— the lateral flight plan is changed.

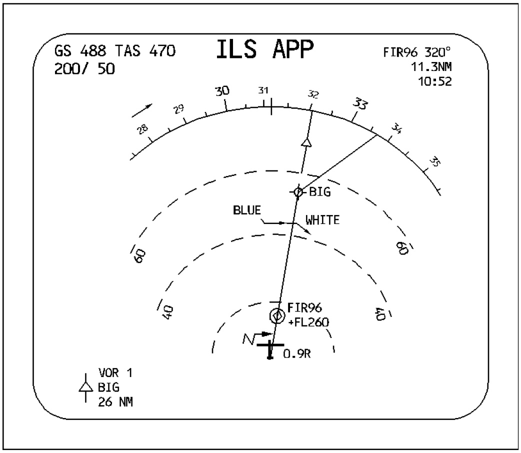
FFC5-04-0230-008-A001AA



PROG PAGE



- When the speed is managed, a target speed range displayed on the PFD defines acceptable speed variations around the nominal descent speed target.
  - If the aircraft is above the descent profile, the speed increases toward the upper limit of the target speed range as the aircraft converges on the descent profile. If this does not increase the descent angle enough, the aircraft deviates from the descent profile. (A/THR is at IDLE).
  - If the aircraft is below the descent profile, the aircraft maintains the target speed until it reaches the vertical profile. The lower margin becomes effective when the aircraft is on the descent profile but has to loose speed in order to stay on it.
- The ND shows an intercept symbol that indicates the position where the system predicts that the aircraft will be back on the descent profile. When the aircraft is above the descent profile, the prediction is based on the assumption that the pilot will extend half speedbrakes. If necessary, the message "EXTEND SPD BRK" comes up on the PFD and the MCDU, and remains there as long as more drag (speedbrakes) is still required. The pilot should respond to this message by deploying half speedbrakes.



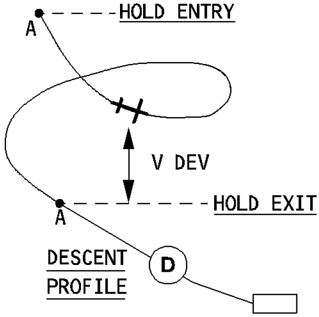
FFC5-04-0230-009-A001AA

Note : *With DES mode engaged, extending the speedbrakes does not necessarily increase the descent rate. It does so only if the aircraft is above profile.*

- **When in a holding pattern**

  The DES mode commands V/S = – 1000 feet/minute while A/THR maintains the holding speed. The current VDEV is the vertical deviation from the altitude at which FM predicts the aircraft will be when it reaches the exit fix.

  Until the pilot exits the hold, the FMGS in DES mode will maintain V/S = – 1000 feet/minute considering downpath vertical constraint. This means that the aircraft will not descent below the next altitude constraint. If the aircraft reaches the next altitude constraint it will level off and ALT CSTR mode will engage.



FFC5-04-0230-010-A001AA

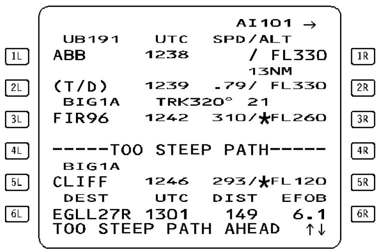
- **Too steep path**

  A descent segment is called "too steep path" when the FMGS predicts that the descent segment between two constraint waypoints is impossible to fly at the planned descent speed with half speedbrake extended.

  When this occurs :

  The MCDU displays no predictions between the upper and the lower points of the too steep path.

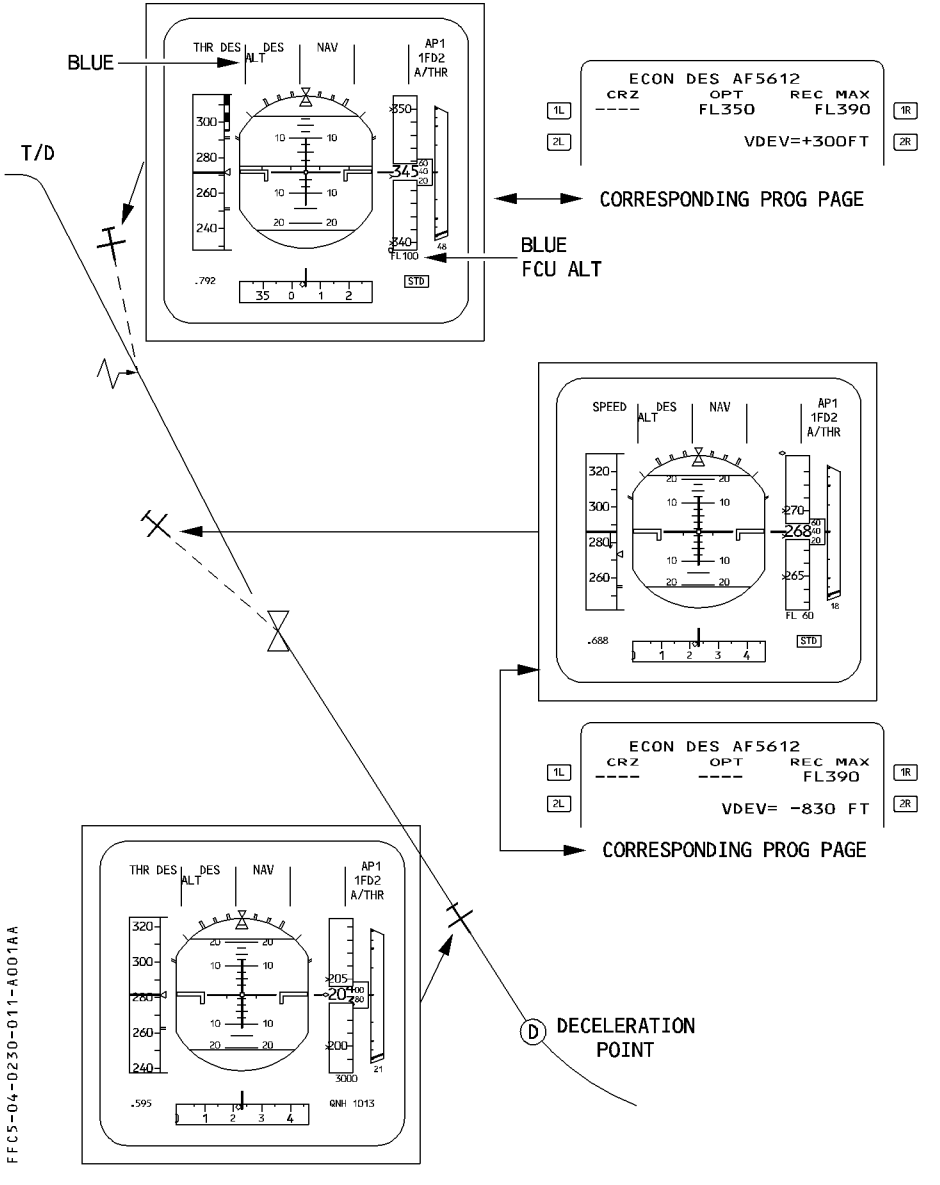
  Relevant message "TOO STEEP PATH" is displayed on MCDU.



NO PREDICTIONS BETWEEN THE UPPER AND LOWER POINTS

FFC5-04-0230-010-B001AA

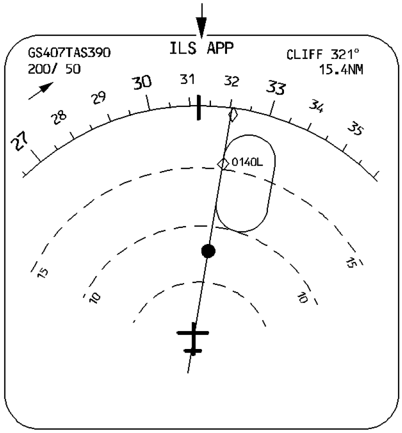
DES MODE PROFILE



APPROACH MODES

R The aircraft can fly different types of approaches :
R – Precision approaches : ILS, MLS.
R – Non-precision approaches : VOR/DME, VOR, NDB (if ADF installed), RNAV.
R – Non-precision approaches using a Localizer only : LOC, LOC B/C.
R The crew uses an ARRIVAL lateral revision to insert these approaches into the flight plan.
R For precision approaches, the crew uses the APPR pushbutton on the FCU to arm or
R engage the guidance modes LOC and G/S.
R For non-precision approaches, the crew uses the APPR pushbutton on the FCU to arm or
R engage the guidance modes APP NAV and FINAL, except for LOC and LOC B/C approaches,
R where the crew only uses the LOC pushbutton to arm or engage the LOC mode.

THE TYPE OF SELECTED APPROACH IS DISPLAYED ON THE TOP SIDE OF THE ND

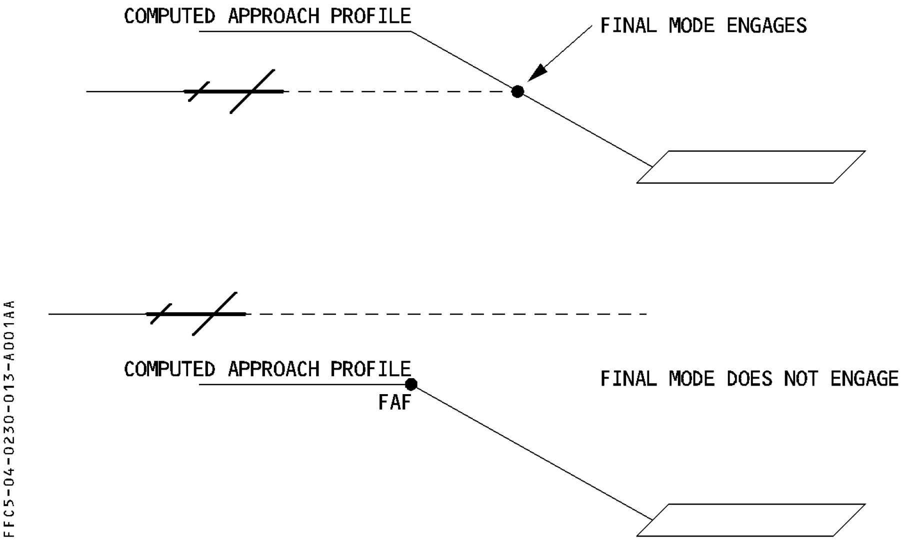


FFC5-04-0230-012-A001AA

APP NAV - FINAL MODES

When a non-precision approach is selected in the active flight plan, and the APPR pushbutton is pressed, APP NAV and FINAL will arm.
If NAV mode was currently engaged, APP NAV mode engages immediately.
FINAL mode will engage when, APP NAV being engaged, the aircraft trajectory intercepts the non-precision flight profile (usually a descending leg).

If the aircraft trajectory does not intercept the approach profile computed by the FMGS, the FINAL mode will not engage :



Refer to 1.22.30, NON PRECISION APPROACH Mode.

FLIGHT MODE ANNUNCIATOR (FMA)

The purpose of the FMA is to display the guidance modes of the aircraft. The FMA shows the A/THR and AP/FD modes, as well as the engagement status of these systems and their ILS approach capabilities.
The AP/FD and A/THR use only the guidance modes displayed on the first line.

· **The first line displays :**
  * A/THR and AP/FD engaged modes in green
  * Landing capability in white (CAT 1, CAT 2, CAT 3 DUAL or CAT3 SINGLE)
  * AP engagement (AP1, AP2 or AP1 + 2) in white

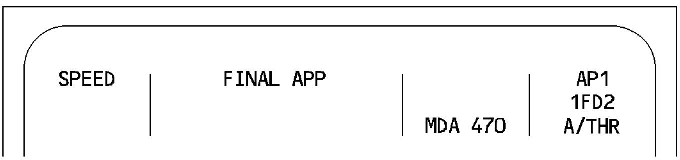
R *Note : CAT 1 is the lowest capability displayed in that field. CAT 1 covers different*
R *requirements including raw data.*

· **The second line displays :**
  * Armed mode in blue except ALT mode when it is armed because of an altitude constraint (magenta).
  * Preset speed or Mach when it is selected by the crew.
  * FD engagement in white. (1FD2 ...).

· **The third line displays :**
  * MDA/MDH or DH/NO DH in blue followed by the value entered manually by the pilot.
  * A/THR status in white when active, in blue when armed.
  * Operational messages

For a detailed description of all indications displayed on the FMAs. (Refer to 1.22.30).

FFC5-04-0230-014-A001AA



TYPICAL FMA DURING NON PRECISION APPROACH

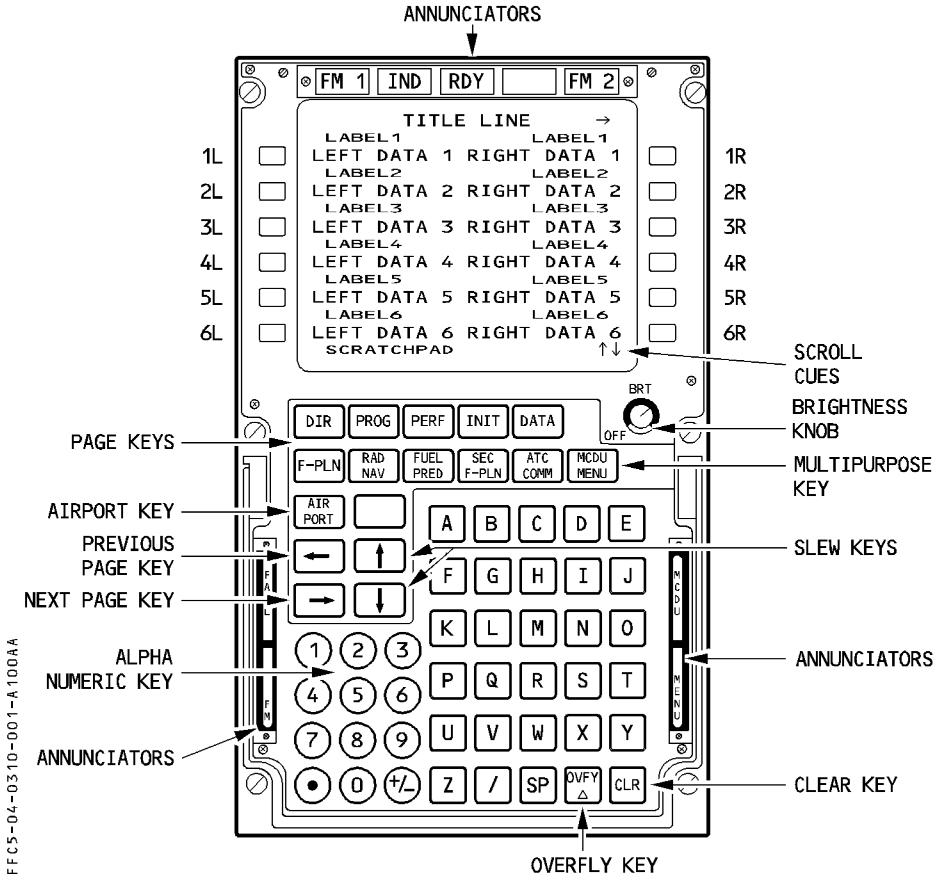
- Both FMAs are driven by the master FMGC (for a detailed description of the FMA, Refer to 1.22.30).
- Each new annunciation is boxed for 10 seconds.

03.00 CONTENTS

03.10 INTERFACE VIEWS

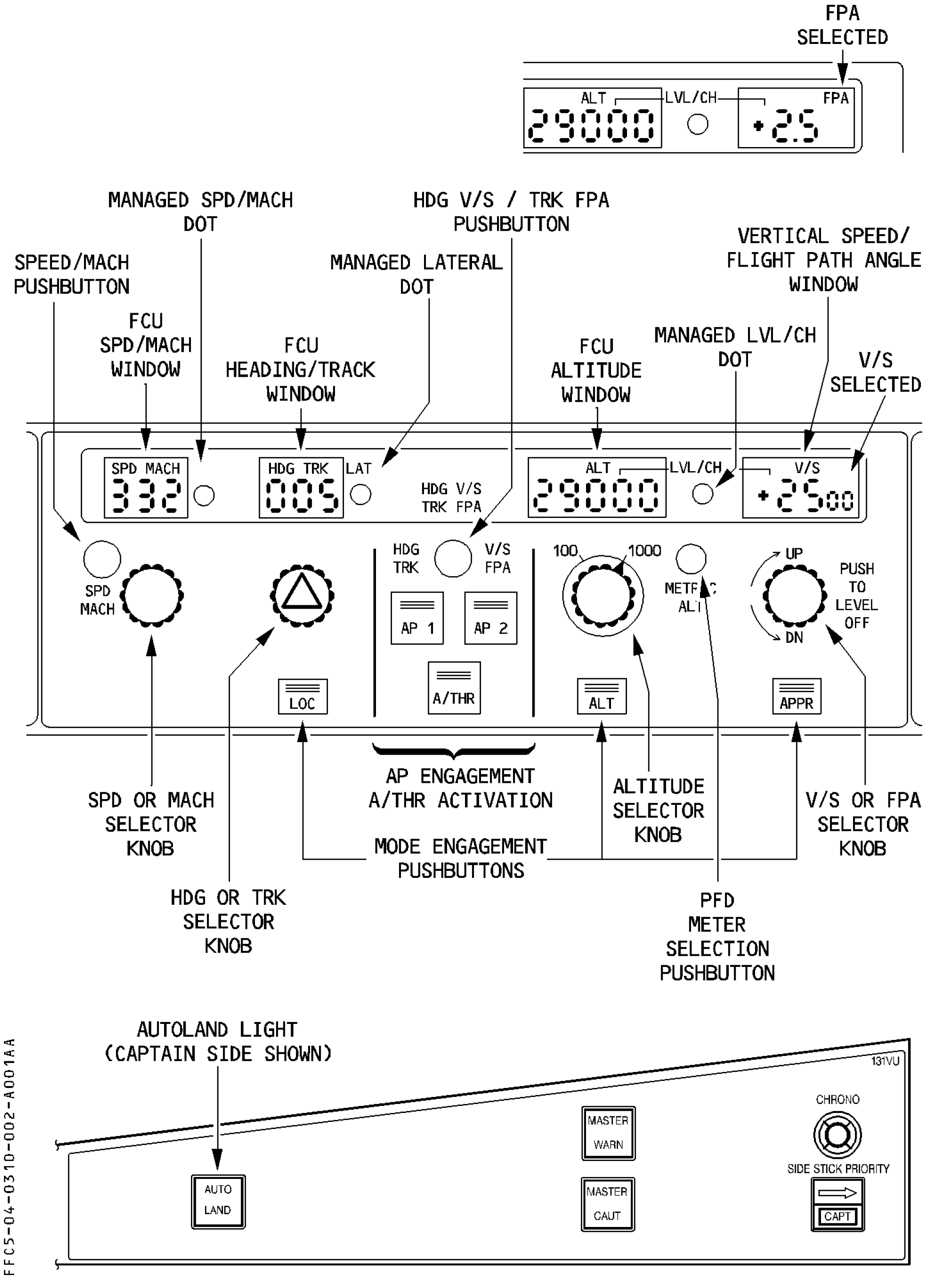
03.20 MCDU PAGES DESCRIPTION

MCDU


ANNUNCIATORS
FM 1
IND
RDY
FM 2
TITLE LINE →
LABEL1 LABEL1
LEFT DATA 1 RIGHT DATA 1
LABEL2 LABEL2
LEFT DATA 2 RIGHT DATA 2
LABEL3 LABEL3
LEFT DATA 3 RIGHT DATA 3
LABEL4 LABEL4
LEFT DATA 4 RIGHT DATA 4
LABEL5 LABEL5
LEFT DATA 5 RIGHT DATA 5
LABEL6 LABEL6
LEFT DATA 6 RIGHT DATA 6
SCRATCHPAD ↑↓
1L
2L
3L
4L
5L
6L
1R
2R
3R
4R
5R
6R
SCROLL CUES
BRT
OFF
BRIGHTNESS KNOB
PAGE KEYS
DIR
PROG
PERF
INIT
DATA
F-PLN
RAD NAV
FUEL PRED
SEC F-PLN
ATC COMM
MCDU MENU
MULTIPURPOSE KEY
AIRPORT KEY
AIR PORT
PREVIOUS PAGE KEY
NEXT PAGE KEY
SLEW KEYS
A B C D E
F G H I J
K L M N O
P Q R S T
U V W X Y
Z / SP OVFY CLR
1 2 3 4 5 6 7 8 9 • 0 +/-
FAIL
FM
MCDU
MENU
ALPHA NUMERIC KEY
ANNUNCIATORS
ANNUNCIATORS
CLEAR KEY
OVERFLY KEY
FFC5-04-0310-001-A100AA

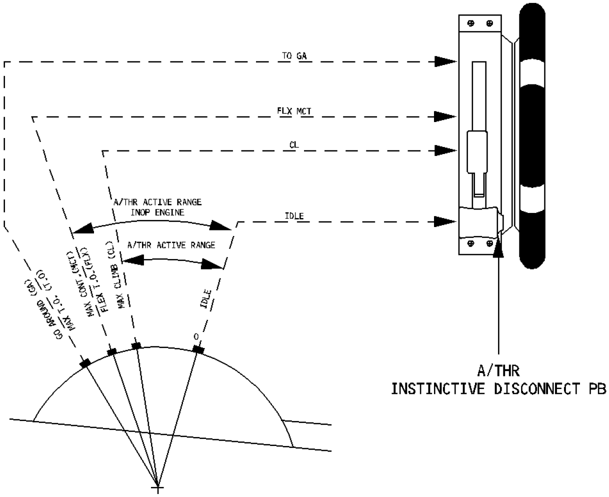
FLIGHT CONTROL UNIT (FCU) AND AUTOLAND LIGHT

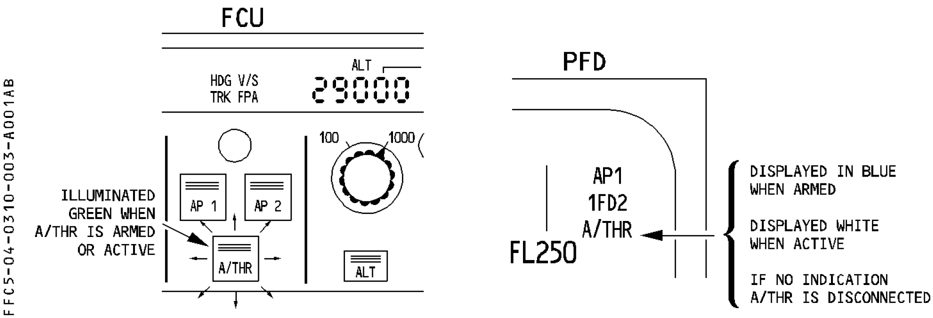
R



R

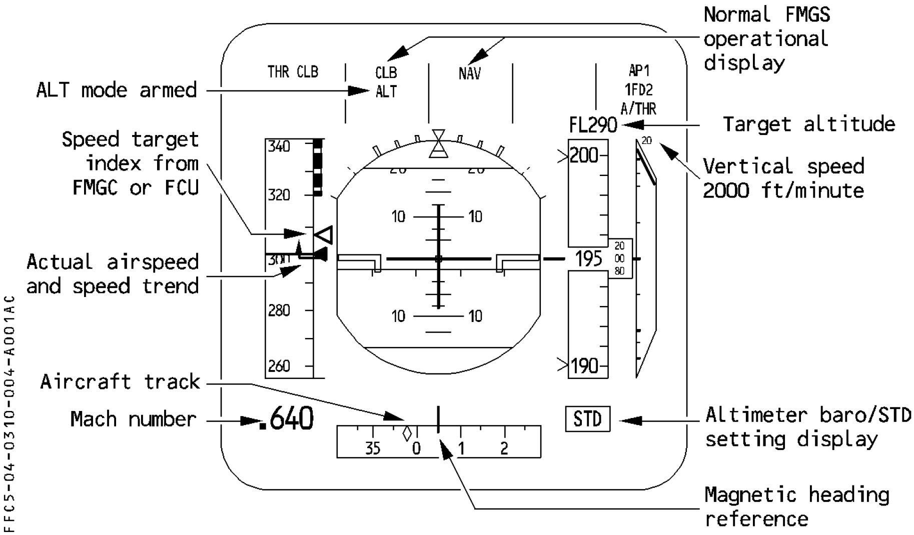
THRUST LEVERS



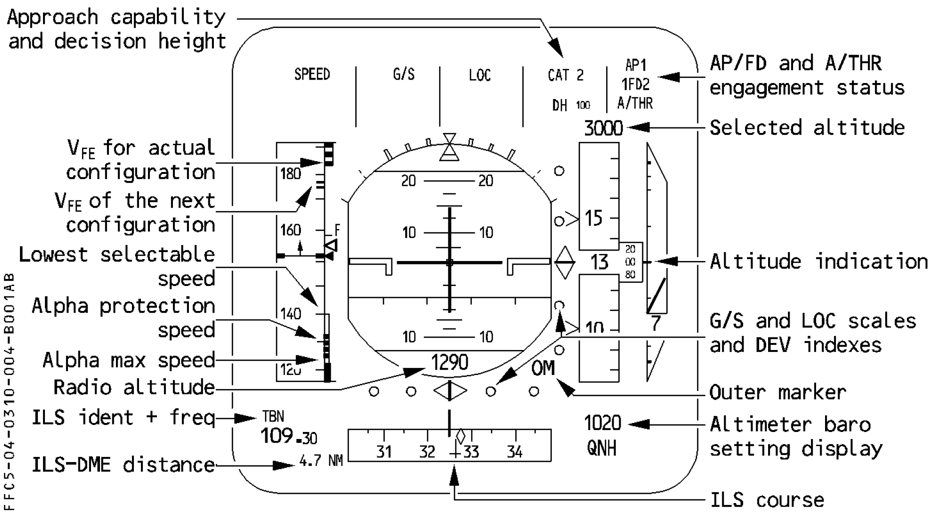


PRIMARY FLIGHT DISPLAY (PFD)

CLIMB PHASE



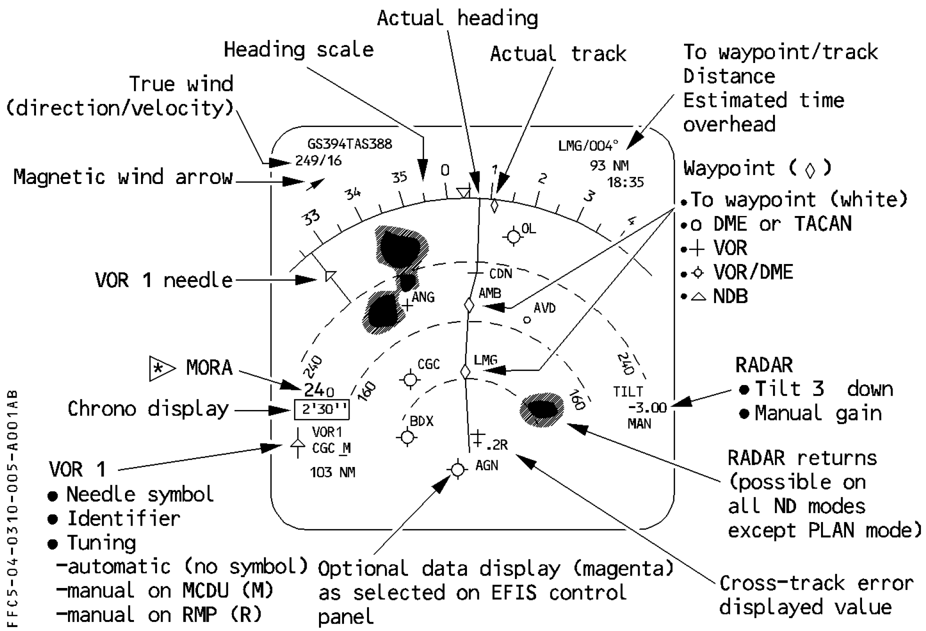
APPROACH PHASE



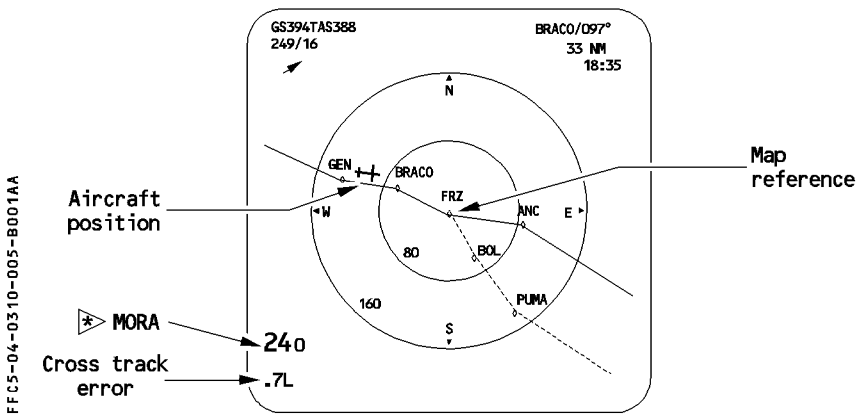
For details refer to FCOM 1.31.

NAVIGATION DISPLAY (ND)

ARC MODE



PLAN MODE



For details refer to FCOM 1.31.

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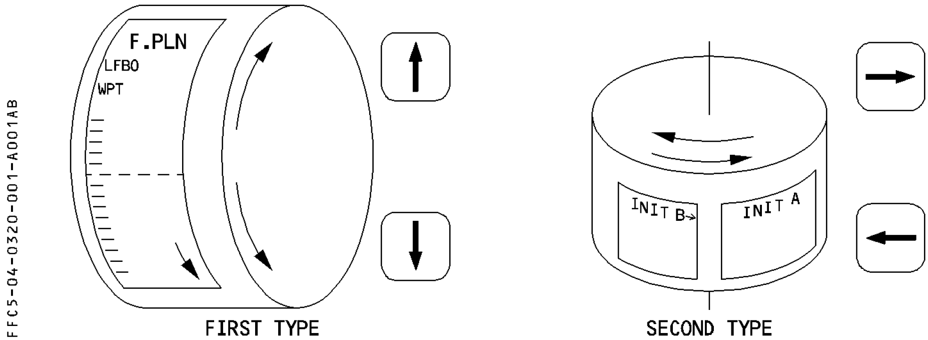
GENERAL

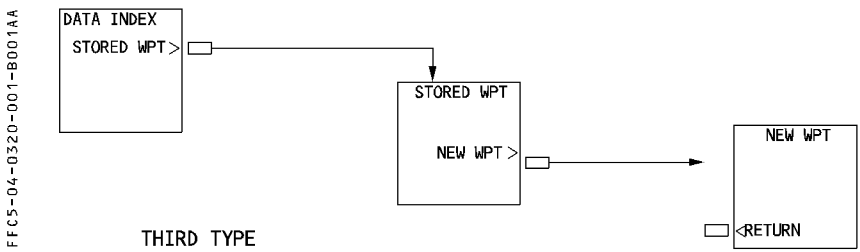
The FMGS (flight management guidance and envelope system) displays information on various “pages”. When a page cannot display all the information assigned, it cues the pilot to call up additional information.
There are three types of pages, and each type has its particular way of cuing the pilot to call up additional information.



First type
When this page cannot display all the information on the screen simultaneously (more information than the six pairs of lines on the screen can hold), the pilot can scroll the page up or down.
When this is the case, the screen displays a ↑↓ symbol in its bottom righthand corner (F-PLN pages, secondary F-PLN page, departure/arrival pages,...).

Second type
When successive pages hold the information, the pilot presses the [→] [←] keys to call up these pages sequentially.
In this case, the page displays an arrow in the top right hand corner of the screen (INIT pages).

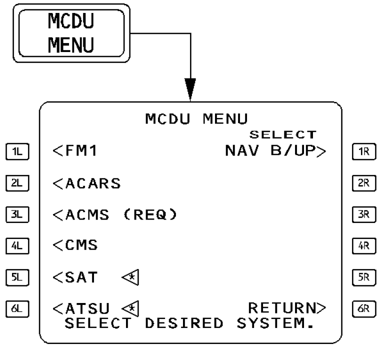
Third type
When successive pages hold different types of information, the pilot calls these up by pressing the key adjacent to the prompts >, < or *.



MCDU MENU PAGE

This page lists the various systems to which the pilot can gain access through the MCDU. It also allows activation of the navigation backup mode.

R



FFC5-04-0320-002-A001AA

The pilot selects a system by pressing the key adjacent to the name of that system. The screen shows the name of the selected system in green, all others in white.
If the MCDU cannot establish communication with the selected system, it displays “TIME OUT”.
When a system calls for pilot attention, the MCDU displays “REQ” next to the system name, and the “MCDU MENU” annunciator lights up.
When the pilot presses the key next to the name of the system that requires attention, the “MCDU MENU” annunciator light goes out.

SELECT NAV B/UP Pressing the [1R] key selects the NAV B/UP function and the field displays DESELECT NAV B/UP.
If the NAV B/UP is inoperative, the field is blank.

RETURN This field is displayed when a function is active

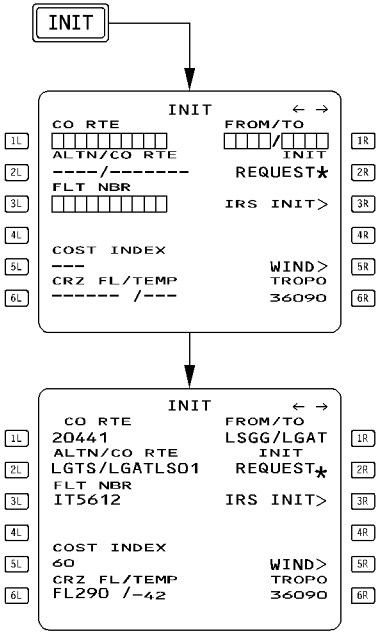
If the MCDU attempts to communicate with a system, “SEL” is displayed next to the system name.

INIT A PAGE

The pilot uses the INIT A page to initialize the flight plan and align the inertial reference system.

- During the entire flight, the pilot can access this page by pressing the INIT key on the MCDU console.
- The pilot may also call up this page by :
  - Pressing the [→] or [←] keys on the MCDU console, while the INIT B page is selected, or
  - Pressing the key next to "RETURN" or "INSERT" on the route selection page, or
- The pilot may press the INIT key when in the done phase, to begin the next preflight

R phase.



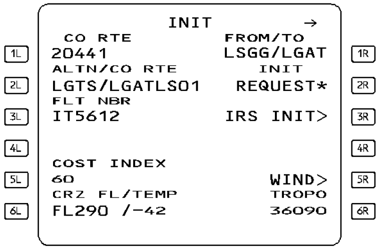
FFC5-04-0320-003-A110AA

[1L] CO RTE

If the flight crew enters a company route number, the screen displays all data associated with that route (10 characters maximum).
Inserting the CO RTE in the RTE selection page also enters the CO RTE number in this field.

[2L] ALTN/CO RTE (blue)	This field is dashed, until a primary destination is entered in the 1R field. If a preferred alternate is associated with the primary destination, it is displayed in this field with the company route identification. The pilot may enter an alternate and a company route manually. If the preferred alternate is not associated with the primary destination, "NONE" is displayed in this field. When the alternate route and the primary destination do not match, the MCDU scratchpad displays "DEST/ALTN MISMATCH". If the primary destination is changed, this field is modified accordingly. The pilot may modify it during the flight.
[3L] FLT NBR	The flight number automatically appears in this field, if it is stored with the company route. The pilot may modify it, or enter a new number here.
[5L] COST INDEX	This is usually stored in the database, along with the company route. The pilot may modify it, or enter a new value here. The system defaults to the last entered value, if a value is not stored in the database.
[6L] CRZ FL/TEMP (cruise flight level and temperature)	The cruise flight level is usually stored in the database, along with the company route. If not, it has to be entered manually. If no cruise flight level is entered, the system will not provide predictions while the aircraft is on ground. The pilot has to enter the temperature at cruise flight level, in order to refine the predictions. Otherwise, these are computed for ISA conditions. (If no sign is entered, the system uses plus).
[1R] FROM/TO	This field allows the pilot to enter a city pair (ICAO codes for city of origin and destination). This entry automatically deletes any previously-entered company route, and calls up the route selection page. If one airfield of the pair is not in the database, the display changes to the NEW RWY page.

FFC5-04-0320-005-A110AA

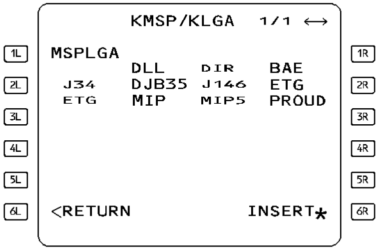


[2R] INIT REQUEST	This prompt is displayed, if the pilot did not enter an active flight plan, or entered a flight number or a company route that is not in the aircraft database. Selecting this prompt sends the ground a request for active flight plan initialization (downlink message). When the asterisk is not displayed, a downlink message cannot be sent. The uplink flight plan is automatically inserted in the active flight plan, prior to engine start, provided an active flight plan does not exist. After engine start, the uplink flight plan is sent to the secondary flight plan, and manually inserted or rejected (Refer to 4.04.40).
[3R] IRS INIT	The pilot presses this key to access the IRS INIT page.
[5R] WIND >	The pilot presses this key to access the climb wind page, unless a temporary flight plan exists. If this is case, the scratchpad displays “TEMPORARY F-PLN EXISTS”.
[6R] TROPO	The default tropopause altitude is 36090 feet. The pilot can use this field to modify it (60000 feet maximum).

ROUTE SELECTION PAGE

This page displays all the company routes stored in the data base that are associated with the inserted city pair. The pilot may call it up manually, or it may be displayed automatically.

- Manually : The pilot presses the FROM/TO or ALTN key on the INIT A page when a city pair is displayed there.
- Automatically : The system displays it when the pilot enters a city pair or defines an alternate on the INIT A page of the active or secondary flight plan, or when the flight crew enters an OTHER ALTN on the alternate page.



FFC5-04-0320-006-A001AA

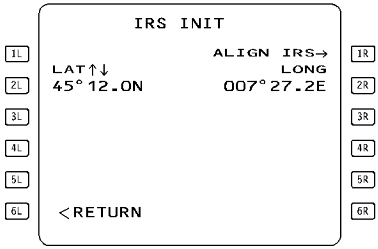
TITLE	Idents for the city pair inserted on the INIT A page. If the flight crew accesses this page from an OTHER ALTN, this field displays the primary destination and the other alternate city pair. (The numbers in the upper righthand corner are the total number of company routes from this city pair stored in the data base).
[1L]	This field shows the name of the company route displayed on the page.
Line 2 to Line 5	These fields display the various elements of the company route (waypoints in green large font and airways in white small font).
[6L] RETURN	The pilot presses this key to return to the accessing page.
[6R] INSERT or SELECT	This prompt displays amber INSERT (blue for the secondary flight plan) if the pilot accessed the page from the INIT A (or secondary INIT A) page. It displays SELECT (blue) if the crew accessed the page from the alternate page. The pilot presses this key to insert the displayed company route in the respective flight plan and return the display to the accessing page.

Note : The pilot can slew the display to show the rest of the route if one page does not show it all, or to display other company routes for this city pair.

IRS INIT PAGE

The pilot uses the IRS INIT page to align the inertial reference system. The pilot accesses this page by pressing the IRS INIT key on the INIT A page.

FFC5-04-0320-007-A100AA



[2L] LAT	This field displays the latitude of the departure airport's reference point. The pilot may modify it by slewing or overwriting.
[6L] RETURN	This prompt enables the pilot to return to the INIT A page.
[1R] ALIGN IRS	This field only displays this legend, if the LAT and LONG fields are filled in, and at least one of the inertial reference systems is in ALIGN status (IRS in NAV position and alignment process not over). If the pilot presses this key, when its field is displaying this legend, the present coordinates are sent to the IRSs and this completes the alignment process. If one of the three IRSs indicates an ALIGN FAULT occurence, the prompt becomes REALIGN IRS.
[2R] LONG	This field displays the longitude of the departure airport's reference point. The pilot may modify it by slewing, or overwriting.

WIND PAGES

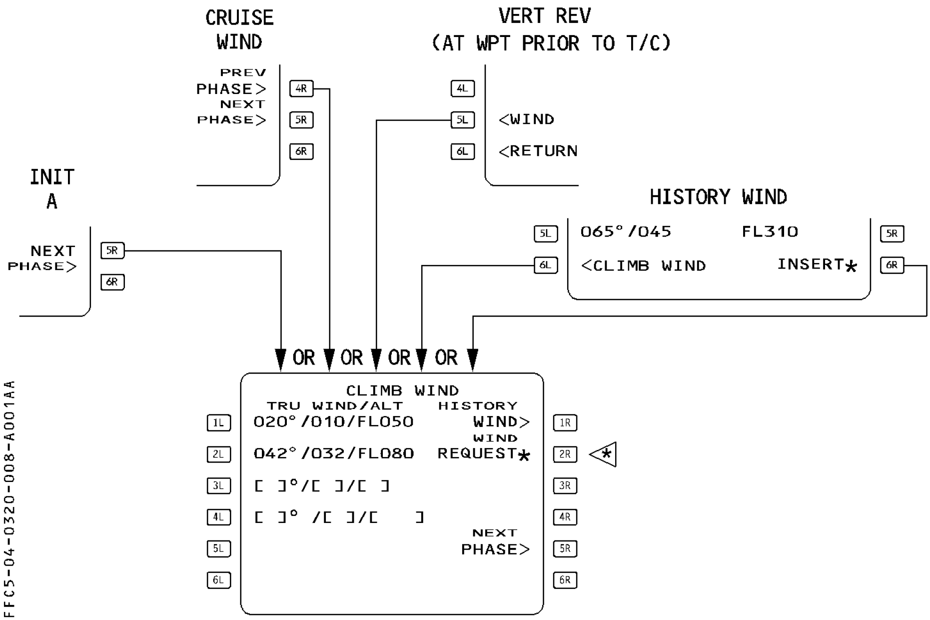
Winds in climb, cruise, descent and approach are necessary to provide the pilot with reliable predictions and performance. Wind pages enable the pilot to enter and/or review
R the winds propagated by the FMGS or sent by ACARS (◁) or ATSU (◁) for the various flight phases.

Note : On WIND pages, wind direction is always true referenced.

CLIMB WIND PAGE

This page enables the pilot to enter and/or review predicted wind vectors (direction and velocity) at up to 5 different levels.

CLIMB WIND page is accessed from :



TITLE — CLIMB WIND in white large font.

[1L] TRU WIND/ALT to [5L] — This field displays the winds entered at various climb altitudes in blue color before climb phase activation and in green color after climb phase activation.
This field may also display history winds or uplink winds.
Large blue brackets are displayed before any wind entry.
Pilot entered and uplinked winds are displayed in large font, history wind data in small font.
Upon sequencing the top of climb, the climb winds are deleted.

Note : Climb winds are not deleted when the origin airport is changed.

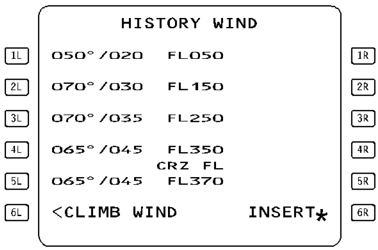
[1R] HISTORY WIND — Displayed in preflight phase only. This key calls up the history wind page. This page is not modifiable (green small font) but can be inserted into the CLIMB WIND page using the 6R key and modified accordingly.

[2R] WIND REQUEST* — Pressing this key sends a request for ACARS winds. (Refer to 4.04.40). This prompt is active only on ACARS equipped aircraft.

[5R] NEXT PHASE — Pressing this key calls up the CRUISE WIND page or the DESCENT WIND page if no cruise waypoint exists.

HISTORY WIND PAGE

FFC5-04-0320-009-A001AA

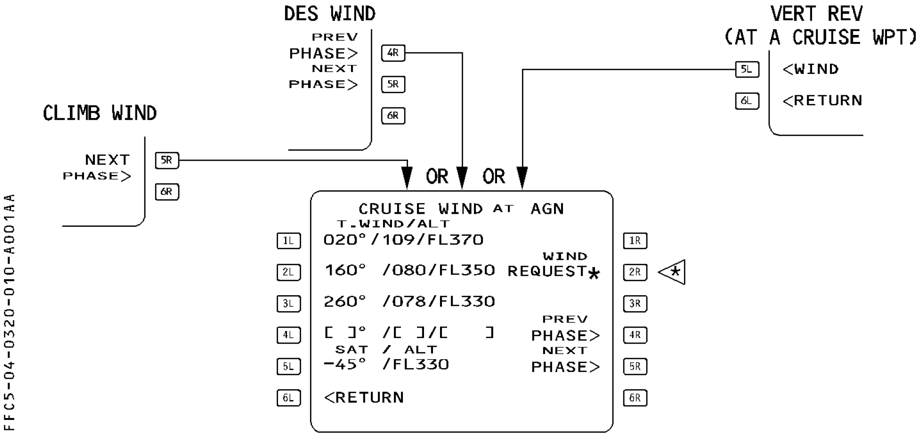


[6L] CLIMB WIND — This key reverts the display to CLIMB WIND page.

[6R] INSERT — This key inserts the history wind values into the CLIMB WIND page.

CRUISE WIND PAGE

This page displays the wind (direction and velocity) for each cruise waypoint.
Cruise wind page is accessed as following. It allows to define a temperature at a given altitude.

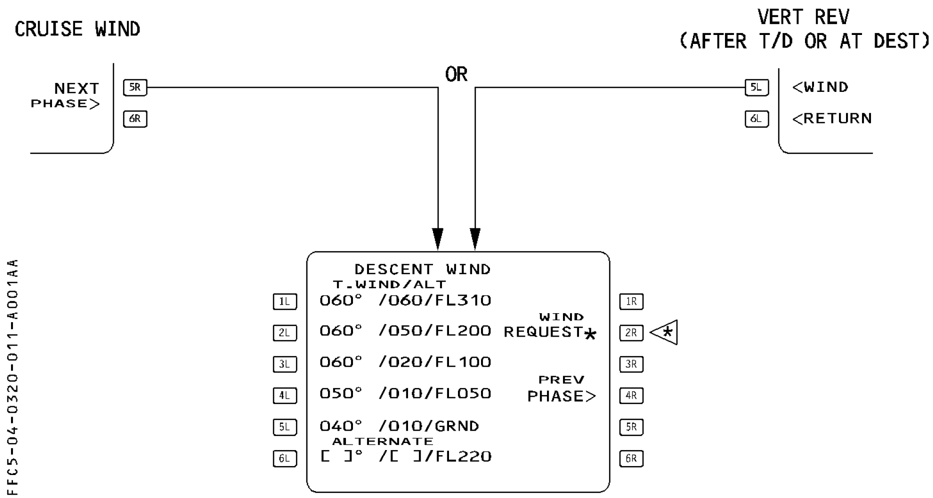


TITLE	CRUISE WIND AT in white large font.
[1L] T. WIND/ALT to [4L]	These fields display in blue the entered wind at various altitudes. The entered winds are propagated at the same altitude to the downpath cruise waypoints, if no other winds are entered. The propagated wind direction and velocity are displayed in small fonts. Both uplinked winds and pilot entered winds are displayed in blue large font. Wind data are modifiable during the cruise.
[5L] SAT/ALT	This field allows the pilot to enter a temperature at a given flight level, or displays a propagated value. The crew must enter both temperature and altitude at the first entry. He can then modify independantly the temperature or the altitude.
[2R] WIND REQUEST*	Pressing this key sends a request for ACARS winds. (Refer to 4.04.40)
[4R] PREV PHASE	This prompt is displayed in Preflight, Takeoff, Climb and Done phases. Pressing this prompt calls up the CLIMB WIND page.
[5R] NEXT PHASE	Pressing this prompt calls up the DES WIND page.

Any new entry performed on the CRUISE WIND page is immediately inserted into the corresponding flight plan. Predictions are dashed on the F-PLN pages during the recomputation time. CRUISE WIND page reverts automatically to F-PLN page if a temporary flight plan is created or the secondary flight plan is activated.

DESCENT WIND PAGE

This page allows the pilot to define and display the winds used for computing the descent profile.
The pilot calls it up by selecting NEXT PHASE on the CRUISE WIND page or WIND prompt on VERT REV page.



[1L] to [5L] — This field displays inserted winds or uplinked winds in large blue font prior to activating the descent phase (modifiable values) and in green after descent phase activation (non-modifiable values).
An entry of "GRND" in the "ALT" field is seen as the wind at ground level. This wind is copied on the PERF APPR page (and corrected for the magnetic variation).
A clear action on one key reverts the line to blue bracket.

[6L] ALTERNATE — This field is displayed only when an alternate is defined.
The pilot-entered value or uplinked value is displayed in large blue font. Always modifiable by the pilot.

R [2R] WIND REQUEST* — Pressing this key sends a request for ACARS winds (Refer to
R 4.04.50). This prompt is active only on ACARS or ATSU equipped aircraft.

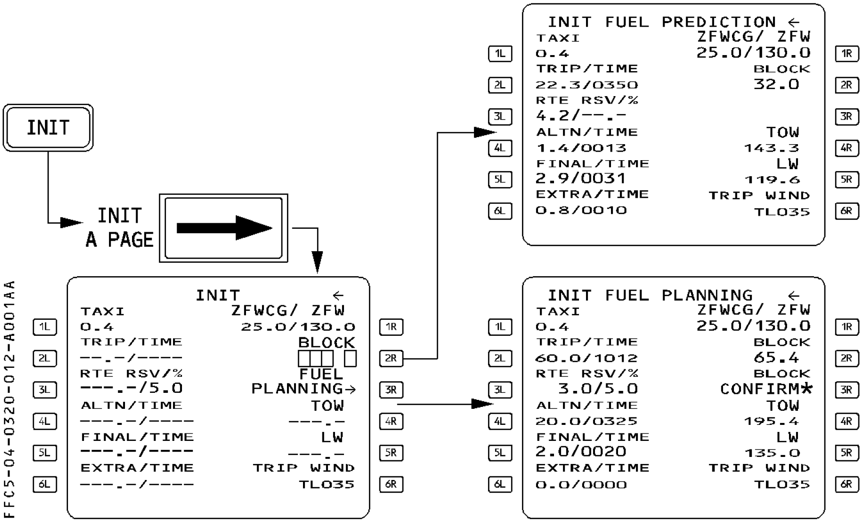
[4R] PREV PHASE — Pressing this key calls up the CRUISE WIND page. The field is erased after the top of descent has sequenced.

Note : Descent winds and alternate wind are deleted if the destination airport is changed.

INIT B PAGE

The pilot uses this page to initialize gross weight and center of gravity before starting the engines. The pilot can call it up from the INIT A page, by pressing the [→] key on the MCDU console, as long as engines have not been started.

R This page automatically reverts to the FUEL PRED page after the first engine is started. The
R FMGS computes its predictions, based on the FOB indicated by the FCMC (or FE as
R backup) from that moment on.



[1L] TAXI	This is the taxi fuel, which defaults to a preset value, (usually 400 kilos). The pilot can change the value through this field.
[2L] TRIP/TIME (green)	This field displays trip fuel and time when predictions become available. The pilot cannot modify this data.
[3L] RTE RSV/% (blue)	This field displays the reserve fuel for the route and the corresponding percentage of trip fuel. It may be blank, if such is the policy of the operator. The pilot can either enter a route reserve, or a percentage, and the system then automatically computes the nominal value.

	[4L] ALTN/TIME (green)	This field displays alternate trip fuel and time, assuming that the Cost Index = 0 and that the aircraft flies at the default cruise flight level. This field displays information in small font, and the flight crew cannot modify it.
R	[5L] FINAL/TIME	This field displays the hold fuel and time, associated with continued flight to the alternate airport (or destination airport, if selected in the “airline fuel policy” section of the database). The pilot may enter a final fuel or time, and the system will compute associated holding time/fuel available. The system assumes that the holding will be in a racetrack pattern, 1500 feet above the alternate airport, for 30 minutes, with the aircraft in CONF1 at maximum endurance speed (racetrack pattern, altitude and selected airport can be modified through the “airline fuel policy” section of the database).
	[6L] EXTRA/TIME (green)	This field displays the amount of extra fuel, and the available time it represents for holding over to the alternate or primary destination, if the pilot did not define an alternate. EXTRA FUEL = BLOCK – (TAXI + TRIP + RSV + ALTN + FINAL). The field displays information in small font, and the flight crew cannot modify it.
	[1R] ZFWCG/ZFW	The zero fuel weight and the location of the zero fuel weight CG are mandatory entries that allow the system to compute speed management and predictions. The pilot can modify this data.
	[2R] BLOCK	The block fuel in this field is a mandatory entry that allows the system to predict the Estimated Fuel on Board (EFOB). When the pilot enters a block fuel, the title of the page changes to INIT FUEL PREDICTION. The FMGC may also compute the block, if the pilot selects the FUEL PLANNING function.
	[3R] FUEL PLANNING (amber)	Pressing this key initiates an FMGC block fuel computation. When the pilot selects this function, FUEL PLANNING becomes green, and the BLOCK field is dashed during FMGC computation. The title of the page changes to INIT FUEL PLANNING, and BLOCK CONFIRM* replaces the FUEL PLANNING prompt, when the block fuel is computed by the FMGC. If the pilot modifies the parameters used for the prediction computation before confirmation, the computation restarts automatically and FUEL PLANNING is displayed in green.

Note : If the pilot enters a number in field 1R or 2R that exceeds the limits, the field displays "ENTRY OUT OF RANGE" and does not accept the value.

[4R] TOW (green)	This field displays the computed takeoff weight. The pilot cannot modify it (small font).
[5R] LW (green)	This field displays the computed landing weight at the primary destination. The pilot cannot modify it (small font).
[6R] TRIP WIND	This field allows the entry of a mean wind component for the trip from the primary origin to the primary destination. Upon entry of a CO RTE or FROM/TO pair, this field defaults to HD 000 in blue small font. An entry preceeded by –, H, HD is considered as headwind, +, T, TL as tailwind. The entered velocity is displayed in blue large font. As soon as the crew inserts a wind on the CLIMB, CRUISE or DESCENT WIND page, the SYSTEM no longer considers the trip wind.

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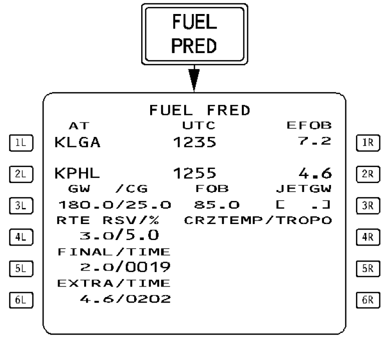
FUEL PREDICTION PAGE

The pilot presses the FUEL PRED key on the MCDU console to display fuel prediction information at destination (DEST) and alternate (ALTN), as well as fuel management data after the engines are started. The pilot may also select a final Gross Weight value for jettison operation.



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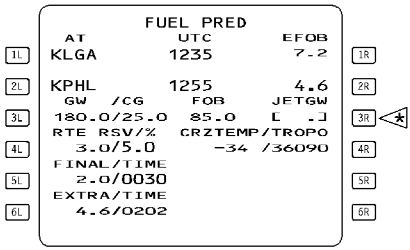
Line 1 AT-UTC/TIME-EFOB	These fields display predictions of time and fuel to the primary destination. TIME is displayed before takeoff, UTC predictions after takeoff. After the pilot enters an Estimated Takeoff Time (ETT), the UTC is displayed.
Line 2 AT-UTC/TIME-EFOB	These fields display predictions of time and fuel to the alternate airport. See 4.04.10 for details.
[3L] GW/CG	<u>GW</u> The system continually updates gross weight during the flight. If no zero fuel weight has been entered, the screen displays amber boxes next to this key. The pilot must enter information in these boxes in order to obtain a speed profile, speed computations, and predictions. The field displays dashes, as long as the system is not calculating fuel on board. <u>CG</u> The system continually updates the center of gravity location along the flight path. If no center of gravity has been entered, the screen displays amber boxes next to this key. The pilot must enter information in these boxes in order to obtain a speed profile, speed computations and predictions. The pilot can modify both the GW and CG.
Line 3 FOB	This field displays the fuel on board, computed by the FCMC (or FE as backup). R The flight crew cannot modify this number.

[4L] RTE RSV/% Prior to departure, this field displays the route reserve fuel and the corresponding percentage of trip fuel. After takeoff, it displays the percentage of the remaining trip fuel from the present position to the destination. The field may be blank, depending on the fuel policy of the operating airline. The crew can enter either a RTE RSV or a RTE RSV %. The system automatically computes the other value.

R



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[5L] FINAL/TIME This field displays the hold fuel and time, associated with continued flight to the alternate airport (or destination airport, if selected in the “airline fuel policy” section of the database). The pilot may enter a final fuel or time, and the system will compute associated holding time/fuel available.
The system assumes that the holding will be in a racetrack pattern, 1500 feet above the alternate airport, for 30 minutes, with the aircraft in CONF1 at maximum endurance speed (racetrack pattern, altitude and selected airport can be modified through the “airline fuel policy” section of the database).

[6L] EXTRA/TIME This field displays the amount of extra fuel, and the resulting time available for holding over the primary destination.
EXTRA FUEL = BLOCK – (TAXI + TRIP + RSV + ALTN + FINAL)
The pilot cannot modify this field (displayed in small green font).

R [3R] JET GW ◁ When the FMS Fuel Jettison option is activated, the flight
R crew can enter the jettison final gross weight in this field.
The FCMC uses this value to stop jettison.

[4R] CRZ TEMP/TROPO This field displays the temperature at the cruise flight level and the altitude of the tropopause. The tropopause defaults to 36090 feet.
The pilot can modify both values.
The field is dashed, when the aircraft sequences the top of climb.

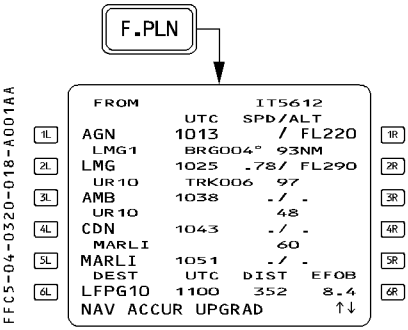
Note : All fields, except [3R], [4R], [5R] and [6R], show dashes until the flight crew starts an engine.

FLIGHT PLAN PAGES

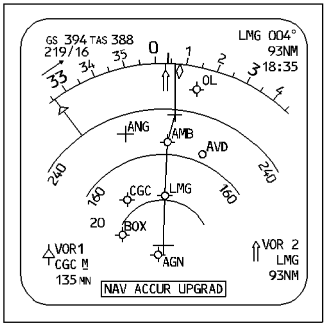
These pages display all waypoints of the active and alternate flight plans, along with associated predictions.
The pilot can make all revisions to the lateral and vertical flight plans through these pages.
He presses the left key to revise the lateral flight plan and the right key to revise the vertical flight plan.
He presses the F-PLN key on the MCDU console to gain access to the A page of the active flight plan.

FLIGHT PLAN A PAGE

The A page displays time, speed, and altitude predictions for each waypoint of the active flight plan.



CORRESPONDING ND

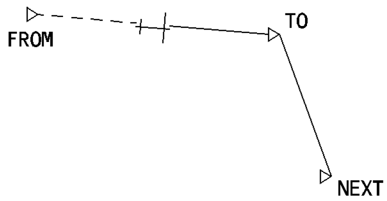


TITLE	FLIGHT NUMBER (blank if no flight number has been entered) This line may display yellow TMPY if a temporary flight plan exists, white OFST, if a lateral offset is flown or yellow OFST if a lateral offset revision is pending.
Line 1 to 5 WPT, UTC, SPD/ALT	These lines display consecutive waypoints along with associated predictions of time, speed or Mach and altitude for each. TIME is displayed before takeoff and UTC after takeoff. After the pilot enters an estimated takeoff time (ETT), UTC is displayed. The time and flight level display at the FROM waypoint (first line of the flight plan) are values that the system memorized at waypoint sequencing.
[1R] SPD ALT	The field dedicated to SPEED or MACH is blank at the FROM waypoint except at airport of departure. (V1 is displayed associated with runway elevation).

Line 6 DEST, UTC/TIME, DIST, EFOB	DIST is the distance to the destination along the displayed flight plan. EFOB is the estimated fuel on board at the destination. The sixth line is permanent and is displayed in a white font once predictions are available, except when a TMPY F-PLN is displayed or when an ALT CSTR is entered (* CLB or DES*) prompt appears).

Note : The predicted altitude at a waypoint is related to the QNH below the transition altitude and is given as a flight level above the transition altitude.

FFC5-04-0320-019-A001AA



The generic flight plan page displays the FROM waypoint (last waypoint to be overflown) on the first line and the TO waypoint in white on the second line. The FROM/TO flight plan leg is called the active leg.
The flight crew can use the scrolling keys to review all flight plan legs down to the last point of the alternate flight plan. The AIRPORT key serves as a fast slew key ; the pilot can press it to call up the next airport (DEST, ALTN, ORIGIN) to be displayed on the flight plan page.
In order to return to the beginning of the flight plan page, the pilot presses the F-PLN key on the MCDU console.
The display shows the name of the leg between two waypoints and the distance between them on a line between the lines that identify them. During an approach, this in-between line also defines the angle of the final descent path. For example, "2-3°" indicates that the leg is two nautical miles long, and the flight path angle is –3°.
The display shows the bearing between FROM and TO waypoints as the bearing from the aircraft position to the TO waypoint. It shows track (TRK) between the waypoints shown in lines 2 and 3. This is the outbound track of the next leg.
When TRUE is selected or when entering the polar area, the degree symbol is replaced by "T".
If the data base contains a published missed-approach procedure, or if someone has inserted one manually, the display shows it in blue after the destination runway identification. It turns green when the go-around phase becomes active.
After the last waypoint of the missed approach, the display shows the alternate flight plan in NAV mode.
When airborne, the flight crew can clear or modify the TO waypoint only by using the DIR key on the MCDU console.

Predictions

The system calculates and displays predictions for all waypoints.

Constraints

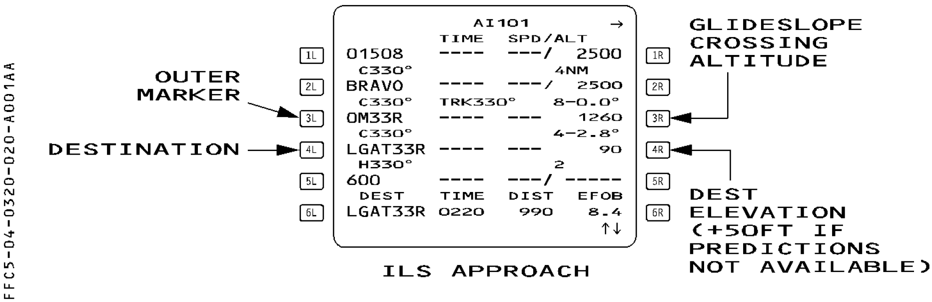
The database may define an altitude constraint and speed constraint for each waypoint of the climb, descent, and approach phases, or the pilot may insert such constraints manually. (Except at origin, destination, FROM and pseudo waypoints).
The constraints are displayed in magenta as long as predictions are not completed.
Once predictions are available, constraints are replaced by speed and altitude predictions preceded by stars. If the star is magenta the system is predicting that the aircraft will match the constraint (altitude within 250 feet, speed not more than 10 knots above the constraints). If the star is amber, the system is predicting that the aircraft will miss the constraint and the MCDU displays “SPD ERROR AT WPT” message.

Pseudo waypoints

Pseudo waypoints are computed geographical positions corresponding to an event in the vertical flight plan ; T/C (top of climb), T/D (top of descent), SPD/LIM (speed limit), DECEL (deceleration for approach) etc. The display shows them as waypoints in parentheses.

Approach display

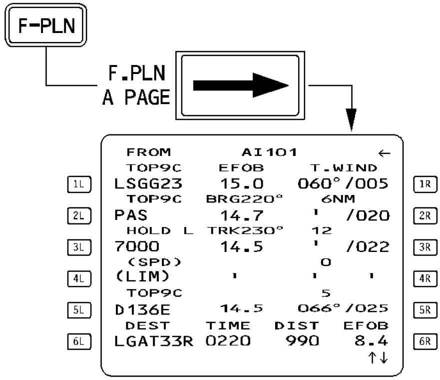
The flight crew cannot enter an altitude constraint at the destination or MAP (Missed Appraoch Point).



ILS APPROACH

FLIGHT PLAN B PAGE

This page displays fuel predictions and forecast winds at each waypoint.
The pilot calls it up by pressing the next page key when the display is showing the A page.



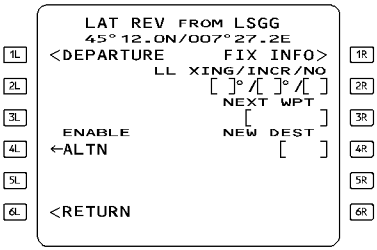
FFC5-04-0320-021-AD01AA

TITLE	FLIGHT NUMBER (blank if no flight number has been entered)
Line 1 WPT-EFOB-WIND to Line 5	These lines display consecutive waypoints and associated fuel predictions, and the forecast wind profile. The direction of forecast winds is relative to true north. Forecast winds include winds entered by the pilot (large font) and the propagated winds at intermediate waypoints (small font). If the flight crew uses a trip wind, it will be displayed for each waypoint. If no other wind entry is made after takeoff, the FROM waypoint will display the wind actually recorded, and the waypoints downpath will still display the trip wind.
Line 6 DEST-UTC/DIST-EFOB	Identical to F-PLN A page.

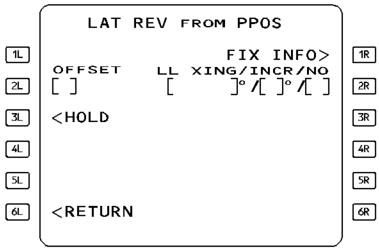
LATERAL REVISION PAGES

These pages give the pilot a list of the lateral flight plan revisions he can use to change the flight plan beyond a selected waypoint.
The pilot calls up these pages from the flight plan pages (A or B) by pressing the left key adjacent to the selected waypoint.
Different lateral flight plan revisions are available for different waypoints.

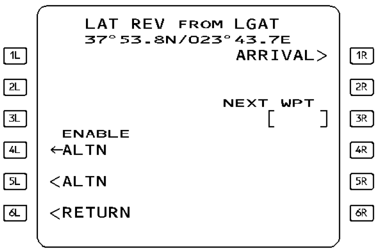
R



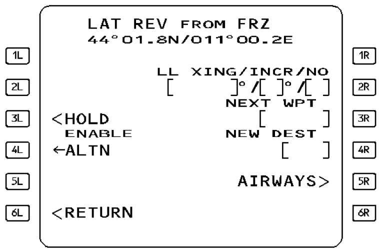
LAT REV AT THE ORIGIN



LAT REV AT THE FROM WPT



LAT REV AT THE DESTINATION



LAT REV AT A WPT

FFC5-04-0320-022-A001AA

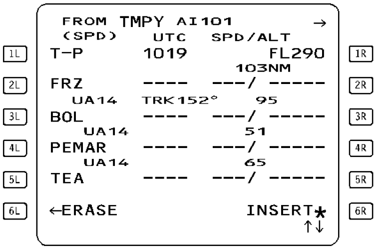
TITLE	The ident of the waypoint or airport selected for revision, along with its latitude and longitude. If the selected waypoint is the FROM waypoint, the title omits the aircraft latitude and longitude, and displays PPOS (present position) instead.
[1L] DEPARTURE	This prompt gives the pilot access to the departure pages, where he can select runways, SIDs, and TRANSs and insert them.

[2L] OFFSET [ ]	This prompt allows the pilot to enter a lateral offset, left or right, in the flight plan. The offset may be from 1 to 50 NM. When the pilot enters an offset, the OFFSET field becomes yellow and the 6L and 6R fields display ERASE and INSERT. The pilot can delete an inserted offset by pressing the CLR pushbutton, by entering a zero for the amount of the offset, or by selecting a DIR TO.
[3L] HOLD	This prompt gives the pilot access to the hold pages.
[4L] ENABLE ALTN	This prompt allows the pilot to switch to the alternate flight plan at the selected revision waypoint and use it as a new active flight plan. The system never displays this prompt at the FROM waypoint.
[5L] ALTN	This prompt gives the pilot access to alternate airport page. The system displays it only at the destination.
[6L] RETURN	This prompt returns the display to the flight plan page.
[1R] ARRIVAL	The pilot uses this prompt to call up the arrival pages, where he can select and insert RWY, APPR, STAR TRANS and VIA.
[1R] FIX INFO	FIX INFO is only displayed on the lateral revision page at the origin or at the FROM waypoint. This prompt gives the pilot access to the FIX INFO page.
[2R] LLXING/INCR/NO	This prompt allows the pilot to create latitude/longitude crossing point. The increment (INCR) ranges from 1 to 20 degrees, and the number of crossing point (from 1 to 99).
[3R] NEXT WPT (1)	The pilot uses this prompt to enter the next waypoint. If this waypoint is a latitude/longitude, or is not in the database nor in the pilot defined elements, the display reverts to the NEW WAYPOINT PAGE.
[4R] NEW DEST (1)	The pilot uses this prompt to enter a new destination.
[5R] AIRWAYS	The pilot uses this prompt to access the AIRWAYS page.
[6R] INSERT	The system displays this prompt when the pilot has created a temporary flight plan. The pilot can use it to activate the temporary flight plan.

(1) For details, see the chapter 4.04.

TEMPORARY REVISION

When the pilot selects a lateral revision, the system creates a “Temporary F-PLN” and displays it in yellow on the MCDU and as a yellow dashed line on the ND to allow the pilot to review the data before inserting. As long as the temporary flight plan is not inserted, the previous flight plan is still active and the system guides the aircraft along it.



TEMPORARY F-PLN A PAGE

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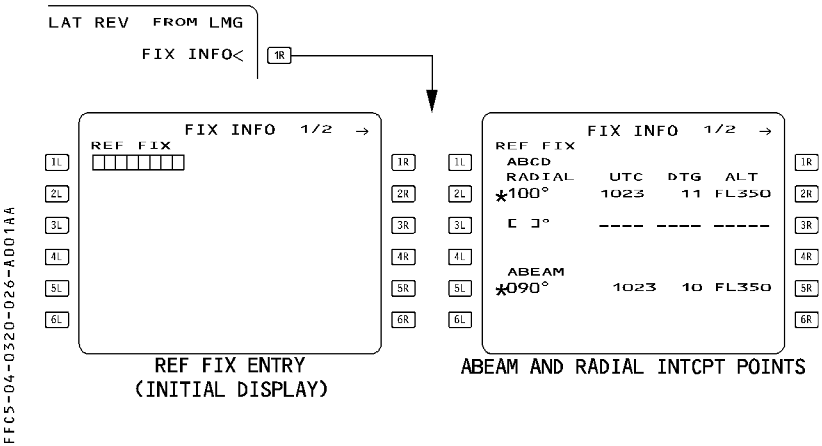
FIX INFO PAGE

This page provides access to the RADIAL intercept function.
The reference may be one or more radial bearings based on a given database fix or a pilot defined element.
If the radial intercepts the active flight plan, the intersection point can be converted to a waypoint and inserted into the flight plan. If not, the ABEAM function may be used.
The FIX INFO page may be accessed from the lateral revision page at origin or at the FROM waypoint.



REF FIX ENTRY
(INITIAL DISPLAY)

ABEAM AND RADIAL INTCPT POINTS

[1L] REF FIX (blue)	Allows entries of the REF FIX. This reference may be any database element (navaid, waypoint, NDB, airport, runway) or a pilot defined element. Prior to entry, amber boxes are displayed.
Line 2 to line 4 RADIAL (blue)	Allows entry of a radial from the REF FIX. If the radial line intersects the active flight plan, the FMGS will compute the time, the along path DTG (Distance To Go) and the altitude at the intersection point (green small font). A blue large star is then displayed to insert the intersection waypoint into the flight plan. This waypoint is not part of the pilot stored elements. Format of the created waypoint is : XXXNNN XXX = 3 first letters of REF FIX ident. NNN = value of the radial

[5L] - [5R] ABEAM

This function enables the pilot to create waypoints on a flight plan (primary or secondary) that are abeam a reference fix.
Once computed, the page displays the radial number in green large font. Time, distance and altitude predictions are displayed in green small font.
Selecting the key adjacent to the star creates the waypoint and inserts it into the flight plan.
The waypoint is identified by AB + the REF FIX ident e.g. AB TLS.
Abeam waypoints are not stored in the pilot stored waypoint database.

Note : *Two FIX INFO pages are available, providing the capability to define two different REF FIX elements.*

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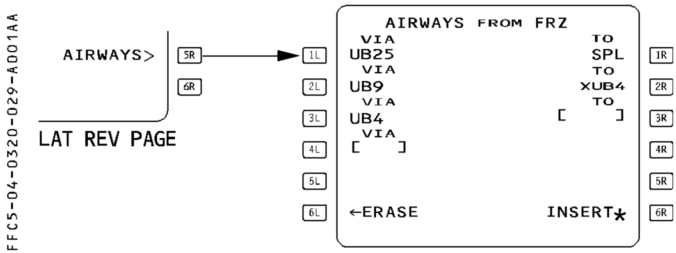
AIRWAYS PAGE

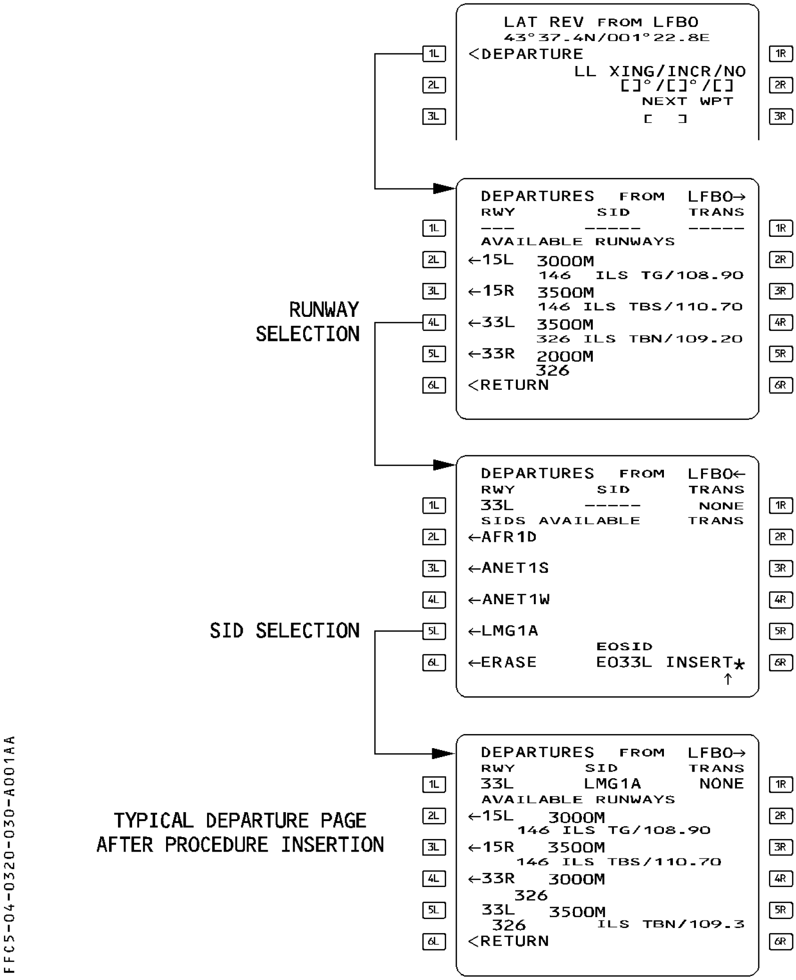
This page allows the pilot to select up to five airways for stringing into the flight plan after the revise waypoint.
The pilot calls up this page by pressing the lateral revision page [5R] key.



TITLE	Revise point ident (large green font)
[1L] VIA to [5L]	This field displays the airways entered by the pilot.
[6L] ERASE or RETURN	The flight crew presses this key to return to the lateral revision page. This field displays ERASE when a temporary flight plan is created. It allows to erase the temporary flight plan.
[1R] TO to [5R]	Displays the ending points of the corresponding airways entered on the [1L] to [5L] entries. The ending point is displayed in large blue font if manually entered, in blue small font if FMGC computed.
[6R] INSERT (amber)	Allows to insert the entered VIA/TO segments into the flight plan. The display reverts to the F-PLN page.

DEPARTURE PAGES

These pages allow the pilot to review departure procedures (RWY, SID, TRANS) and enter them into the active flight plan.
The pilot calls them up by pressing the 1L key when the display is showing the lateral revision page for the origin.
Three pages are available : RWY, and SIDS and TRANS (if any).
The pilot calls up each page sequentially either by selecting a data item (such as RWY) or by pressing the [→] key on the MCDU console.

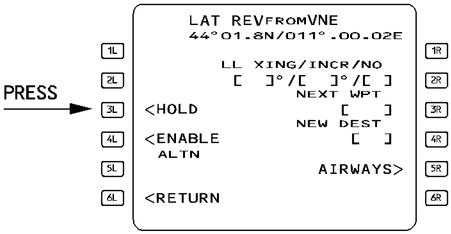


Line 1 RWY, SID TRANS	This line displays the RWY, SID, and TRANS in green after they have been inserted into the active flight plan or in yellow if selected but not yet inserted. If nothing has been selected or inserted, the line displays dashes.
[2L] RWY's/SID's to [5L]	These fields display selectable and selected RWYs or SIDs (including EOSID and NO SID option). The pilot can slew each list. Selectable RWYs and SIDs are displayed in blue with an arrow. Once a RWY or SID is selected, the arrow disappears. A RWY or SID already inserted in the flight plan is displayed in green. The display shows the length, heading (T if true North referenced), and, if available, the ILS ident and frequency for each runway.
[6L] ERASE or RETURN	The pilot presses this key to erase a selected data item and revert to the previous selection. If the pilot erases the page, the display reverts to the active flight plan page. The display shows RETURN instead of ERASE when the pilot has not created a temporary flight plan.
[2R] TRANS to [5R]	This field displays the selectable and selected en route transitions respectively in blue and green. They are blank if there are no transitions.
[6R] INSERT or BLANK	The pilot uses this key to insert a temporary procedure into the flight plan. The page reverts to the active flight plan page when the insertion is completed. It is associated with RETURN (6L).
[6M] EOSID	Once a runway is inserted into the flight plan, this field displays any ENG OUT SID for that runway. If there is none, it displays NONE.

HOLD PAGES

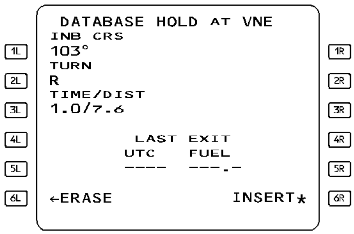
These pages allow the pilot to review and modify the holding pattern parameters at the selected revise waypoint. The holding pattern data may come from the database or may be defaulted to standard dimensions.
The pilot calls up these pages by pressing the HOLD key on the LAT REV page for the waypoint. Three different HOLD pages are available :

FFC5-04-0320-032-A001AA



- **DATABASE HOLD AT...**
  The database has a holding pattern for the selected revise waypoint, but has not been inserted in the flight plan yet.

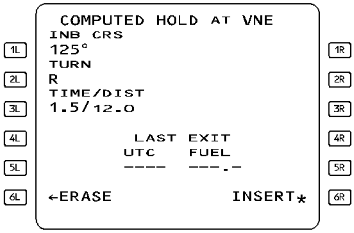
FFC5-04-0320-032-B001AA



- **COMPUTED HOLD AT...**

  The database has no holding pattern for the selected revised waypoint.
  The system proposes default holding pattern data.

FFC5-04-0320-033-A001AA

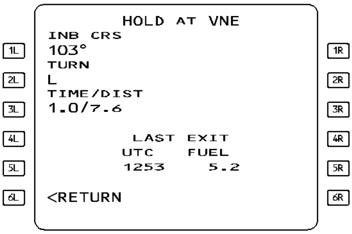


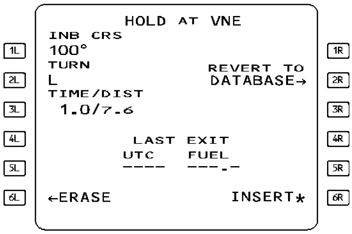
INB CRS = INBD TRK of the F-PLN leg leading to the revised waypoint.
TURN = Turn direction right.
TIME on outbound leg is 1.5 minute above 14 000 feet, 1 minute below 14 000 feet.
[2R] field shows “REVERT TO COMPUTED” when the pilot has modified the holding pattern.

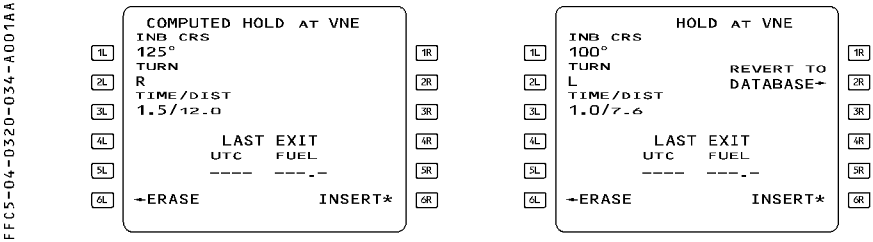
- **HOLD AT...**

  The flight plan contains a holding pattern that is defined in the database.
  If the pilot has modified holding pattern data from the database, but has not inserted it in the flight plan yet, the field next to [2R] displays “REVERT TO DATABASE” or “REVERT TO COMPUTED” to allow the pilot to revert to defaulted parameters.

FFC5-04-0320-033-B001AA

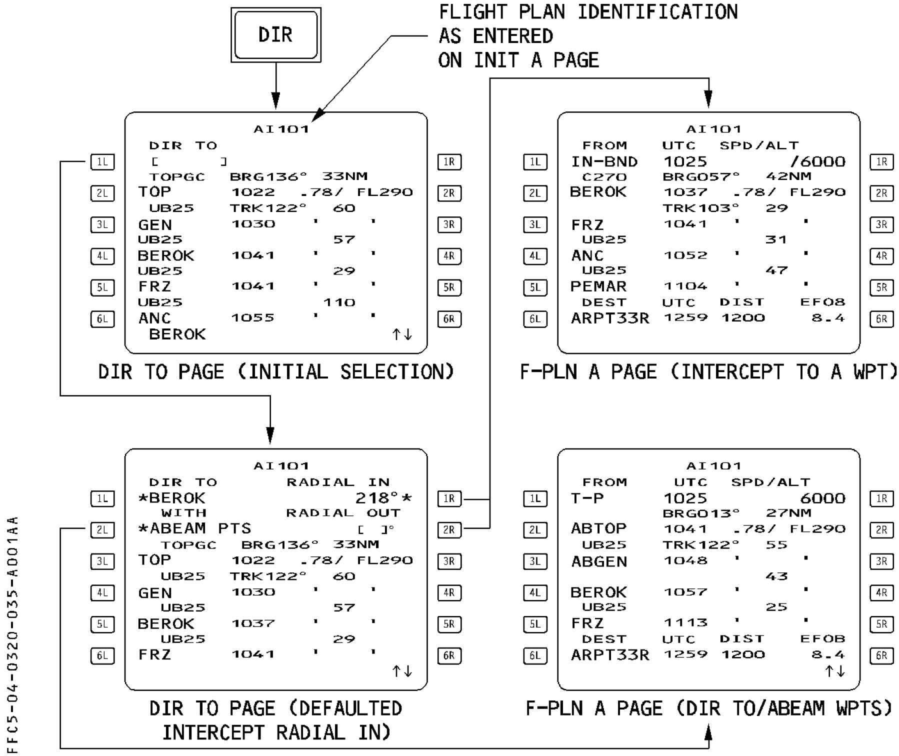






[1L] INB CRS	This field displays the inbound course of the holding pattern. The data may be modified.
[2L] TURN	This field shows the direction to turn in the hold (L or R). The data may be modified.
[3L] TIME/DIST	This field shows the time and distance for the outbound leg. The data may be modified. Time and distance are dependent values that the system calculates from the predicted ground speed, which in turn depends upon the holding speed (speed for maximum endurance, ICAO speed limit, or constraint speed, whichever is lower).
[6L] ERASE or RETURN	The pilot presses this key when the field shows ERASE to erase the holding pattern. The pilot presses this key when the field shows RETURN to return to the LAT REV page if the hold is already inserted in the flight plan.
[2R] REVERT TO DATABASE or REVERT TO COMPUTED	The pilot presses this key to delete manual modifications to the database hold (or computed hold) and revert to database (or computed) holding data.
[6R] INSERT	The pilot presses this key to insert the hold into the active flight plan.
LAST EXIT UTC FUEL	This field displays the time at which the aircraft must leave the holding pattern in order to meet fuel policy criteria (extra fuel = 0). The system also displays the estimated fuel on board at that time.

DIRECT TO PAGE



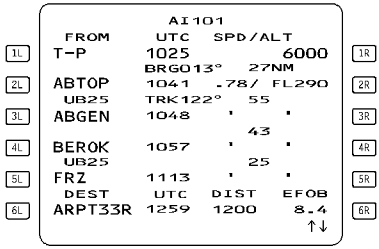
Pressing the “DIR” key under the MCDU screen brings up the DIR TO page. The [1L] key on this page is the DIR TO key. The pilot presses it to modify the flight plan by creating a direct leg from the aircraft's present position to any selected waypoint. When in NAV mode, the pilot must use this key to modify the active leg or the TO waypoint. The pilot cannot call up this page when the aircraft's present position is not valid.

[1L] DIR TO Pressing this key selects the DIRECT TO or INTERCEPT waypoint. The pilot can identify the waypoint to be inserted by using its identifier, its latitude and longitude, place/bearing/distance, or place-bearing/place-bearing.

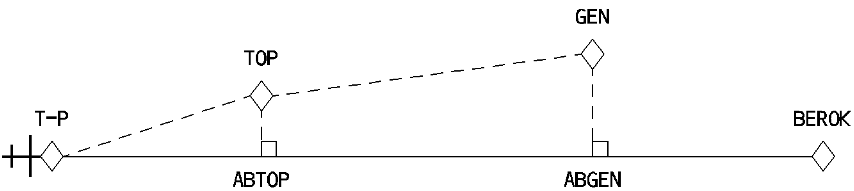
Note : If the entered DIR TO is a latitude/longitude, the NEW WAYPOINT page is automatically called up.

If the pilot does not select the RADIAL IN (1R) or RADIAL OUT (2R) or ABEAM PTS (2L), the DIR TO function routes the aircraft from the present position to the waypoint inserted in the DIR TO field.

Line 3 to Line 6	These lines display the active flight plan with time/speed/distance predictions. The display may be slewed ↑↓. Pressing any key activates the DIRECT TO function from present position to the waypoint adjacent to that key.
[2L] ABEAM PTS	The flight crew presses this key to activate the DIR TO/ABEAM function which projects perpendiculary the flight plan waypoints on the DIR TO leg :



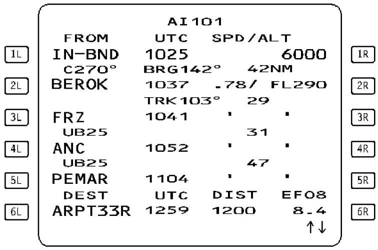
FFC5-04-0320-036-A001AA

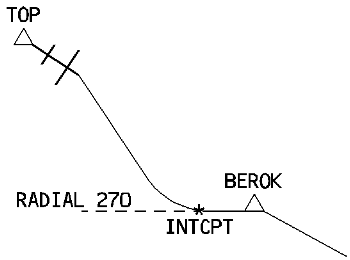


[1R] RADIAL IN and [2R] RADIAL OUT

The pilot fills these fields to define a QDM or a QDR associated to the waypoint defined in 1L. These keys activate respectively the DIRTO/INTERCEPT TO and DIRTO/INTERCEPT FROM functions. The pilot enters the radial in or radial out as : XXX T or XXX M, XXX being the radial, and T or M depending on the reference (true or magnetic). If T or M is not precised, the reference selected on the TRUE/MAG switch is used.
The aircraft intercepts from its current position and track the selected waypoint and QDM (or QDR) to (or from) this waypoint.

FFC5-04-0320-037-A001AA



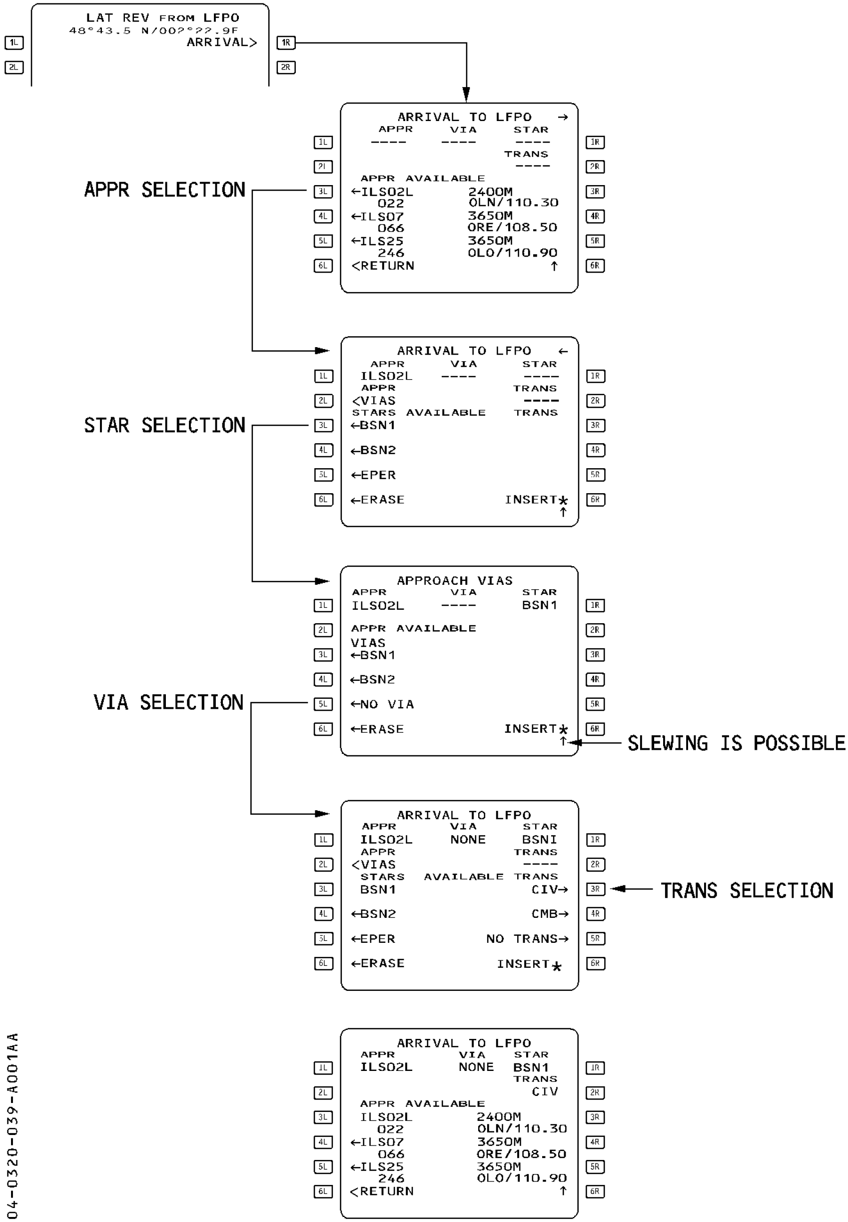


If the DIR TO/INTCPT WPT entry is to a waypoint already in the flight plan, a defaulted RADIAL IN is displayed in small font. However no radial is displayed on ND for this default radial. No default radial is provided for the RADIAL OUT field.
Selecting the INTCPT TO (RADIAL IN [1R]) function :
– activates the intercept radial INTO the WPT
– sets the course = radial IN + 180°
– reverts the display to F-PLN A page.
Selecting the INTCPT FROM (RADIAL OUT [2R]) function :
– activates the of the intercept radial FROM the WPT
– sets the course = radial OUT
– reverts the display to F-PLN A page.
For detail refer to 4.04.

ARRIVAL PAGES

These pages allow the pilot to review arrival procedures (approaches, VIAs, STARs, TRANS) and insert them into the active flight plan.
The pilot calls them up from the LAT REV page for the destination by pressing 1R key.
Three pages, APPR, STAR, and VIA, are available, along with a fourth, TRANS, if there are any transitions.
The pilot calls up each page sequentially either by selecting a data item (such as APPR) or by pressing the [→] key on the MCDU console.

Line [1L] - [1R] [2R]	This line displays the APPR, VIA, STAR, and TRANS in green if they have been inserted in the flight plan, and in yellow, as temporary flight plan, if they have been selected but not yet inserted. It displays dashes or NONE if nothing has been selected or inserted.
[2L] APPR VIAS	The pilot presses this key to call up transitions from the last point of the STAR to first point of the approach.
[3L] to [5L]	These fields list selectable and selected APPRs, STARs, and VIAs. The flight crew can slew the pages, when necessary. Selectable APPRs, STARs, and VIAs are displayed in blue with an arrow. Once the pilot has selected an APPR, STAR, or VIA, the arrow disappears. After the APPR, STAR, or VIA is inserted into the flight plan, it is displayed in green. For each approach the display shows runway length, heading (T if true North referenced), and the frequency and identifier of the ILS when ILS is available.
[6L] ERASE or RETURN	The pilot presses this key to erase selected data and revert to the previous selection. The page reverts to the LAT REV page. The field displays "RETURN" instead of ERASE when the flight crew has not created a temporary flight plan.
[3R] TRANS to [5R]	These fields display selectable and selected en route transitions (if any). They are blue when selected, and become green when inserted into the active flight plan.
[6R] INSERT	The pilot presses this key to insert the temporary procedure into the active flight plan. The page reverts to the active flight plan page when this happens.

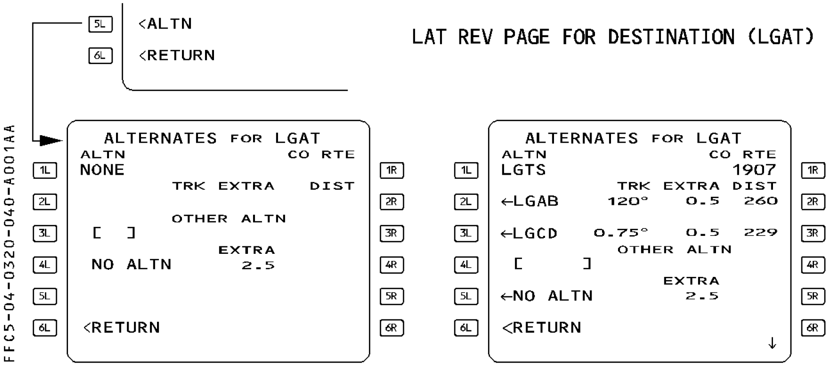


TYPICAL ARRIVAL PAGE
WITH SELECTED DATA

FFC5-04-0320-039-A001AA

ALTERNATE PAGE

This page enables the pilot to review, in the NAV database, the alternate airports that are paired with the destination, and define additional alternates, if needed. (Alternate airports are linked to the destination). The pilot calls up this page with the ALTN prompt, from the lateral revision page for the destination.



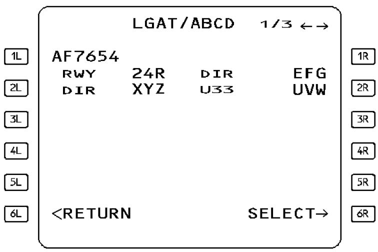
TITLE	The destination airport is displayed in large green font.
[1L] ALTN	This field displays the selected alternate : In green, if it is active ; in yellow, if it is temporary. “NONE” is displayed, if NO ALTN option is selected, or if the destination has no alternate.
Line 2 R to line 5	These lines display the identifications of alternates (up to 6), the extra fuel weight remaining after landing at the alternates, and the great-circle track and distances to them from the destination. If the database contains a company route between the destination and the alternate, the distance shown is an airway distance (not a great-circle distance). When the database defines a preferred alternate, it is displayed on Line 2 (if no scrolling has been performed).

[4L] OTHER ALTN	The pilot can enter an airport identifier in the brackets (Line 3). If that airport is not stored in the database, the NEW RUNWAY page appears for the pilot to use in defining it. If it is stored in the database, the ROUTE SELECTION page appears, and the pilot can use it to select the best route. The pilot may enter a distance in the DIST field of the OTHER ALTN prompt in order to get preliminary fuel predictions. However, once he has selected the alternate airfield as a temporary alternate and then inserted it, the ALTN distance reverts either to the airway distance if he has selected a company route, or otherwise to the direct distance to the alternate. The pilot can use OTHER ALTN to overwrite and replace the previous OTHER ALTN.
NO ALTN	The pilot uses this key to select the NO ALTN option.
[6L] RETURN	The pilot presses this key to make the display revert to the LAT REV page.
or	
ERASE	Pressing this key erases the temporary selection.
[1R] CO RTE	The pilot presses this key to display the active company route between the destination and the selected alternate.
[6R] INSERT	Pressing this key activates the temporary selection.

ROUTE SELECTION PAGE FOR ALTERNATE

This page allows the pilot to review the company route between the destination and the alternate, and select a different route, if that seems appropriate.
This page comes up automatically when the flight crew enters an ident in the OTHER ALTN field.
See “Route Selection”, page for a description of this page.

FFC5-04-0320-041-A001AA



[6R] SELECT	When the pilot presses this key the display reverts to the alternate page. (The distance between the destination and the alternate is then the airway distance).

VERTICAL REVISION PAGES

These pages contain the menu of available vertical flight plan revisions that can be applied at a selected waypoint.
The pilot calls up these pages from the flight plan A or B pages by pressing the right hand key next to the selected revised waypoint.
The pilot may make several different vertical revisions (although some may not be available at all waypoints) : speed limit, speed constraint, altitude constraint, time constraint, wind page and STEP ALTS page.

```
     VERT REV AT LFBO15R
   EFOB=13.2    EXTRA=2.3

   CLB SPD LIM
 250/FL100              RTA>



 <WIND           STEP ALTS>
 <RETURN
```

VERT REV AT ORIGIN

```
     VERT REV AT MIP
   EFOB=12.4    EXTRA=0.8

   CLB SPD LIM
 250/10000              RTA>
   SPD CSTR        ALT CSTR
 *[  ]              [    ]*
 MACH/START WPT
 *[  ]/MIP
 <WIND           STEP ALTS>
 <RETURN
```

VERT REV AT CRUISE WPT

```
     VERT REV AT SBJ
   EFOB=14.5    EXTRA=0.8

   CLB SPD LIM
 210/ 7000              RTA>
   SPD CSTR        ALT CSTR
 *[  ]                  5000
 MACH/START WPT   ALT ERROR
 *[  ]/SBJ              -500
 <WIND           STEP ALTS>
 <RETURN
```

VERT REV AT WPT IN CLIMB.
(ALT CSTR ENTERED AND
PREDICTED MISSED)

```
     VERT REV AT KLGA
   EFOB=8.4     EXTRA=0.8

   CLB SPD LIM
 250/10000              RTA>
                  G/S INTCP
                        2000
   QNH
  □□□□
 <WIND           STEP ALTS>
 <RETURN
```

VERT REV AT DEST

```
     VERT REV AT CXR
   EFOB=---     EXTRA=---

   CLB SPD LIM
 250/10000              RTA>
   SPD CSTR        ALT CSTR
 *[  ]                -FL310
 MACH/START WPT
 *[  ]/CXR
 <WIND           STEP ALTS>
 *CLB         OR        DES*
```

VERT REV AT WPT
(PREDICTIONS NOT AVAILABLE)

```
     VERT REV AT PEMAR
   EFOB=12.4    EXTRA=0.8

   CLB SPD LIM
 250/10000              RTA>
   SPD CSTR        ALT CSTR
 *[  ]              [    ]*
 MACH/START WPT   END WPT
 .81/N47E005        N47W009
 <WIND           STEP ALTS>
 <RETURN
```

VERT REV WITH CONSTANT MACH SEGMENT
DEFINED BETWEEN N47E005 AND N47W009
(BOTH WAYPOINTS ARE IN CRZ PHASE)

FFC5-04-0320-042-A100AA

TITLE (white)	"VERT REV AT [location]" (Second line shows remaining fuel and extra fuel at the revise waypoint.
[1L] "TOO STEEP PATH BEYOND" (amber)	This message is displayed if the waypoint is part of a leg with too steep a descent path.
[2L] CLB/DES SPD LIM (magenta)	This field displays the speed limit applicable to the climb or descent phase. It displays it in a large font when data has been inserted manually and in a small font when data comes from the database.
[3L] SPD CSTR (magenta)	This field displays any speed constraint assigned to the revised waypoint. It is in a large font when inserted manually, and in a small font when it comes from the database. It is not displayed at the origin airport, a FROM waypoint, a speed limit pseudo waypoint, or the destination airport.
[4L] QNH	This field functions only when the revised waypoint is the primary destination. It allows the pilot to enter the sea-level atmospheric pressure. This field is identical to the QHN field of the PERF APPR page.
[4L] MACH/START WPT (blue)	This prompt allows the pilot to enter or modify the start point of a constant Mach segment, and its associated Mach. This prompt is not displayed at primary destination and alternate flight plan waypoints. (Refer to 4.04.20)
[5L] WIND (blue)	The pilot presses this key to access to the wind pages. The first wind page that is displayed, corresponds to the selected waypoint e.g. climb page if the selected waypoint is a climb phase waypoint. A CLR action reverts it to brackets.
[6L] RETURN or CLB	The pilot presses this key to return to the last displayed flight plan page. When displayed pressing this key assigns the constraint to CLB phase and inserts it into the vertical flight plan. The page reverts to the flight plan page.
[2R] RTA prompt	This prompt gives access to the RTA page. It is not displayed when the VERT REV page is accessed from the alternate F-PLN.

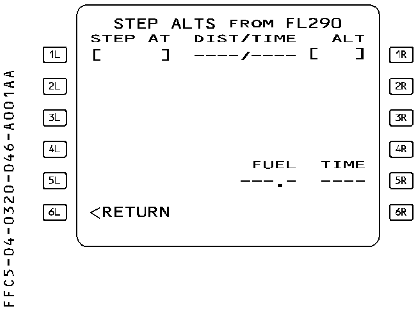
[3R] ALT CSTR (magenta)	This field displays the altitude constraint assigned to this revised waypoint. It uses a large font when the constraint is entered manually, a small font when it is from the database. A CLR action reverts it to brackets. The constraint may be : · "At", entered as XXXXX (FL180, for example) · "At or above", entered as + XXXXX or XXXXX + (+ FL310, for example) · "At or below", entered as – XXXXX or XXXXX – (– 5000, for example) · A "window" constraint. The altitude window consists of two altitudes between which the aircraft should fly. The crew cannot manually enter a "window" constraint.
G/S INTCP (green)	This field displays the glide intercept altitude for an ILS approach on the vertical revision page at destination.
[4R] ALT ERROR (green)	When the aircraft misses a predicted altitude constraint, this field displays the difference between the altitude constraint and the predicted altitude. If, for example, "– 500" appears in this field in green, the aircraft will reach the waypoint at an altitude 500 feet below the constraint altitude. This applies only to waypoints in the climb and descent phases.
[4R] END WPT (blue)	This prompt allows the pilot to enter or modify the endpoint of a constant Mach segment. It is displayed when a pair Mach/start exists in 4L field. This prompt is not displayed on the destination VERT REV page. (Refer to 4.04.20).
[5R] STEP ALTS (white)	This legend appears for any waypoint once a cruise altitude has been entered. It is not available in engine-out, descent, approach and go-around phases. This gives the pilot access to the step altitudes page.
[6R] DES	When this field displays "DES", pressing this key assigns the constraints to the descent phase and inserts them into the vertical flight plan. The page reverts to the F-PLN page. (See Note, below).

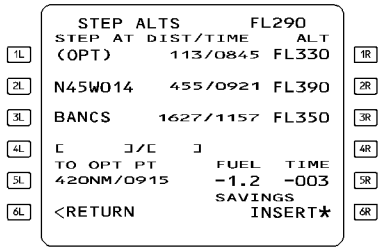
Note : *Altitude and speed constraints may apply to climb, descent or approach phase, but never to cruise phase. Fields 6L/6R display "CLB/DES" when the revised waypoint is a cruise phase waypoint and the FMGS needs to know if the new constraint is to be applied in climb or descent phase. The FMGS will modify the cruise phase accordingly. These 2 prompts also display "CLB/DES" when the predictions are not computed. (top of climb and top of descent not yet defined).*

INTENTIONALLY LEFT BLANK

STEP ALTS PAGE

This page enables the flight crew to insert up to four geographic step points and one optimal step point into the flight plan. This page also displays the cost savings associated with the optional step.
The flight crew either calls it up from the vertical revision page, or from the performance cruise page.





PAGE FILLED WITH GEOGRAPHIC AND OPTIMAL STEPS

TITLE	STEP ALTS, followed by the current cruise altitude.
Line 1	In this field, the flight crew can either enter a geographic step, or an altitude for an optimal step.
Line 2 to line 4	STEP AT (large blue font). The flight crew can only enter geographic steps in these fields. Displays the point at which the active step begins. It may be either an active (or secondary) flight plan waypoint, or an inserted optimal point (OPT).
DIST / TIME (UTC) (green small font)	Displays the distance to go and time from the present aircraft position along the flight plan to the step point.
ALT	Displays the altitude to step to, and allows entry of the optimal step format : FL or ALT.

Note : The following messages may be displayed in the DIST / TIME field :
- *ABOVE MAX, if the step altitude exceeds the Max altitude*
R *computed by the FMS (refer to 1.22.20).*
R - *IGNORED, if the step end point is less than 50 NM from the top of descent.*
R - *STEP NOW, if the aircraft is within 20 NM from the step*
R *point.*
- *NO OPTIMAL, if an inserted optimal step falls in a discontinuity due to a flight plan change, or if a time constraint exists in the flight plan.*

[5L] TO OPT PT (green small font)	This field displays the distance and time to a non inserted optimal step point if one exists.
[6L] RETURN	The flight crew presses this key to return the display to the previous page.

Note : *On any flight plan change, an inserted optimal step remains in the flight plan at a fixed distance to destination.*

[5R] SAVINGS

This field displays the fuel and time savings before insertion of the optimal step point.
Fuel savings are displayed in thousand of kilograms (or pounds) (maxi 99.9). The value is preceded by :
"–" in case of fuel saving,
"+" in case of additional fuel cost.
Time savings are displayed in hours and minutes.
The value is preceded by
"–" in case of time saving,
"+" in case of additional time cost.

Note : *If no optimal step point exists for the altitude displayed in [1R], the "NO OPTIMAL" message is displayed in the FUEL / TIME field. This message is also displayed if the optimal step falls into a discontinuity.*

[6R] INSERT (amber)

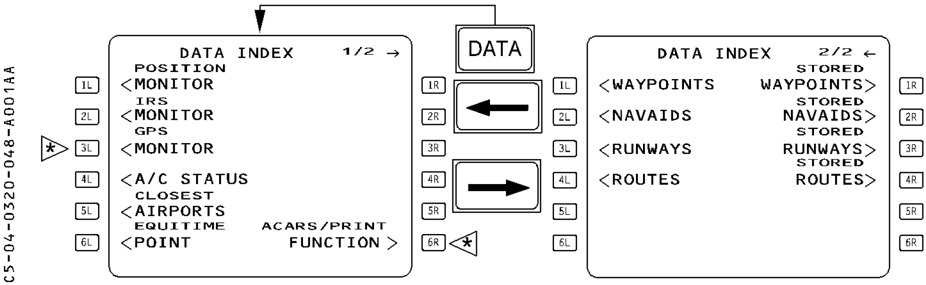
This field displays INSERT when an optimal step point exists but is not yet inserted. When INSERT is selected :
– the optimal step point is inserted into the flight plan.
– OPT is displayed in line 1L.
– optimal step distance and time are deleted in line 5L.
– the * UPDATE blue prompt replaces the INSERT prompt.

UPDATE

This prompt allows to compute another optimal step point.
The UPDATE prompt is then replaced by the *INSERT prompt.

DATA INDEX PAGES

There are two INDEX pages :
The DATA INDEX 1/2 page gives access to various pages devoted to navigation.
The DATA INDEX 2/2 page lists the navigation data entered in the FMGS.
The pilot enters those items labeled "stored" and can modify them. The pilot can call up the others, but cannot modify them.
The pilot calls up these pages by pressing the DATA key on the MCDU console :



DATA INDEX 1/2 PAGE DATA INDEX 2/2 PAGE

DATA INDEX 1/2 PAGE

[1L] POSITION MONITOR -	[2L] IRS MONITOR When the flight crew presses these keys, the display shows all essential navigation data.
[3L] GPS MONITOR ⊲	This key calls up the GPS MONITOR page.
[4L] A/C STATUS	This key calls up the aircraft status page.
[5L] CLOSEST AIRPORTS.	This key calls up the closest airports page.
[6L] EQUITIME POINT	This key calls up the equitime point page.
[6R] ACARS/PRINT ⊲	This key calls up the PRINT function pages and the ACARS function pages.

DATA INDEX 2/2 PAGE

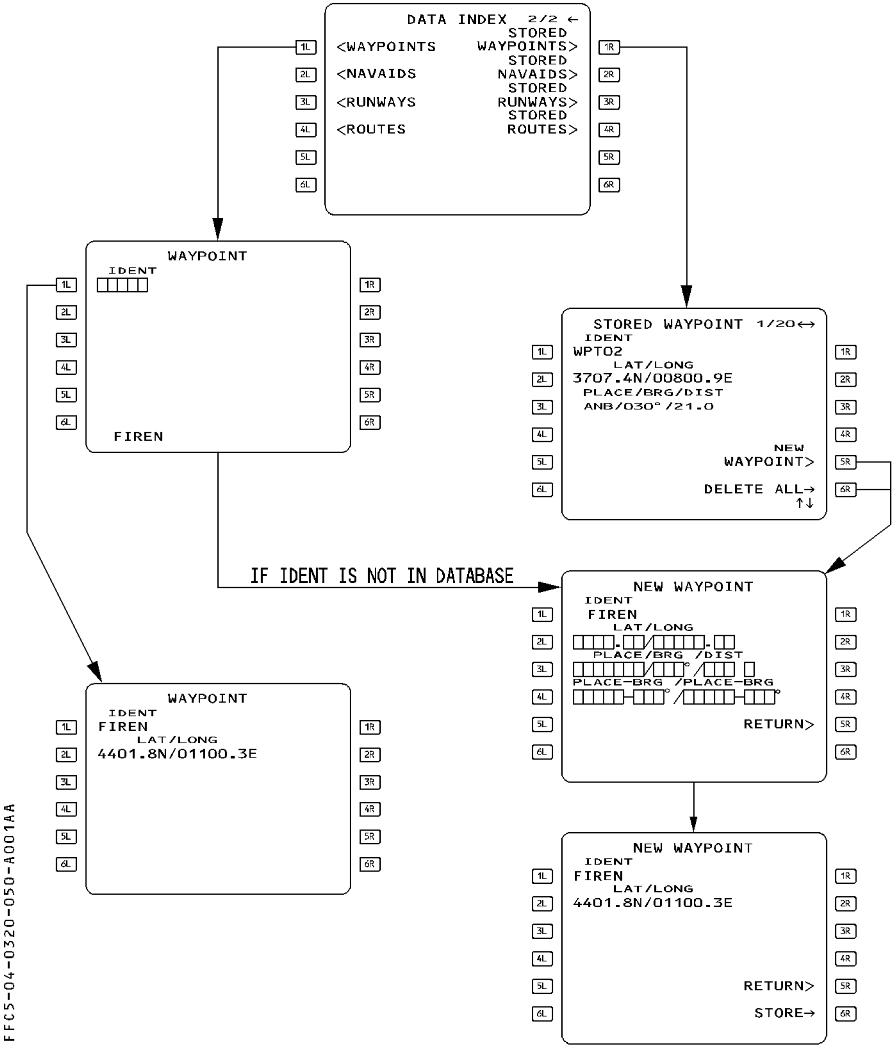
[1L] WAYPOINTS - [2L] NAVAIDS - [3L] RUNWAYS - [4L] ROUTES
These keys call up descriptions of waypoints, navaids, runways, and routes stored in the database so that the pilot can review it.

[1R] STORED WAYPOINTS - [2R] STORED NAVAIDS - [3R] STORED RUNWAYS - [4R] STORED ROUTES

These keys call up waypoints, navaids, runways, and routes that the pilot has stored, allowing the pilot to review them and to store them in or delete them from the database.

They are erased automatically in the done phase when a specific pin program is activated.

WAYPOINT/STORED WAYPOINT/NEW WAYPOINT PAGES



WAYPOINT PAGE

- The pilot can call up this page by pressing the 1L key when the data index page is on display. The display then shows waypoint information associated with the identifier the flight crew inserts in the [1L] field.
- It is possible to call up by this page any waypoint not stored in the stored waypoint list if they belong to the active, temporary or secondary flight plan.

STORED WAYPOINT PAGE

The pilot calls up this page by pressing the 1R key when the data index page is on display. This page displays waypoints that the pilot has defined and stored. It lists each stored waypoint along with a number that shows the relative order in which it was inserted in the database. This number is displayed in the upper righthand corner of the page. For example, "1/20" indicates that the waypoint was the first of 20 stored.

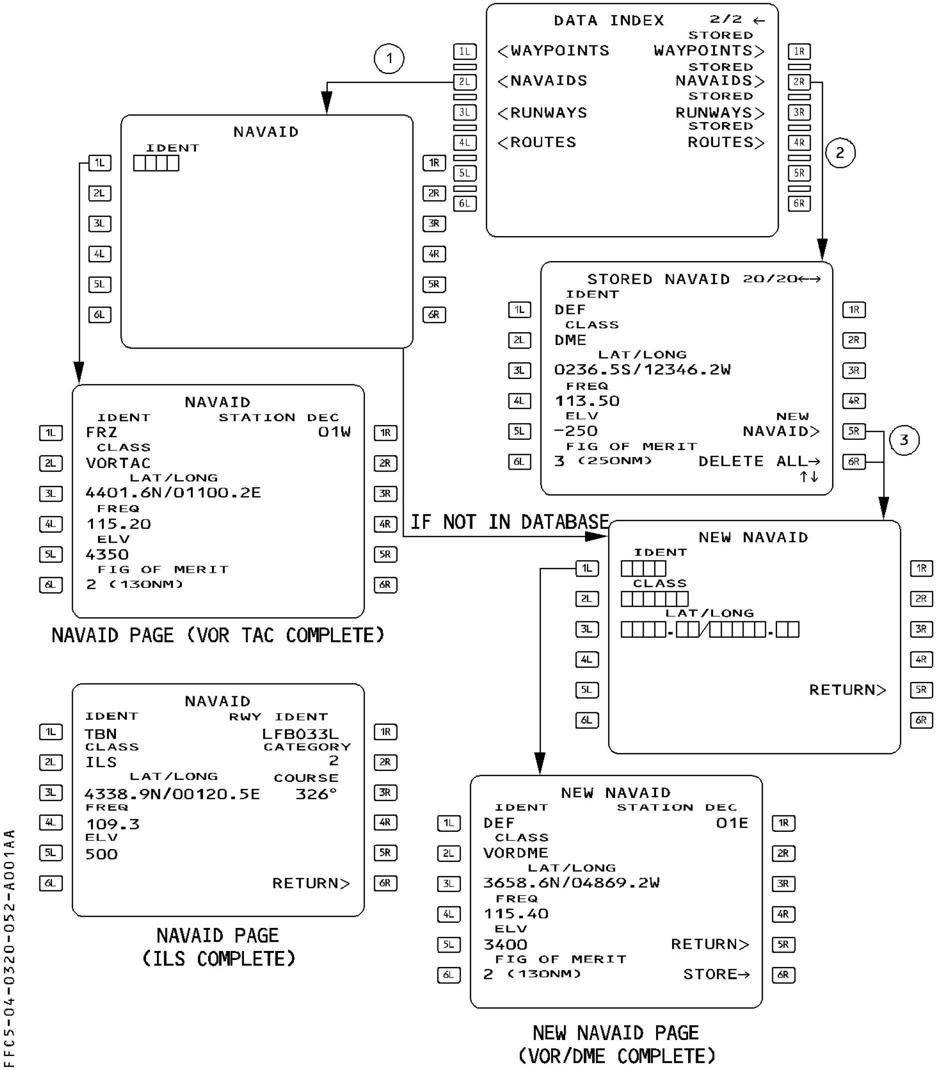
Note : Lat/long crossing points and Abeam/Radial Intercept points are never included in the stored waypoint list.

[1L] IDENT	To delete a waypoint, the pilot clears the 1L ident display.
[3L]	PLACE/BEARING/DISTANCE and
[4L]	PLACE-BEARING/PLACE-BEARING
[5R] NEW WAYPOINT	The pilot presses this key to call up the NEW WAYPOINT page.
[6R] DELETE ALL	The pilot presses this key and the label changes to amber CONFIRM DELETE ALL. Pressing a second time this key deletes all the waypoints stored by the flight crew except those currently in use in the active or secondary flight plan. ("F-PLN ELEMENT RETAINED" appears on the MCDU).

NEW WAYPOINT PAGE

- The pilot calls up this page by pressing the 5R key when the STORED WAYPOINT page is on display.
- The pilot can use this page to define and store up to 20 waypoints. Entering an additional waypoint deletes the first one.
  The pilot defines a waypoint by entering its ident in the data field next to 1L, then entering its position in the amber boxes.
  A "T" may be added if the bearing has been defined using the true North reference e.g. N42E002/015°T/120.0 or WPT 01. 030°T/WPT02-125°T.
  The STORE prompt appears next to 6R when the boxes are filled, and the pilot presses the key to store the waypoint in the database.
  If the pilot enters the waypoint's position as place/bearing/distance or place-bearing/place-bearing, the FMGC computes its latitude and longitude.

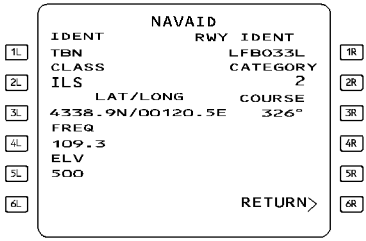
NAVAID/STORED NAVAID/NEW NAVAID PAGES



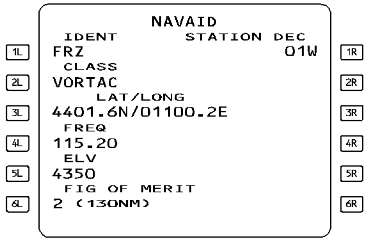
NAVAID PAGE

The pilot calls up this page by pressing the 2L key on the data index page.
This page displays navaid information associated with the identifier the pilot inserts in the [1L] field.

FFC5-04-0320-053-A001AA



NAVAID PAGE (ILS)



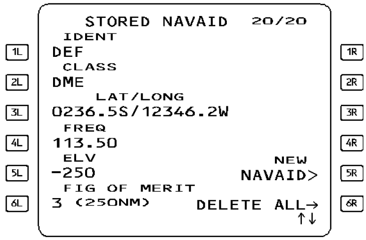
NAVAID PAGE (VOR TAC)

[2L] CLASS	This field identifies the navaid as VOR, DME, VOR DME, VORTAC, NDB, LOC, ILS, MLS, ILS/DME, MLS/DME, ILS/TAC or TACAN. The field displays NON COLLOCATED if the navaid is non collocated.
[4L] FREQ or CHAN	CHAN is displayed if the class of the navaid is an MLS or an MLS DME.
[5L] ELV	This field gives the elevation of the navaid in feet above sea level. It is not displayed for VOR or NDB.
[6L] FIG OF MERIT	This field shows how far out the FMGS can autotune a VOR, VOR/DME, VORTAC, or DME for display or for computing position. 0 : up to 40 NM 1 : up to 70 NM 2 : up to 130 NM 3 : up to 250 NM
[1R] STATION DEC or RWY IDENT	This is the magnetic declination in the navaid area (used only for VOR, VOR/DME, and VORTAC). The field displays RWY IDENT if the navaid is a LOC, ILS, MLS, ILS/DME, MLS/DME or ILS/TAC.
[2R] CATEGORY	This field shows the navaid's category if it is an ILS, ILS/DME, MLS, MLS/DME or ILS/TAC. A LOC DME has a category = 0.
[3R] COURSE	This is the localizer course if the navaid is an ILS or a LOC. A "T" is added if the course is true referenced.
[6R] RETURN	This prompt is displayed if the page has been accessed from the SELECTED NAVAID page. The pilot presses this key to return to the SELECTED NAVAID page.

STORED NAVAID PAGE

The pilot calls up this page by pressing the 2R key on the data index page.
He uses this page to display or delete navaids he has defined and stored.

FFC5-04-0320-054-A001AA



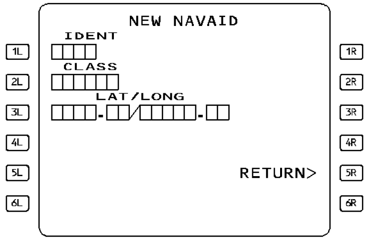
A number in the upper right hand corner of the screen shows the relative order in which the navaids were stored. (For example, 3/7 means third out of seven stored).
Slew keys give the pilot access to the different stored navaids.

[1L] IDENT — The pilot deletes a stored navaid by entering its ident in this field, then pressing the CLR key at the bottom of the MCDU control panel.

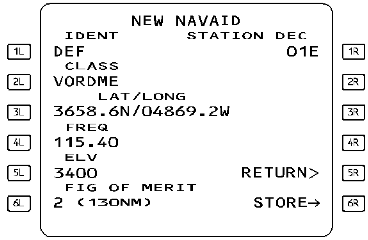
[6R] DELETE ALL and CONFIRM DELETE ALL
The pilot presses this key to erase all the stored navaids except those currently in use in the active or secondary flight plan. (The MCDU displays “F-PLN ELEMENT RETAINED.”).

NEW NAVAID PAGE

The pilot calls up this page by pressing the 5R key on the stored navaid page.



EMPTY NEW NAVAID PAGE



NEW NAVAID PAGE (VOR/DME)

FFC5-04-0320-055-A001AA

The pilot can use it to define and store up to 20 navaids. He must enter the navaid elements in two steps :

1. Enter the data in the lines of amber boxes.
2. Enter frequency, elevation, figure of merit, and station declination or ILS category and course, if applicable.

Note : *The pilot cannot create an ILS/DME, MLS/DME or a non-colocated navaid.*
If the runway associated with the ILS or MLS has been entered through the new runway page, the course, ident, and runway ident are already displayed on the new navaid page when it comes up (copied from the new runway page). See the discussion of the new runway page, below, for details.

[1R] STATION DEC — The pilot must enter the magnetic declination if the prompt is displayed. This prompt is displayed only for VOR, VORTAC or VOR/DME.
R For a true referenced station, (polar area), enter OT or TO.

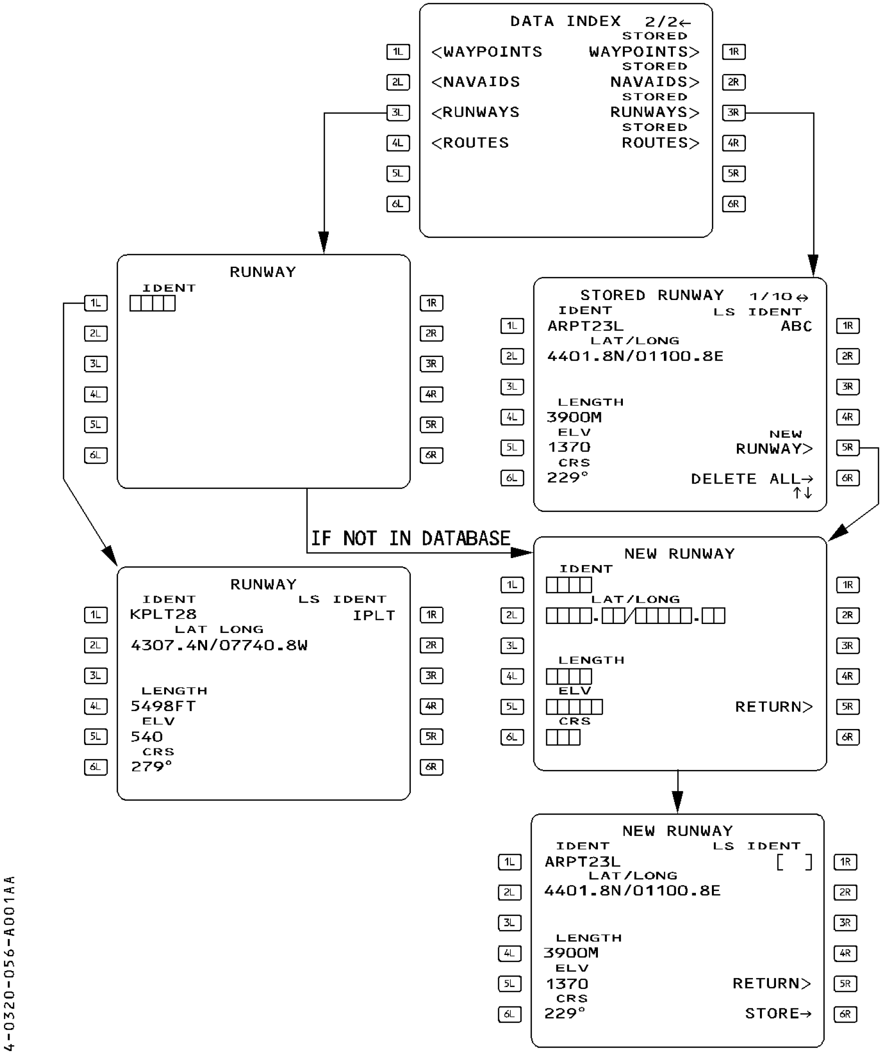
[3R] COURSE — If the navaid is an ILS, MLS, LOC, enter the course. Add a "T" for true reference e.g. 120°T.

[6R] STORE — This prompt appears when all the amber boxes are filled. The pilot presses the key to store the navaid.

A stored navaid is never used for position computation.

R

RUNWAYS/STORED RUNWAYS/NEW RUNWAY PAGES



NEW RUNWAY PAGE
(MANUALLY COMPLETED)

RUNWAY PAGE

This page displays the following information :

[1L] IDENT The runway ident, which comprises the airport identification and the runway direction. It uses six or seven digits (CYYZ 24L and LFRJ 08, for example).

[2L] LAT/LONG The latitude and longitude of the runway threshold.

[4L] LENGTH The runway length in meters (M) or feet (ft), in four digits (9999 ft).

[5L] ELV The elevation of the threshold in feet above sea level.

[6L] CRS The runway course (degrees magnetic). T is displayed, if true North referenced.

[1R] LS IDENT The LOC, ILS or MLS identifier.

STORED RUNWAY PAGE

The pilot uses this page to display or delete runways defined and stored by the flight crew. The stored runways are listed and numbered in the order in which they were inserted. The number is displayed in the upper righthand corner of the page. (For example, 2/4 means the runway is the second of four stored runways).
The pilot can delete any stored runway from the database by displaying its ident in the 1L field, then pressing the CLR key on the MCDU control panel.

R [6R] DELETE ALL and CONFIRM DELETE ALL
The pilot presses this key to erase all the stored runways, except those in use in the active or secondary flight plan. (The MCDU displays "F-PLN ELEMENT RETAINED").

[1L] to [6L] These fields are similar to RUNWAY page fields.

Note : When 10 runways are stored, entering a new stored runway deletes the first one of the list (1/10).

NEW RUNWAY PAGE

The pilot can use this page to define and store up to 10 runways.
When the pilot enters an ILS/LOC ident in the [1R] field, the new navaid page comes up. When the pilot has entered the necessary data in the new navaid page and stored it, the new runway page reappears.
The new runway page and the new navaid page (ILS/LOC) are not independent :

- When the flight crew defines the ILS/LOC first (on the new navaid page), the new runway page, when called up, already displays the RWY course, RWY ident, and ILS ident (copied from the new navaid page).
- When the flight crew defines the runway first (on the new runway page) the new navaid page, when called up, already displays the ILS course, ILS ident, and runway ident.

The pilot must enter the two directions of a runway on two different new runway pages (LFRJ 08 and LFRJ 26, for example) to allow a flight plan to select either one.

[1L] to [6L]	Enter information about the new runway.
[1R] LS IDENT	Enter the ILS/MLS/LOC ident. The NEW NAVAID page comes up.
[5R] RETURN	When displayed, pressing this key return to NEW NAVAID page.
[6R] STORE	This prompt appears only when all the amber boxes have been filled.

R *Note :* – *The NEW RUNWAY may be used as departure or destination but no SID or STAR can be associated or stored with this runway. Therefore the pilot will use it as an "independent" airport.*
A new runway is identified by the 4 letter ICAO airport identifier although all six or seven digits must be entered.

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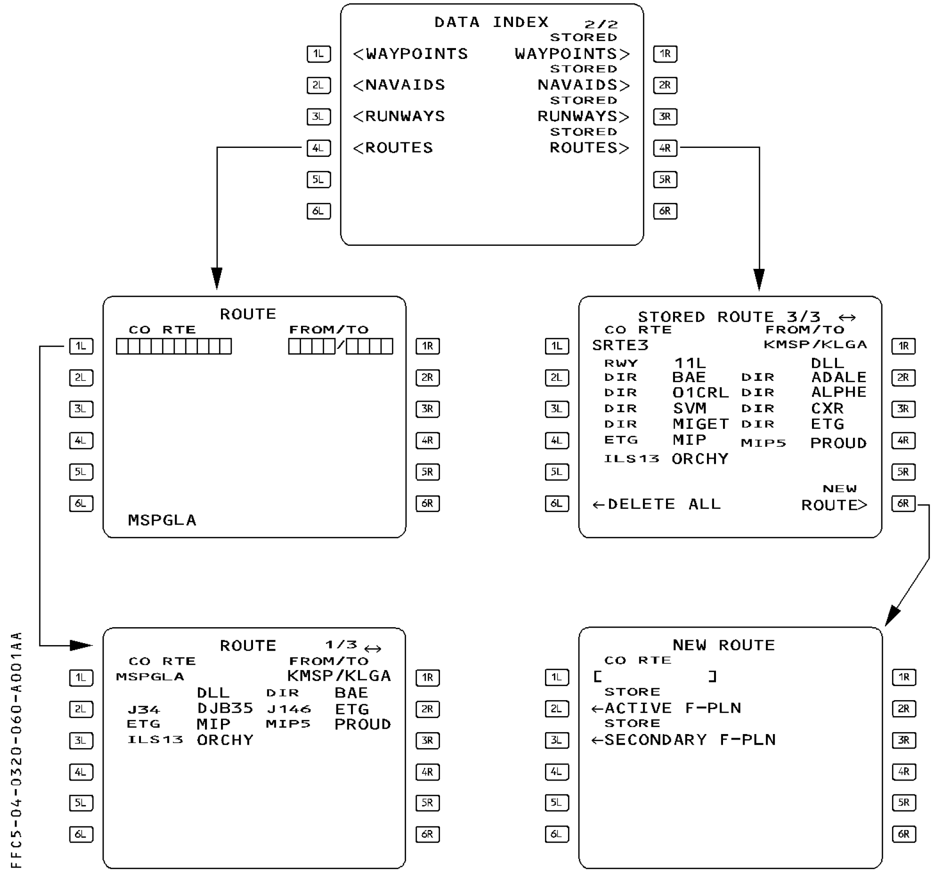
ROUTE/STORED ROUTE/NEW ROUTE PAGES



ROUTE PAGES

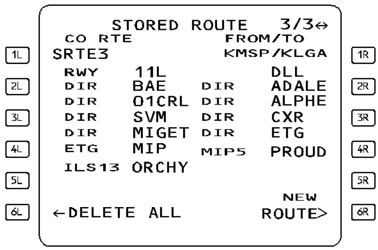
(Not-modifiable)

[1L] CO RTE	Any company route ident entered in this field causes all the elements of the route to be displayed.
Line 2 to Line 6	These lines display the various route elements, including waypoints and airways.

[1R] FROM/TO This field is automatically filled when the pilot enters the ident for a company route. When the pilot enters a city pair manually, the MCDU displays "NOT IN DATA BASE" if the city pair is not in the navigation database. If the city pair is in the database, the CO RTE field displays the first route stored (small font, blue). If more than one route is stored, the pilot can slew to see the different routes.

STORED ROUTE PAGE

FFC5-04-0320-061-A001AA



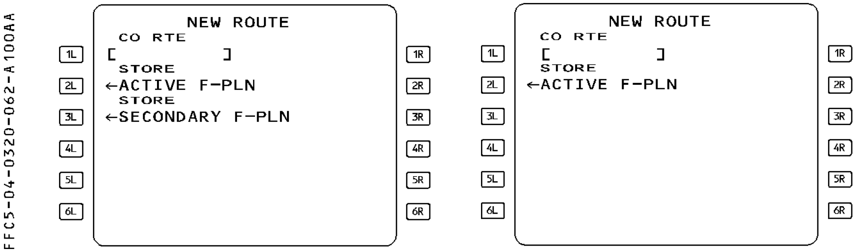
This page displays up to 5 routes stored by the pilot. The stored route are listed and numbered in the order of insertion. The number is displayed in the upper right hand corner of the page.

[1L] CO RTE	This field identifies the stored route. Clearing this field deletes the stored route.
Line 2 to Line 5	The fields in these lines are identical to the corresponding fields in the route page.
[6L] DELETE ALL	Pressing this key changes the label to amber CONFIRM DELETE ALL. Pressing a second time this key deletes all routes previously stored by the crew.
[1R] FROM/TO	This identifies the city pair of the stored route.
[6R] NEW ROUTE	Pressing this key calls up the new route page.

Note : When 5 routes are already stored, the pilot cannot insert a new stored route. The message "STORED ROUTE FULL" is displayed and the pilot must manually delete a route to store a new one.

NEW ROUTE PAGE

The pilot calls up this page by pressing the NEW ROUTE key on the stored route page. It
R can be used to store up to five new routes that have already been defined in the active or secondary flight plan.



[1L] CO RTE — This field enables the pilot to enter a new company route ident. If that ident has already been assigned, the entry is rejected.

[2L] STORE ACTIVE F-PLN (blue)
Pressing this key stores parameters of the active flight plan as the new route.
The display shows this prompt, when the system contains a FROM/TO, but only during preflight.

[3L] STORE SECONDARY F-PLN (blue)
Pressing this key stores parameters of the secondary flight plan as the new route.
The display shows this prompt when the system contains a FROM/TO and the secondary flight plan has not yet been sequenced.

Note : – *If it has not already been named, a stored route is named automatically when stored : SRTE 1 to SRTE 5.*
R – *When 5 routes are already stored, the pilot cannot insert a new route. The*
R *"STORED ROUTE FULL" message is displayed, and the pilot must manually delete*
R *a route in order to store a new one.*
– *Several elements of the flight plan are not retained, when the route is stored :*
  – *Pilot-entered holds*
  – *Offset*
  – *Pilot-entered constraints*
  – *Modifications to terminal procedures*
  – *Pseudo-waypoints*
  – *Step at optimum.*
  – *Pilot-entered Constant Mach Segment*
  The MCDU then displays "REVISIONS NOT STORED".

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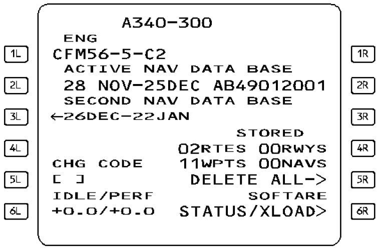
AIRCRAFT STATUS PAGE

The system automatically displays this page at power up, but the pilot may also call it up by pressing the DATA key on the MCDU console.



FFC5-04-0320-064-A100AA

TITLE AIRCRAFT TYPE

[1L] ENGINE TYPE The system uses this to calculate predictions.

R *Note : When the same performance database is used for different aircraft*
R *configurations, the aircraft or engine type displayed in the [1L] field may differ*
R *from the actual aircraft.*

[2L] ACTIVE DATABASE The display shows the validity period and part number in large font.

[3L] SECOND DATABASE The display shows the validity period and part number in small font. The pilot can press the 3L key to switch to the second database as the active database.

CAUTION

Cycling the database erases the primary and secondary flight plans, as well as stored data. The flight crew must never do this in flight.

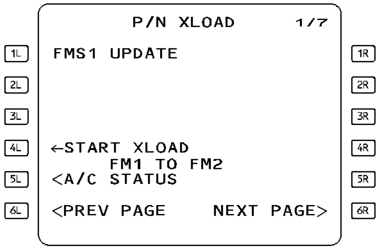
[5L] CHG CODE The maintenance crew can modify the IDLE/PERF factor displayed in [6L].
This field is displayed in the PREFLIGHT and DONE phases.
The label is displayed in small white font. The brackets, or the entered value, is displayed in large blue font.

[6L] IDLE/PERF	These factors can only be modified while the aircraft is on ground. If no value has been entered, the databases' default value is displayed in small font. Some aircraft require that the IDLE/PERF factor, be adjusted. To do so, the crew may use the following procedure : – Enter "ARM" in the CHG CODE line's [5L] brackets. – Write the new IDLE/PERF factor in the scratchpad. – Enter this new factor in line [6L]. The entered factor is displayed in large green font. The airline may change the ARM code by modifying the NAV DATABASE policy file.
[4R] STORED	This field displays pilot-stored data in a large green font. The field is blank if no data is stored. (The airline can choose to have this data automatically erased at the done phase).
[5R] DELETE ALL	Pressing this key changes the label to amber CONFIRM DELETE ALL. Pressing this key a second time deletes all pilot–stored data, except data that is part of the active and secondary flight plans.
[6R] STATUS/XLOAD	This prompt gives access to the P/N STATUS and P/N XLOAD pages.

P/N XLOAD PAGE

This page allows the crossloading of all the databases or the configuration files' part numbers which are different between both sides. Crossloading from this page avoids reviewing each individual P/N STATUS pages.

FFC5-04-0320-065A-A100AA

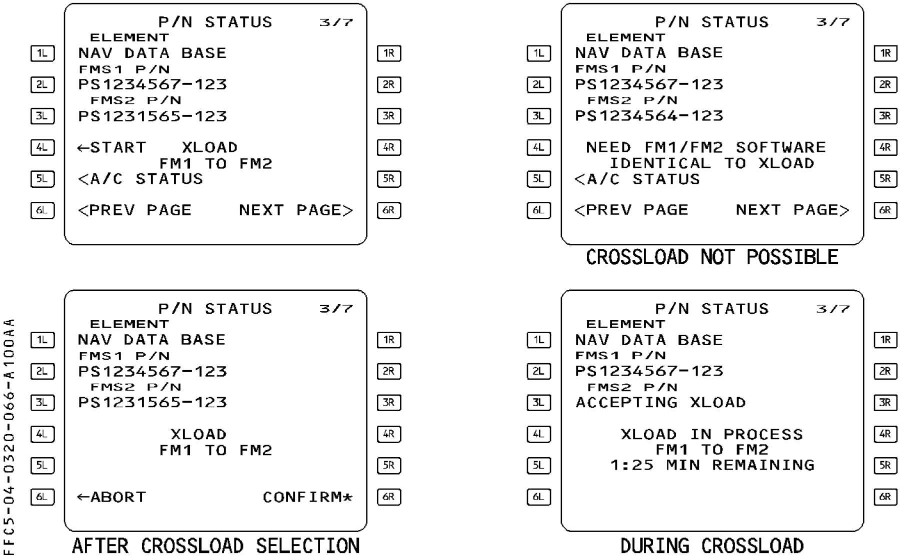


TITLE	P/N XLOAD
[1L]	FMS1 UPDATE : FMS1 can be loaded on the right side MCDU FMS2 UPDATE : FMS2 can be loaded on the left side MCDU
[4L]	START XLOAD : This blue prompt is displayed, only if the system detects a difference between both side part numbers. FMS1/FMS2 IDENTICAL : Displayed in green, when there is no difference between both side part numbers.
Line 5	FM1 TO FM2 or FM2 TO FM1 : Indicates the crossloading direction. This line is not displayed when there is no difference between both side part numbers.
[5L]	A/C STATUS : This white prompt is displayed when there is no crossloading in process. It gives access to the A/C STATUS page. MM : SS MIN REMAINING : Indicates the time remaining for crossload completion, when a crossload is in process.
[6L] PREV PAGE	The pilot presses this key to return to the A/C STATUS page.
[6R] NEXT PAGE	The pilot presses this key to callup the next P/N XLOAD page.

P/N STATUS PAGES

These pages allow reviewing and crossloading the following databases and configuration files between both FMS :

- — page 2 FMS SOFTWARE part numbers
- — page 3 NAV DATA BASE part numbers
- — page 4 FM AIRLINE CONFIG part numbers
- — page 5 FM OPTIONS CONFIG part numbers
- — page 6 PERF DATA BASE part numbers
- — page 7 FLIGHT TEST DATA BASE



CROSSLOAD NOT POSSIBLE

AFTER CROSSLOAD SELECTION

DURING CROSSLOAD

TITLE P/N STATUS

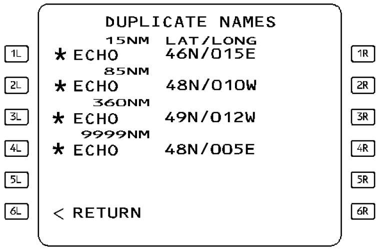
Line 1 ELEMENT Indicate the name of the database or configuration file that can be crossloaded :

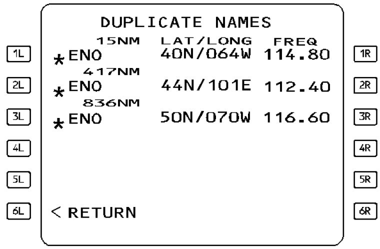
- — FMS SOFTWARE on page 2
- — NAV DATA BASE on page 3
- — FM AIRLINE CONFIG on page 4
- — FM OPTIONS CONFIG on page 5
- — PERF DATA BASE on page 6
- — FLIGHT TEST DATABASE on page 7.

Line 2 FMS1 P/N Line 3 FMS2 P/N	These fields display the part numbers of the database or configuration file stated on line 1, that are installed on FMS 1 and FMS 2. Identical part numbers are displayed in green, different ones in amber. During crossload, the updated part number is replaced by the amber "ACCEPTING XLOAD" message.
Line 4	This line is empty when the active flight phase is not Preflight or Done. XLOAD FMx TO FMy or START XLOAD FMx TO FMy : This blue prompt is displayed when the database or configuration file stated on line 1 can be crossloaded. XLOAD ARMED : Displayed in blue on the receiving FM when the crossload has been requested, but not yet confirmed. XLOAD IN PROCESS : Displayed in white when the crossload is ongoing. XLOAD NOT SUPPORTED : Crossloading is unavailable for this element. NO P/N TO XLOAD : The element is missing. NEED FG1/FG2 IDENTICAL TO XLOAD : The FG software of the receiving side is incompatible with the FG software to be crossloaded. NEED FM1/FM2 SOFTWARE IDENTICAL TO XLOAD : The crossloaded element is incompatible with the receiving side FM software.
[5L] A/C STATUS	This prompt is available when no crossload is in process. This gives the pilot access to the aircraft status page. MM : SS MIN REMAINING : Displays the time remaining to complete the crossload, when a crossload is in process.
[6L] PREV PAGE	This key calls up the previous P/N STATUS page.
ABORT	This amber prompt is displayed when a crossload is in process. The pilot uses it to stop the crossload.
[6R] NEXT PAGE	This key calls up the next P/N STATUS page.
CONFIRM*	This amber prompt is displayed when a crossload has been armed. The pilot presses it to start the crossload.

DUPLICATE NAMES PAGE

This page, which appears automatically, allows the pilot to select a specific waypoint, airport, or navaid when the database holds more than one under the same identifier.





FFC5-04-0320-067-A100AA

The pilot presses the key adjacent to a waypoint, navaid, or airport to select it as the one to be entered. When the pilot has finished, the page automatically reverts to the previously displayed page.

Distance
The direct distance to the aircraft is displayed in green above each name. If this distance is greater than 9999 NM, 9999 NM is displayed.

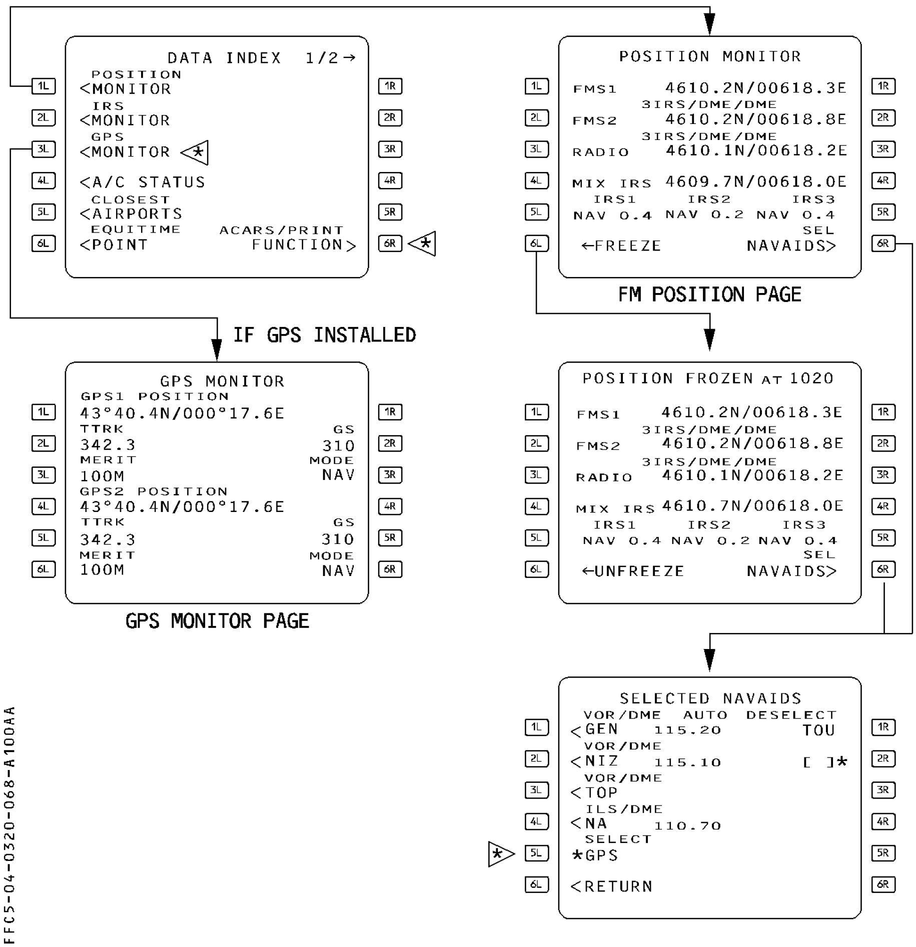
LAT/LONG column
This column lists the rounded off latitudes and longitudes, of the different points using the same identifier.

FREQ/CHAN column
This column lists the navaids frequencies, if any. It displays CHAN for an MLS.

Note : · *The DUPLICATE NAMES page is not displayed when 2 waypoints with the same ident belong to the same airway. The system selects the first waypoint found in the database.*
· *The waypoints or navaids are ranked by their distance from the aircraft position.*
· *When a waypoint is named using ICAO phonetic alpha characters, a minus sign and the ICAO code of the country where the waypoint is located, are displayed. e.g. Alpha in France becomes A-LF ; Bravo in England becomes B-EG.*

POSITION MONITOR PAGE

The position monitor page displays all the different positions that the FMGC has computed with the different methods of navigation available. It also displays which method obtained each position. (The positions should be almost identical).
The flight crew calls up this page by pressing the 1L key on the data index page.
R



POSITION MONITOR AND POSITION FROZEN PAGE

Line 1 FMS 1	This line shows the latitude and longitude as calculated by the onside FMGC, and the method of navigation the FMGC used for that calculation (for example, "3IRS/DME/DME").
Line 2 FMS 2	This line shows the latitude and longitude as calculated by the opposite FMGC, and the method of navigation used.
Line 3 RADIO or GPS or GPIRS	This line shows the latitude and longitude the onside FMGC calculated from selected radio navaids (for example, DME/DME, VOR/DME, or LOC) or from GPS or GPIRS.
Line 4 MIX IRS	This line shows the latitude and longitude of the weighted mean inertial reference system (IRS) that the onside FMGC calculated from the available IRSs.
Line 5 IRS 1,2,3	This line shows the deviation in nautical miles of each IRS position from the onside FMGC position. It also displays the IRS mode, which can be INVAL, ALIGN, NAV or ATT. *Note : INVAL is displayed when an ADIRS has failed or the IRS position is not refreshed.*
[6L] FREEZE/UNFREEZE	The flight crew presses this key to freeze (or unfreeze) all the data displayed on the page. When the data are frozen, the title of the page specifies the time at which they were frozen.
[6R] SEL NAVAIDS	The flight crew presses this key to gain access to the selected navaids page.

SELECTED NAVAIDS PAGE

MODIFIABLE ONLY FOR DESELECTION

Line 1	This field displays the navaid tuned for display purposes, and the tuning mode (AUTO, MAN, or RMP).
Line 2 and 3	These fields display the navaids, if any, tuned for the calculation of radio position by the FMGEC.
[4L]	This field displays the tuned ILS (or MLS), if any.

[5L] DESELECT/SELECT GPS	The crew presses this key to manually select or deselect the GPS for position computation. Upon transition to DONE phase the prompt returns to DESELECT status. If the pilot deselects the GPS, "GPS IS DESELECTED" is displayed when the aircraft is at less than 80 NM from the top of descent, or in approach phase.
[6L] RETURN	The pilot presses this key to return to the position monitor page.
[1R] DESELECT to [6R]	The pilot deselects a navaid by entering its identifier in one of these six fields. Once deselected in this way, the navaid can no longer be tuned manually through the entry of its ident, nor can it be autotuned for display or determination of the position for the rest of the flight. The deselection is cleared – manually by a CLR action into this field, or – automatically upon transition to the done or preflight phase, or upon activation of the second database.

The pilot may deselect as many as six stations.

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IRS MONITOR PAGE

This page displays the IRS data. The crew calls up this page by pressing the IRS monitor prompt of the DATA INDEX page.

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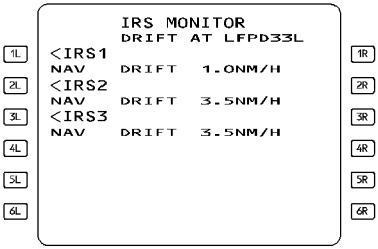
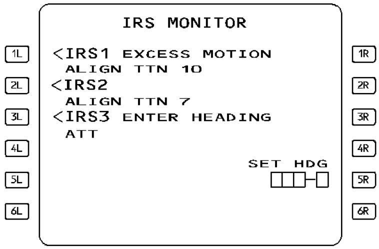


IRS IN NAV

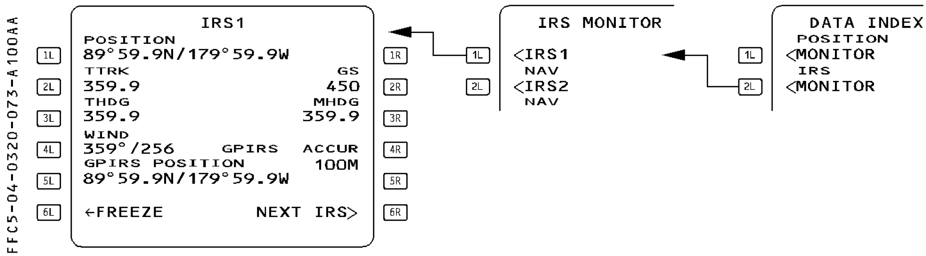


IRS IN ALIGN or ATT

TITLE DRIFT AT XXXX (amber)	Displays “DRIFT AT” runway identifier if at least one IRS average drift is displayed.
[1L] to [3L] IRS 1(2) (3)	(white) These prompts allow access to the associated IRS pages. Each label line displays the mode (NAV, ALIGN, ATT or INVAL) the average drift (upon transition to DONE phase) the Time To Nav (if IRS in align) for each IRS.
[1R] to [3R]	Displays the status message of the associated IRS in green small font. List of available messages : IR FAULT — CHECK C/B DELAYED MAINT — CDU FAULT ENTER PPOS — ENTER HEADING SELECT ATT — REENTER PPOS EXCESS MOTION — SYS BELOW – 15° SWITCH ADR
[5R] SET HDG (white)	This field is displayed if at least one IRS is in ATT mode. This function allows initialization of a heading for IRS in ATT mode. · If a heading has been entered in this field or on the ADIRS panel the value is displayed in blue. · If not, amber boxes are displayed.

IRS 1 (2)(3) PAGE

This page displays the IRS parameters, and GPS/IRS hybrid parameters, if GPS is installed. This page is accessed either by pressing the 1L key from the IRS MONITOR page, or the NEXT IRS prompt on another IRS page (closed loop).

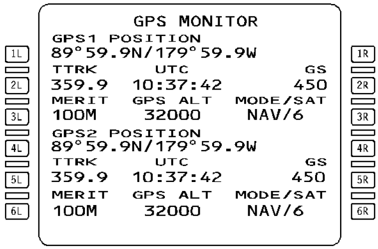


TITLE	Displays the selected IRS in large white font. When data is frozen, IRS is replaced by "IRS FROZEN AT", followed by the time at which the pilot has frozen the display.
[1L] POSITION	Displays the latitude/longitude given by the selected IRS.
[2L] TTRK	True track
[3L] THDG	True heading
[4L] WIND	True wind direction/velocity
[5L] GPIRS	GPS/IRS hybrid position of the IRS
R [6L] FREEZE/UNFREEZE	R Allows the crew to freeze or unfreeze all data displayed on R all three IRS pages. When the data is frozen, the title of the R page specifies the time at which it was frozen. It is R automatically unfrozen when the page is exited.
[2R] GS	Ground speed
[3R] MHDG	Magnetic heading
R [4R] GPIRS ACCUR	GPS/IRS Figure of Merit (meters or feet)
[6R] NEXT IRS	This prompt enables the display of another IRS page (closed loop IRS 1 → 2 → 3 → 1)

GPS MONITOR PAGE ◁

This page displays the GPS data. The pilot calls up this page by pressing the GPS MONITOR prompt of the DATA INDEX page.

FFC5-04-0320-074-A102AA



Line 1 and 4 GPS 1,2	POSITION
[2L] and [5L] TTRK	GPS 1, 2 true track
[3L] and [6L] MERIT	GPS 1, 2 figure of merit (meters or feet)
[2R] and [5R] GS	GPS 1, 2 ground speed
[3R] and [6R] MODE/SAT	GPS 1, 2 mode : (INIT, ACQ, NAV, TEST, FAULT, AIDED or ALTAID) and number of satellites tracked.

INIT	:	System initialization
ACQ	:	Satellite acquisition
NAV	:	Normal mode
TEST	:	System test
FAULT	:	Invalid system
ALTAID/AIDED	:	Degraded modes. GPS uses aircraft inputs for computation purposes.

[2] and [5] UTC : GPS 1, 2 UTC

[3] and [6] GPS ALT : GPS altitude is displayed for information purposes. It is not used by the FMGS.

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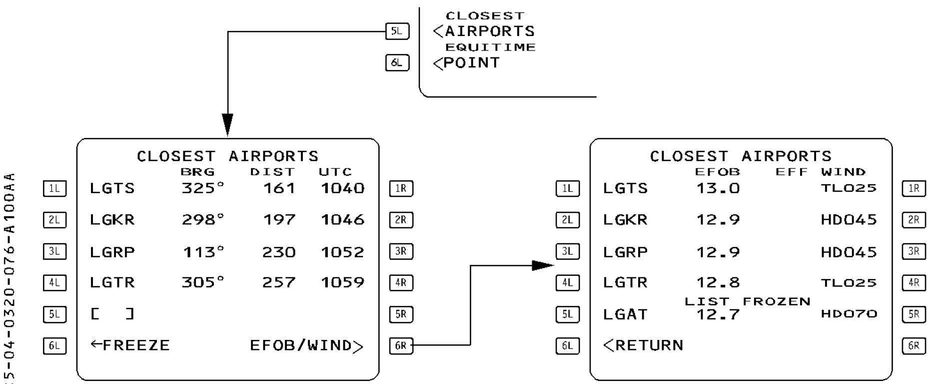
CLOSEST AIRPORTS PAGES

The system selects automatically the 4 closest airports from the current aircraft position and displays them on these pages. A fifth one can be selected by the pilot.
The page 1 displays the bearing, distance and time to go to each airport, the page 2 displays the EFOB and allows the crew to enter an effective wind to be flown to each airport.
The flight crew accesses the CLOSEST AIRPORTS page 1 by depressing 5L key from DATA INDEX A page, the CLOSEST AIRPORTS page 2 by pressing the EFOB/WIND prompt (6R key) on the page 1.

DATA INDEX PAGE



CLOSEST AIRPORTS 1 CLOSEST AIRPORTS 2

[1L] - [1R] to [4L] - [4R]: The four closest airports are extracted from the database, and ranked by distance from the aircraft position.

- BRG: displays the current bearing from the aircraft position to the airport. T is added if true reference is selected.
- DIST: displays the current great circle distance from the aircraft position to the airport.
- TIME or UTC: displays the predicted time to the airport computed using the current wind or a wind vector entered on the page 2 and the speed according to current mode (managed or selected).
  The time is only computed in cruise phase.

[5L]: The crew may enter a fifth airport here using the 4 letter code. The entry may be modified at any moment even when the “LIST FROZEN” is displayed.

If the pilot enters an airport that is not in the database, then "NOT IN DATABASE" appears in the scratchpad.

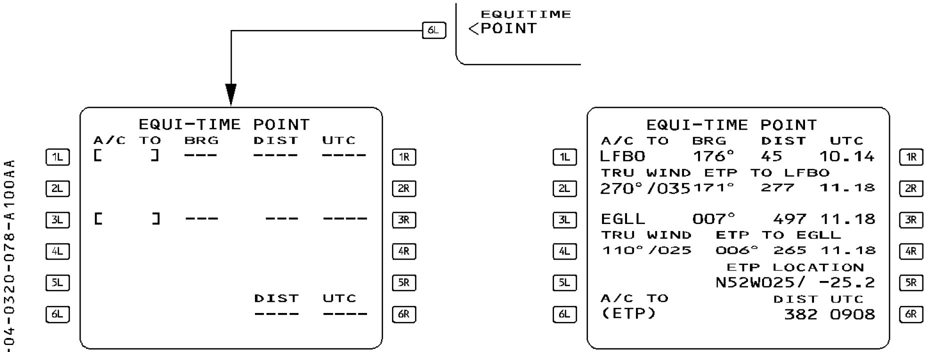
[1L] - [1R] EFOB to [5L] - [5R] EFF WIND	Displays the EFOB at each airport. EFOB is only computed in cruise phase. The pilot may enter here an anticipated headwind or tailwind along the bearing to the airport. If the entry is preceded by +, T, TL a tail wind is assumed. If the entry is preceded by –, H, HD a head wind is assumed. Before the pilot entry, a default value may be displayed, based on the current wind. The effective wind is used to compute the EFOB and time to the airport.
[6L] FREEZE/UNFREEZE	This prompt allows the pilot to freeze and unfreeze the list of four airports. The list is automatically frozen upon accessing the page 2. It will remain frozen upon returning to page 1. The "LIST FROZEN" message is always displayed on page 2.
RETURN	Returns to the page 1
[6R] EFOB/WIND	Gives access to the page 2. Pressing this prompt automatically freezes the list of four closest airports.

Note : – *If the aircraft position becomes invalid, all fields are dashed, FREEZE/UNFREEZE and EFOB/WIND prompts are removed, LIST FROZEN is displayed and the A/C POSITION INVALID message is displayed in the scratchpad. Page 2 may not be accessed.*
– *Predictions (EFOB, TIME) displayed on the page assume :*
· *ECON CRZ speed (managed) or current selected speed (selected) ;*
· *CI (for managed speed only) and CRZ FL from primary F-PLN are kept ;*
· *Constant wind value ;*
· *In case of engine out, the aircraft altitude is the minimum of (CRZ FL, EO REC MAX) ;*
· *Downpath steps are not considered ;*
· *Descent fuel burn is a conservative value which only depends on the difference between current CRZ ALT and destination altitude.*

EQUI-TIME POINT PAGE

The pilot will use this page to require an equitime point computation between two different points (airport, navaid runway or waypoint). This pseudo-waypoint is displayed on the navigation display along the F-PLN. The EQUI-TIME POINT page is accessed by pressing the 6L key from the DATA INDEX page :
R

DATA INDEX PAGE 1



EQUI-TIME PAGE
NO DEFAULTED REF

COMPUTED EQUI-TIME POINT

[1L] A/C TO (blue) Displays reference waypoint 1.
[3L] A/C TO (blue) Displays reference waypoint 2.

Note : Origin and destination airports are used by default for respective reference points 1 and 2 until a pilot entry is made.

[1R] BRG/DIST/UTC and (TIME)
This field displays the bearing, distance, time from the
R aircraft's current position to the reference waypoint 1.
[3R] (green) Idem for the reference waypoint 2.
BRG : Displays the current great circle bearing from the
R aircraft's position to the reference waypoint. T is added, if TRUE reference is selected.
DIST : Displays the current great circle distance from the
R aircraft's position to the reference waypoint.
TIME : Displays the predicted time to the reference waypoint (computed using the current wind or a wind vector entered by the crew).
Time is only computed in cruise phase, otherwise it is dashed.

[2L] and [4L] TRU WIND and (blue)

The pilot may enter the wind (direction/velocity) at the reference waypoint and CRZ FL :
This wind is used to compute the time from the aircraft position to the reference waypoint and to locate the equitime point itself.
R If no entry is made, the wind/velocity field will read zero.

[2R] and [4R] EPT TO XXX and (green)

This field displays the bearing distance and time from the equitime point (ETP) position to the reference waypoint.

[5R] ETP LOCATION

This field displays the ident of the next waypoint following the equitime point. The distance along the flight plan from the equitime point to the indicated waypoint is provided.

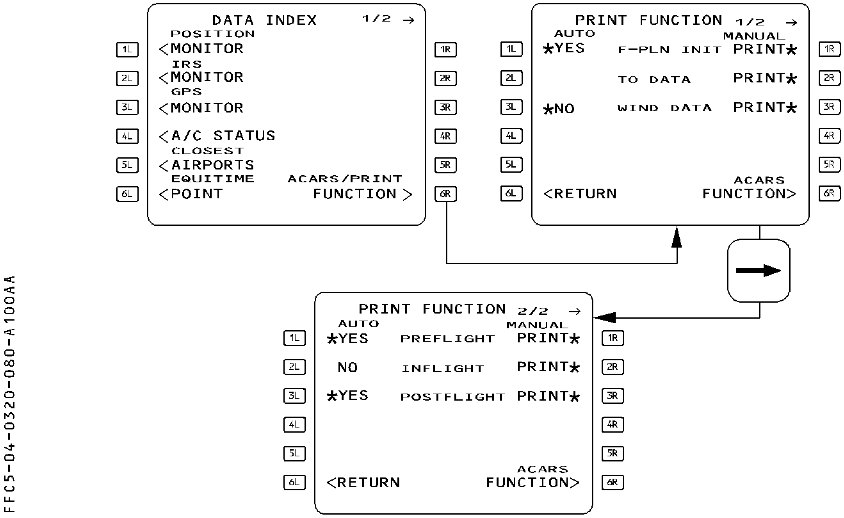
[6L] - [6R] A/C TO (ETP) DIST/UTC (green)

This field displays the distance and time from the current aircraft position to the equitime point along the flight plan.
If at least one reference waypoint exists but no equitime point exists, the field is blank and NO ETP is displayed in 6L.

Note : The assumptions for the equitime point computation include the cost index, speed managed (with SPD LIM), and winds.
In case of engine-out, the EO LRC speed is considered.

PRINT FUNCTION PAGES

The PRINT FUNCTION pages enable the pilot to print the active data relative to the current flight.
The "PRINT FUNCTION" prompt is displayed on the DATA INDEX 1/2 page [6R] key, and gives access to the PRINT FUNCTION page 1 and 2.



PRINT FUNCTION PAGE 1/2

The page displays the manual printing capabilities for the active flight plan data (line 1), the active takeoff data (line 2), the wind data (line 3).

Left column

AUTO (white)
* YES (blue) Line 1 : the uplinked flight plan INIT data are automatically printed when received.
Line 2 : the uplinked takeoff data are automatically printed at uplink reception.
Line 3 : the active wind data are automatically printed at uplink reception.
* NO (blue) : The report displayed on the line is not automatically printed. The pilot can reactivate the function by pressing the left key of the line.
Blank : The report displayed on the line is not automatically printed. The pilot cannot reactivate the function, but you can still print manually using the right hand key.

Right column

MANUAL (white)	Displays the status of the manual printing capability of the active data (and not the ACARS uplink data)
PRINT * (amber)	Pressing the right keys prints the following active data : Line 1 : active flight plan init data. Line 2 : active takeoff data. Line 3 : active wind data. If the star is not displayed, the printing is not possible. When the key has been pressed, the star is removed until the data are printed.
[6L] RETURN	Pressing this key reverts the display to the DATA INDEX page.
[6R] ACARS FUNCTION	Pressing this key reverts the display to the ACARS FUNCTION page.

PRINT FUNCTION PAGE 2/2

This page describes the printing capabilities of the reports displayed on line 1 to 3.

Left column

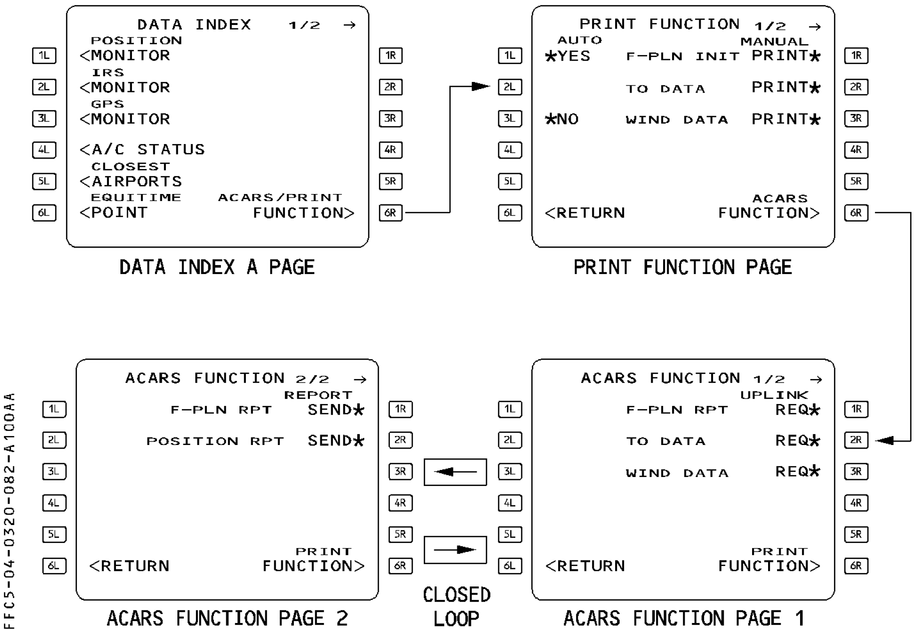
AUTO (white)	
* YES (blue)	Line 1 : the PREFLIGHT report is automatically printed at engine start. Line 2 : the INFLIGHT report is automatically printed at takeoff. Line 3 : the POSTFLIGHT report is automatically printed at engine shutdown.
* NO (blue)	The report displayed on the line is not automatically printed. The pilot can reactivate the function by pressing the left key of the line.
NO (without a star)	The automatic printing is deactivated internally for the report. The pilot cannot reactivate it.

Right column

MANUAL PRINT *	Pressing a right key prints the report displayed on the line. If the star is not displayed, the printing is not possible. When the key is pressed, the star is removed until the report is printed.
[6R] ACARS FUNCTION	The crew presses this key to revert to the ACARS FUNCTION page.

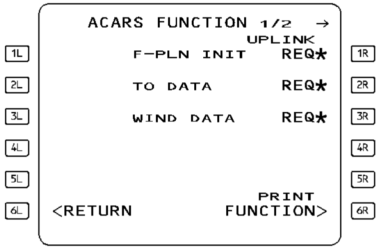
ACARS FUNCTION PAGE

The ACARS FUNCTION pages display the functions that enable the pilot to send manual requests or reports to the ground.
All functions displayed on page 1 and 2 may be inhibited through a pin program of the navigation database policy file.
ACARS/PRINT FUNCTION prompt is displayed on the DATA INDEX page 1/2. Pressing this key displays the PRINT FUNCTION page from which the ACARS FUNCTION page can be accessed.



ACARS FUNCTION PAGE 1

FFC5-04-0320-083-A100AA



TITLE	ACARS FUNCTION 1/2 in white
Line 1 F-PLN INIT REQ*	Pressing this key sends a request for flight plan to the ground (downlink message). INIT REQUEST prompt of the INIT A page provides the same function.
Line 2 TO DATA REQ*	Pressing this key sends a request for takeoff data. Displayed in DONE and PREFLIGHT phases. TO DATA REQUEST prompt of the UPLINK TO DATA REQ page provides the same function.
Line 3 WIND DATA REQ*	Pressing this key sends a request for wind data. WIND REQUEST prompt of the CLIMB, CRUISE and DESCENT WIND pages provides the same function.

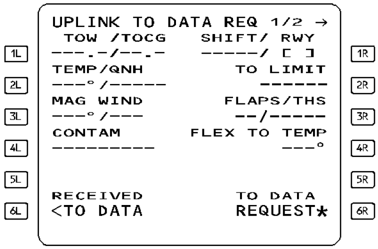
Note : If "REQ" is not followed by a star, the request cannot be sent (downlink message).
When a function (line 1 or 2 or 3) is deactivated using the navigation database policy file, the corresponding line is blank.

[6L] RETURN	The pilot presses this key to make the display revert to the DATA INDEX page.
[6L] PRINT FUNCTION	The pilot presses this key to access the PRINT FUNCTION page. (Refer to PRINT FUNCTION page).

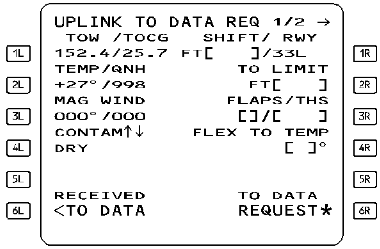
UPLINK TO DATA REQ PAGES

This page allows the pilot to send a request for takeoff data for up to 2 runways. There is one page for each runway. The page is accessed from the PERF TAKEOFF page, or from the
R UPLINK XXX (MAX or FLX or DRT) TO DATA page, by pressing the UPLINK TO DATA prompt.

FFC5-04-0320-084-A100AA



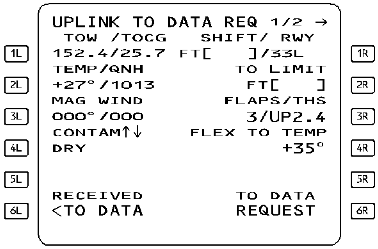
NO RUNWAY DEFINED



RUNWAY DEFINED, DEFAULT VALUES DISPLAYED.

TITLE	The title appears in white.
[1L] TOW/TOCG (green)	This field is dashed, until a runway is defined in the [1R] field. The TOW/TOCG are the values of the INIT B and FUEL PRED pages. If not available, dashes are displayed. They cannot be modified by the pilot.
[2L] TEMP/QNH or QFE (green/blue)	This field is dashed until a runway is defined in the [1R] field : TEMP = Defaulted to SAT ; cannot be modified by the crew. QNH or QFE = Defaulted to FCU selection, and can be modified by the pilot.
[3L] MAG WIND (blue)	This field is dashed, until a runway is defined in the [1R] field, and displays the wind at the origin. It can be modified by the pilot.
[4L] CONTAM (blue)	This field is dashed, until a runway is defined in the [1R] field. The display is defaulted to DRY. The slew keys allow the pilot to modify the runway contamination : DRY, WET, 1/4 WATER, 1/2 WATER, 1/4 SLUSH, 1/2 SLUSH, COMP SNOW.
R [6L] RECEIVED TO DATA	This prompt calls up the UPLINK MAX (or FLX or DRT) TO DATA page that displays the data received by ACARS.

FFC5-04-0320-085-A100AA

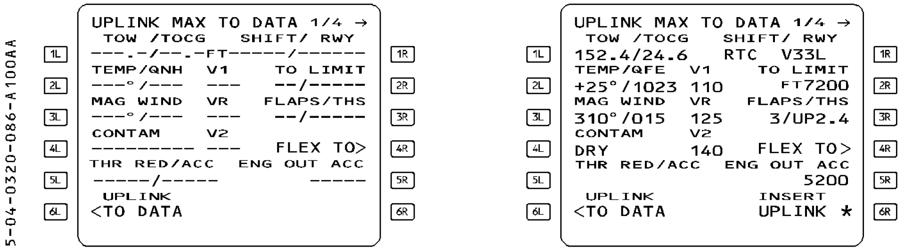


[1R] SHIFT/RWY (blue)	This field is dashed until a runway is defined in the F-PLN. If a runway is defined in the F-PLN, it is automatically filled: SHIFT = value from PERF TO page or blue bracket if no value defined. RWY = F-PLN departure runway This field is modifiable by the pilot.
[2 R] TO LIMIT (blue)	It is dashed until a runway is defined in [1R] field. It displays blue brackets [ ] when a runway is defined. The pilot may enter a length considering obstacles on the runway.
[3R] FLAPS/THS (blue)	This field is dashed until a runway is defined in [1R] field; then defaulted to values from PERF TO page. Blue brackets are displayed if PERF TO page has no defined values.
[4R] FLEX TO TEMP (blue)	This field is dashed until a runway is defined in [1R] field; then it is defaulted to values from the PERF TO page. Blue brackets are displayed if PERF TO page has no defined values. This field is modifiable by the pilot. The pilot may enter a FLEX TO temperature (FXX)
[6R] TO DATA REQUEST* (amber)	Pressing the key sends the takeoff data request message to the ground. The star disappears when the request is sent. The star is displayed again when data are available.

Page 2/2 is a page used for requesting a second runway data.

Note : – *If the UPLINK TO DATA REQ page 2 is accessed (page 1 being filled), the fields of page 2 are filled with default values after entry of a runway in [1R]. QNH or QFE and wind are common with page 1.*

UPLINK MAX TO DATA PAGES



REQUEST IS PENDING

This page is accessed from the UPLINK TO DATA REQ page by pressing the RECEIVED TO DATA key.
There is a set of 2 pages (MAX TO DATA and FLEX DRT TO DATA) for each of the 4 uplinked runway data. Uplinked data is displayed in green, and cannot be modified by the pilot.

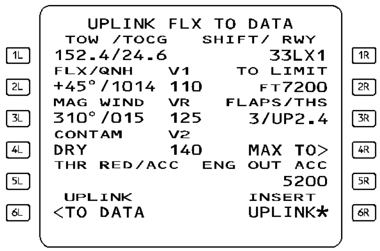
[1L] TOW/TOCG	Uplinked reference takeoff gross weight, and takeoff center of gravity.
[2L] TEMP/QNH (or QFE)	Uplinked temperature and baro setting.
[3L] MAG (TRUE) WIND	Uplinked takeoff runway wind. MAG or TRUE, depending on the runway reference.
[4L] CONTAM	Uplinked takeoff runway contamination.
[5L] THR RED/ACC	Uplinked thrust reduction and acceleration altitudes.
[6L] UPLINK TO DATA	Pressing the key calls up the UPLINK TO DATA REQ page.
V1, VR, V2	Uplinked takeoff speeds.
[1R] SHIFT/RWY	Uplinked TO runway ident, runway intersection, and position shift.
[2R] TO LIMIT	Uplinked runway length remaining.
[3R] FLAPS/THS	Uplinked FLAPS/SLATS CONF and TRIM position.
[4R] FLEX TO	Pressing the key calls up the UPLINK FLEX (or DRT, if derated takeoff option is installed) TO DATA pages.
R [5R] ENG OUT ACC	Uplinked engine-out acceleration altitude.

R [6R] INSERT UPLINK* Uplinked takeoff data is available for insertion.
R Selecting this prompt inserts the following data in the FM :
R – V1, VR, V2
R – THR RED/ACC, ENG OUT ACC altitudes
R – MAG WIND
R – FLAPS/THS
R – SHIFT
R – FLEX or DRT
R The display reverts to the PERF TO page ; the asterisk disappears.
R This field is not displayed, if the runway does not match the active runway, or if the uplinked TOW/TOCG differs from the current TOW/TOCG (if already existing). The "CHECK TAKEOFF DATA" message is displayed on the MCDU scratchpad.

R *Note : All previously-received data is replaced by the new uplinked data.*

UPLINK FLX (OR DRT) TO DATA PAGES

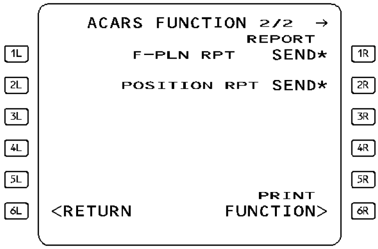
FFC5-04-0320-087-A100AA



TITLE	UPLINK FLX TO DATA or UPLINK DRT TO DATA, if the derated takeoff function is installed, and if the pilot selected a derated takeoff.
[2L]	FLX (or DRT)/QNH (or QFE) When the UPLINK FLEX TO DATA page is selected, it displays uplink assumed Flex Temperature and baro setting (QNH or QFE). When the UPLINK DRT TO DATA page is selected, this field displays DRT/BARO. If so, it displays the thrust rating and baro setting (QNH or QFE).
[4R] MAX TO	Pressing this key calls up the MAX TO DATA page. For all other fields, refer to MAX TO DATA page.

ACARS FUNCTIONS PAGE 2

FFC5-04-0320-088-A100AA



ACARS FUNCTION PAGE 2

Line 1 F-PLN RPT SEND	This key, when pressed, sends the flight plan report to the ground.
Line 2 POSITION RPT SEND	This key, when pressed, sends a Position Report to the ground.

<u>*Note*</u> : *– No report can be sent if "SEND" is not followed by a star*
– When a function (line 1 or 2) is deactivated through the navigation database policy file, the corresponding line is blank.

[6L] RETURN	The pilot presses this key to make the display revert to the DATA INDEX page.
[6R] PRINT FUNCTION	The pilot presses this key to access the PRINT FUNCTION page.

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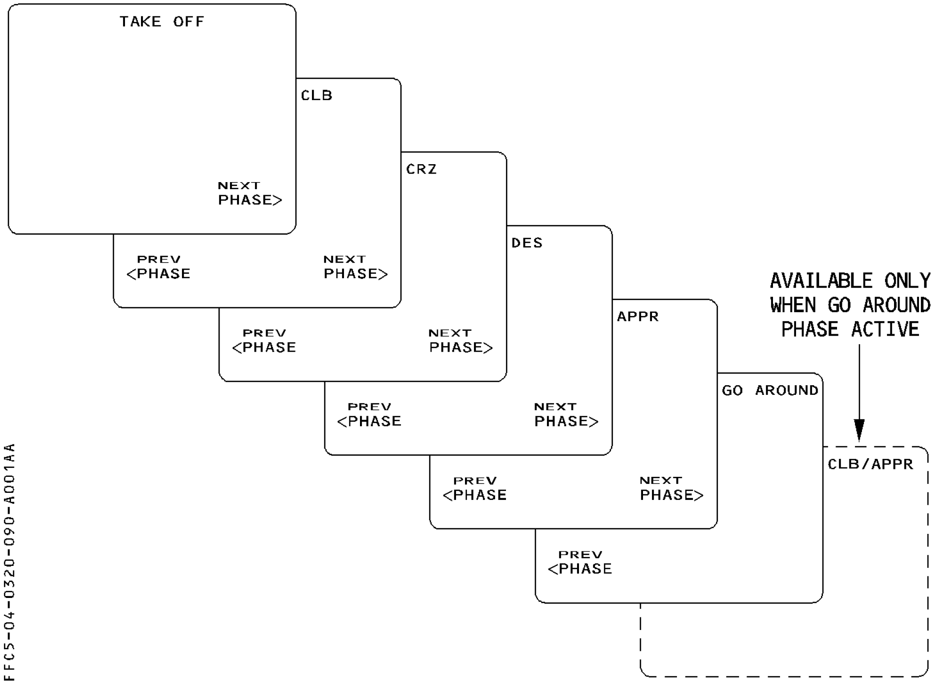
PERF PAGES

The flight plan is divided into several phases :
PREFLIGHT - TAKEOFF - CLIMB - CRUISE - DESCENT - APPROACH - GO-AROUND - DONE
Each phase except the preflight and done phases has a performance (PERF) page. The PERF pages display performance data, speeds related to the various phases, and predictions.
Pressing the PERF key on the MCDU console calls up the performance page for the current active phase. Performance pages relating to phases already flown are not available.
In the preflight and done phases, pressing the PERF key brings up the takeoff performance page.
Pressing the PERF key in the done phase makes the phase transition to the preflight phase.



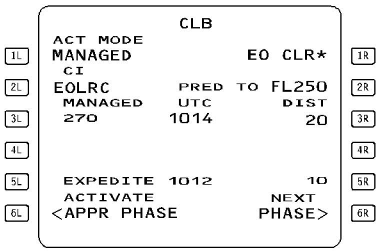
The FMGS flight phase are not related to the FWC phases.

Line 6	Fields may display two different prompts, depending upon whether the phase is active or not.
[6L] PREV PHASE	To review the performance page for the previous phase. The prompt is neither available on the takeoff performance page, nor for the phases already flown.
[6L] ACTIVATE APPR PHASE	To activate, then confirm, the APPR phase. Only available on the page corresponding to the active phase.
[6R] NEXT PHASE	To review the performance page for the next phase.

Note : Engine-out condition

- *When the FMGS detects an engine-out condition, the system automatically calls up the performance page for the current flight phase (except when this occurs before the diversion point during takeoff or no EOSID exists in the flight plan) and displays "EO CLR*" in the [1R] field and "EO LRC" (engine-out long range cruise) in the [2L] field.*
  On the CLB, CRZ and DES (when the descent phase is not active) PERF pages, the pilot can enter a cost index value and overwrite to "EO LRC".
  Clearing the cost index reverts to EO LRC.
  If the pilot presses the [1R] key, the system reverts to the normal processing (with no engine failed) and suppresses the EO information. (Refer to 4.04.10).
- *If the engine-out condition is detected before the diversion point at takeoff, a temporary flight plan is created.*

R

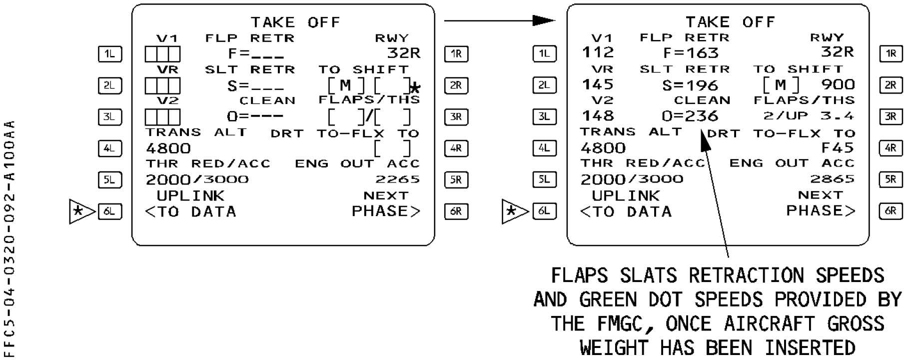


CLIMB PHASE ACTIVE
ENGINE-OUT IS DETECTED

FFC5-04-0320-091-A100AA

PERF TAKEOFF PAGE

R During the preflight phase, the flight crew can press the PERF key to call up the takeoff performance page.

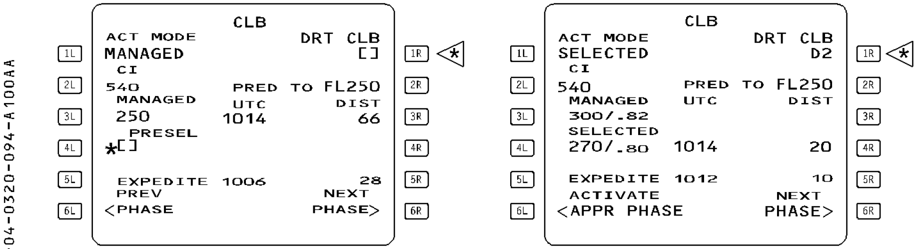


TITLE	TAKE OFF is in large white font when the takeoff phase is not active, and in large green font when it is active.
[1L] V1 [2L] VR [3L] V2	The boxes are amber, as long as the flight crew does not make entries in them. The flight crew can modify any entry, as long as the takeoff phase is not active. *Note* : · *If the flight crew does not enter V2, the SRS mode will not be available at takeoff.* · *If the flight crew has entered V1, V2 or VR and the takeoff runway is changed, the MCDU scratchpad displays CHECK TAKEOFF DATA, and V1, V2 and VR fields revert to amber boxes.*
[4L] TRANS ALT (Transion Altitude)	The flight crew can call this up from the database after the origin airport is defined. The flight crew can modify it.
[5L] THR RED (Thrust Reduction altitude)	This is the altitude at which the flight crew should reduce the thrust from TOGA/FLX to MAX CLIMB (CL detent) with all engines operative. – The default thrust reduction is 1 500 feet above the runway elevation. – The flight crew can modify this altitude : The minimum is 400 feet above the runway elevation.

ACC (Acceleration altitude)	This is the altitude at which the climb phase is triggered. – The target speed jumps to the initial climb speed. – The default value is 1500 feet above the runway elevation. – The flight crew can modify the value. The minimum value is 400 feet above the runway elevation, even if it is always higher than, or equal to, thrust reduction altitude. *Note : – A clearing action reverts both values to the defaulted ones.* *– When the flight crew selects an altitude on the FCU that is :* *– Below ACC, it brings the ACC down to this altitude.* *– Below THR RED, it brings THR RED and ACC down to this altitude. (The 400 feet minimum still applies).*
[6L] UPLINK TO DATA	This key calls up the UPLINK TO DATA REQ page. It is only displayed in the PREFLIGHT and DONE phases, when ACARS is installed.
[1R] RWY	This field shows the takeoff runway selected on the active flight plan. The flight crew cannot make an entry from this field. The field shows dashes, if no runway has been inserted in the flight plan.
[2R] TO SHIFT	The takeoff shift is the distance in meters or feet between the beginning of the runway and the aircraft's takeoff position. When taking off from an intersection, the flight crew should insert this value to ensure a correct update of the FM position. The takeoff shift value must be positive, and cannot be greater than the available takeoff run.
[3R] FLAPS/THS	This is a flight crew entry for the positions of the flaps and the trimmable horizontal stabilizer (THS) at takeoff. The FLAP and THS setting are respectively used by the FWC to trigger the "FLAP/ MCDU DISAGREE" and "PITCH TRIM/MCDU/CG DISAGREE" ECAM cautions. The flight crew can modify it until takeoff, by entering "UP X.X" or "X.X UP", or "DN X.X" or "X.X DN" for the THS.
R R R R R [4R] DRT TO-FLX TO	The flight crew may either insert a FLX TO temperature (i.e. F45) for FLX takeoff setting purposes, or a Derated takeoff level (i.e. D04). It can only be entered during preflight. The system sends it to the FADEC, and displays it on the upper ECAM display. The TEMP value is always entered in degrees Celsius.
[5R] ENG OUT ACC	This field displays the engine-out ACC altitude, as defined in the database, or is manually entered by the flight crew. This is for display only, as a reminder. It cannot be cleared. The above ACC altitude rules of [5L] apply to this field.
[6R] NEXT PAGE	This key calls up the climb performance page.

PERF CLIMB PAGE

R



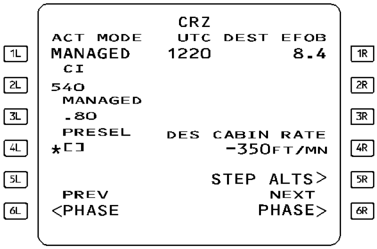
CLIMB PHASE NOT ACTIVE

CLIMB PHASE ACTIVE
(speed manually selected 270)

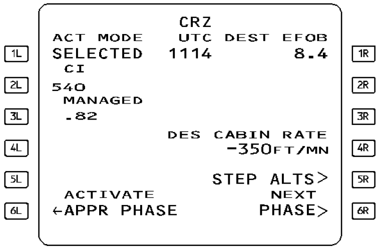
TITLE	CLB is displayed in large white fonts when the climb phase is inactive, and in large green fonts if it is active.
[1L] ACT MODE	This field displays the preselected active speed mode : SELECTED or MANAGED. The pilot cannot modify it from this field.
[2L] CI (Cost Index)	This field displays the cost index, as initialized on the INIT A or defaulted from the database, or inserted in this field by the pilot. *Note : In case of engine-out EO LRC (engine-out long range cruise) replaces the CI field.* *You can enter a cost index and overwrite EO LRC. In this case, clearing the cost index reverts to EO LRC.*
R [3L] MANAGED	This field displays the FMGS-computed ECON speed/Mach (refer to 4.02.20). Before CLIMB phase is active, if the preselected speed mode is SELECTED, a star is displayed next to the MANAGED speed. Pressing the 3L key in this case preselects MANAGED speed, and 4L field reverts to brackets.

	[4L] PRESEL or SELECTED	<u>If the climb phase is not active :</u> This field displays PRESEL, as long as the climb phase is not active. The pilot can only enter a preselected speed. <u>If the climb phase is active :</u> The title of this field becomes SELECTED. This field displays the selected (or preselected) SPD or MACH target. The pilot cannot directly modify it this field, but can adjust it with the SPD/MACH selection knob on the FCU. If the pilot pushes in the FCU SPD/MACH selection knob to revert to managed speed, the system selects (or reselects) ECON SPD/MACH, and [4L] is blank.
	[5L] Blank or EXPEDITE	This field is blank, as long as the climb phase is not active. This field displays this legend when the climb phase is active. It indicates the time and distance required to reach the altitude displayed in the 2R field, in case of a climb at green dot.
	[6L] PREV PHASE	This field displays this legend, if the climb phase is not active. The pilot presses this key to call up the takeoff page.
	[6L] ACTIVATE APPR PHASE	The field displays this legend, if the climb phase is active. Pressing this key once displays “CONFIRM APPR PHASE*”. Pressing it again activates the approach phase.
R R	[1R] EO CLR or DRT CLB ◁	The system displays the EO CLR prompt, in case of an engine-out in climb, or DRT CLB when the crew selected a derated climb◁.
	[2R] PRED TO...	This field displays the target altitude for the predictions shown in 3R, 4R, or 5R. It defaults to the FCU altitude, but the pilot can modify it to any altitude below CRZ FL.
	[3R] or [4R] or [5R]	These fields show target altitude predictions selected in the [2R] field for the current vertical mode and target speed. [3R] field : Predictions for ECON speed (managed) [4R] field : Predictions for SPD manually selected [5R] field : Predictions for climb at green dot (EXPEDITE speed). These fields are only displayed while the takeoff, or climb phase is active.
	[6R] NEXT PHASE	The pilot presses this key to call up the PERF CRZ page.

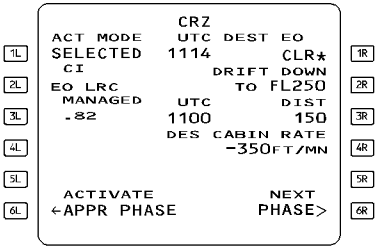
PERF CRUISE PAGE



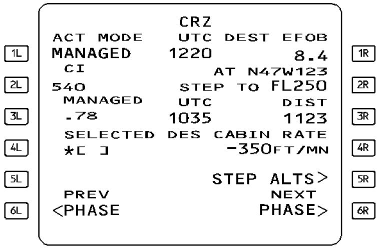
CRZ PHASE NOT ACTIVE



CRZ PHASE ACTIVE



PERF CRZ PAGE IN
EO CONDITION



PERF CRUISE PAGE WITH
PREPLANNED STEP

FFC5-04-0320-096-A001AA

TITLE — CRZ in white large font, when cruise phase is not active, in green large font, when it is.

[1L] ACT MODE — This field shows the active speed/Mach target : SELECTED or MANAGED (ECON).
The pilot cannot modify it through this field.

[2L] CI — This field shows the cost index as initialized on the init A page or defaulted from the database, or as inserted in this field by the crew.
EO LRC replaces automatically the cost index value in case of engine out.

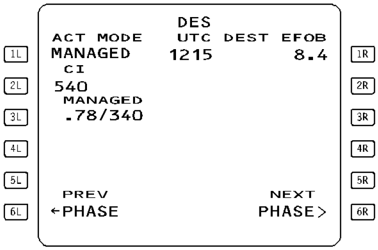
[3L] MANAGED — When the speed target is managed, the FMGS computes the ECON speed.
This field displays the ECON speed/Mach :
ECON is the optimum speed or Mach, in terms of time and fuel cost ratio, related to the active flight plan, weather, cruise flight level, and gross weight.

[4L] PRESEL or SELECTED
<u>If cruise phase is not active :</u>
The pilot can enter a preselected speed or Mach number.
<u>If cruise phase is active :</u>
This field is blank.

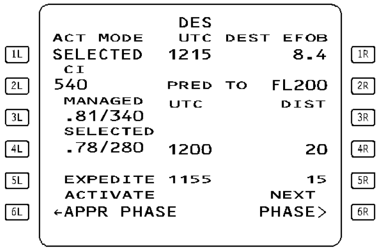
*Note : When the cruise phase is not yet active, a * symbol appears next to the selectable speed (or Mach).*

	[6L] PREV PHASE or	The pilot can press this key to call up the climb page, if the cruise phase is not yet active.
	[6L] ACTIVATE APPR PHASE	This field displays this legend if the cruise phase is active. The flight crew presses the key once to change the legend to "CONFIRM APPR PHASE*". A second press activates the approach phase. *Note : If the pilot inadvertently activates the approach phase, it can reselect the cruise flight level into the progress page to reactivate the cruise phase.*
	[1R] TIME/UTC DES EFOB	Before takeoff, this field displays the flight time to destination and the predicted remaining fuel on board. If the crew enters an estimated takeoff time, the field automatically displays the predicted arrival time (UTC) at destination. After takeoff, it displays the predicted arrival time at destination (UTC) and the remaining fuel on board. EO CLR is displayed when an engine-out is detected.
R R R	[2R] STEP TO FL XX DRIFT DOWN TO FLXX, or TO T/D	This field, in combination with 3R, displays the predictions for the step point and the step altitude, the drift down altitude, or the Top of Descent.
R R	[3R] TIME/UTC and DIST	This field displays the time and distance to go to the various points identified in 2R.
	[4R] DES CABIN RATE	This field displays Max (computed DES cabin rate, maximum descent cabin rate). The pilot may modify the value : The FM then recomputes the top of descent, in order to match this value. If the FM cannot match the pilot entry, the FM-computed value overwrites the pilot entry. A clear action reverts to the default value (- 350 feet per minute). As DES CAB RATE is a negative value, "minus" is not a necessary entry.
	[5R] STEP ALTS	This key calls up the STEP ALTS page (see vertical revision).
	[6R] NEXT PHASE	This key calls up the DES page.

PERF DESCENT PAGE



DES PHASE NOT ACTIVE WITH
MANAGED SPEED/MACH SELECTION



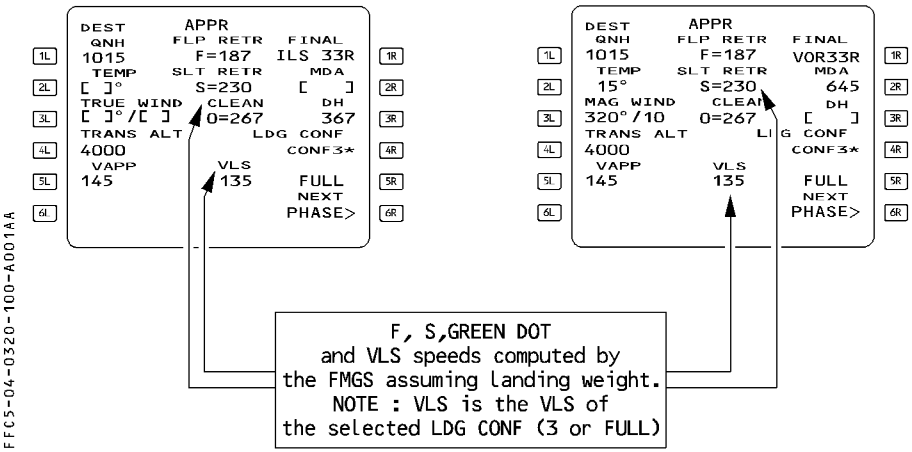
DES PHASE ACTIVE WITH
SELECTED SPEED/MACH

FFC5-04-0320-098-A001AA

TITLE	DES in a white large font when the descent phase is not active and in a green large font, when it is active.
[1L] ACT MODE	This field displays the active speed target (MANAGED or SELECTED). The flight crew cannot modify it through this field.
[2L] CI	This field displays the cost index, as initialized on the INIT A page or defaulted from the database, or inserted in this field by the flight crew. The flight crew cannot modify it when the descent phase is active.
[3L] MANAGED	<u>If the descent phase is not active :</u> Before the flight crew makes any entry. This field displays MANAGED in white, with the associated ECON descent Mach or speed in blue. The crew may overwrite the ECON descent Mach or speed by entering a Mach number or a speed in this field. The system uses the pilot entry to compute the descent profile. The descent may be flown in managed using this new pilot entry. The entry is modifiable. It can be cleared to revert to ECON speed/Mach <u>If the descent phase is active :</u> The flight crew cannot make an entry in this field. The field displays the ECON speed/Mach or the speed/Mach value previously entered by the pilot.

[4L] blank or	<u>If the descent phase is not active,</u> this field is blank.
[4L] MACH/SPD	<u>If the descent phase is active :</u> The field displays the speed or Mach target manually selected by the pilot. "SELECTED" is displayed in the [1L] field. To modify the field value, the pilot will use the SPD/MACH selector knob of the FCU. [4L] field and FCU window will display the same value. Pushing in the FCU speed selector knob activates the managed SPD/MACH target displayed in the [3L] field.
[5L] Blank or	If the descent phase is not active this field is blank.
[5L] EXPEDITE	Displays this legend if the descent phase is active. It indicates the time and distance required to reach the altitude displayed in the 2R field at MMO/VMO speed.
[6L] PREV PHASE or	This key calls up the cruise phase page if the descent phase is not yet active.
ACTIVATE APPR PHASE	Displays if the descent phase is active. First press causes "CONFIRM APPR PHASE" to be displayed. Second press activates the approach phase.
[1R] TIME/UTC	DEST EFOB Before takeoff, this field displays the flight time to destination and the predicted remaining fuel on board. If the crew enters an estimated takeoff time, the field displays automatically the predicted arrival time (UTC) at destination. After takeoff, it displays the predicted arrival time at destination (UTC) and the remaining fuel on board.
[2R] PRED TO...	This field displays the target altitude for the predictions in [3R] [4R], or [5R] . The display defaults to the altitude selected on the FCU. The flight crew can modify it to any altitude lower than present altitude.
[3R]	These fields display altitude predictions down to the target altitude selected in [2R], computed for the current vertical mode (DES or OP DES) and the indicated target speed. [3R] field : shows predictions for the "MANAGED" SPD/MACH profile.
[4R]	[4R] field : displays predictions for a SPD/MACH.
[5R]	[5R] field : displays predictions for a descent at MMO/VMO (EXPEDITE). Fields [3R] [4R] [5R] are displayed only when DES phase is active.
[6R] NEXT PHASE	The pilot presses this key to call up the PERF APPR page.

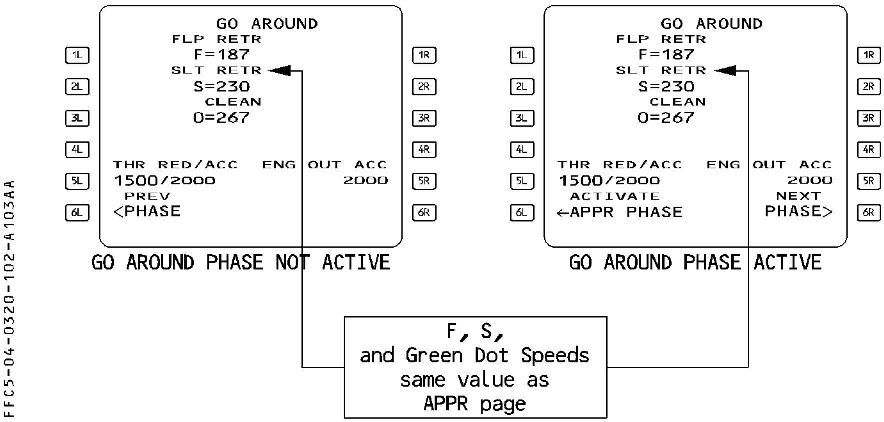
PERF APPR PAGE



TITLE	APPR in a white large font if the approach phase is not active, in a green large font if it is.
[1L] QNH	This field displays brackets when the aircraft is more than 180 NM from the destination. Inside 180 NM, a mandatory amber box appears. The pilot must enter the QRH, either in hPa (three or four digits) or in inches of mercury (two digits, decimal point, and two more digits). The system interprets : 1003 as 1003 hPa 29.92 as 29.92 inches of mercury The pilot can modify this entry at any time. The system uses QNH to compute the cabin repressurization segment.
[2L] TEMP	This field displays the temperature at destination. Until the pilot enters the temperature, the field displays brackets. The pilot can modify this figure. The system uses this temperature to refine its computation of the descent profile (ISA model).

[3L] MAG WIND or TRUE WIND	The pilot enters the wind speed in knots at the destination in this field. The reference of the wind entry is magnetic or true, depending on the airport's reference. The system transmits any entry made in this field to the descent wind page (which displays wind direction as true, not magnetic, whatever the airport's reference is).
[4L] TRANS ALT	This field displays the transition altitude taken from the data base (small font) or entered by the flight crew (large font). The pilot can modify it at any time.
[5L] VAPP	The FMGC computes this approach speed, using the formula: VAPP = VLS + 1/3 of the headwind component (1/3 of the headwind component is limited to 5 knots as a minimum and 15 knots as a maximum). The pilot can modify VAPP. A clear action reverts VAPP to the computed value. *Note : VLS = 1.23 VS1G of the selected landing configuration (full or 3).*
[6L] PREV PAGE	This field displays this legend if the approach phase is not active. Pressing this key calls up the descent performance page.
[1R] FINAL	This field displays the approach specified in the flight plan. The pilot cannot modify it through this field.
[2R] MDA or MDH	This field displays the minimum descent altitude (or minimum descent height if the QFE pin program is activated), with associated brackets. The pilot inserts the value, which it can modify at any time. If the flight crew makes an entry in [3R] or changes the approach, it clears this figure.
[3R] DH	If the flight plan includes an ILS approach, this field displays "DH" and empty brackets. The pilot inserts the decision height. The system will accept an entry of "NO". If the flight crew inserts an MDA or an MDH, this erases the decision height, and this field reverts to brackets. The DH range is 0 to 700 feet.
[4R] LDG CONF CONF 3	The pilot can select configuration 3 by pressing the 4R key. This moves the * down to the [5R] field, which is displaying "FULL".
[5R] FULL	The pilot can use this key to select configuration FULL when necessary. Configuration FULL is the default landing configuration.
[6R] NEXT PHASE	Depressing this key calls up the go-around performance page.

PERF GO AROUND PAGE



TITLE	GO AROUND is in large white font, if the go-around phase is not active ; it is in large green font, if it is.
[5L] THR RED ACC	This field displays the thrust reduction altitude and the acceleration altitude.

<u>Thrust reduction altitude :</u>

- Altitude at which thrust must be reduced from takeoff/go-around thrust to maximum climb thrust.
- LVR CLB flashing on flight mode annunciator.
- Defaults to 1500 feet above destination runway elevation, or to the altitude set by the airline.
- Can be modified by the crew (minimum 400 feet above destination runway elevation).

<u>Acceleration altitude :</u>

- The target speed does not automatically increase to Green Dot speed when climbing through the GA accel. altitude. The pilot has to manually select OPEN CLB mode.
- Defaults to 1500 feet above destination runway elevation, or to the altitude set by the airline
- Can be modified by the crew, but is always equal to (or higher than) the thrust reduction altitude.

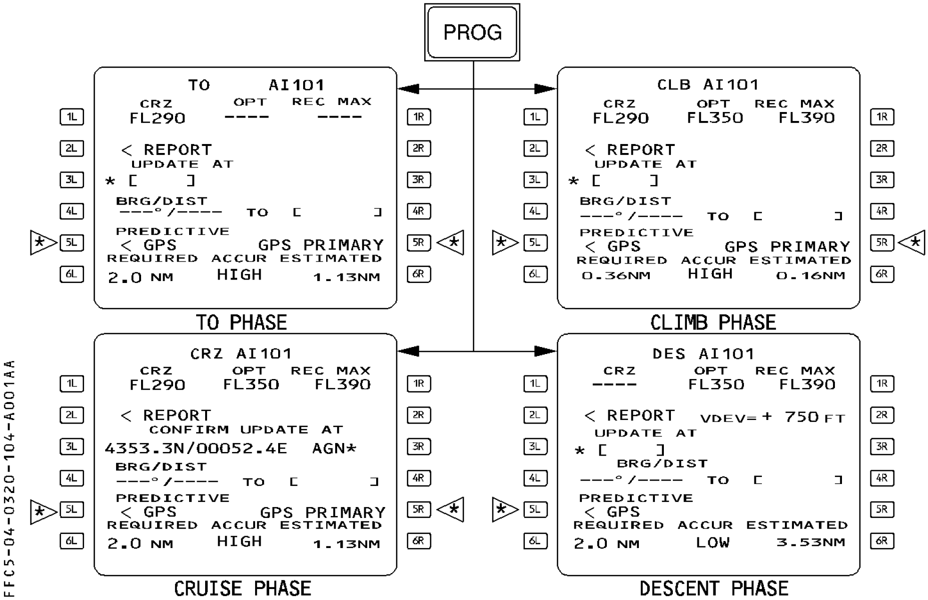
	[6L] PREV PHASE or	This field displays this legend, if the go-around phase is not active. Pressing the key calls up the PERF APPR page.
	ACTIVATE APPR PHASE	This field displays this legend, if the go-around phase is active. Pressing it once makes "CONFIRM APPR" appear. A second press activates the approach phase.
	[5R] ENG OUT ACC	This display has the same characteristics as the display beside the 5R key on the takeoff page. It is for display only, and the pilot can modify it.
	[6R] NEXT PHASE	Pressing this key calls up the PERF APPR page.
R R R	[IR] Blank or EO CLR*	This field is normally blank. EO CLR* is displayed when GO AROUND is the active phase and an engine-out condition is detected.

<u>Note</u> : *When the go-around phase is active, if the pilot enables ALTN, or if the pilot inserts a new destination in the active flight plan and a new cruise flight level on the progress page, the go-around phase automatically shifts to the climb phase. (The target speed jumps from green dot speed to initial climb speed).*

PROG PAGES

The progress page is a multifunction page that enables the flight crew to :
- Select a new cruise flight level
- Cross-check the navigation accuracy of the Flight Management (FM) system and validate it
- Update the FM position
- Monitor the descent.

R



TITLE	The title is different for each flight phase (see illustrations above). The FMS flight phase appears in large green font. The flight number in large white font. EO in amber large font if the engine out is detected.
Line 1 CRZ (blue)	This line displays in blue the cruise flight level inserted on the INIT A page or directly in this field. If the flight crew uses the FCU to select an altitude that is higher than that displayed in this field, the system changes the number displayed in this field to agree. The flight crew cannot insert flight level in this field that is lower than the FCU selected altitude. This field displays dashes when the descent or approach phase is active.

TR N° 74-1 PAGE 2 OF 2

OPT — This field displays the optimum flight level (in green), that is computed based on the current gross weight, cost index, temperature, wind and a minimum estimated cruising time of 15 minutes.
It displays dashes :
- In cruise, when the aircraft is less than 15 NM from the Top of Descent
- In the descent and approach phases
- If an engine-out is detected.

REC MAX — This field displays the recommended maximum altitude (in magenta), that is computed based on the current gross weight and temperature. It provides the aircraft with a 0.3 g buffet margin, a minimum rate of climb at MAX CL thrust, and level flight at MAX CRZ thrust. This field is limited to FL 410.
If one engine is out (or two engines for A340 aircraft only), this field displays the recommended maximum engine-out altitude, that is computed based on the long-range cruise speed and assuming that anti-ice is off.

R *Note : The OPT or REC MAX field may display a value up to FL 415.*
R *However, the current aircraft's maximum certified altitude is*
R *41100 feet. Disregard the OPT or REC MAX value, if it exceeds*
R *FL 411.*

[2L] REPORT — This key calls up the REPORT PAGE.

[2R] VDEV — This field is displayed during the descent and approach phases, when NAV mode is engaged, or in HDG mode, provided that the crosstrack error (XTK) is less than 5 NM. It displays the vertical deviation between the aircraft's current altitude and the FMS-computed vertical profile.

FFC5-04-TR-074-001AA

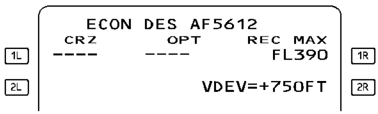
OPT — This field displays the optimum flight level (in green), that is computed based on the current gross weight, cost index, temperature, wind and a minimum estimated cruising time of 15 minutes.
It displays dashes :
- In cruise, when the aircraft is less than 15 NM from the Top of Descent
- In the descent and approach phases
- If an engine-out is detected.

REC MAX — This field displays the recommended maximum altitude (in magenta), that is computed based on the current gross weight and temperature. It provides the aircraft with a 0.3 g buffet margin, a minimum rate of climb at MAX CL thrust, and level flight at MAX CRZ thrust. This field is limited to FL 410.
If one engine is out (or two engines for A340 aircraft only), this field displays the recommended maximum engine-out altitude, that is computed based on the long-range cruise speed and assuming that anti-ice is off.

[2L] REPORT — This key calls up the REPORT PAGE.

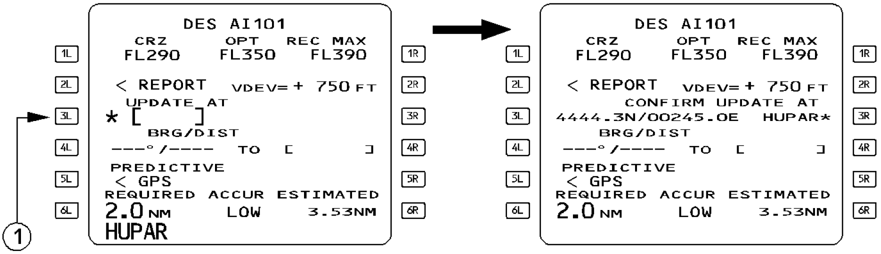
R **[2R] VDEV** — This field is displayed during the descent and approach phases, when
R NAV mode is engaged, or in HDG mode, provided that the crosstrack
R error (XTK) is less than 5 NM. It displays the vertical deviation
R between the aircraft's current altitude and the FMS-computed vertical
R profile.

FFC5-04-0320-105-A001AA



Line 3 UPDATE AT — The flight crew can update the FMS position via this field by entering either the ident of a waypoint, a NAVAID, an aiport, a latitude and longitude (L/L), a place/bearing/distance (PBD), or a place-bearing/place-bearing (PB/PB).

FFC5-04-0320-106-A001AA



Line 3 UPDATE AT — When the flight crew has entered this data, this field changes its format to : "CONFIRM UPDATE AT", followed by the latitude/longitude and ident of the inserted position with an asterisk.

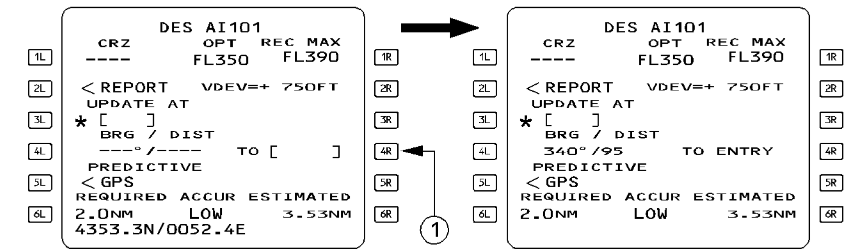
<u>*Note :*</u> *If no ident has been inserted, the field displays "ENTRY" instead of an ident.*

The flight crew presses the right-hand key adjacent to the asterisk to confirm the update, when the aircraft overflies the inserted position.

Line 4 BRG/DIST — On this line the flight crew can enter an airport, a waypoint, a NAVAID, or a runway. The flight crew may enter this information as an ident, a latitude/longitude (L/L), a place/bearing/distance (PBD), or a place-bearing/place-bearing (PBX). The field then displays the FMS computed bearing and distance of this bearing from the aircraft's present position. If it does not have an ident, the point is called "ENTRY".

Example : BRG/DIST
340°/95.4 to ENTRY
The line displays a T if the true reference is selected (NORTH REF pushbutton switch).

FFC5-04-0320-106-B001AA

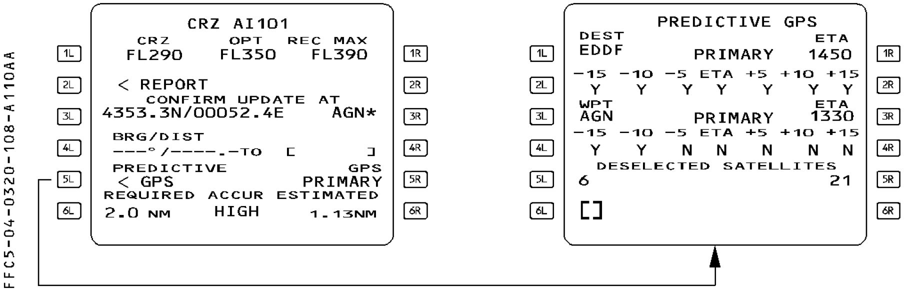


[5L] PREDICTIVE GPS ◁	This field provides access to the PREDICTIVE GPS page.
[5R] GPS PRIMARY ◁	If installed, this field displays GPS PRIMARY when the GPS PRIMARY is available. When GPS PRIMARY is not available, this field is blank. The scratchpad displays "GPS PRIMARY" when GPS/IRS becomes available or "GPS PRIMARY LOST" when GPS/IRS is no longer available.
[6L] REQUIRED	This field displays the default value for the required navigation accuracy. The flight crew can modify it, as necessary. If the flight crew has not modified this data, the default value changes according to the current flight area (Refer to 1.22.20).
ACCUR HIGH/LOW	This field displays the navigation accuracy estimated by the FMS. HIGH indicates that the estimated navigation accuracy is high : The ESTIMATED value is less than the REQUIRED value. LOW indicates that the estimated navigation accuracy is low : The ESTIMATED value is greater than the REQUIRED value.
[6R] ESTIMATED	This field displays the current Estimated Position Error value (EPE), as computed by the FMS.

PREDICTIVE GPS PAGE

Note : This page is only operative with GPS Honeywell. All fields are dashed with GPS Litton.

The pilot accesses this page by pressing the PREDICTIVE GPS prompt of the PROG page. This page displays information relative to predictive availability of GPS PRIMARY at destination and at any waypoint selected by the crew.



[1L] DEST	Destination airport as currently selected in active flight plan. Not modifiable. This field shows dashes when no destination airport exists.
[1R] ETA	This field is defaulted to the estimated arrival time as computed by the FMS (blue small font). The pilot may enter a value in this field (blue large font). Amber boxes are displayed when no prediction exist or crew entry has been cleared.
Line 2 PRIMARY Y/N	Predicted primary status at destination airport at the following times : estimated time of arrival ± 5, 10, 15 minutes. Availability of GPS PRIMARY at corresponding time is indicated by Y when PRIMARY is predicted to be available and by N when GPS PRIMARY is not predicted to be available. These fields are blanked when destination [1L] or time [1R] is not defined.

NO CHANGE

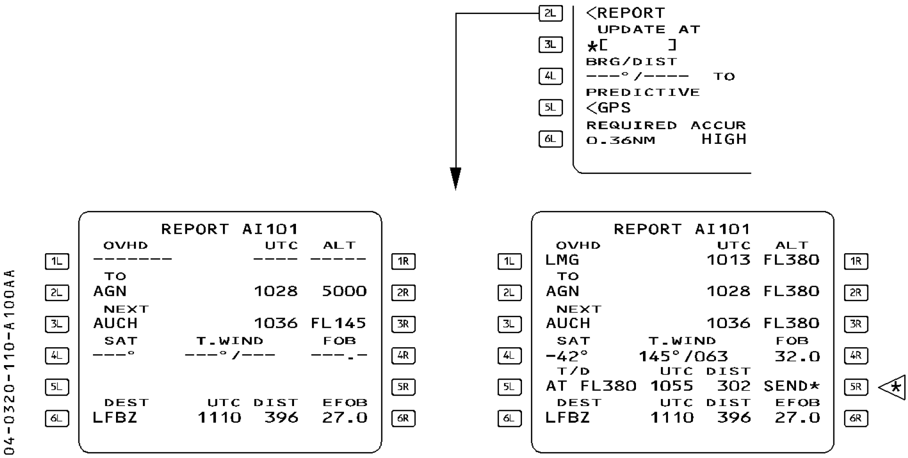
R **Erroneous GPS predictions**

R The following procedure must be followed whenever a GPS RAIM availability Check is
R necessary.
R If the predictive GPS status appears at the different times (ETA –15 min, –10 min, –5 min,
R 0 min, +5 min, +10 min, +15 min) as for example N, N, N, Y, N, N, N, the displayed N
R may be spurious. To determine the GPS availability at ETA –15 :
R – Enter the destination in the WPT field [3L],
R – Enter, the ETA –15 value in the ETA field [3R] on the MCDU PREDICTIVE GPS page and
R check that a "Y" is displayed at the ETA time.
R Repeat this last action as necessary for each different times : –10, –5, 0, +5, +10, +15.

[3L] WPT	The pilot may enter a reference waypoint in this field. Blue brackets are displayed when no entry has been made.
[3R] ETA	When a reference waypoint has been entered in [3L], amber boxes are displayed. The crew is requested to enter a reference time in this field.
Line 4 PRIMARY Y/N	Equivalent information to [2L] / [2R] displayed for any pilot selected waypoint. Corresponding time of arrival is also displayed.
Line 5 DESELECTED SATELLITES and Line 6 SATELLITES	Allow the pilot to deselect up to four satellites by inserting the corresponding satellite number, the number is then displayed in blue large font. When deactivated, the satellites are not considered for predictive GPS availability at destination or at selected waypoint. The deselection is cancelled when the entry is cleared (blue brackets are displayed) or the field is overwritten by a different satellite number.

REPORT PAGE

The pilot calls this page by pressing the [2L] key on the PROG page :



REPORT PAGE IN PREFLIGHT PHASE

REPORT PAGE IN FLIGHT

This page displays information relative to the FROM, TO, NEXT and DEST waypoints as well as the current wind, temperature, distance and time to the next cruise profile change.

TITLE (White)	Displays the flight number. This line displays EO amber in case of engine out detection.
[1L] OVHD (green)	Displays the last sequenced waypoint. This field never displays the pseudo waypoints and F-PLN markers (T-P, PPOS, IN-BND, OUT-BND).
[1R] UTC/TIME ALT (green)	This field displays the time and altitude recorded at the time of sequence.
[2L]-[2R] TO (green)	This field displays the active waypoint, predicted time of arrival and predicted altitude at this waypoint. *Note : Time and altitude values are identical to those values on F-PLN pages.*
[3L]-[3R] NEXT (green)	Same information for the next waypoint.

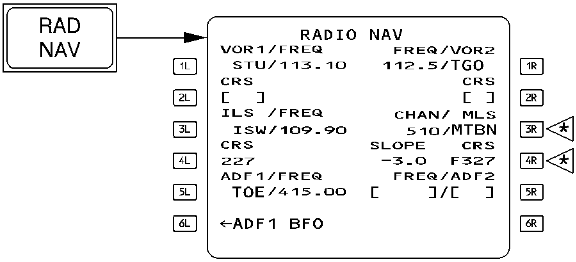
[4L] [4R] SAT/T.WIND/FOB (green)	This field displays the static air temperature, the wind direction and velocity, and the FOB recorded at waypoint sequencing.
[5L] T/D/UTC/DIST (green)	This field displays the estimated time and the distance to go to the next change of the cruise profile (T/D, S/C, S/D). These data are only displayed when the cruise phase is active.
[5R] SEND* ◁ (blue)	The crew uses this prompt to downlink a position report. This field may be blanked depending on airline policy, and on ACARS installation.
Line 6 DEST/UTC/DIST/EFOB	This field displays the estimated time of arrival, the distance along the F-PLN and estimated fuel on board at destination. This display is identical to the information of the F-PLN pages.

Note : No data can be inserted or modified on the REPORT page.

RADIO NAV PAGE

This page enables the pilot to select or verify the radio navaids, tuned for display purposes only.
Among these navaids are VOR, VOR/DME, TAC, VORTAC, and ILS.
If either RMP is set to NAV, this page is blank on both MCDUs.

FFC5-04-0320-112-A110AA



Line 1 VOR1/FREQ FREQ/VOR2	This line displays the identifiers and frequencies of VOR1 and VOR2, whether they are automatically or manually-tuned. To manually tune a VOR, the pilot inserts the ident or frequency. If the ident is not in the database, the new navaid page comes up. A “clear” action reverts the selection to the autotuned navaid.
Line 2 CRS	This line displays courses for the navaids on Line 1. The pilot can manually enter the courses via these fields. It displays “T”, if a tuned VOR is true North-referenced.
[3L] ILS/FREQ	This field displays the ILS ident and frequency. It is autotuned, if the ILS is associated with the departure runway, or if the flight plan shows an ILS approach selected for the destination. The ILS may also be entered manually. When the manually-entered ILS differs from the autotuned ILS, “RWY/LS MISMATCH” appears.
[4L] CRS	This field displays the course associated with the ILS on Line 3. It comes up automatically when an ILS is autotuned, or if an ILS has been manually-tuned via its ident. Otherwise, the course must be entered manually. The course may be backbeam (Bxxx), or frontbeam (Fxxx).

[3R] CHAN/MLS ◁

The pilot manually tunes an MLS by its ident, or its channel. The system automatically tunes the associated course and slope.

Note : If an MLS is tuned while an ILS was tuned, the ILS is deselected.

[4R] SLOPE CRS ◁

The pilots enters the slope and the course of the MLS in this field.
The course may be backbeam (Bxxx), or frontbeam (Fxxx). The field displays T, if the MLS is true North-referenced.

Line 5
ADF1/FREQ FREQ/ADF2

This line displays the identifiers and frequencies of ADFs 1 and 2.
The pilot can use the ident or the frequency to manually tune the ADF.

Line 6
ADF1/BFO BFO/ADF2

When an ADF1 is selected, these fields display an ADF/BFO prompt. The flight crew presses the key once to erase the arrow and put the ADF in BFO mode. A clear action brings the arrow back and cancels BFO.

Note :
- *The autotune function only works for navaids stored in the database.*
- *When tuning manually, the operator should use the ident rather than the frequency, unless the navaid is not in the database.*
- *Manually tuned frequencies are displayed in large font.*

SECONDARY PAGES

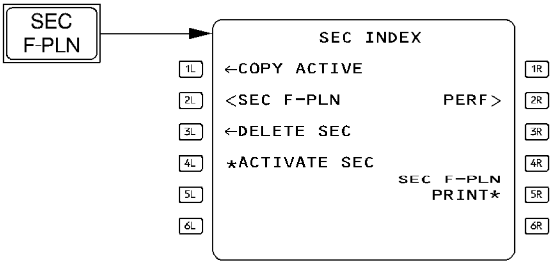
The SEC F-PLN key on the MCDU console allows the flight crew to call up the secondary index page and the secondary flight plan page. The secondary flight plan is generally for a diversion, for predictable runway changes for takeoff or landing, or for training.
There are two types of secondary index pages. The type selected depends on the presence of a secondary flight plan.

SECONDARY INDEX PAGE

A SECONDARY FLIGHT PLAN IS ALREADY DEFINED

R

FFC5-04-0320-114-A001AA



[1L] COPY ACTIVE (blue)	The flight crew presses this key to copy the active flight plan into the secondary flight plan and delete the previous secondary plan.
[2L] SEC F-PLN (white)	The flight crew presses this key to call up the secondary flight plan pages.
[3L] DELETE SEC (blue)	The flight crew presses this key to delete the current secondary flight plan.
[4L] ACTIVATE SEC (amber)	The flight crew presses this key to activate the secondary flight plan as the active flight plan.

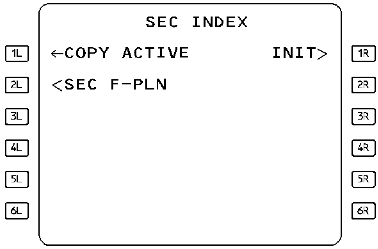
Note : "ACTIVATE SEC" appears routinely if the HDG/TRK mode is active. If the NAV mode is active, "ACTIVATE SEC" appears only if the active and secondary flight plans have a common active leg.

[1R] INIT (white)	This field displays this prompt when the secondary flight plan is not defined as a copy of the active flight plan. Pressing this key calls up the SEC INIT A and B pages.

[2R] PERF (white)	The flight crew presses this key to call up the performance pages for the secondary flight plan.
R [5R] SEC F-PLN PRINT	The flight crew presses this key to print the secondary flight plan report. R

A SECONDARY FLIGHT PLAN IS NOT DEFINED

FFC5-04-0320-115-A001AA



[1L] COPY ACTIVE (blue)	The flight crew presses this key to copy the active flight plan into the secondary flight plan.
[2L] SEC F-PLN (white)	The flight crew presses this key to call up the secondary flight plan pages.
[1R] INIT (white)	The flight crew presses this key to call up the secondary INIT page. It is similar to the active INIT page, but blue brackets replace all the amber boxes.

SECONDARY FLIGHT PLAN PAGES

The secondary flight plan A and B pages are identical to those of the active flight plan. They are sequenced automatically only when the secondary flight plan is copied from the primary flight plan and when their active legs are identical.
Pages for the active and secondary flight plans differ from each other as follows :

Secondary lateral revision pages :
- ERASE and INSERT are not displayed.
- OFFSET and RADIAL FIX INFO are not available.
- A lateral revision of the secondary flight plan does not create a temporary flight plan : All revisions are directly applied to the secondary flight plan.

Secondary vertical revision pages :
- A vertical revision on the secondary flight plan does not create a temporary flight plan.

Secondary step altitude pages

– These pages operate as the primary STEP ALTS page, except that optimal step, savings are not available.

Secondary INIT A and B pages :

– They use blue brackets instead of amber boxes.
– They have no align or realign prompt.
– They do not provide for slewing or entering data in the 4L-4R fields (airport reference)

Secondary wind pages :

– They have no history wind page.

Secondary performance pages :

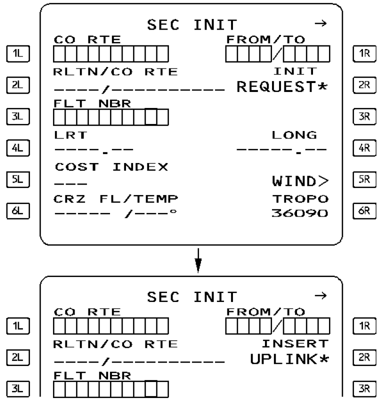
– All boxes are replaced by blue brackets
– They have no engine out mode, no engine out long range cruise cost index.
– They have no expedite predictions
– They have no ACTIVATE/CONFIRM APPROACH PHASE prompt
– They have no PRED TO ALTN predictions on the PERF CLB and PERF DES pages.
– They have no derated climb thrust ◁ selection on the PERF CLB page
– They have no engine out drift down, no top of descent, no cabin descent rate information on the PERF CRZ page.

The secondary flight plan has no FUEL PRED page.

<u>The secondary INIT A page is also used to request or display an uplink INIT message received after engine start.</u>

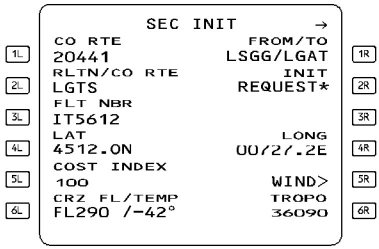
This uplink INIT message can be cleared or inserted as SECONDARY INIT data.

FFC5-04-0320-117-A100AA



[2R] INIT REQUEST*	Enable to request INIT data from the ground or,
[2R] INSERT UPLINK*	A downlink message has been received following a request. The message can be cleared or entered in the SEC INIT page.

FFC5-04-0320-117-B100AA



SECONDARY INIT A PAGE
AFTER UPLINK MESSAGE
INSERTION.

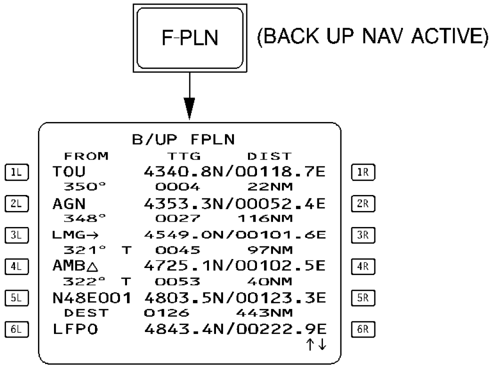
BACK UP NAV PAGES

The MCDU features a back up navigation function which provides simplified IRS based navigation in case of a dual FM failure.
BACK UP NAV pages display the data related to the BACK UP NAV function.
During FM normal operation, the F-PLN is continuously downloaded in the MCDU memory: the BACK UP NAV function links the MCDU of the failed FM to its onside IRS.
All navigation data related to the MCDU F-PLN are displayed on the associated ND.
BACK UP NAV function is activated on the MCDU MENU page by depressing the NAV B/UP prompt.
The MCDU back-up F-PLN may accept a maximum of 150 waypoints. It displays only point to point F-PLN (radial, pattern, heading leg... cannot be part of the MCDU F-PLN).
No secondary or temporary F-PLN exists.
These are five pages available while BACK UP NAV is active :

- B/UP F-PLN
- B/UP F-PLN for DIRECT TO
- B/UP PROG
- B/UP IRS for onside IRS (1 or 2)
- B/UP IRS3

B/UP F-PLN PAGE

The B/UP F-PLN page displays the MCDU F-PLN data. The pilot calls up this page by pressing the F-PLN key while B/UP NAV is active.



FFC5-04-0320-119-A001AA

TITLE — B/UP F-PLN is displayed in a white large font

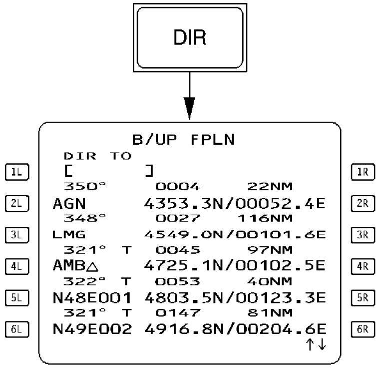
line 1 to line 5 — Display consecutive waypoints with their associated latitude/longitude.
If a waypoint is to be overflown, an overfly symbol (△) is displayed after the identifier.
If a turn is specified into the next leg, a large font arrow is displayed after the identifier.
Label lines contain the bearing, time to go and distance to the next waypoint displayed in small font.

- white — bearing
- green — time to go and distance
- BRG — Between FROM and TO waypoints : True or Mag depending on the TRUE pushbutton position. T is displayed when the bearing is true referenced.
  Between other waypoints : out bound true track of the great circle joining the 2 related waypoints, independant of TRUE pushbutton switch.
- TTG — HHMM limited to 9959. Time between the 2 related waypoints.
- DIST — NM limited to 9999.

line 6 DEST — DEST airport identifier and associated latitude/longitude.
DIST to destination is computed as the direct distance from the aircraft to the active waypoint plus the along flight plan distances.
time to go to destination is computed as distance to destination divided by ground speed.
TTG and DEST are dashed if aircraft position is unavailable.

B/UP F-PLN (DIR TO) PAGE

The pilot calls up this page using the DIR key on MCDU while BACK UP NAV is active and aircraft position is valid.

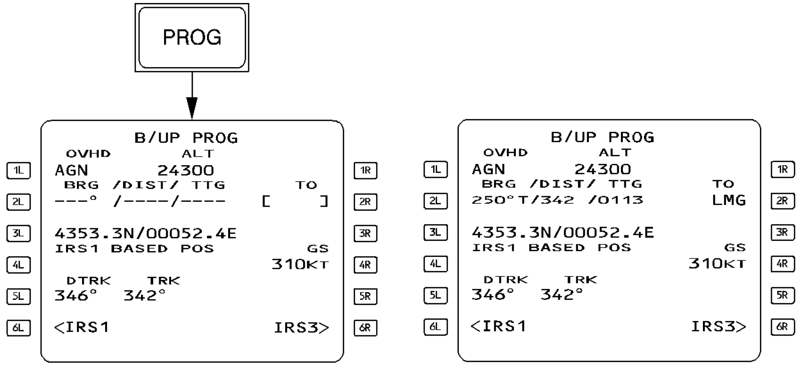


FFC5-04-0320-120-A001AA

TITLE	B/UP F-PLN is displayed in a white large font.
[1L] DIR TO	Allows DIRECT TO selection to the desired waypoint. This waypoint can be selected from the F-PLN or manually entered through the scratchpad (IDENT/LAT/LONG or LAT/LONG)
line 2 to line 6	Display consecutive waypoints of the F-PLN. Same as the B/UP F-PLN page. The TO WAYPOINT is displayed in [2L]. Vertical slewing function is available.

B/UP PROG PAGE

It displays flight parameters relative to the F-PLN or a selected waypoint.
The pilot calls up this page by pressing the PROG key on MCDU when BACK UP NAV is active.



FFC5-04-0320-121-A001AA

B/UP PROG PAGE

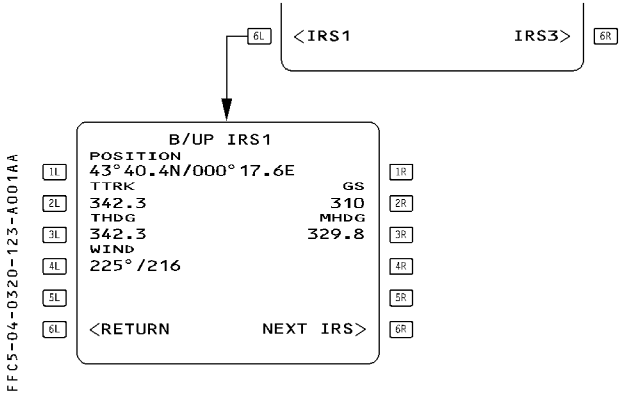
ONE WPT IS SELECTED

TITLE	B/UP PROG is displayed in a white large font.
line 1 OVHD/ALT	Displays the identifier of the last sequenced waypoint and the altitude at the time of the sequence.
line 2 BRG/DIST/TTG/TO	Allows the pilot to enter an existing MCDU F-PLN waypoint identifier or LAT/LONG or IDENT/LAT/LONG. MCDU then computes bearing, distance and time to go to that waypoint from the present position. The pilot may modify or clear this entry (2R field). BRG : True or magnetic outbound track of the great circle joining aircraft present position to the entered waypoint : dependent on the TRUE pushbutton switch position. DIST : limited to 9999. TTG : HHMM limited to 9959. time to go to the entered position computed assuming current ground speed. These fields are displayed in a green small font. They are dashed if present position is unavailable.

[4L] IRS 1 (2 or 3) BASED POS (green)	Current aircraft position provided by the selected IRS : IRS 1 (or 3 if IRS 1 failed) on MCDU 1 IRS 2 (or 3 if IRS 2 failed) on MCDU 2
[4R] GS (green)	Current ground speed from the selected IRS.
[5L] DTRK/TRK (green)	Desired track of the MCDU F-PLN active leg and current aircraft track from the selected IRS (True or Mag). These tracks are true or magnetic depending on TRUE pushbutton position.
[6L] IRS 1 (2)	Gives access to onside B/UP IRS (1 or 2) page
[6R] IRS 3	Gives access to B/UP IRS 3 page.

B/UP IRS 1 or 2 or 3 PAGE

Display IRS 1, 2, 3 navigation data.
The pilot calls up this page from B/UP PROG page, by pressing the corresponding prompt.



TITLE	B/UP IRS 1, 2, 3 displayed in a white large font.
[1L] POSITION	Current aircraft position from selected IRS
[2L] T TRK	True track
[2R] GS	Ground speed
[3L] T HDG	True heading
[3R] M HDG	Magnetic heading Dashed when in polar area.
[4L] WIND	Wind direction and velocity Wind direction is always true referenced.
[6L] RETURN	Gives access to B/UP PROG page
[6R] NEXT IRS	Gives access to the next IRS page. (Closed loop 1 → 2 → 3 → 1)

This page is not modifiable by the crew.

RTA PAGE

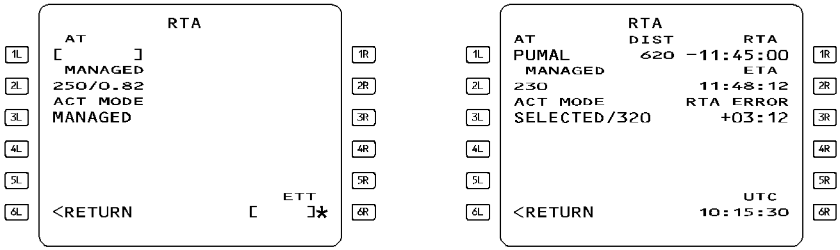
The Required Time of Arrival (RTA) page allows the entry and display of a waypoint identifier with associated time constraints. The page also displays the entered or computed Estimated Takeoff Time (ETT) as well as the following data :

- Predicted ETA at the time-constrained waypoint ;
- Performance adjusted SPD target ;
- Time error ;
- Distance to time constrained waypoint ;
- Active speed mode ;

The pilot calls up this page with the RTA prompt from the vertical revision page.

R

FFC5-04-0320-124-A100AA



TITLE	RTA (large white font)
line 1	This line displays AT and blue brackets, if no time constraints exist, or AT, DIST and RTA when a time constraint has been defined. The waypoint identifier is displayed in large blue font. If only the waypoint identifier has been defined, blue brackets and a blue star are displayed facing the 1R prompt. The pilot enters the time constraint as “HHMMSS”, preceeded by : – for at or before ; + for at or after ; no sign for at.
R [2L] MANAGED	This field displays the FMGS-computed ECON speed/Mach (refer
R	to 4.02.20)

	[3L] ACT MODE	This field displays the active speed mode : MANAGED or SELECTED/NNN (NNN is the target speed). The pilot cannot modify it through this field.
	[6L] RETURN	The pilot presses this key to revert the display to the VERT REV page.
	[2R] ETA	When a required time at arrival has been defined, the 2R field displays the estimated time of arrival as “HHMMSS”.
R R R R	[3R] RTA ERROR	This field is blank when the RTA is predicted as made. If the RTA is predicted as missed, “RTA ERROR” is displayed in small white font, and the time error between ETA and RTA is displayed in small amber font.
	[6R] ETT	The Estimated Takeoff Time (ETT) field is available in the preflight phase. If no ETT is available, the 6R field displays blue brackets and a blue star. Once available, the ETT is displayed in magenta.
	UTC	Universal time is displayed in green for takeoff, climb, cruise, descent and approach phases.

MCDU MESSAGE LIST

There are two types of messages displayed on the MCDU, and they displayed in two different colors.
Type I : A direct result of a pilot action ;
Type II : Information about a situation, or a call for pilot action ;
Type II messages are stored in a first-in/first-out message queue (5 messages max).
They are suppressed, if correct data is entered, or when they no longer apply.
The flight crew can clear all messages by pressing the CLEAR key on the MCDU console.
Amber (A) : Important
White (W) : Less important

MESSAGE	TYPE/COLOR	CONDITIONS
A/C POSITION INVALID	II/A	The aircraft position has become invalid. If the message has been cleared and the flight crew attempts to call up the HOLD at PPOS or DIR TO page, while the aircraft position is still invalid, then the message is redisplayed.
ACT RTE UPLINK ◁ (ACARS msg)	II/W	A flight plan is stored in the active flight plan.
ALIGN IRS	II/A	Appears when the IRS are ready for alignment, but the IRS INIT page is not displayed on either side of the flight deck. The ALIGN IRS message requires that one flight crewmember call up the IRS INIT page, and take whatever action it calls for.
ALT F-PLN DELETED	II/W	The alternate flight plan has been automatically deleted. This occurs when the flight plan memory is full and the system attempts to store more data in it.
AREA RNP IS XX-XX◁	II/A	Displayed when the RNP value, manually-entered on the PROG page, is larger than the default RNP value associated to the current flight area, and when there is no RNP value defined in the navigation database for the active leg or route.
AWY/WPT MISMATCH	I/W	The pilot-entered VIA on the AIRWAYS page does not contain the revised point. If you enter a second airway ident, it must contain the first airway ending point.
BLOCK IGNORES RTA	II/W	A time constraint existing at initiation of flight planning, or an entry of a time constraint made after initiation of flight planning, are ignored by the fuel planning function.

R

MESSAGE	TYPE/COLOR	CONDITIONS
CABIN RATE EXCEEDED	II/W	This message appears when the aircraft gets within 200 NM of the destination, and the computed rate of descent makes it impossible for the cabin to be repressurized at the maximum rate.
CHECK ALTN WIND (ACARS msg)	II/W	The uplinked alternate cruise flight level differs from the defaulted alternate cruise flight level.
CHECK APPR SELECTION *EFIS PFD (FMA)	II/W	Displayed, when a NON ILS approach is part of the F-PLN and an ILS is manually-tuned on the RAD NAV page. This message reminds the crew that available guidance modes for the approach are APP NAV/FINAL. Displayed, when in cruise at less than 100 NM from the top of descent, or in the descent or approach phase.
CHECK CO RTE (ACARS msg)	II/W	The uplinked company route identifier differs from the one specified in the request.
CHECK DATA BASE CYCLE	II/W	The current date does not match the effective date of the active database, and someone attempts to enter a FROM/TO or CO RTE.
CHECK IRS 1(2)(3)/FM POSITION	II/A	Each IRS position is compared to the FM position. The difference is greater than a threshold function of time.
CHECK NORTH REF * EFIS ND	II/A	The MAG/TRUE switch does not match the airport MAG/TRUE bearing reference (as stored in the FMGS navigation database), either at the departure airport (during preflight), or at the destination airport (when entering the ARRIVAL area).
CHECK DEST DATA (ACARS msg)	II/A	The aircraft is at 180 NM from destination and the destination QNH, TEMP or WIND displayed on the PERF APPR page received by ACARS uplink has to be checked. If a modification of these parameters is performed creating a conflict with previous data, the message is triggered again.
CHECK FLT NBR (ACARS msg)	II/A	The uplinked flight number differs from the flight number specified in the request.
CHECK QFE	II/A	This appears at the transition from QNH to QFE reference, when the QFE altitude differs by more than 100 feet from the predicted altitude, with the QNH set on the MCDU by means of the airport elevation in the NAV database.

R

MESSAGE	TYPE/COLOR	CONDITIONS
CHECK TAKEOFF DATA	II/W	Following a flight crew entry or modification of one of the take-off parameters, there may be an inconsistency between the take-off runway or the TO shift and V1, V2, VR, FLEX TO temperature or derated level. The flight crew activated the secondary F-PLN in PREFLIGHT or DONE phase.
CHECK WEIGHT	II/A	An activate secondary is performed and either leads to the reinitialization of the FCMC with a different ZFW or ZFWCG, or FOB + Sec ZFW differs by more than 5 T from current GW.
CHECK WEIGHT WITH WBS ⊲	II/A	The GW received from the WBS differs by more than 10 T from the ZFW + FOB (or BLOCK).
CLK IS TAKEOFF TIME	II/W	This appears when the flight crew has entered an estimated takeoff time (ETT) and actual time is equal to ETT.
CLOCK/GPS TIME DIFF XX ⊲	II/A	Aircraft clock time and GPS time differ by more than XX minutes.
CROSSLOAD ABORTED	II/W	Message displayed on the transmitting MCDU indicates an error in the transmitting process.
CROSSLOAD COMPLETE	II/W	The crossload of database from one FMGC to the other one was successfully completed.
CRZ FL ABOVE MAX FL	II/W	This appears when the flight crew enters a cruise altitude that is above the computed maximum altitude.
CSTR DEL ABOVE CRZ FL	II/W	This appears when a flight plan altitude constraint has been deleted because the flight crew has inserted a cruise flight level or step-down altitude that is at or below the flight plan constraint.
CSTR DEL UP TO WPT01	II/W	This appears when constraints get deleted because the aircraft transitions to a go-around flight phase before the FMGS sequences the flight plan destination.
DECELERATE Also displayed on PFD	II/A	The aircraft is still in cruise phase and managed speed after it reaches the top of descent and it has not begun the descent.
DEFAULT STATE ASSUMED	II/W	This appears when all initialization data has been cleared after a very-long-term power interruption. The flight crew should see this only when powering up a new MCDU.

R

MESSAGE	TYPE/COLOR	CONDITIONS
DELETING OFFSET	II/W	This appears when the system is deleting an offset automatically, which it does under certain specific conditions, such as : — change of active leg due to lateral revision. — termination of next leg at destination runway and the current distance to go is less than or equal to the distance required to reach the path, or the next leg is not a CF, FM or TF leg.
XXXX IS DESELECTED	I/W	The pilot entered a deselected navaid on the RADNAV or PROG page.
DEST/ALTN MISMATCH	I/W	The pilot attempts to enter an alternate CO RTE (which starts at an origin that is not the primary flight plan destination).
DIR TO IN PROCESS	I/W	The flight crew calls up the vertical or lateral revision page on one MCDU while the direct to page is displayed on the other MCDU.
ENTER DEST DATA	II/A	The flight crew has not entered wind, QNH, or temperature for the destination, and the aircraft is 180 NM out.
ENTRY OUT OF RANGE	I/W	The flight crew attempts to enter data that is out of the range specified for the selected field.
EXTEND SPD BRK	II/W	DES mode is engaged, idle is selected and the aircraft must decelerate in order to recover the path, or to respect an altitude constraint, a speed limit or a speed constraint.
FLT NBR UPLINK ◁ (ACARS msg)	II/W	A flight number has been added to the uplink flight plan without previous request.
F-PLN ELEMENT RETAINED	I/W	The flight crew attempts to delete stored navaids, waypoints or runways that are contained in any flight plan or that are being tuned.
F-PLN FULL	II/W	There is not enough memory in the flight plan allotment for the computer to accept more flight plan data.
FM DATALINK UNAVAIL ◁	II/W	None of the two buses between the ATSU and the FM 1/2 is available. The CP DLC, the ADS and some of the AOC functions are not available.

R

MESSAGE	TYPE/COLOR	CONDITIONS
FMS1/FMS2 A/C STS DIFF	II/W	This message always precedes a transition to independent mode, and appears at power-up if the system detects a difference in one of the following : – NAV data base serial number – Performance database – FM operational program – Aircraft and airline program pins
FMS1/FMS2 GW DIFF	II/W	Onside and offside aircraft weight differ by 2 tons or more.
FMS1/FMS2 PGM PIN DIFF	II/W	Onside and offside program pins are different.
FMS1/FMS2 POS DIFF	II/A	Onside and offside positions differ by 5 NM (0.5NM if GPS installed) or more.
FMS1/FMS2 SPD TGT DIFF	II/W	Onside and offside target speeds differ by 5 knots or more.
FORMAT ERROR	I/W	A data entry does not meet the specified entry format for a given field.
GPS PRIMARY LOST ◁ (also displayed on ND)	II/A	Displayed when GPS PRIMARY mode is lost.
GPS PRIMARY ◁	II/W	Displayed when the FMS is transitioning to GPS PRIMARY
GPS IS DESELECTED ◁	II/A	This message appears when GPS has been manually deselected and the aircraft is 80 NM before the top of descent or in approach phase.
INDEPENDENT OPERATION	II/A	The FMGCs operate independently of each other.
INITIALIZE WEIGHTS	II/A	The zero-fuel weight or block fuel (FOB) is undefined after engine start.
INVALID FLT NBR ◁ UPLINK (ACARS msg)	II/W	The uplink message contains a valid flight plan but no flight number.
INVALID PERF ◁ UPLINK (ACARS msg)	II/W	Performance uplink message has been rejected.
INVALID RTE ◁ UPLINK (ACARS msg)	II/W	An error was detected into the uplink message and it is rejected.
INVALID TAKEOFF ◁ UPLINK (ACARS msg)	II/W	The current uplink takeoff data message is rejected.
INVALID WIND ◁ UPLINK (ACARS msg)	II/W	The current uplink wind message is rejected.

MESSAGE	TYPE/COLOR	CONDITIONS
LAT DISCONT AHEAD	II/A	The next leg is a discontinuity and the aircraft is 30 seconds from flying the leg.
LIST OF 10 IN USE	I/W	The flight crew has tried to enter more than ten stored runways into the database, and all of the first ten are included in a flight plan or a pilot-stored route.
LIST OF 20 IN USE	I/W	The flight crew has tried to create a PBD, LAT/LONG, or PB-PB, or store a pilot-defined waypoint or navaid when 20 are already in use (in a flight plan or pilot-stored routes).
MACH SEGMENT DELETED ⊲	II/W	A constant Mach segment of the active flight plan has been automatically deleted. This occurs when the secondary flight plan or the alternate is activated, or engine out is detected or when the flight phase changes from CRZ to another one.
MCDU OVERHEATED	II/A	This message is displayed for 15 seconds in case of MCDU overheating.
NAV ACCUR DOWNGRAD (also displayed on ND)	II/A	NAV accuracy has been downgraded from HIGH to LOW. (See FMGS principles for an explanation).
NAV ACCUR UPGRAD (*EFIS ND)	II/A	NAV accuracy has been upgraded from LOW to HIGH.
NAV DB LOAD INCOMPLETE	II/W	This message is displayed on the MCDU page when the navigation database does not exist or has been loaded or incompletely.
NEW ACC ALT-HHHH	II/W	The acceleration altitude has been changed.
NEW CRZ ALT-HHHHH	II/W	The cruise altitude has been changed.
NEW THR RED ALT-HHHH	II/W	The thrust reduction altitude has been changed.
NO ANSWER TO ⊲ REQUEST (ACARS msg)	I/W	A crew request, was previously sent to the ground and no answer has been received for 4 minutes.

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MESSAGE	TYPE/COLOR	CONDITIONS
NO INTERSECTION FOUND	I/W	The system could not find any common waypoint nor intersection point through the airway.
NON UNIQUE ROUTE IDENT	I/W	The flight crew has tried to enter on the new route page a company route ident that is identical to an existing company route ident (pilot-defined or in the database).
NOT ALLOWED	I/W	Data entry is not allowed in the selected field, or a selection action is not allowed.
NOT ALLOWED IN NAV	I/W	An attempt to modify the TO waypoint is made while in NAV mode.
NOT IN DATA BASE	I/W	The pilot is trying to enter or call up a company route ident, a FROM/TO pair, a place defined by place-bearing-distance (PBD) or place-bearing/place-bearing (PB/PB) or an airport navaid, waypoint runway, or navaid frequency (including pilot-defined elements) that is not in the current database.
NOT XMITTED ◁ TO ACARS (ACARS msg)	II/W	A pilot request or a crew report was sent but the communication was not established or not acknowledged.
ONLY SPD ENTRY ALLOWED	I/W	The pilot is trying to enter a Mach number for a preselected speed value on the CLIMB page.
PAGE UPDATE IN PROCESS	I/W	The pilot presses a key on the flight plan page while predictions are being updated.
PERF DATA ◁ UPLINK (ACARS msg)	II/W	Performance data are received from ground.
PLEASE WAIT	I/W	Resynchronization between both FMGCs is in progress.
PROCEDURE RNP IS XX.XX ◁	II/A	Displayed when the RNP value, manually-entered on the PROG page, is larger than the RNP value defined in the navigation database for the active leg or route.
REENTER WEIGHT/CG	II/A	This message is displayed if the system detects a disagree of more than 0.1 tone or 0,1 % between ZFW/ZFWCG entered by the crew, or received from the FCMC.
RETRACT SPD BRK (also displayed on PFD)	II/W	Speedbrakes are extended, DES mode is engaged and : – ALT or ALT* engages or – the aircraft is below the path or – CONF 3 or full is reached.

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MESSAGE	TYPE/COLOR	CONDITIONS
PRINTER NOT ◁ AVAILABLE (ACARS msg)	II/W	A printer communication error has been detected while printing a report. The printing is terminated.
RESET IRS TO NAV	II/A	The system has an initial position for IRS alignment, or the initial position has changed since IRS alignment, but none of the IRSs are in align mode.
REVISIONS NOT STORED	II/W	This message, displayed when a pilot-defined route or company route (active or secondary flight plan) is stored, indicates that the following elements are not retained : — Pilot-entered holds — Offsets — Modifications to terminal area procedures — Pilot-entered constraints — Pseudo waypoints — Step at optimum.
RTA DELETED ◁	II/W	A time constraint is automatically deleted : — in case of engine-out — when entering the holding pattern — in case of go-around — at phase transition to approach — at phase transition from approach to climb — when a time constraint is inserted in the same flight plan at a different waypoint — When a DIR TO/ABEAM is performed — When the alternate flight plan is activated
RTA EXISTS ◁	I/W	Displayed if the pilot tries to clear an estimated takeoff time defined by the system.
RTE DATALINK IN ◁ PROG (ACARS msg)	I/W	A flight plan modification is performed after a F-PLN INIT request has been sent. This message is displayed until the uplink is entirely received.
RWY/LS MISMATCH	II/A	— During climb, cruise, (ILS or MLS) descent approach, or go-around, the LS frequency entered on the RAD NAV page does not match the LS associated with the destination runway. — During preflight or takeoff, the LS frequency entered on the RAD NAV page does not match the LS associated with the takeoff runway.
SELECT TRUE (also displayed on ND)	II/A	The MAG/TRUE switch is on MAG while IRS send true HDG/TRK.

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MESSAGE	TYPE/COLOR	CONDITIONS
SEC F-PLN DELETED	II/W	The secondary flight plan has been automatically deleted because the memory entries exceeded the capacity of the computer memory used for flight plans.
SEC RTE UPLINK ◁ (ACARS msg)	II/W	A flight plan is stored in the secondary flight plan.
SELECT DESIRED SYSTEM	II/W	The MCDU displays its MENU page.
SET GREEN DOT SPEED ("SET GREEN DOT" displayed on PFD)	II/A (W)	This message appears when the following conditions are all met : – Engine-out condition – Aircraft in selected speed mode – FCU-selected speed equal to or greater than green-dot speed + 10 kt, and ALT* or ALT not active, or FCU-selected speed equal to or less than green-dot speed – 10 kt.
SET HOLD SPEED (also displayed on PFD)	II/A (W)	This instruction appears when the aircraft is in selected speed, the pilot has inserted a hold in the flight plan, the aircraft is 30 seconds or less from the point where it must start decelerating towards hold speed, and the selected speed differs from the hold speed by more than 5 kt.
SET MANAGED SPEED ("SET MANAGED SPD" is displayed on PFD)	II/A (W)	The target speed is selected for the current phase, but there is no preselected speed for the next flight phase. When this is so, this message is displayed at transitions from climb to cruise, and from climb or cruise to descent. The message is always displayed at the transition to descent from climb or cruise if selected speed is active. It is not displayed if managed speed is active.
SETTING SPD/RTA ◁	II/W	Displayed when the system recomputes its managed speed target to satisfy the RTA constraints.
SPECIF NDB UNAVAIL	II/A	The NDB to be autotuned (specified for a NDB approach) is not available.
SPECIF VOR-D UNAVAIL (also displayed on ND)	II/A	The VOR, VOR-DME, or VORTAC to be autotuned (specified for an RNAV or VOR approach) is not available.

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MESSAGE	TYPE/COLOR	CONDITIONS
SPD ERROR AT WPTXX	II/W	In lateral managed flight, the system predicts that the aircraft will miss a speed constraint by more than 10 kt. When the prediction changes to bring the miss within 5 kt, the message is cleared.
SPD LIM EXCEEDED	II/A	The aircraft is more than 150 feet below the speed limit altitude and more than 10 kt over the speed limit.
STEP ABOVE MAX FL	II/W	The pilot has entered a step altitude that is above the predicted maximum altitude.
STEP DELETED	II/W	A step has been deleted for any reason, including sequencing.
STORED ROUTE FULL	I/W	The system already contains five pilot-defined routes. (Only five are allowed.)
SYSTEM RNP IS XX.X ⊲	II/A	Displayed when the RNP value, manually entered in the PROG page is larger than the RNP value associated with the current flight area (FMGS default value, refer to 4.02.20 position accuracy). It is also displayed when the RNP value associated to the current flight area becomes smaller than the manually entered RNP value.
TAKEOFF DATA ⊲ UPLINK (ACARS msg)	II/W	A takeoff data message is received.
TEMPORARY F-PLN EXISTS	I/W	The flight crew has selected any key (except ERASE or INSERT) or attempted a flight planning operation on the secondary flight plan while the system is displaying a temporary flight plan.
TIME CONSTRAINT EXISTS	I/W	The flight crew attempted to enter a time constraint although a time constraint already exists.
TIME CONSTRAINT DELETED	II/W	A time constraint is deleted automatically : – in case of engine out – when entering the holding pattern – in case of go around – when an entry is made and another time constraint already exists.
TIME ERROR AT WPTXX	II/W	While the aircraft is in lateral managed flight the FMGC predicts that it will miss a time constraint. (Refer to 4.04.40).
TIME MARKER LIST FULL ⊲	I/W	The system already contains four time markers. (Only four are allowed).

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MESSAGE	TYPE/COLOR	CONDITIONS
TIME TO EXIT	II/A	The aircraft must leave holding immediately to satisfy fuel reserve requirements. (Extra fuel is zero).
TOO STEEP PATH AHEAD	II/A	The system displays this message in cruise phase if the aircraft is within 150 NM of its destination or in descent or approach phase and in NAV mode and the descent profile contains a segment that is too steep.
TUNE BBB FFF.FF	II/A	The system cannot autotune the VOR for approach or position because of a manual VOR selection.
UNKNOWN PROGRAM PIN	II/W	The system has been unable to initialize because of an incompatible or undefined aircraft pin program combination (A/C type, engine type, VMO/MMO parity) in the FMGC software.
UPLINK INSERT IN ◁ PROG (ACARS msg)	II/W	Displayed when an uplink message is currently inserted in the FMGS.
USING COST INDEX-NNN	I/W	The system contains a flight plan, and the flight crew tries to enter a zero fuel weight or a gross weight into it before defining a Cost Index (CI). The FMGC defaults to the cost index from the last flight.
WAIT FOR SYSTEM RESPONSE	II/W	The MCDU displays the SUBSYSTEM WAIT page.
WIND DATA UPLINK ◁ (ACARS msg)	II/W	Uplink wind message has been received.
WIND UPLINK EXISTS ◁ (ACARS msg)	I/W	A flight plan modification (active or secondary) is attempted when uplink winds are not inserted yet.
WIND UPLINK PENDING ◁ (ACARS msg)	II/A	A temporary flight plan exists or a DIR TO page is displayed and a wind uplink is received and stored.
XXXX IS DESELECTED	I/W	The flight crew attempts to enter a deselected navaid through the RAD NAV or PROG page.

MCDU DATA FORMAT LIST

The following chart lists all the data the pilot may enter on the MCDU.
It also shows the acceptable format for the various data items, the acceptable range, the units of entry, and the MCDU pages on which the data can be entered.
The following codes are used to indicate various data formats :

A : letters
N : numbers
X : letters and numbers

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
ACCEL ALT	See ALT		ft (MSL)	TAKEOFF GO AROUND
ALT	NNNN or NNNNN (Leading zeros must be included)	Max alt = 41 000 Entry is rounded to the nearest 10 feet	ft (MSL)	F-PLN A VERT REV SEC F-PLN A STEP ALTS PERF CLB PERF DES CLIMB WIND CRUISE WIND DESCENT WIND PROG INIT A SEC INIT A SEC F-PLN A
ALTN	Same as ARPT	Same as ARPT		INIT A
ALTN RTE	Same as CO RTE	Same as CO RTE	N/A	INIT A
ARPT	AAAA 1 character minimum. 4 maximum.	If AAAA is not in the data base airport file New Runway page is displayed		INIT A LAT REV ALTN F-PLN A and B SEC F-PLN A and B WAYPOINT DIR TO PROG
AIRWAYS (VIA)	XXXXX	If not in data base, "NOT IN DATA BASE" is displayed	N/A	AIRWAYS
BLOCK FUEL	NNN.N leading zeros may be omitted.	0-150.0 thousands of kg 0-330,7 thousands of lbs	Thousands of Kg or lbs (pin program)	INIT B
CABIN RATE	NNN	100 - 999 in 1ft/min increments	ft/min	PERF CRZ
CG	NN.N	8.0 - 50.0	% MAC	FUEL PRED
CHANNEL	NNN	500-699		NEW NAVAID RAD NAV
CLASS (navaid)	AAAAAA (refer to range for exact inputs allowed)	VOR DME VORDME VORTAC LOC, ILS NDB MLS TACAN	N/A	NEW NAVAID

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
CO RTE	XXXXXXXXX Up to 10 alphanumeric characters may be entered	If not in the NAV data base, a mesage will be displayed	N/A	ROUTE NEW ROUTE INIT A
COST INDEX	NNN may be entered as 1-3 digits ; leading zeros may be omitted	0-999	Kg/Mn or 100 Lb/h according to Lb/Kg pin program	INIT A PERF CLB PERF CRZ PERF DES
CRS	NNN leading zeros may be omitted Entry of 360 = 0	0-360	Degrees	RADIO NAV NEW NAVAID
CRZ FL	Must be entered as flight level	Maximum : FL 450	FL (MSL)	INIT A SEC INIT A PROG
CRZ TEMP	See TEMP		See TEMP	INIT A FUEL PREDICTION SEC INIT A
DH	NNN "NO" may be entered	0-700	ft	APPROACH
DIST	NN.N (leading and trailing zeros may be omitted)	0-99.9 in 1 NM increments	NM	HOLD
DIST	NNNN	0-9999 in 1 NM increments	NM	ALTN
DRT TO	"D"NN	Eight possible values		PERF TAKEOFF
EFF WIND	± NNN "+" may be entered as "T" or "TL" "–" may be entered as "H" or "HD" Leading zeros may be omitted If no sign is input, "+" is taken	0-500	kts	CLOSEST AIRPORT EQUI-TIME INIT A SEC INT A
ELV	± NNNN if + or – is not input, assume + ; leading zeros may be omitted	–1000 - + 20470	ft (MSL)	NEW NAVAID(NAVAID) NEW WAYPOINT
EO ACC ALT	Same as ALT		ft (MSL)	PERF TAKEOFF/ GO AROUND

R

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
ETT	Estimated takeoff time same as UTC/TIME	0000-9959	HOUR : (2 first N) MIN : (2 last N)	VERT REV F-PLN
ETT/RTA ◁	HH:MM:SS	00:00:00 to 23:59:59	Hour HH Min MM Sec SS	RTA
EXTRA/TIME	± NNN.N/NNNN	± Max. Block/GMT		INIT B SEC INIT B FUEL PRED
FIG OF MERIT	N	0-3	N/A	NEW NAVAID
FINAL/TIME	Only one may be entered at a time. To input FINAL enter NNN.N to input TIME enter/NNNN	FINAL = 0-100 Time = 0-90 min	Thousands of kg or Lbs (pin pgm) minutes	INIT B FUEL PREDICTION SEC INT B
FLAPS	N	0,1, 2, or 3		TAKEOFF
FLEX TO TEMP	1. If Derated TO option not implemented : same as TEMP 2. If Derated TO option is implemented : F NN		NN in degrees centigrage	TAKEOFF
FLIGHT LEVEL	FLNNN or NNN Leading zeros on NNN may be omitted	Maximum FL 450	Hundreds of ft (MSL)	F-PLN A PROG VERT REV INIT A SEC INIT A SEC F-PLN A STEP ALTS PERF CLB PERF DES CLIMB WIND CRUISE WIND DESCENT WIND
FLT NBR	XXXXXXXXXX Up to 10 alphanumeric characters may be entered			INIT A
FREQ	NNN.NN point may be omitted if no decimal part.	108.00 - 117.95	MHz	PROG RADIO NAV NEW NAVAID
FREQ (ADF)	NNNN.N point may be omitted if no decimal part, leading zeroes may be omitted.	190.0 - 1750.0	KHz	RADIO NAV

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
FROM/TO	AAAA /AAAA See "ARPT"	AAAA must be in data base	N/A	INIT A
GMT	HHMM Where HH are hours and MM are minutes Leading zeros may be omitted. 1 or 2 digit entry is interpretred as minutes.	HH : 0-23 MM : 0-59	Hours minutes	VERT REV
GW	NNN.N Leading and trailing zeros may be omitted	35-0 - 350.0	Thousands of kg or Lbs (pin program)	FUEL PREDICTION
IDLE FACTOR	± N.N Leading and trailing zeros may be omitted	–9.9 - +9.9	%	A/C STATUS
INB CRS	NNN Leading zeros may be omitted. An entry of 360 is displayed as 0.	0-360	Degrees	HOLD
INCR	NN	1 - 20	Degrees	LAT REV
JET GW	NNN.N Leading and trailing zeros may be omitted	See 4-03-FUEL PRED key - 350.0	Thousands of kg or Lbs (pin program)	FUEL PREDICTION
LAT	DDMM.MB or BDDMM.M DD - degrees, MM.M - minutes, B - direction.Leading zeros may be omitted but the direction (B) is necessary. Latitude is displayed as DDMM.MB	B : N or S 0, DD ≤ 90 0, MM.M, 59.9	Degree minutes tenths of minutes	INIT A
LAT/LONG	LAT/LONG Same as LAT and LONG except both must be entered with / in between	Same as LAT and LONG	Same as LAT and LONG	PROG F-PLN A and B NEW WAYPOINT NEW NAVAID SEC F-PLN A and B DIR TO LAT REV NEW RUNWAY
LENGTH	NNNNN Leading zeros may be omitted	1000-8000 m 3282 - 26347 ft	Meters or ft (pin program)	NEW RUNWAY

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
LONG	DDDMM.MB or BDDDMM.M DDD - degrees o MM.M - minutes B - direction. Leading zeros may be omitted but the direction (B) is necessary Longitude is displayed as DDDMM.MB	B : E or W 0 ≤ DDD ≤180 0 ≤ MM.M ≤ 59	Degrees minutes tenths of minutes	INIT A
MACH	.NN The decimal point is necessary. Trailing zeros are not necessary	MAX = MMO	Mach Number	PERF CLB PERF CRZ PERF DES
MACH/SPD	MACH and SPD must be entered with / between (see MACH and SPD formats)	Same as MACH and SPD	Same as MACH and SPD	PERF DES PERF CLB
MDA	NNNNN (leading zeros may be omitted)	Landing elevation - Landing elevation + 5000 ft	ft (MSL)	APPROACH
MDH	± NNNNN	0 - 5000	ft (AGL)	APPROACH
NAVAID	XXXX Up to 4 alphanumeric characters may be entered	Any alphanumeric	N/A	PROG NEW NAVAID NAVAID F-PLN A and B LAT REV SEC F-PLN A and B DIR TO RADIO NAV SELECTED NAVAID
NO	NN number of LLXING	1-99		LAT REV
OFST	NNB or BNN NN - offset distance B - direction Leading zero on distance any be omitted. OFST will always be displayed as BNN	B : L or R 1 < NN < 50	NM	LAT REV

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
PLACE/ BRG/DIST	PLACE : can be any data base (or pilot defined) ARPT, RWY NAVAID or WAYPOINT entry, without decimal digit. An entry of BRG = 360 is displayed as 0. Nota : True/Mag ref. TBD DIST : is NNN.N where leading zeros may be omitted ; all 3 parameters must be entered with "/" between entries	PLACE - If not in data base, a message "NOT IN DATA BASE" is displayed - BRG : must be a 3 digits BRG = 000 -360 DIST = 0.999.9	N/A degrees NM	F.PLN A and B SEC F-PLN A and B LAT REV NEW WAYPOINT PROG DIR TO STEP ALTS
PERF FACTOR	± N.N (leading or trailing zero may be omitted)	–9.9 - +9.9	%	A/C STATUS
PLACE-BRG/ PLACE-BRG	Same as for PLACE/BRG/DIST A PLACE - BRG couple is entered with a dash in the middle. 2 couples have to be entered with "/" between	Same as for PLACE/BRG/DIST except for PLACE : in each of couple, PLACE is limited to 5 characters. couples	Same as for PLACE/BRG/DIST	Same as for PLACE/BRG/DIST
PLACE/DIST	PLACE : same as for PLACE/BRG/DIST DIST : same as for PLACE/BRG/DIST	PLACE : same as for PLACE/BRG/DIST DIST :0-999.9	N/A NM	F-PLN A and B SEC F-PLN A and B LAT REV NEW WAYPOINT DIR TO STEP ALTS
QNH	NNNN (leading or trailing zero may be omitted).	745.0 - 1050.0	Hecto Pascals	APPROACH VERT REV
	NN.NN (leading or trailing zeros may be omitted).	22.00 - 31.00	In. Hg	
RADIAL IN	NNN(T) 3 digits entry with True/Mag reference.	000-360	Degrees	DIR TO

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
RADIAL OUT	NNN(T) 3 digits entry with True/Mag reference	000-360	Degrees	DIR TO FIX INFO 1 and 2
RTE RSV RTE RSV%	Ony one may be enteered at a time To input RTE RSV enter/NNN.N To input RTE RSV enter/NN.N	RTE RSV = 0-25,600 KG RTE RSV % = 0-15 %	Thousands of KG or Lbs (pin pgm) %	INIT B FUEL PREDICTION
REQUIRED (navigation accuracy)	NN.NN (leading or trailing zeros may be omitted	0.01-200	NM	PROG
RWY	AAAANND Where AAAA is same as ARPT NN is runway number (2 digits must be entered) D is L or R or C if there is more than one runway with the same number at the airport. D is not included unless there is more than one runway with the same number at AAAA.			RUNWAY NEW RUNWAY
SATELLITE NUMBER	NN (leading zero may be omitted)	1-99	N/A	PREDICTIVE GPS
SAT/ALT	TEMP/ALT	See TEMP and ALT	N/A	CRUISE WIND
SET HDG	NNN/N (leading and trailing zeros may be omitted) will always be displayed as NNN/N	000.0 - 360.0	Degrees	IRS MONITOR
SLOPE	NN.N	00.0-90.0	Degrees	NEW NAVAID

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
STATION DEC	NNND Where NNN is the declination and D is the direction. Leading zeros may be omitted. D is not required for an entry of zero declination	NN : 00-180 D : E or W	Degrees	NEW NAVAID
STEP ALT	SNNN or NNNS (where NNN is in Flight Level) or SNNNNN or NNNNNS (where NNNNN is in ALT) Leading zeros may be omitted	Same as Flight Level or ALT	Same as Flight Level or ALT	F-PLN A
SPD	NNN (must be 3 numerics)	MAX VMO MIN = 100 kt	kt (CAS)	F-PLN A SEC F.PLN A VERT REV PERF CLB PERF CRZ PERF DES
SPD LIM	SSS/NNNNN SSS is a speed NNNNNN is an ALT or FLIGHT LEVEL (see ALT and FLIGHT LEVEL)	SSS same as SPD	kt/ft (MSL) or kt/FL	VERT REV
SPD/MACH	See MACH/SPD	Same as MACH and SPD	Same as MACH and SPD	PERF CLB PERF DES
TAXI	N.N Leading or trailing zeros may be omitted	0-9.9	Thousands of kg or Lbs	INIT B
TEMP	± NN If no sign, assume +		Degrees centigrade	APPROACH
THR RED ALT	Same as ALT	400 ft AGL mini	ft (MSL)	TAKEOFF GO AROUND
THS	AAN.N or N.NAA where AA is UP or DN (DOWN)	max UP = 7.0 max DN = 5.0 min UP and DN is 0.0 the increment value is .1	Degrees	TAKEOFF
TIME	N.N	0-9.9	Minutes	HOLD
TIME MARK.	See GMT	See GMT	Hours Minutes	F-PLN A and B

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
T.O.SHIFT	NNNNN	1 - Length of origin runway	m or ft	TAKEOFF
TRANS ALT	Same as ALT	400 ft AGL min	ft (MSL)	TAKEOFF APPROACH
TRIP WIND	See EFF WIND		kts	INIT A SEC INIT A
TROPO	Same as ALT	Same as ALT	ft	FUEL PREDICTION
UPDATE AT	Same as WAYPOINT	Same as waypoint	N/A	PROG
UTC/TIME	NNN	0000-9959	Hour (2 first N) Min. (2 last N)	HOLD VER REV PREDICTIVE GPS
V1	Same as SPD		kt (CAS)	TAKEOFF
V2	Same as SPD		kt (CAS)	TAKEOFF
VR	Same as SPD		kt (CAS)	TAKEOFF
VAPP	Same as SPD		kt (CAS)	APPROACH
WAYPOINT	XXXXXXXX - may be from 1–7 characters for waypoint. Acceptable as waypoint Ident : SEC ARPT NAVAID WAYPOINT LAT/LONG, PLACE.BRG/ PLACE.BRG PLACE.BRG/DIST PLACE/DIST may be entered to define a waypoint			WAYPOINT NEW WAYPOINT F-PLN A and B F-PLN A and B LAT REV PROG DIR TO FIX INFO 1 and 2 EQUI TIME PT STEP ALTS PREDICTIVE GPS
WIND DIR/WIND MAG	NNN/NNN Both must be entered ; leading zeros may be omitted.	WIND DIR : 0-360	Degrees	PERF APPR CLIMB WIND CRUISE WIND DESCENT WIND
	An entry of WIND DIR = 360 is displayed as 0.	WIND MAG : 0-500	Kt	

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
WIND DIR/ WIND MAG/ALT	NNN/NNN/FL NNN or NNN/NNN/NN NNN NNN-Leading zero not necessary. An entry of Wind DIR = 360 is displayed as 0.	WIND DIR 0-360 WIND MAG 0-200 same as ALT	Degrees /kt /ft MSL	CIMB WIND CRUISE WIND DESCENT WIND
ZFW	NNN.N Leading and trailing zeros may be omitted	35-350.0	Thousands of kg or Lbs	INIT B
ZFWCG	Same as CG	Same as CG	Same as CG	INIT B

04.00 CONTENTS

04.10 LATERAL FUNCTIONS

04.20 VERTICAL FUNCTIONS

04.30 OTHER FUNCTIONS

04.40 LONG RANGE

R **04.50** **AOC FUNCTIONS**

R **04.60** **PRINT FUNCTION**

GENERAL

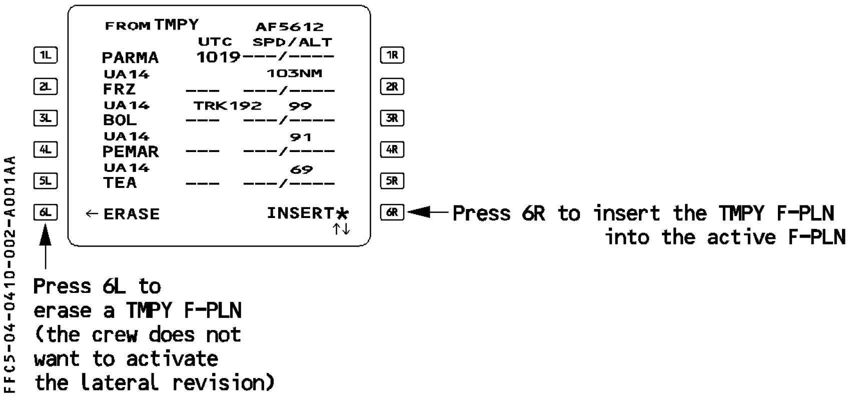
The lateral revision function allows the pilot to create or modify the following parts of the flight plan :

- airway
- waypoint
- new destination
- holding pattern
- offset
- alternate
- Fix information
  Each time the pilot activates one of the revisions listed above, he accesses to a temporary flight plan that allows to check the modification before inserting it in the active flight plan. The crew selects these functions by pressing the left keys on F-PLN A or B.
- Direct to and overfly functions are accessed through MCDU keys. No temporary flight plan is created with these functions.
- “Update at” capability is a specific function that manually updates the FM position. It does not use a temporary flight plan, but the pilot must confirm the insertion before it is activated.

TEMPORARY F-PLN (TMPY)

When a pilot makes a lateral revision to the F-PLN, the FMGS creates a temporary flight plan. This is a copy of the active F-PLN, but is corrected by the lateral revision in progress. The aircraft continues to follow the active F-PLN until the temporary revision is inserted. The revision appears in yellow characters on both MCDUs and NDs.

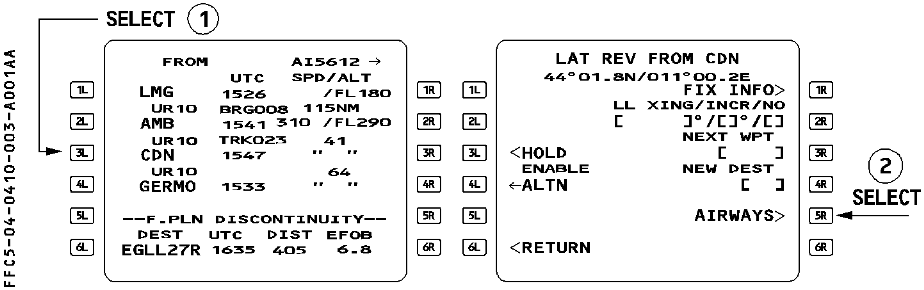
- Lateral and vertical revisions cannot be made to a temporary F-PLN.
- Only one temporary F-PLN may be accessed at a time.
- The "DIRECT TO" function, when used, erases a temporary F-PLN.
- When a DIR TO is in process, a temporary revision cannot be displayed on the other MCDU.
- A TMPY F-PLN changes the title of the flight plan pages. (TMPY appears in all titles).
- No predictions are computed for a temporary flight plan (Dashes are displayed).



Temporary data are displayed in yellow (ND and MCDU). Once inserted they become active and are displayed in green.

INSERTING AN AIRWAY WITH "VIA"

The pilot can insert into the active flight plan, up to 5 successive airway segments going from a revised waypoint or ending at a given waypoint of the flight plan.

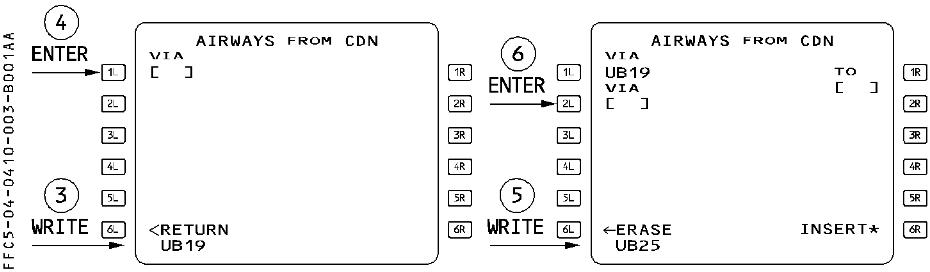


– **SELECT the revised waypoint (here CDN).**

– **PRESS [5R] to select the airways function.**

THE PILOT WISHES TO INSERT SUCCESSIVE AIRWAY SEGMENT FROM A WAYPOINT

e.g. from CDN - Airways UB19 – Airways UB25 – Ending point AAA.



– **WRITE the first airway in the scratchpad (here UB19).**

– **PRESS [1L] to insert into the VIA field.**

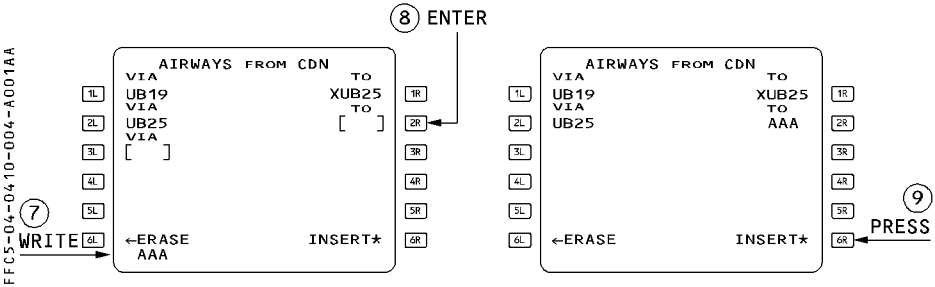
– **WRITE the second airway in the scratchpad (here UB25)**

– **PRESS [2L] to insert into the VIA field.**

The system determines automatically the first downpath intersection point between the 2 airways.

- If the airways have a common waypoint, the system selects it as the ending point of the first VIA.
- If they have no common waypoint but have a single intersection, the system creates this intersection as an FM computed point and displays X followed by the airway ident (here XUB25).
- If they have no common waypoint neither intersection, the system displays NO INTERSECTION FOUND in the scratchpad.

Once the pilot has entered the required airways (up to 5), he must enter the ending point of the last selected airways :

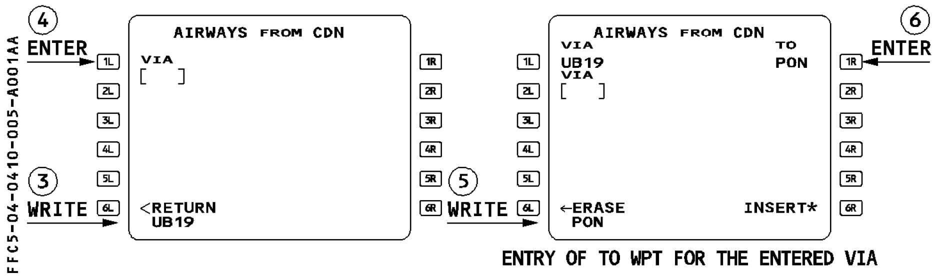


- **WRITE the ending waypoint in the scratchpad (here AAA).**

- **PRESS [2R] to insert the ending waypoint into the TO field.**

R *Note : If two waypoints with the same ident belong to the same airway, the DUPLICATE*
R *NAMES page will not be called and the system selects the first one in the*
R *database.*

THE PILOT WISHES TO INSERT ONE AIRWAY SEGMENT TO AN ENDING WAYPOINT



- **WRITE the airway ident in the scratchpad (here UB19).**
- **PRESS [1L] to insert into the VIA field.**
- **WRITE the ending waypoint in the scratchpad (here PON).**
- **PRESS [1R] to insert into the TO field.**

R *Note : – If the revise waypoint or the ending waypoint does not belong to the entered*
R *airway, the system displays AWY/WPT MISMATCH in the scratchpad.*
R *– If two waypoints with the same ident belong to the same airway, the*
R *DUPLICATE NAMES page will not be called and the system selects the first*
R *one in the database.*

FLIGHT PLAN INSERTION

The flight crew inserts the flight plan either directly from the AIRWAYS page or from the TMPY F-PLN page. In both cases :

- **PRESS [6R] to insert the temporary flight plan. Clear the flight plan discontinuity as necessary.**

INSERTING A WAYPOINT

The pilot can insert waypoints by two methods :
- directly into the flight plan. All modifications go directly into the active flight plan. No temporary flight plan is created.
- by means of a lateral-revision at "NEXT WAYPOINT", a process that creates a temporary flight plan.

The second method allows to check the temporary flight plan before inserting it.

WAYPOINT IDENTIFICATION

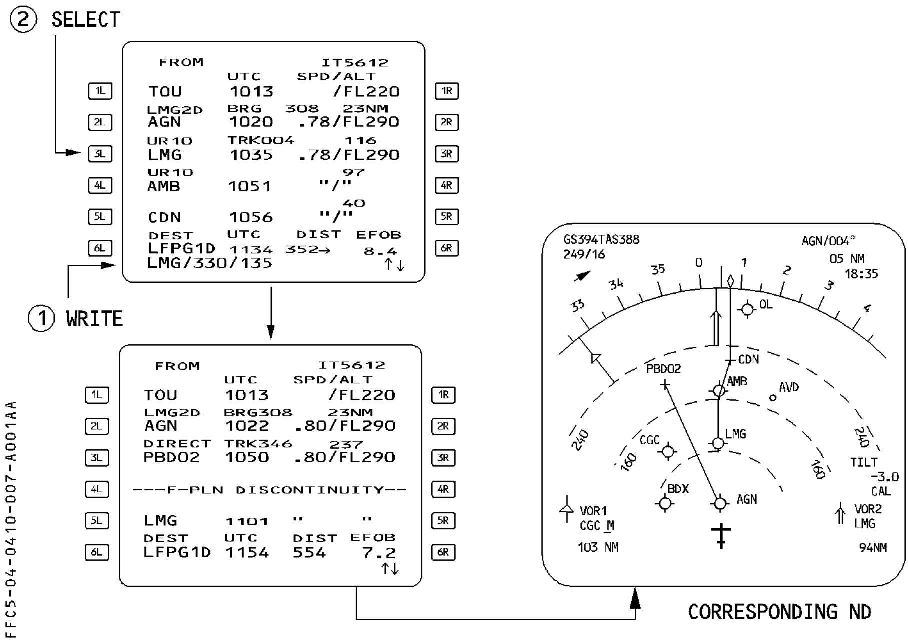
The pilot can identify a waypoint by :
- Its identifier (if it is in the navigation data base)
- A Latitude/Longitude (LL)
- A Place/Bearing/Distance (PBD). The waypoint is defined by its bearing and distance from a place.
- A Place-Bearing/Place-Bearing (PBX). The waypoint is defined by the interception of 2 radials from 2 places.
- A Place/Distance (PD). The waypoint is defined by a distance from a place, along the F-PLN.

Note : If a slash or a dash is not entered properly, the Multifunction Control and Display Unit displays a "FORMAT ERROR" message.

When the Flight Management Guidance System receives a waypoint not in the data base, it identifies it as LLxx or PBD xx or PBX xx or PD xx (xx is a two-digit number between 01 and 20) and stores it in the stored waypoints file of the database.

Note : When NAV mode is engaged, the crew cannot modify the "TO" waypoint (active leg) using the waypoint insertion function. If the crew wants to modify it, the DIR TO function will be used.

WAYPOINT INSERTED DIRECTLY IN THE FLIGHT PLAN



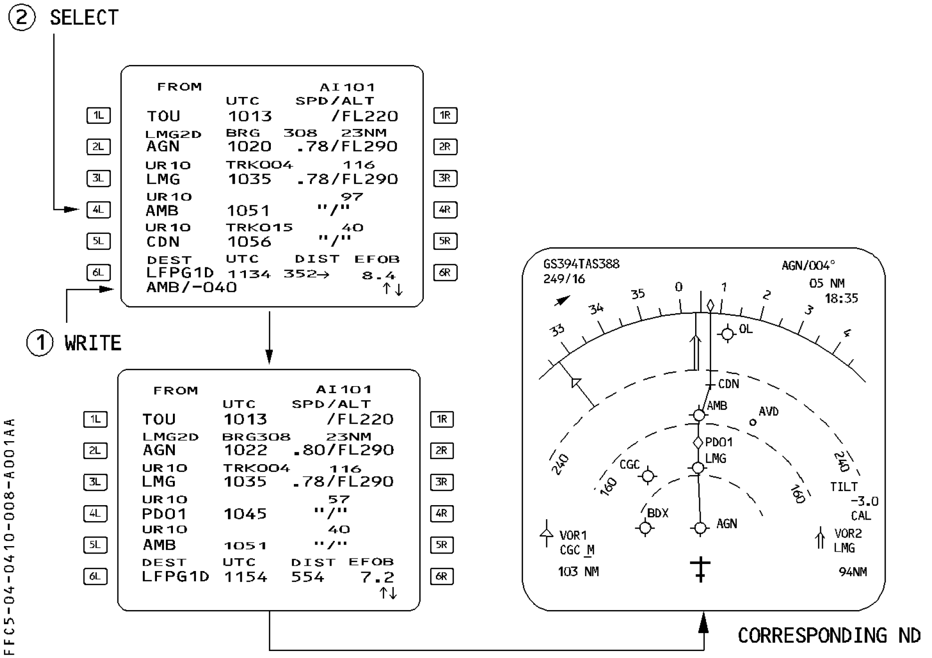
- **WRITE the waypoint identifier or LAT/LONG, Place/Bearing/Distance or Place-Bearing/Place-Bearing into the scratchpad. (Example : Place : LMG, Bearing: 330°, Distance : 135 NM)**

- **PRESS the appropriate key to enter the waypoint into the flight plan. The rule is that the new waypoint appears next to the pressed key, and the previous waypoint moves down the flight plan path.**

This operation creates a discontinuity between the new waypoint and the previous one. The new flight plan will have to be cleared of the discontinuity and some waypoints erased.

ALONG TRACK WAYPOINT INSERTION

The pilot can enter in the F-PLN page or in the STEP ALTS page an along track waypoint defined as a place/distance waypoint.

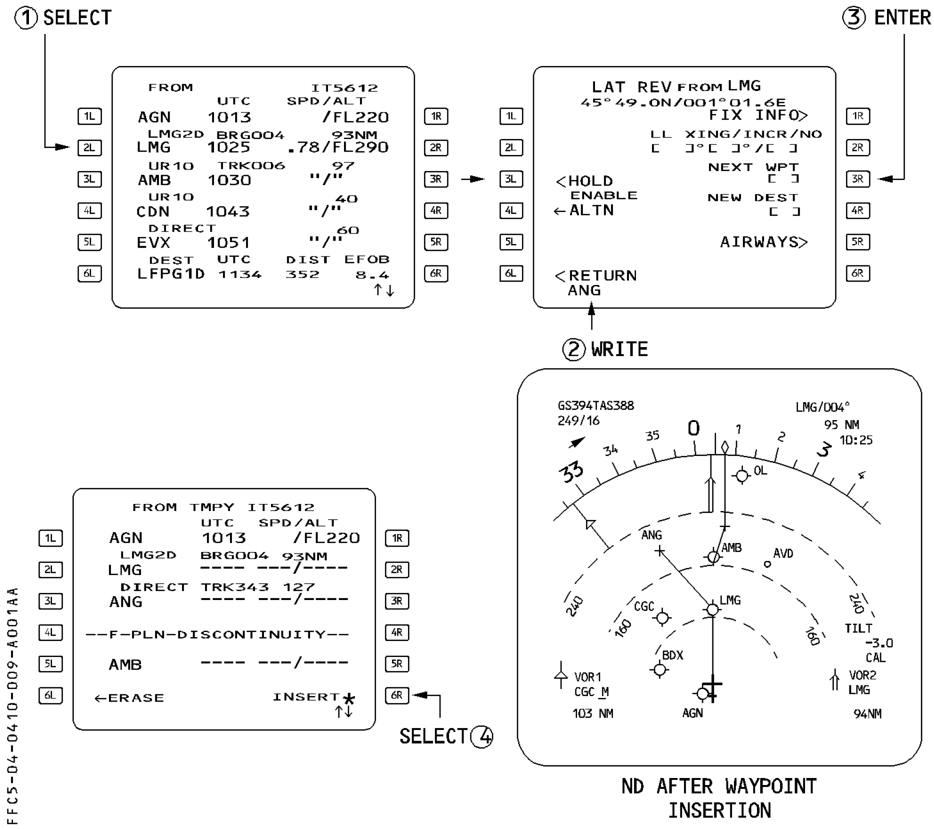


– **WRITE the waypoint identifier and distance from this place.**
According to the sign of the distance, the crew may define an along track waypoint before or after the revised place. (Example : AMB/-040).

– **PRESS the appropriate key adjacent to the place identifier. The system positions the waypoint automatically in the flight plan.**

This operation does not create any discontinuity.
The system does not accept an along track waypoint entered at the FROM waypoint.

WAYPOINT INSERTED THROUGH THE USE OF "NEXT WAYPOINT"

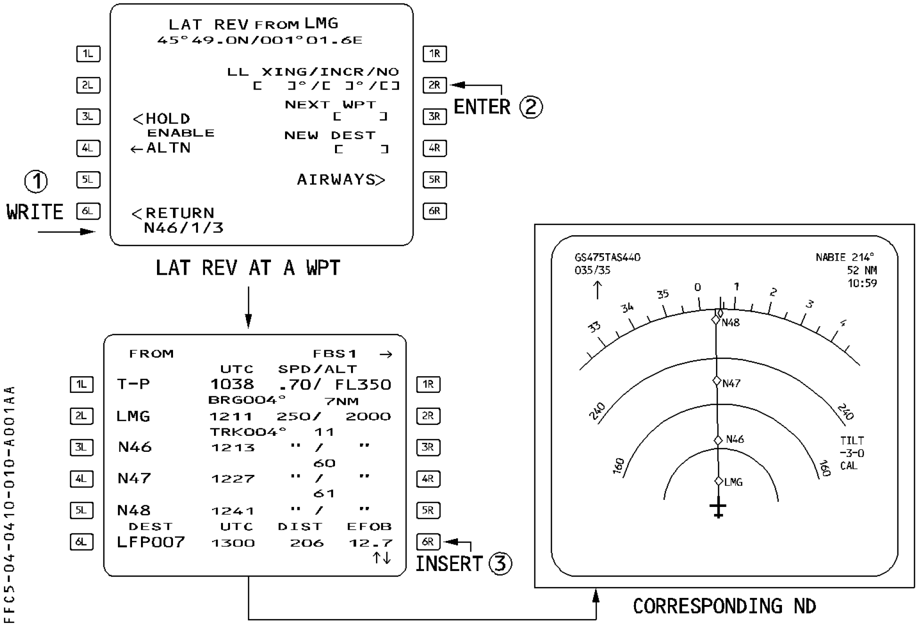


ND AFTER WAYPOINT INSERTION

- **SELECT the lateral revision (LAT REV) function at an appropriate waypoint.**
- **WRITE the waypoint identifier, or LAT/LONG, or Place/Bearing/Distance, or Place-Bearing / Place-Bearing into the scratchpad.**
- **ENTER it in the brackets under NEXT WPT (next waypoint).**
- **INSERT the temporary flight plan by depressing the [6R] key**
- **CLEAR the F-PLN discontinuity as appropriate.**

LATITUDE/LONGITUDE CROSSING WAYPOINT INSERTION

This function allows the insertion of one or several points along the flight-plan beyond the revised waypoint at fixed latitude or longitude intervals (INCR) from a specified latitude or longitude.
These waypoints are not considered as part of the pilot defined elements, the system deletes them when sequenced.



– **WRITE the latitude (NXX, XXN, SXX or XXS), the required increment in degrees between the successive waypoints and the number of required waypoints.**
(Example : The pilot wants to get 3 points, every degree from latitude N46 : he enters N46/1/3).

– **PRESS [2R] to insert into the LL XING/INCR/NO field.**

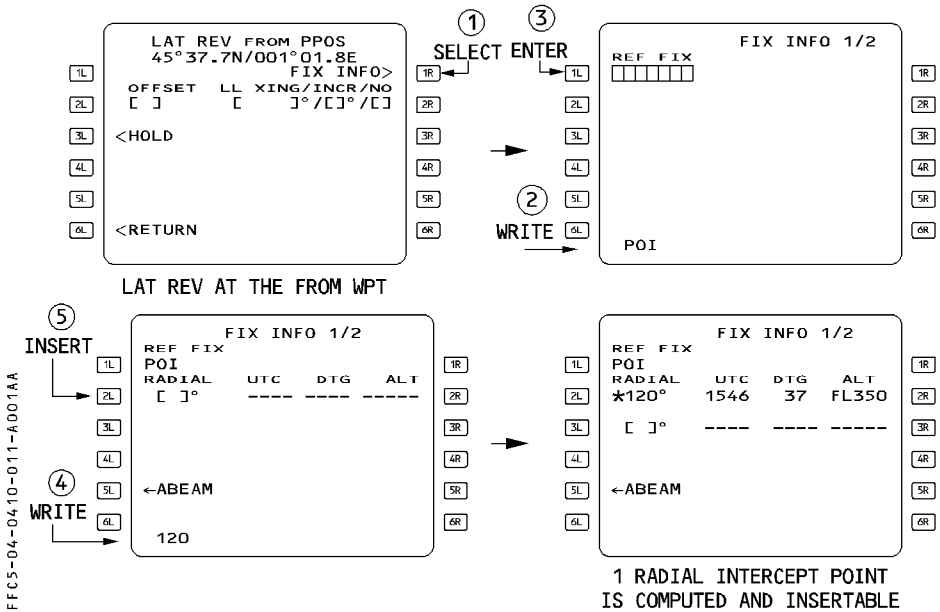
– **PRESS [6R] to insert the new waypoints in the flight plan without discontinuity.**
The system does not store these waypoints in the database.

FIX INFO

When using FIX INFO function, the pilot defines waypoint intersections of the flight plan with radials associated to a fix.
When the pilot inserts the intersection point, the system identifies automatically this point, but does not store it in the navigation database.
FIX INFO function offers 2 possible waypoint insertions : radial intercept waypoint and abeam intercept waypoint.

INSERTING OF A RADIAL INTERCEPT WAYPOINT

The pilot accesses the radial intercept function from the lateral revision page at origin or at the "from" waypoint.



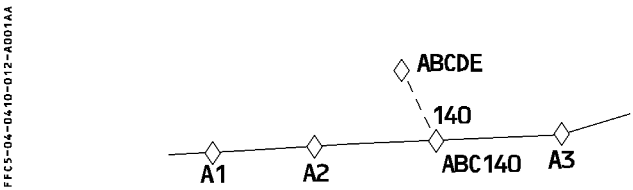
- **WRITE the reference fix identifier into the scratchpad. It may be any database or pilot defined fix (here POI).**

- **PRESS key [1L].**

- **WRITE the radial into the scratchpad (here 120°).**

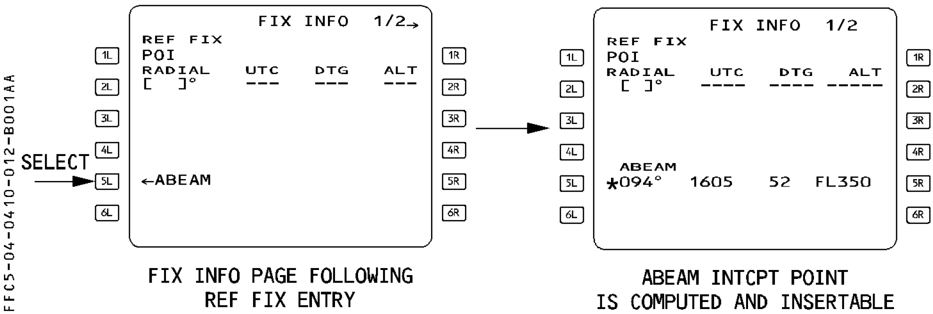
– **PRESS key [2L] for the first radial.**
  If the radial line intersects the active flight plan, the system computes the time, distance to go and the altitude at the intersection point.
  Up to 3 radials may be entered.

– **SELECT the required radial to insert the associated waypoint into the flight plan :**
  The system assigns automatically its ident as the 3 first characters of the reference fix ident, followed by the radial. (Example : ABC 140).



INSERTING AN ABEAM INTERCEPT WAYPOINT

The pilot accesses this function from the lateral revision page at origin or at the FROM waypoint.



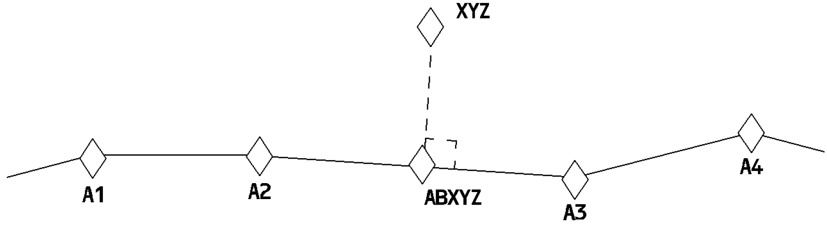
– **WRITE the reference fix identifier into the scratchpad (here POI).**

– **PRESS key [1L].**

– **SELECT the ABEAM prompt : the system computes the radial, time, distance to go, altitude and predictions related to the waypoint abeam the reference fix.**

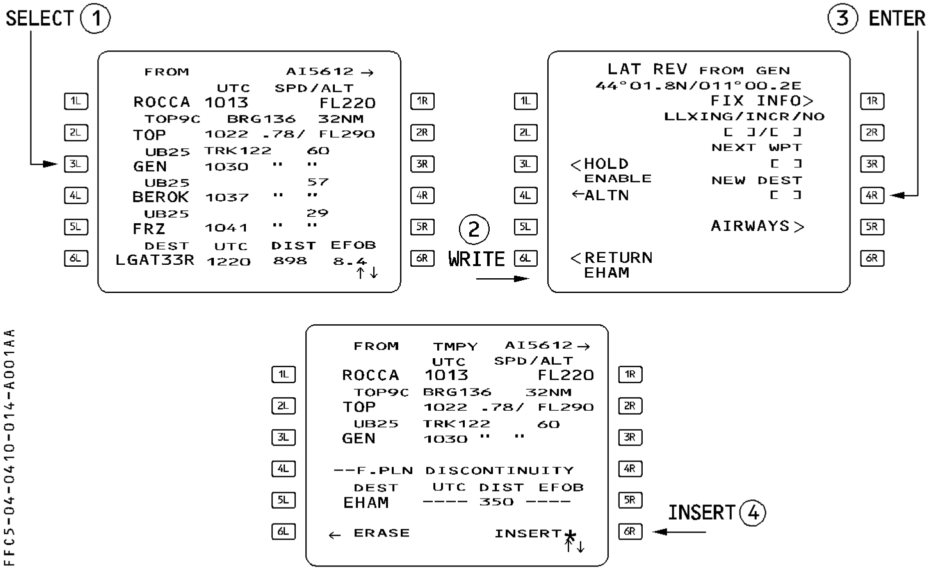
– **SELECT key [5L] to insert the abeam intercept waypoint into the flight plan : the system assigns automatically its identifier as AB, followed by the 5 first characters of the reference fix identifier (Example ABXYZ)**

FFC5-04-0410-013-A001AA



INSERTING A NEW DESTINATION

The pilot may define a new destination and insert it through the lateral revision page. The pilot may then call up the new destination from any waypoint along the flight plan except the FROM waypoint, the destination, and the missed-approach waypoint. When the new destination has been inserted, a flight plan discontinuity appears between the revision waypoint and the new destination. All waypoints beyond the revision waypoint (including the previous destination and associated missed approach) are deleted.



– **SELECT the lateral revision function at an appropriate waypoint.**

– **WRITE the new destination in the scratchpad.**

– **Enter it in the brackets under NEW DEST**

– **INSERT the temporary flight plan ([6R] key), and complete the flight plan to the new destination.**

HOLDING PATTERN

Holding pattern description, associated guidance and flight crew procedures are put together in this chapter.
The flight management and guidance computer (FMGC) has three types of holding pattern that the pilot can use in a flight plan.

HOLD TO FIX (HF)

The holding pattern is always part of an arrival or departure procedure. The aircraft flies it once and then exits the holding pattern automatically at the fix. The predicted speed in the holding pattern is the lowest of ICAO speed limit, max endurance speed, or any speed constraint.
Guidance to the fix in the holding pattern is similar to that on any leg of a flight plan. The HF patterns are part of the navigation database and cannot be created by the crew.

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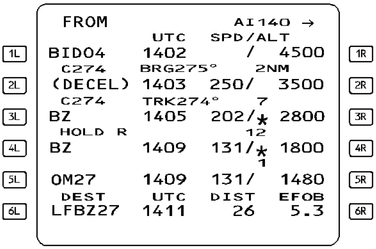
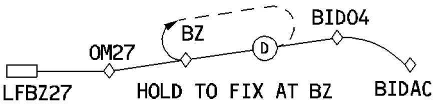
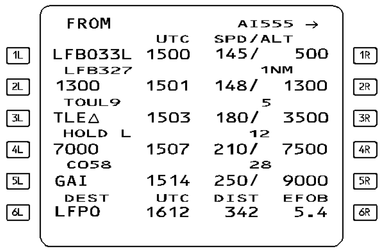


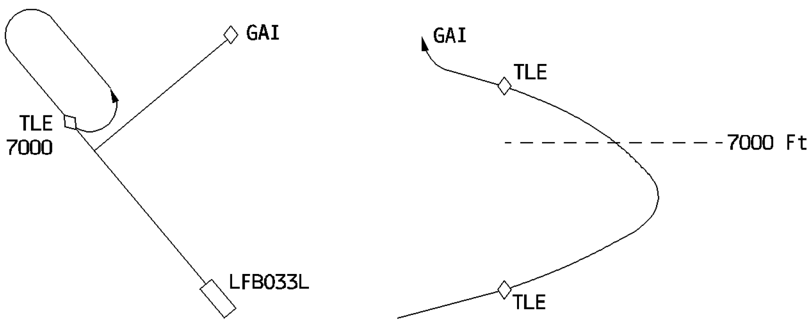


HOLD TO FIX AT BZ
(ARRIVAL PROCEDURE)

HOLD to ALTITUDE (HA)

This type of holding pattern is also part of an arrival or departure procedure.
The aircraft flies the hold until it reaches the specified altitude. Then it exits the hold automatically at the fix.
The predicted speed for the holding pattern is the lowest of the ICAO speed limits, the max endurance speed or any speed constraint.
The size of the holding pattern is a function of the predicted speed.
Guidance in a hold to altitude (HA) is similar to that for any leg of a flight plan.
The HAs are in the navigation database as part of arrival or departure procedures and cannot be created by the crew.





HOLD TO ALTITUDE AT LFBO
(DEPARTURE PROCEDURE)

FFC5-04-0410-016-A001AA

HOLD WITH MANUAL TERMINATION (HM)

This type of holding pattern may be part of an arrival procedure, or the pilot may enter it at present position or at any flight plan waypoint.
The pilot will use this type of holding pattern to comply with a defined procedure or a clearance limit or to meet an operational need (such as losing altitude, holding for weather improvement, or absorbing an ATC delay).
This type of holding pattern is exited under pilot decision and not automatically.
There are 3 types of HM, all are modifiable.

DATABASE HOLD

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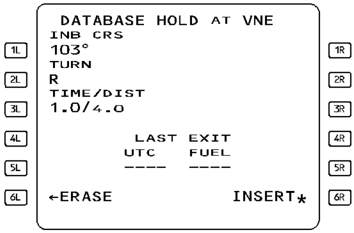

If the holding pattern is part of the database, it is named DATABASE HOLD and all its associated data (inbound course, turn direction, time/distance) are defined in the data base. Flight crew can modify this data.

COMPUTED HOLD AT ...

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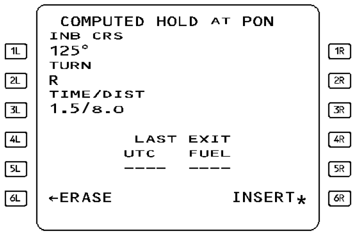
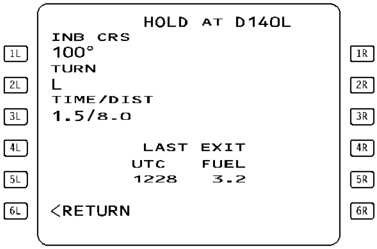


If the holding pattern is not in the database, the FMGC designs a holding pattern and proposes it to the pilot. The associated data consists of default values that the pilot can modify.

HOLD AT ...



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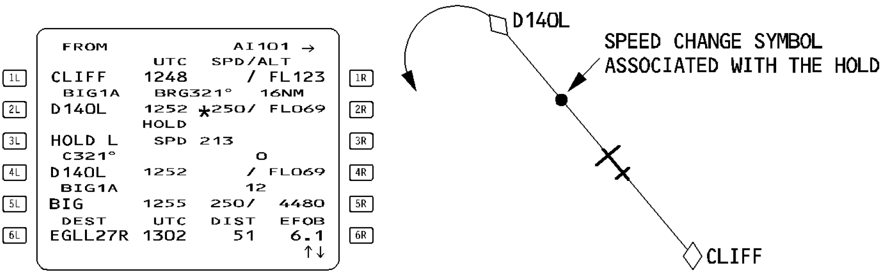
If the pilot inserts into the active flight plan a holding pattern that is manually corrected from a hold defined by the FMGS, the screen displays a "HOLD AT ..." page. The field 2R displays REVERT TO DATABASE or REVERT TO COMPUTED to restore the database data if necessary.

PREDICTIONS AND GUIDANCE ASSOCIATED WITH AN HM HOLDING PATTERN (HOLD WITH MANUAL TERMINATION)

Before deceleration

Although the hold is inserted into the flight plan, the FMGS does not take it into account for predictions until the aircraft enters the hold.
However, if the hold is not deleted by the crew, the FMGS schedules a deceleration point and displays it on the ND.



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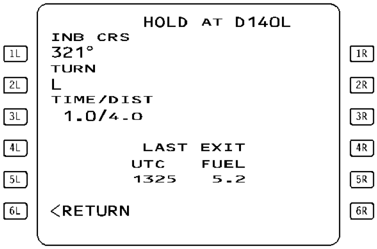


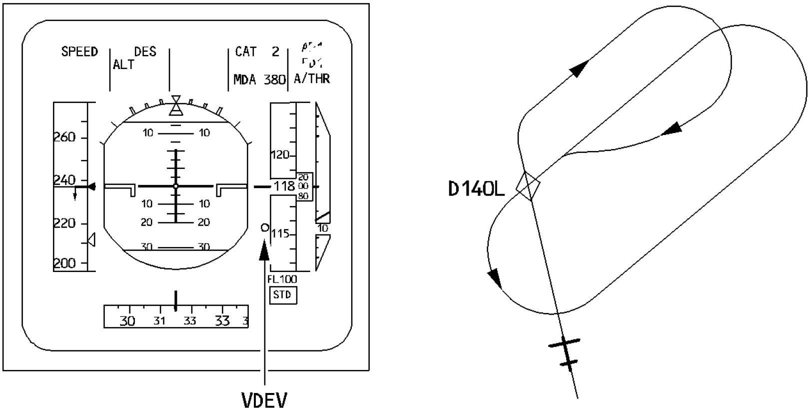
The FMGS predicts the estimated time and amount of fuel remaining at which the aircraft must exit holding so as to comply with the fuel policy specified on the fuel prediction page.
When the aircraft enters the holding pattern, the FMGS revises all predictions and assumes the aircraft will fly one turn of the holding pattern.
All predictions are revised if there is one additional holding pattern when the holding fix is overflown.

<u>On reaching the speed change pseudo waypoint</u>

The FMGS either causes the aircraft to decelerate to the hold speed (if managed speed is active and NAV mode engaged), or displays "SET HOLD SPD" (set hold speed) on the MCDU and primary flight display if the flight crew has selected a speed target.
The default hold speed is the lowest of :
– Maximum endurance speed
– ICAO limit holding speed
– Speed constraint (if any).

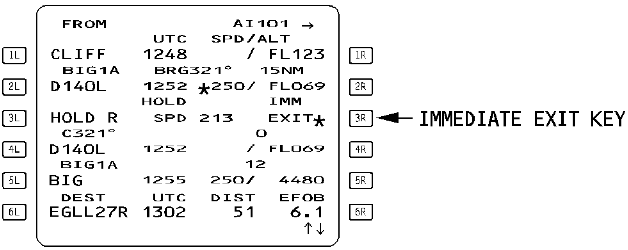
R When no specific speed limit applies, the default hold speed is the Maximum Endurance
R speed, which is approximately equal to Green Dot in clean configuration (it can vary
R between Green Dot and Green Dot + 10 knots, depending on the aircraft weight, altitude
R and temperature).

The flight plan predictions for time and fuel do not yet consider that the hold will be flown. However, the navigation display shows the hold entry and holding pattern trajectory.



FFC5-04-0410-020-A001AA

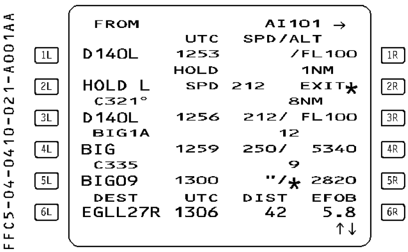
Deceleration receives priority, so that when the aircraft is in descent with the descent mode engaged, it will deviate above the descent path to decelerate. (VDEV becomes positive on the progress page).
The flight plan page displays an immediate exit prompt.
If the flight crew presses the key next to “IMM EXIT” before arriving at the holding fix, the aircraft will not enter the holding pattern, but will resume its phase-related managed-speed profile.

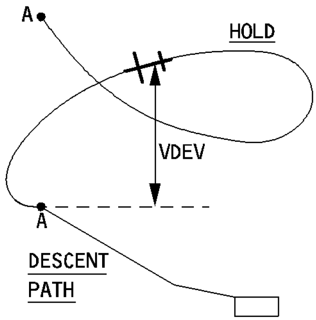


FFC5-04-0410-020-B001AA

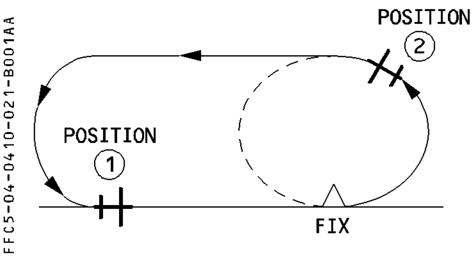
R **<u>After reaching the hold entry fix</u>**
R The aircraft enters the hold. The MCDU HOLD page displays the associated holding data :
R – The inbound course (INB CRS)
R – The TURN direction (L or R)
R – The TIME/DIST
R – The LAST EXIT time and the associated fuel to reach the alternate airport with no extra
R fuel.

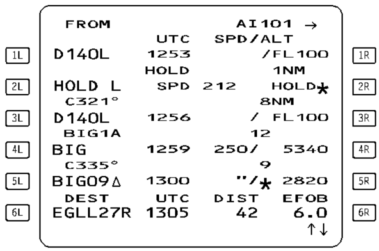
R The FMS assumes that the aircraft will fly one turn of the holding pattern, and revises the predictions accordingly.
When the holding pattern is defined by a leg time (and not a leg distance), the system revises the size of the hold as a function of the target speed :
- If managed speed is active, the system uses the predicted holding speed to calculate the size of the holding pattern.
R - If the selected speed is active, the system uses the target speed the flight crew selects at the entry fix sequencing to calculate the size of the holding pattern.
- The VDEV displayed on the primary flight display and the PROG page when the aircraft is flying in the HM (hold pattern with manual termination) is the difference between the aircraft's current altitude, and the altitude at which it should be, when it reaches the hold exit fix in order to be positioned correctly on the descent path.





With IMM EXIT pressed (aircraft in the holding pattern)
The predictions and guidance assume that the aircraft is returning immediately to the hold fix.
Sequencing the hold fix, the aircraft exits the holding pattern and resumes its navigation. The flight plan page displays "RESUME HOLD*" instead of "IMM EXIT*".





HOLD EXIT PROCEDURE

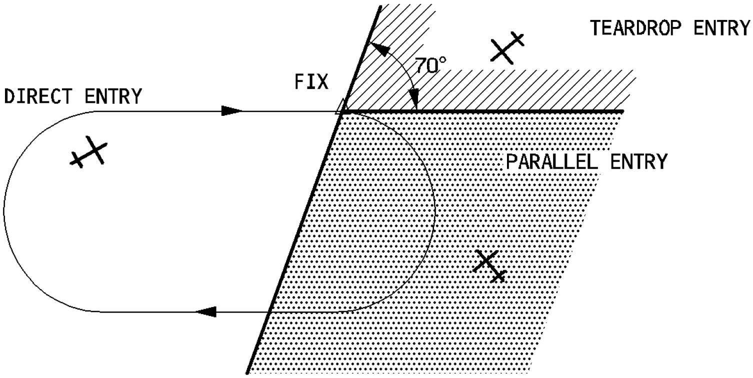
- **Position (1) If "IMM EXIT" pressed, aircraft will exit at next fix overfly.**
- **Position (2) If "IMM EXIT" pressed, aircraft will make an immediate turn to the fix where hold will be exited.**

If managed speed is active, the computer sets the target speed to the applicable speed of the current phase (for example, speed constraint, ECON speed, or speed limit).
The computer then bases its predictions on the assumption that the flight will continue on the descent path, if the aircraft is in a descent.
If DES mode is engaged, the following applies :
- The holding pattern is never included in the descent path computation.
- The flight crew cannot enter altitude and speed constraints at the hold exit fix (this is only allowed at the hold entry fix).
- The vertical guidance in the HM during the descent phase calls for a constant – 1 000 feet per minute, but the computer considers altitude constraints that will take effect farther down the flight path as it calculates vertical guidance and predictions. The system will not allow the aircraft to descend below the next altitude constraint. If the aircraft reaches the next altitude constraint, it will level off, and the altitude constraint mode will engage.

With RESUME HOLD pressed
If the flight crew presses the key next to "RESUME HOLD", the aircraft remains in the holding pattern, and the display again shows "IMM EXIT".
After that, each time the aircraft flies over the holding fix, the system updates the predictions for one more holding circuit.

HOLDING PATTERN ENTRIES

The FMGS offers three types of entry into holding patterns :
1. Direct entry
2. Teardrop entry
3. Parallel entry



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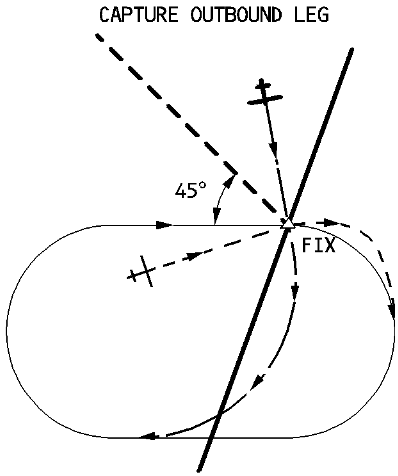
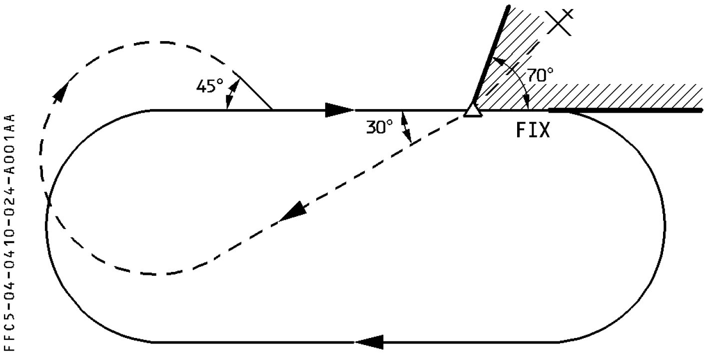
1. The direct entry

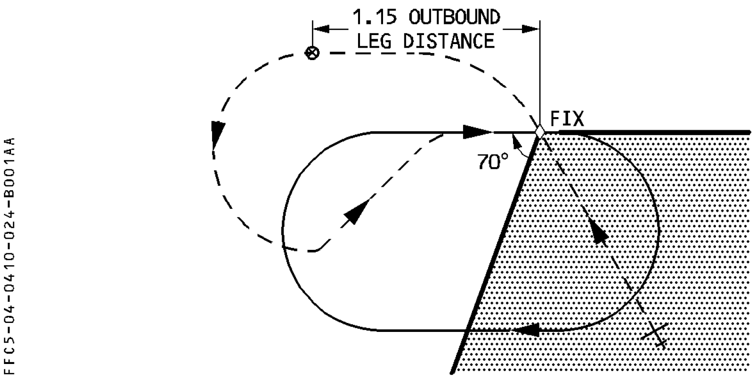


FFC5-04-0410-023-B001AA

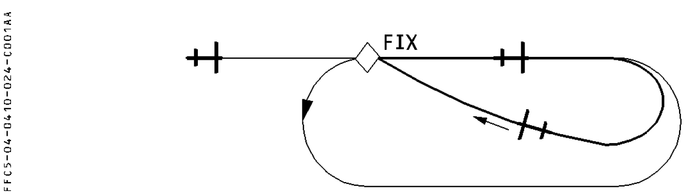
2. The teardrop entry



3. The parallel entry

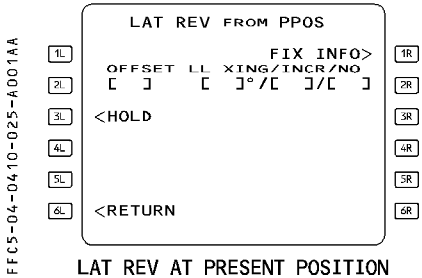


Note : *If the leg the aircraft is flying toward the holding fix is on a "limit" between a teardrop entry and a parallel entry, the FMGC may compute and display either of the two entries. The pilot should keep this in mind and not assume that the FMGC is malfunctioning.*
If the flight plan leg toward the hold entry fix is on a course that is the reciprocal of the inbound course of the holding pattern, the aircraft will fly a parallel entry.

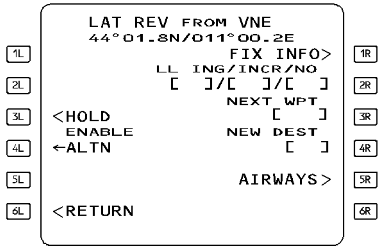


PROCEDURE TO INSERT A HOLD (HOLD WITH MANUAL TERMINATION)

The HOLD prompt allows the flight crew to enter a Hold with Manual termination (HM) at the revised waypoint or at present position.
The flight crew accesses the HOLD page from a lateral revision at the present position
R (PPOS) or at a waypoint.



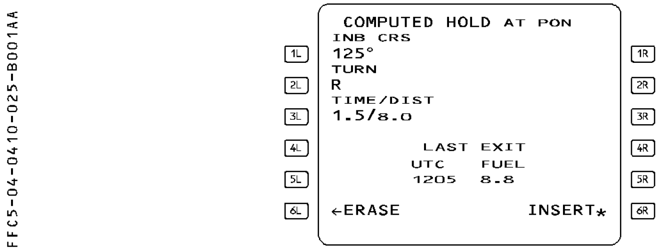
LAT REV AT PRESENT POSITION



LAT REV AT A WPT

- **SELECT lateral revision at present position (PPOS) or an applicable waypoint**
- **PRESS HOLD prompt, [3L] key**
- **CHECK and (if necessary) MODIFY the HOLD data**
- **CHECK the temporary flight plan and INSERT it, if appropriate.**

R



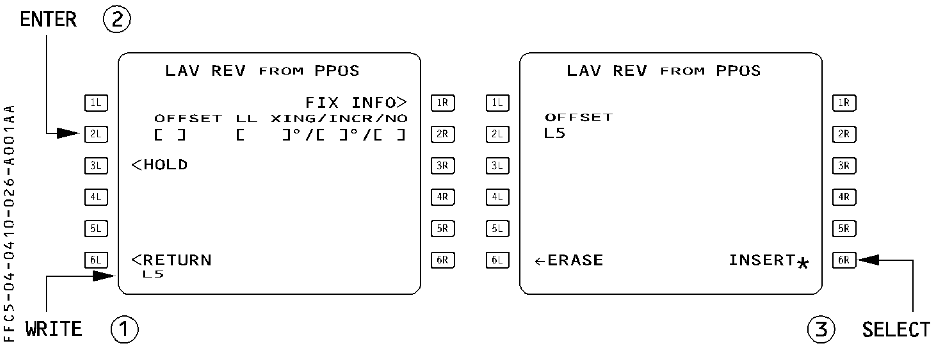
PROCEDURE TO DELETE A HOLD (HOLD WITH MANUAL TERMINATION)

- **CLEAR the HOLD directly in the flight plan as it can be done for a normal waypoint.**

OFFSET

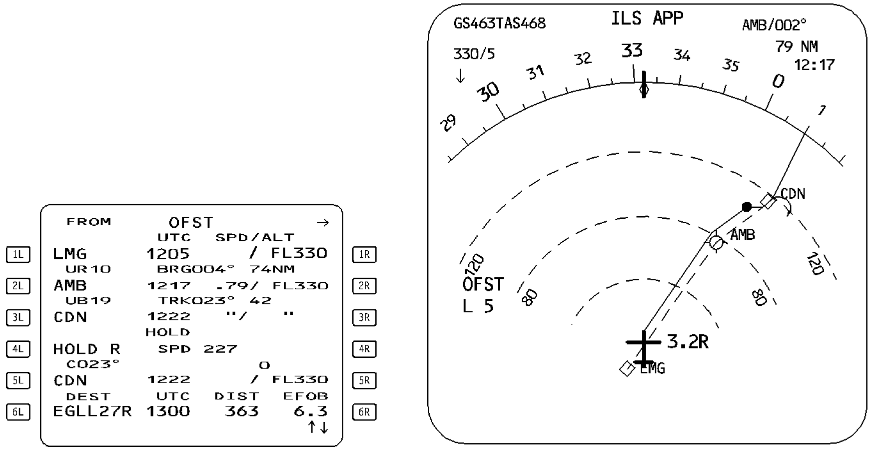
Offset allows the pilot to define a lateral offset to the left or right of the active flight plan. Once inserted, the offset applies from present position (PPOS) all along the flight plan to the first waypoint (WPT) at which a holding pattern is defined, or to the last waypoint before the runway.
In most cases, the pilot will use it en route because of an ATC clearance or to avoid bad weather expected along the flight-plan route.
Accessed from lateral revision (LAT REV) at the present position page, an offset may be defined between 1 and 50 nautical miles in one-nautical-mile steps.
After inserting the offset in the flight plan, the flight plan page shows OFST in its title, and the navigation display shows the offset flight plan in a solid green line and the original flight plan in a dashed green line.
The offset is cleared :
– Automatically (holding pattern, approach)
– Manually with the clear (CLR) key.

Note : If the pilot enters an OFFSET when the aircraft is too close to the TO waypoint, the FMGS may refuse to accept it, in which case the MCDU displays the message "ENTRY OUT OF RANGE".



INSERTING AN OFFSET

- **SELECT LAT REV at present position (PPOS).**
- **WRITE the required offset value and direction (Example, L5 or 5L).**
- **PRESS [2L] to enter the offset into the OFFSET field.**
- **PRESS [6R] to activate the OFFSET.**



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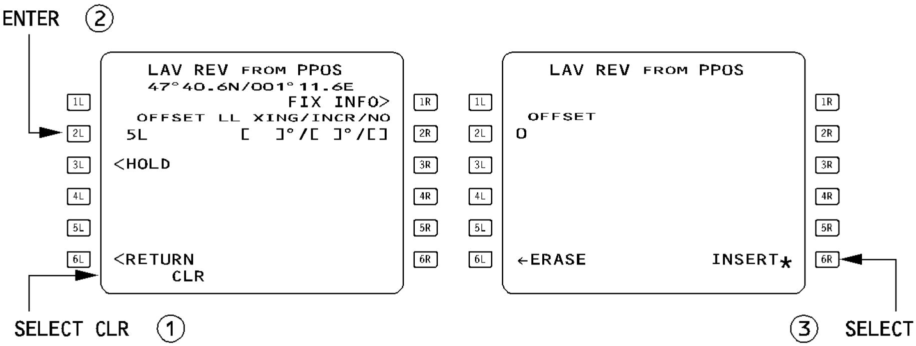
MANUAL CANCELLATION OF OFFSET

There are two normal methods for cancelling an offset :

- **1. SELECT DIR TO a waypoint (the next waypoint, for example)**
- **2. SELECT a Lateral Revision (LAT REV) at FROM WPT**

  – **CLEAR the OFFSET field.**

  – **PRESS [6R] to activate the temporary flight plan (cancelling OFFSET).**



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ALTERNATE FUNCTION

The ALTERNATE FUNCTION performs two actions :
- It reviews and defines alternate airports and inserts them into the flight plan.
- It allows a diversion to be activated through the ENABLE ALTN command.

REVIEW AND SELECTION OF ALTERNATE AIRPORT

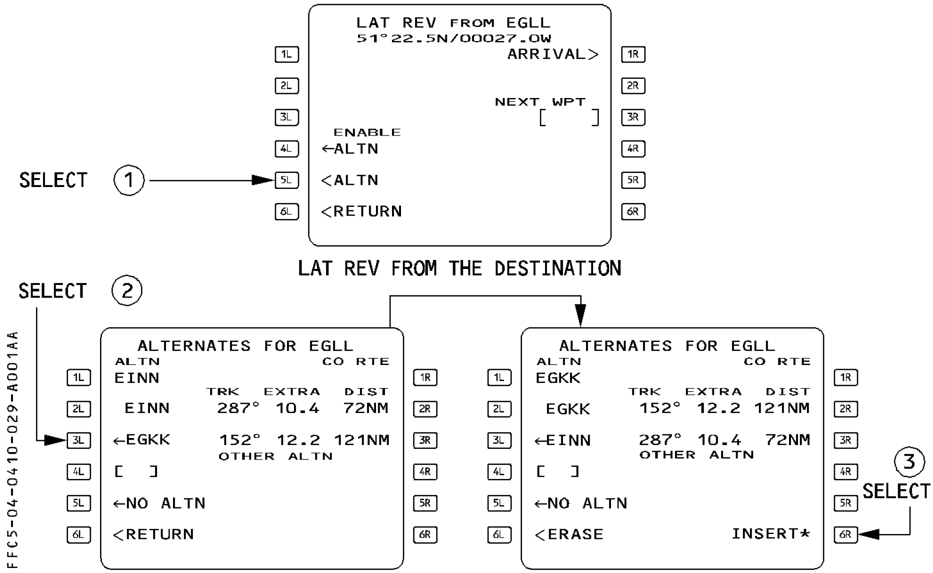
Several alternate airfields may be stored in the database and assigned to a destination. When the pilot selects a company route (CO RTE) (or a city pair), the computer strings the preferred alternate into the active flight plan.
The pilot may review the alternate airports on the ALTN page, and if the one selected is not suitable because of weather or fuel considerations, another alternate may be strung into the active flight plan.
The pilot may define an additional alternate airport into the list, if necessary.
The ALTERNATE page shows the track and distance (airway or direct) between destination and alternate, as well as fuel management data (EXTRA fuel, assuming the associated airfield is the alternate airport). This data will help the pilot to change the preferred alternate, if necessary.
Access the ALTERNATE page through the ALTN prompt on LAT REV page at destination. The alternate airfields are attached to the destination.

ENTERING NEW ALTERNATE INTO THE F-PLN

If the preferred alternate is not suitable, proceed as follows :

- **SELECT F-PLN key on MCDU**
- **SELECT LAT REV at destination.**
- **SELECT ALTN [5L] key.**
- **SELECT an AIRFIELD IDENTIFIER**
- **INSERT the temporary flight plan**

<u>Note</u> : *If weather and destination airfield conditions allow it, you may select "NO ALTN", fuel predictions will be computed without alternate fuel.*



SELECTION OF OTHER ALTERNATE

Fuel management information for flight to another alternate airfield may be obtained by selecting the OTHER ALTN field.

– **SELECT LAT REV from DESTINATION**

– **SELECT ALTN [5L] key.**

– **ENTER the airfield identifier into the brackets.**
  · If the airfield is not in the database, the NEW RUNWAY page appears automatically.
  · If the airfield is in the database and there is a company route (CO RTE) to it, the ROUTE SELECTION page appears automatically.

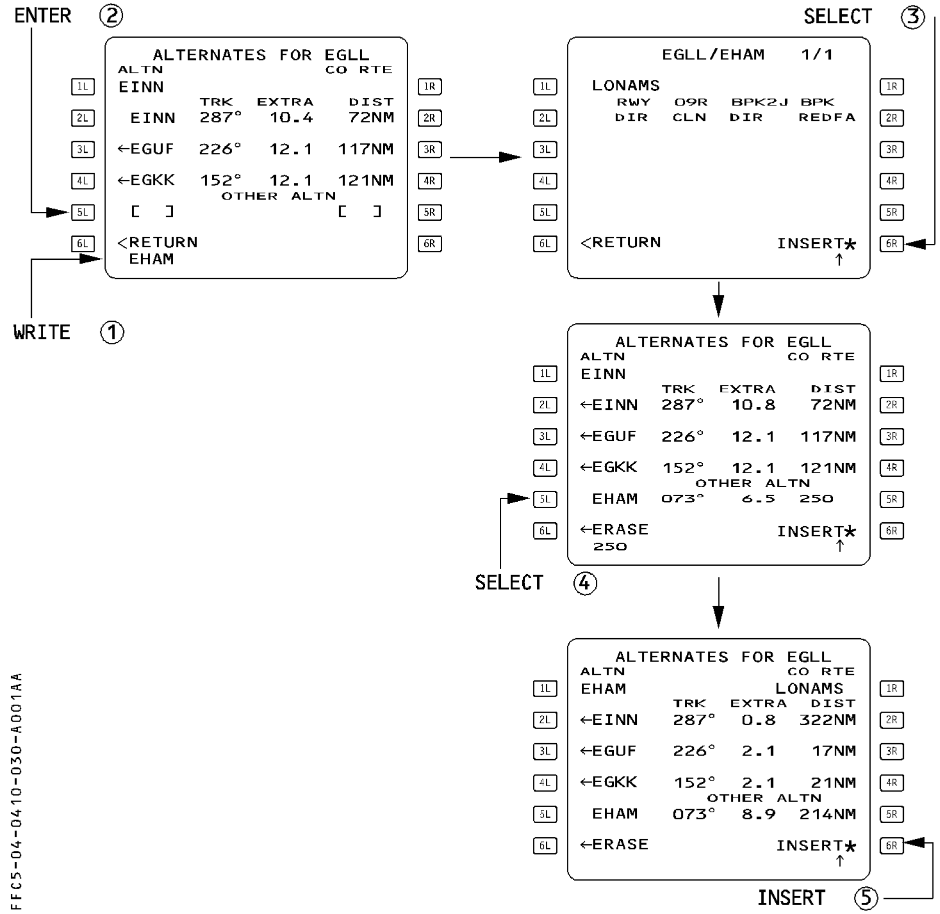
– **SELECT the route as appropriate or RETURN to the ALTN page.**

– **ENTER the distance into the brackets (if required). XTRA fuel and track (TRK) will appear.**

– **SELECT the other alternate (OTHER ALTN) as a primary alternate if it is convenient. (EXTRA fuel and DIST revert to AIRWAY distance).**

– **INSERT it if you want to have it as a primary alternate.**

Note : – *The pilot can always overwrite the "OTHER ALTN". The new "OTHER ALTN" then replaces the previous one, which is lost.*
– *The pilot can select OTHER ALTN as a primary alternate (active flight plan) to replace any alternate on the initial list.*
– *If the pilot selects the other alternate as a primary alternate and overwrite the OTHER ALTN field by entering a new airport, the first one will remain a primary alternate and the system will memorize a second OTHER ALTN.*



The pilot may enter a distance in OTHER ALTN field. The system will compute the extra fuel and the track for this distance.

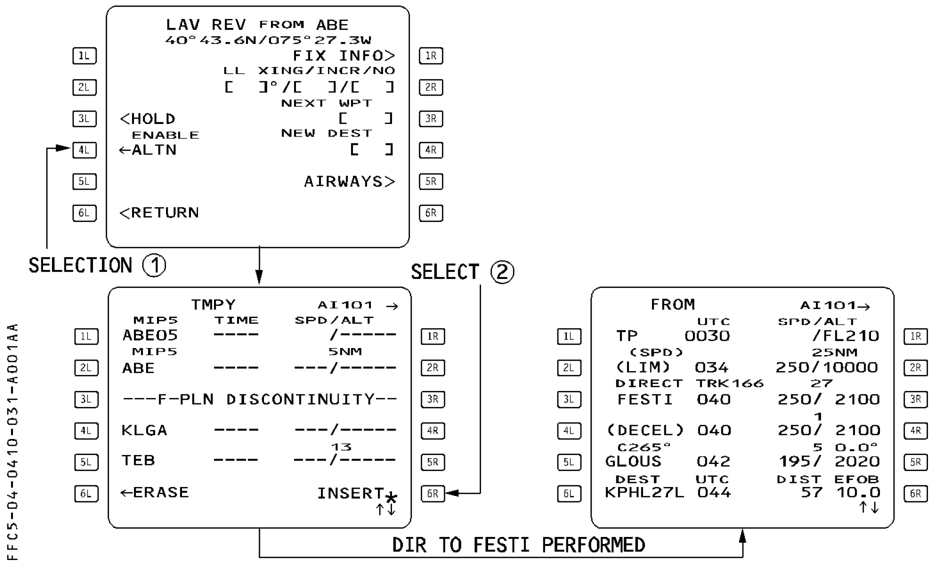
PREDICTED DATA FOR ALTERNATE

Data predictions are based on :

* Aircraft weight being equal to landing weight at primary destination
* Flight at flight level 220 if the airway distance is less than 200 NM, otherwise at flight level 310
* Cost index 0
* Constant wind (as entered in alternate field of the DES WIND page).
* Constant delta ISA (equal to delta ISA at primary destination)
* Airway distance for a company route, otherwise direct distance manually entered by the pilot in OTHER ALTN field (used only for preliminary predictions).

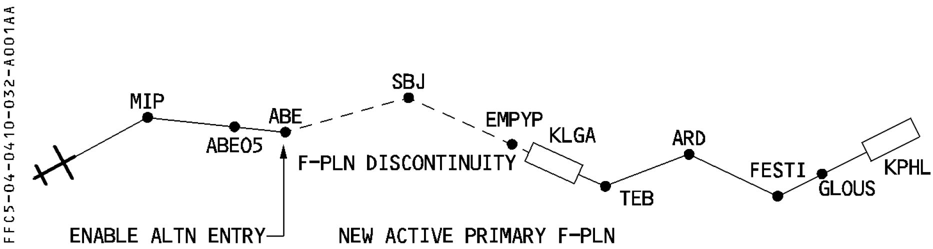
ENABLE ALTN

This allows the pilot to initiate a diversion by entering the alternate flight plan just after the revision waypoint (with a discontinuity).
The pilot may have to adjust the resulting flight plan (use “direct to”, or add or suppress waypoints), depending upon the circumstances.



TO ACTIVATE THE PRIMARY ALTN :

- **SELECT a LAT REV at the "TO" waypoint (or at another suitable waypoint)**
- **PRESS the ENABLE ALTN key**
- **INSERT the temporary flight plan**
- **ENTER an appropriate waypoint in DIRECT TO and adjust the flight plan.**
- **ADJUST the cost index on the PERF page and the defaulted cruise flight level (CRZ FL) on the PROG page, as required.**



When ENABLE ALT is pressed at ABE, a flight plan discontinuity is created from ABE down to destination and the alternate route is linked to the active flight plan.

DIR KEY (DIRECT-TO-FUNCTION)

The pilot uses the "Direct To" function to define a direct leg from the present position to any waypoint on the active flight plan or to any waypoint.
The designated waypoint may be entered by its identifier (if it is stored in the database) or by a latitude/longitude, place/bearing/distance, or a place-bearing/place-bearing.

Note : If the autopilot or flight director is in the heading/track or localizer mode, the "DIR TO" function engages NAV mode.

Three functions are available through the DIR TO key :
- the DIR TO defines a direct leg from present position to a specified waypoint.
  NAV mode engages simultaneously to the DIR TO selection.
  When the pilot uses DIR TO, the present position (PPOS) becomes the "FROM" waypoint and the active flight plan shows it as T-P (turn point).
- the DIR TO/ABEAM function, defines the abeam waypoints along the direct leg. These waypoints are the projection on the direct leg of the initial F-PLN waypoints located between the aircraft position and the specified waypoint.
  NAV mode engages simultaneously to the DIR TO/ABEAM selection.
- the DIR TO/INTCPT function allows to define a specified RADIAL INBOUND or OUTBOUND an inserted waypoint. The current aircraft track is used to compute the INTCPT point with the specified radial.
  NAV mode is armed simultaneously to the DIR TO/INTCPT selection.

The ND displays the DIR TO leg as a temporary flight plan leg between current aircraft position and specified waypoint. In case of a DIR TO/INTCPT the leg is not displayed when the angle between the current aircraft track and the intercept radial exceeds 160°.

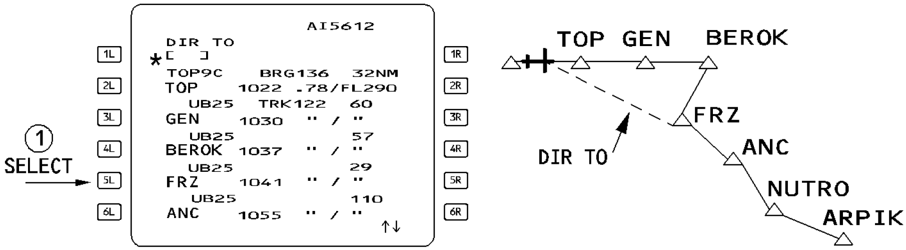
PROCEDURE FOR DIR TO WAYPOINT

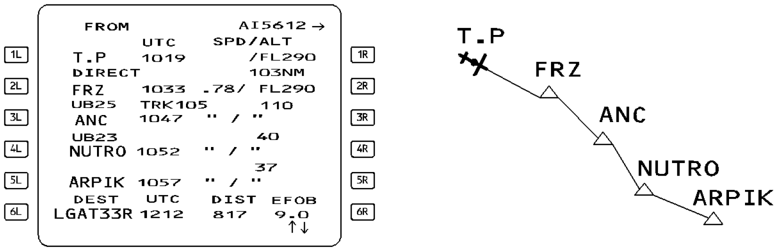
Case 1. The "TO" waypoint is in the flight plan

Example : DIR TO FRZ

– PRESS the DIR key on the MCDU.

– PRESS the line select key next to "FRZ"





FFC5-04-0410-034-A001AA

RESULTING F-PLN AND ND DISPLAY

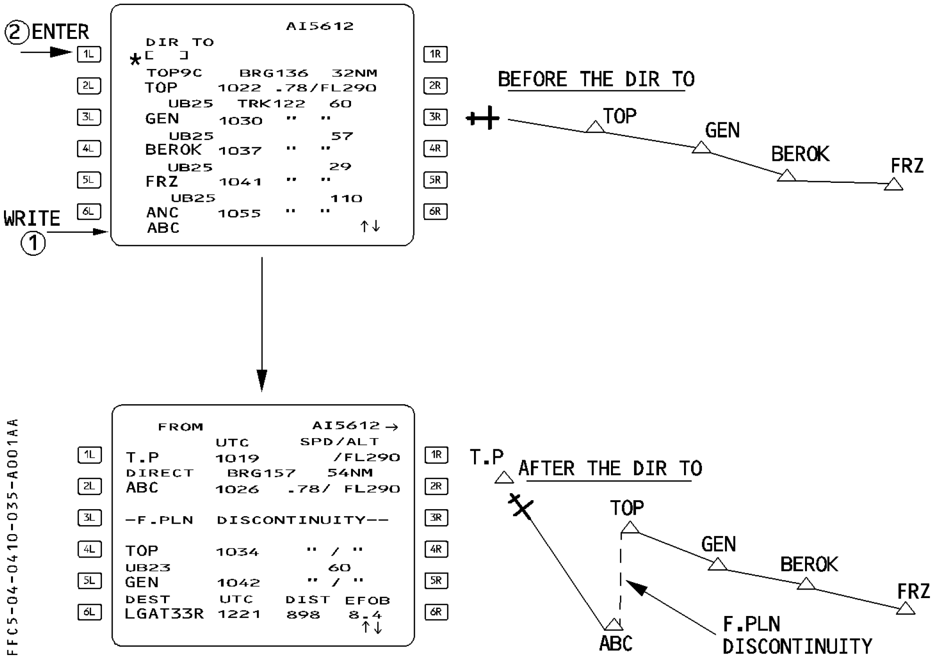
<u>Case 2. The “TO” waypoint does not belong to the flight plan</u>

<u>Example</u> : Direct to ABC (ABC being an ident, LL or PBD or PB/PB)

– **PRESS the DIR key.**

– **WRITE the waypoint identifier (e.g. ABC) into the scratchpad.**

– **PRESS [1 L] to enter “ABC” in the “DIR TO” field.**



Clear the discontinuity and the waypoints that are not included in the new flight plan.

PARTICULAR CASES FOR USE OF DIR TO

– If the pilot is flying a manual leg (part of a SID or STAR), the flight plan page displays "F-PLN DISCONTINUITY", preceded by "MANUAL" (see below).
These legs are specific heading or track legs flown with no defined end waypoint.

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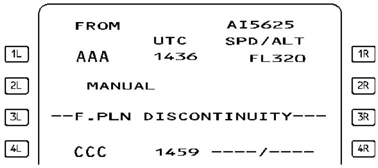

– When the pilot encounters a flight plan discontinuity, or if a major reset occurs, the flight plan page displays "PPOS - F-PLAN DISCONTINUITY", and the pilot looses managed guidance in both the lateral and vertical plans.
The autopilot or flight director reverts to the basic HDG V/S (or TRK FPA) modes. Predictions remain available and are based on the assumption that the aircraft will fly a direct leg from its present position to the next waypoint.

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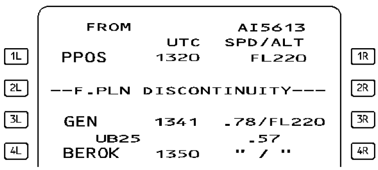


– In both of these cases, the only way to return to a standard flight plan is to perform a "DIR TO" a designated waypoint.

R *Note : During cruise, the DIR TO function is not available as long as uplink wind data,*
R *received through ACARS or ATSU (⊲), is not inserted or cancelled on the CRUISE*
R *WIND page.*

PROCEDURE FOR DIR TO/ABEAM

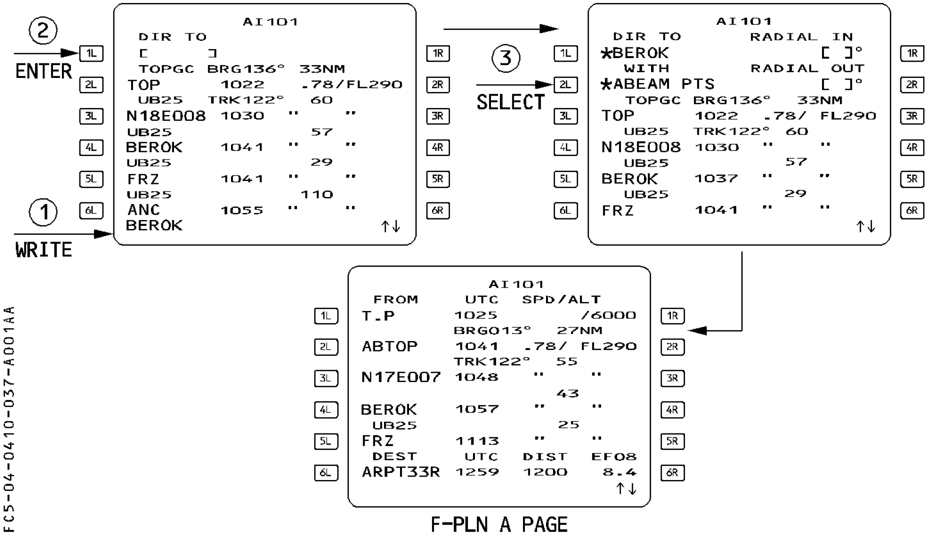
Example : DIR TO/ABEAM BEROK

– **PRESS the DIR key on the MCDU.**

– **WRITE the waypoint identifier into the scratchpad (Example : BEROK).**

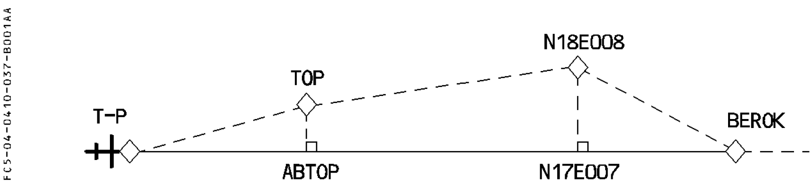
– **PRESS [1 L] to enter the waypoint in the DIR TO field.**

– **SELECT the ABEAM PTS function**
The display reverts to F-PLN A page.



Note : 1. If between two waypoints projected on the direct leg there was a discontinuity in the original flight plan, this discontinuity disappears between the corresponding abeam points on the direct leg.

2. If the pilot enters a latitude/longitude type reference waypoint, the system renames the abeam point with its recomputed coordinates (only in degrees).



PROCEDURE FOR DIR TO/INTERCEPT

– **PRESS the DIR key.**

– **WRITE the waypoint identifier into the scratchpad.**

– **PRESS [1L] to enter the waypoint in the DIR TO field.**
The MCDU displays in [1R] and [2R] field the functions radial inbound and radial outbound from the waypoint.
If the waypoint belongs to the flight plan, the system displays the track of the flight plan as defaulted radial inbound. The crew can modify it.

– **WRITE the required radial in or out into the scratchpad.**

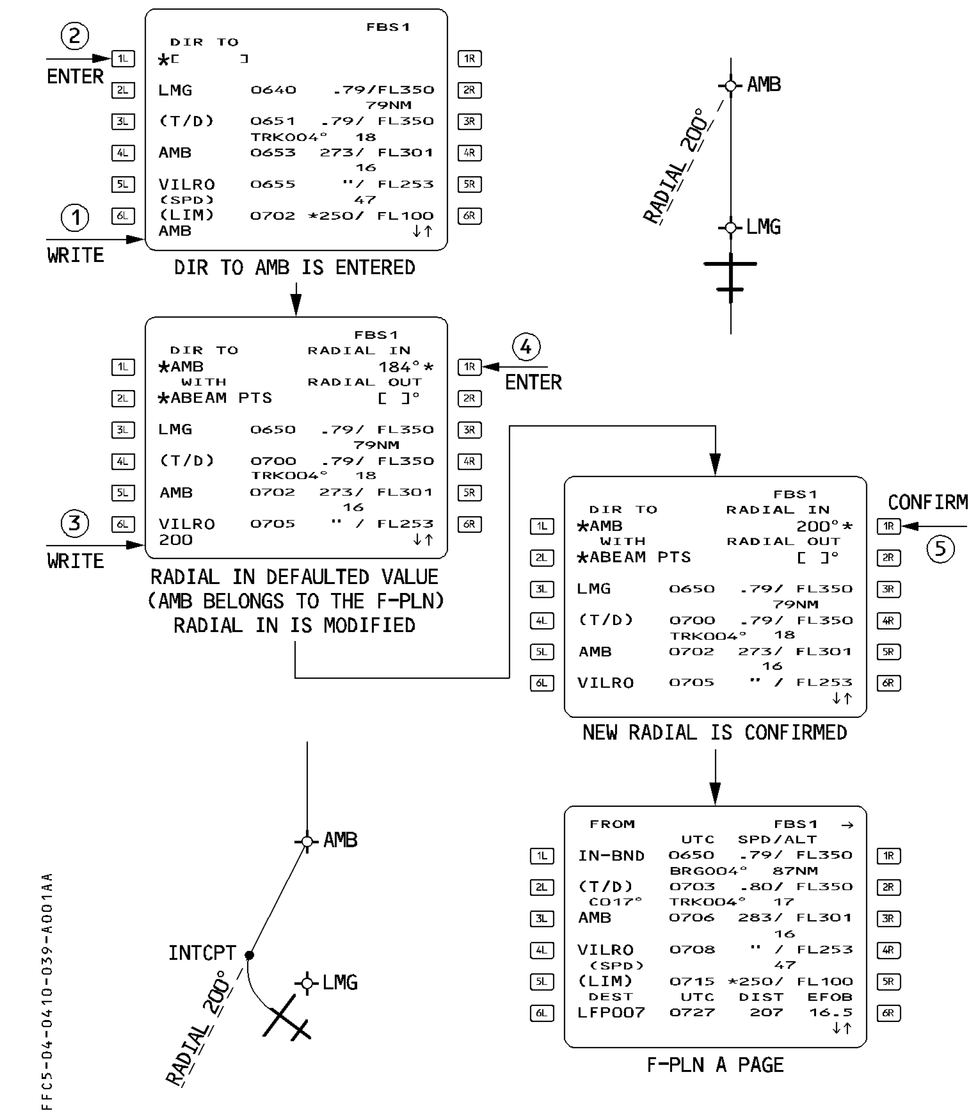
– **PRESS [1R] or [2R] key to enter the radial in the required field.**
The ND displays the entered radial in amber dotted line : the pilot can still modify it.

– **PRESS [1R] or [2R] key to confirm the DIR TO/INTERCEPT selection.**
The display reverts to F-PLN A page, and the system arms NAV mode, and engages HDG mode. The FROM waypoint is the aircraft position at the time of the DIR TO/INTERCEPT selection. The MCDU indicates it as INBND or OUTBND.

Note : 1. *If the waypoint does not belong to the flight plan, the system strings the DIR TO/INTERCEPT leg to this waypoint, and inserts a discontinuity following the waypoint.*
2. *A DIR TO/INTERCEPT cancels any active offset.*
3. *If the current AP/FD lateral mode is HDG or TRK, NAV becomes armed.*
If NAV mode was engaged, NAV becomes armed. FCU HDG or TRK must be used to guide the aircraft.
The ND displays an intercept point, if the intercept angle is less than 120°. The system constantly updates it to reflect the current aircraft track and position with respect to the intercept radial. The NAV mode engages when reaching the intercept point.

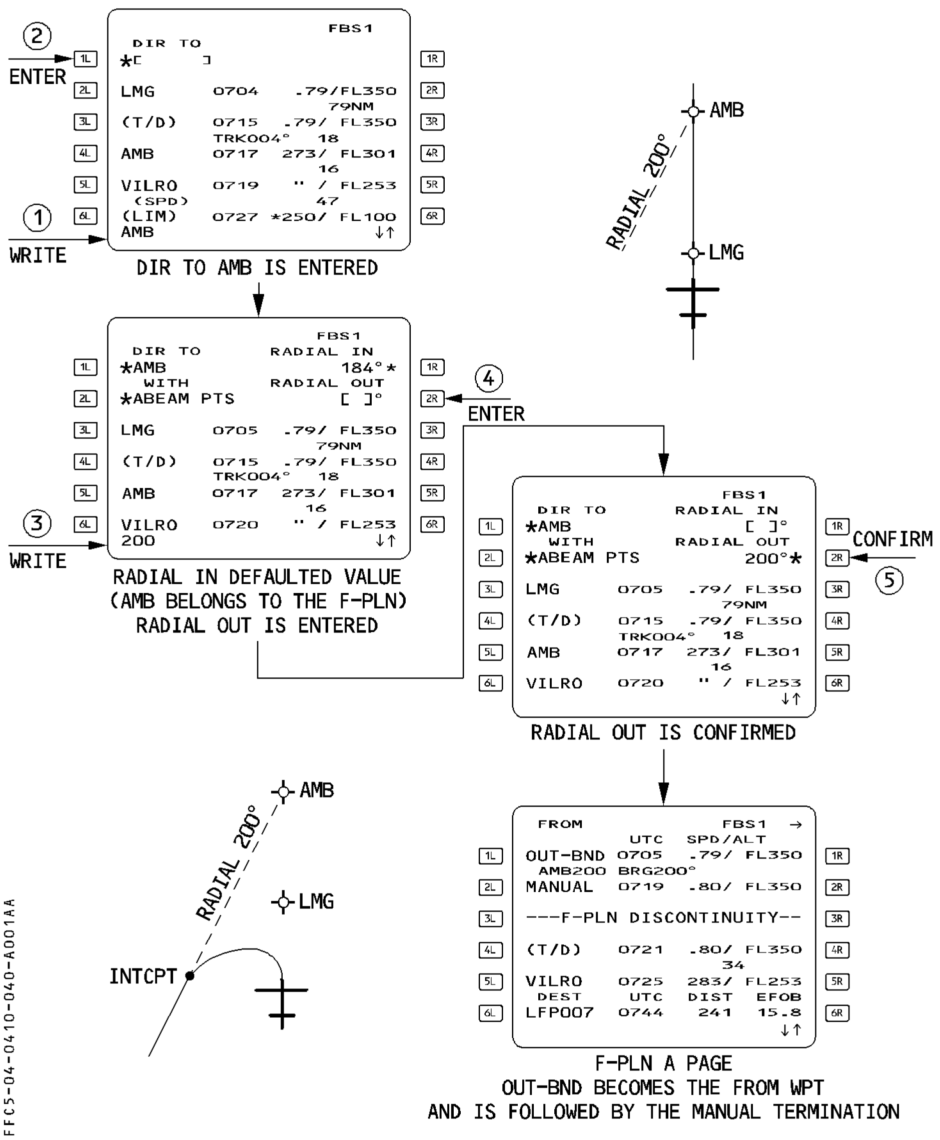
Example : RADIAL INBND

R DIR TO AMB - RADIAL 200° INBOUND



Example : RADIAL OUTBND

R DIR TO AMB - RADIAL 200° OUTBOUND

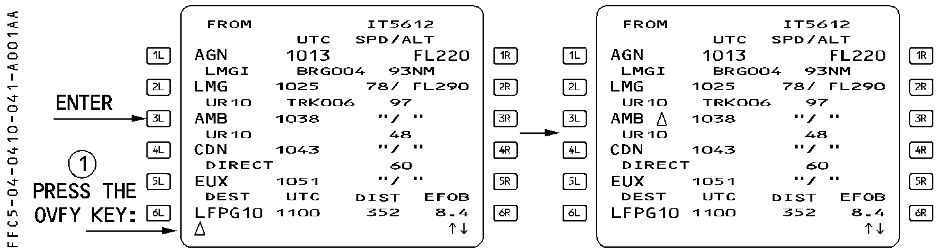


OVFY (OVERFLY) KEY

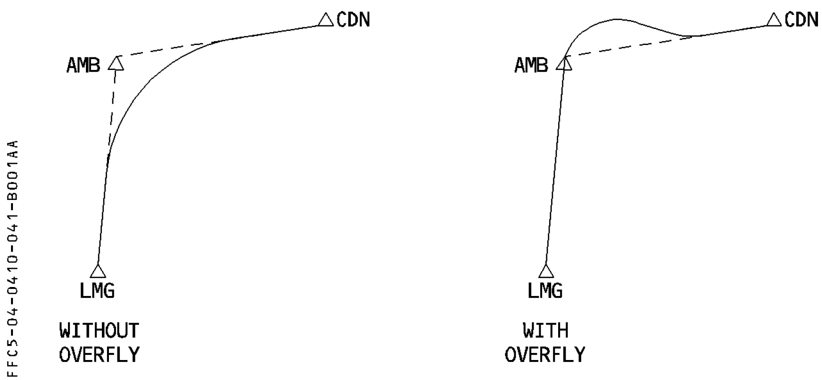
The overfly key programs the Flight Management Guidance Computer to fly over a specific waypoint or navaid. To use it :

- **PRESS the "OVFY" key.**
  A "△" appears in the scratchpad.

- **INSERT it by pressing the key adjacent to the waypoint to be overflown. [3L] in this example.**



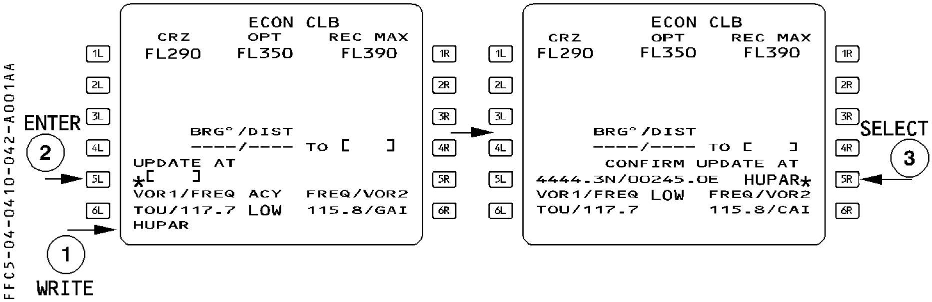
The pilot cannot cancel the overfly program. If you do not want to fly over the point you have entered, use DIR TO (direct to) the next waypoint or engage the heading mode, whichever is more suitable.



The overfly function allows you to fly over a specific waypoint, and then returns the aircraft to the great circle track.

UPDATE AT

The pilot uses "UPDATE AT" on the PROG page to manually change the position the FMGS has computed (FM position and bias).
Use this facility with extreme caution : it is apt to be inaccurate because the system relies on the pilot's estimating when a designated position has been reached.



- **WRITE the identifier for the navaid (or waypoint, or airport) or the coordinates or the PBD or PB/PB at which an update is intended.**

- **PRESS [5L] to enter the identifier in the "UPDATE AT" field. The coordinates of the point, along with its identifier (or "ENTRY" if the identifier is not in the database), appear in that field.**

- **PRESS [5R] to activate the update when you estimate that you are at the position.**

Note : The system reinitializes the Estimated Position Error computation when a position update is performed. This may lead to the appearance of a "NAV ACCUR DOWNGRAD" or "NAV ACCUR UPGRAD" message.

If the "UPDATE AT" does not take effect properly, it corrupts the FM position.

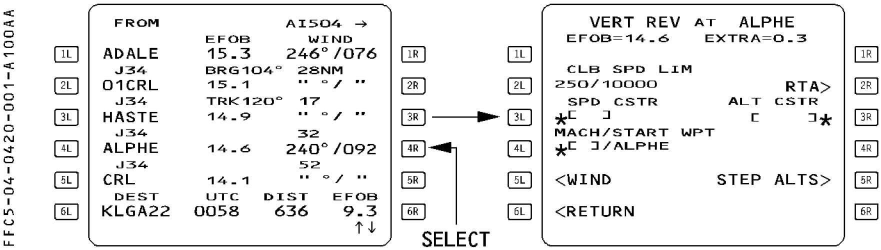
- In an area with good radio navaid coverage :
  - If the update error is small, subsequent radio position updating will correct the FM position.
  - If the update error is large, the system will reject any radio updating because its internal "reasonableness test" will reject the various navaids. Thus the FM position will only be the MIX IRS position corrected by the position bias determined at the time of the update, and the error will be maintained.
- In an area without proper navaid coverage, radio position updating will not be available and the FM position, if incorrect, will remain incorrect until a new manual update is performed.
- Therefore, the pilot should use "UPDATE AT" only in case of a major position problem such as :
  - on the ground, no flight plan appears on the navigation display and ARC/ROSE NAV mode is selected .
  - A "CHECK A/C POSITION" message appears and the position monitor page indicates an obvious position mismatch.
  - A "CHECK IRS/FM POSITION" message appears on the MCDU.
  - A "FM/IR POSITION DISAGREE" message appears on the ECAM.

◁ When the GPS PRIMARY is operative, the FM position will always converge towards the GPS position at a rate depending on the aircraft altitude. Therefore when GPS PRIMARY is operative, an "update at" that is innacurate will have a temporary effect on the FM position.

GENERAL

The vertical revision function allows the pilot to modify the following parts of the flight plan :
- Speed limit
- Speed and altitude constraints
- Time constraints
- Wind
- Step climb or step descent
- Constant Mach segment

The pilot selects these functions by pressing the right key on flight plan A or B.



Note : Section (4.04.20) only describes the following three functions : Wind and time constraints, and constant Mach segment.
For other vertical revision functions, refer to the next chapter (4.05).

REQUIRED TIME OF ARRIVAL (RTA)

GENERAL

A Required Time of Arrival (RTA) is a time requirement to be met over a specified waypoint of the lateral flight plan, including destination but excluding the origin and FROM waypoints. When the predictions are available, the time constraint value is replaced by the predicted time at the related waypoint, highlighted by a star (*) :
– If the RTA is predicted as matched, the star (*) is in magenta
– If the RTA is predicted as missed, the star (*) is in amber.
No specific symbol is provided on the ND.
A time constraint is cleared in the same way as any other constraints. If a time constraint is automatically deleted, the MCDU displays an "RTA DELETED" message.

ENTERING A REQUIRED TIME OF ARRIVAL

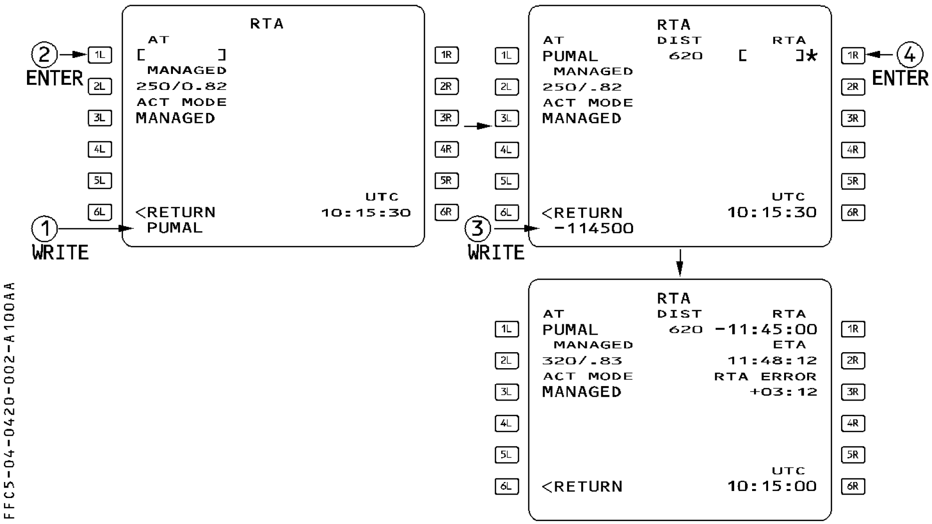
– **SELECT the F-PLN key on MCDU**

– **SELECT a VERT REV at revised waypoint**

– **SELECT the RTA prompt (2R key)**
The MCDU displays the RTA page.

– **WRITE the identifier of the waypoint where the time constraint has to be defined**

– **ENTER it in 1L field**
The prompt RTA and the distance indication appear.



– **WRITE the required time of arrival**
  The format is HHMMSS (entry of seconds is not mandatory)

– **ENTER it in 1R field**

– **CHECK on fields 2R and 3R if the entered constraint can be met.**

WIND – TEMPERATURE – QNH

GENERAL

In order to receive the best predictions, the pilot must enter wind and temperature values for the different phases and for various waypoints of the cruise phase.
The system uses the temperature value at a given altitude, associated with the tropopause as entered on the INIT A page to optimize the temperature profile.

ENTERING THE TRIP WIND AND TEMPERATURE DURING THE F-PLN INITIALIZATION

The trip wind is a mean wind component for the entire flight from origin to destination. The pilot can enter it before engine start on the INIT B page. It is usually defined by the airlines flight operations on the computerized flight plan.
The FMGS does not consider the trip wind for alternate predictions.
The trip wind is used as long as no winds are entered in the CLB, CRZ and DES WIND pages.
When the pilot enters a CLB, CRZ or DES WIND, the FMGS disregards the trip wind.

– **PRESS the INIT key**

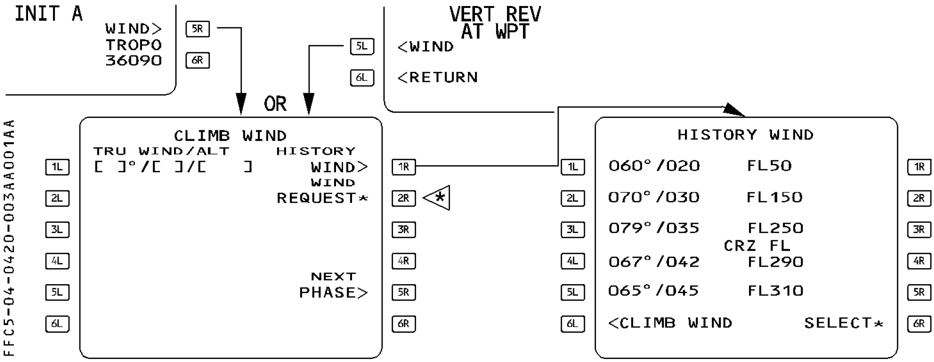
– **INSERT the temperature at cruise FL**

– **On the INIT B page INSERT the TRIP WIND**
  The trip wind is defined as a headwind component (HDXX, XXHD or – XX), or as a tailwind (TLXX, XXTL or + XX).
  The FMGS uses the trip wind to compute preliminary performance, time and fuel predictions.

– **CHECK the predictions on the F-PLN B page**
– For the ALTN F-PLN, an average wind may be entered on the DES WIND page for alternate cruise flight level.

<u>Note</u> : *Wind can be automatically received (and inserted) through ACARS (◁) system (Refer to 4.04.40)*

Once a CLIMB, CRZ or DESCENT WIND is entered, the system ignores the TRIP WIND. Once temperature and winds are inserted, the FMGS computes the ISA profile, and the F-PLN B page displays the forescast wind profile (by linear interpolation and propagation).



ENTERING THE WIND AND TEMPERATURE DURING F-PLN INITIALIZATION

When completing the INIT A page and once the wind and cruise FL temperature forecasts are available, the pilot may enter them, if significantly different, by pressing the wind prompt.
He will access the different wind pages using NEXT PHASE key and PREV PHASE key. He will slew the CRZ WIND page to access the various waypoints of the cruise winds.
The pilot will enter wind data as follows :
- For climb phase ; by inserting either the HISTORY WIND data (as recorded during the last descent) or by inserting winds (at up to 5 altitudes) on the CLIMB WIND page.
- for cruise phase ; by inserting winds (at up to 4 FL) at various CRZ waypoints on the CRZ WIND pages. The 4 levels are the same for all the cruise waypoints. The pilot may enter the temperature of each waypoint and at destination on this page.
- For descent phase ; by inserting winds (at up to 5 FL/altitudes) on the DES WIND page.
- For the ALTN F-PLN, an average wind may be entered on the DES WIND page for alternate cruise flight level.

Note : Wind can be automatically received (and inserted) through ACARS (◁) system (Refer to 4.04.40)

Once a CLIMB, CRZ or DESCENT WIND is entered, the system ignores the TRIP WIND.
Once temperature and winds are inserted, the FMGS computes the ISA profile, and the F-PLN B page displays the forescast wind profile (by linear interpolation and propagation).

WIND ENTRY RULES

When from an empty field, a wind entry is performed, direction/velocity/altitude (or flight level) must be entered simultaneously. One entry in each bracket.
Overwriting a wind cancels the previous one.
Entered wind data can be cleared, the field reverts to brackets. Propagated wind cannot be cleared.
Entering a new altitude over an existing altitude replaces that existing altitude at all cruise waypoints. Any winds entered at the overwritten altitude are lost at all cruise waypoints.

ENTERING THE HISTORY WIND (F-PLN INITIALIZATION)

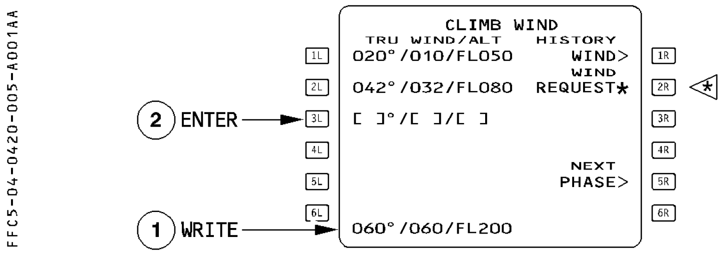
The pilot may insert the history wind but cannot modify this page.
If convenient, PRESS the (6R) prompt to insert. After insertion, the [6R] prompt is suppressed but the page still displays the wind values for information.

ENTERING THE CLIMB WIND (F-PLN INITIALIZATION)

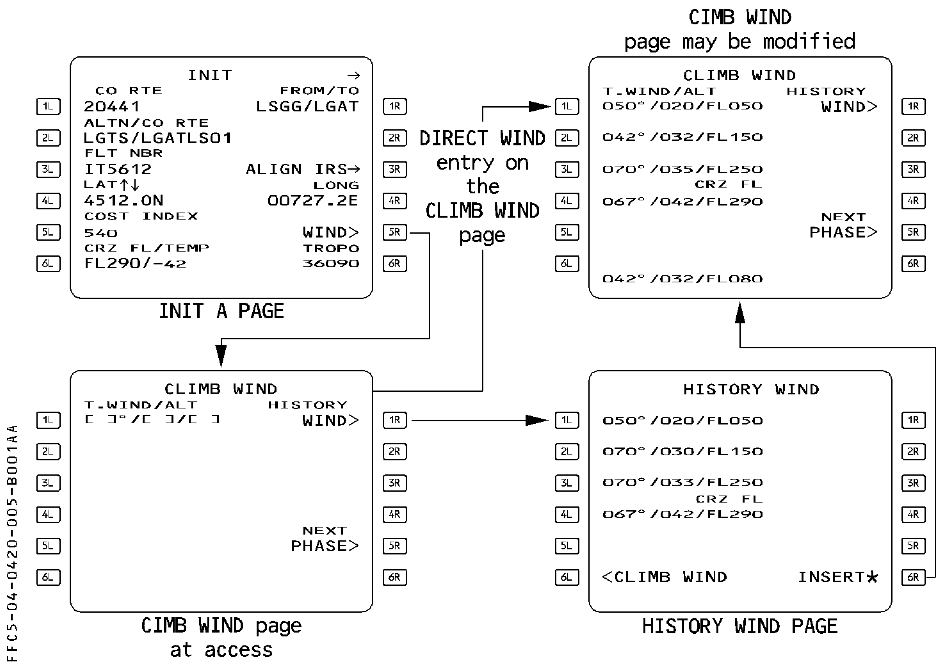
If history winds are not convenient.

– **SELECT CLIMB WIND page from INIT A page or VERT REV page.**

– **WRITE new winds into the scratchpad and ENTER.**



Winds entered on CLIMB, CRZ and DESCENT WIND pages are always true north referenced.
Tower wind entered on PERF is magnetic referenced.
The pilot can enter "GRND" in the altitude field for wind at destination.
CLIMB WIND cannot be modified when the climb phase is active.
At climb phase transition, wind data switch from blue to green colour and any attempted modification will trigger the "NOT ALLOWED" message.
The system extrapolates the highest wind entry to all higher levels.
The system interpolates winds between 2 entered levels.



ENTERING THE CRUISE WINDS AND TEMPERATURES

At flight plan initialization the CRZ WIND page displays all cruise waypoints with empty brackets. In flight, only down path waypoints are displayed.

– **SELECT VERT REV at WPT.**

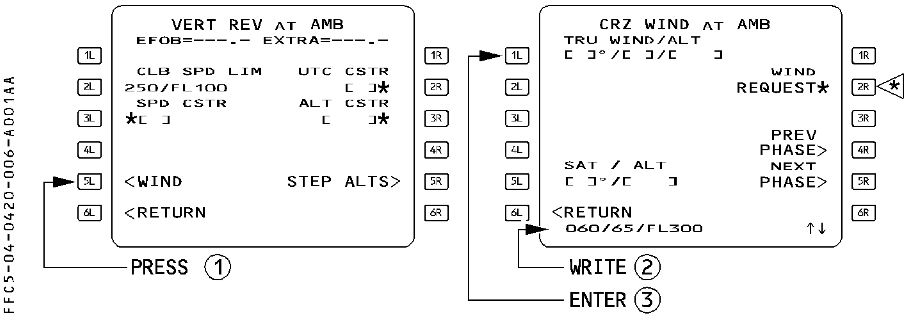
– **PRESS the WIND prompt.**

– **SELECT NEXT PHASE.**

– **SLEW until relevant waypoint is displayed.**

– **WRITE and ENTER the new temperature into the scratchpad.**

– **WRITE and ENTER the new wind data into the scratchpad.**
WIND and temperature may be entered through ACARS pages. Refer to 4.04.40 if ACARS is installed.



The crew will modify the entered winds and temperatures in flight if a significant difference is expected (greater than 30 kt or 30° for the wind data and greater than 5° for the temperature).
The system propagates the pilot (or ACARS) wind and temperature entries downpath, until a waypoint for which a different temperature or wind has been entered for the same flight level, or until the last cruise waypoint.
The forecast winds at a waypoint is determined as follows :

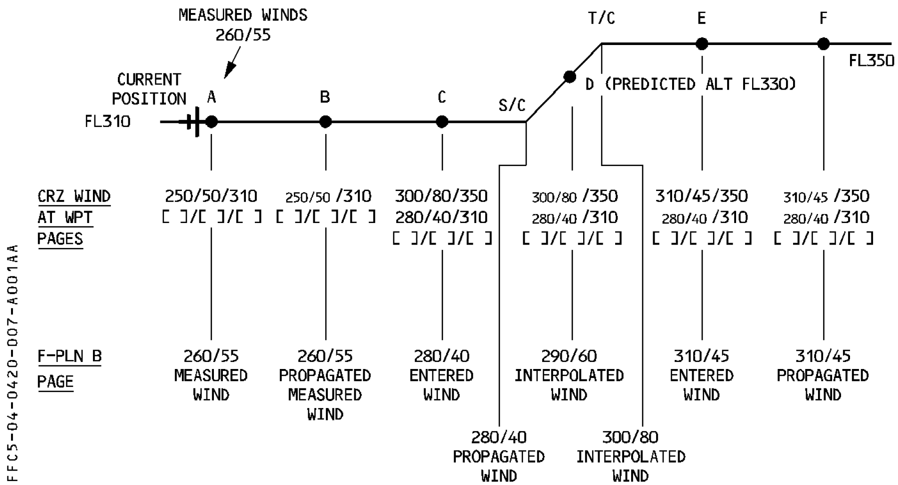
– If the predicted altitude at the waypoint matches an altitude defined in the CRZ WIND page, the forecast wind is the corresponding entered or propagated wind displayed at that waypoint on the CRZ WIND page.
– If the predicted altitude lies between two altitudes entered on the CRZ WIND page, the wind direction and velocity are linearly interpolated.

- If the predicted altitude is above or below the set of cruise altitudes, the forecast wind is a constant value extrapolated from the entered or propagated wind at the highest (or lowest) altitude displayed on the CRZ WIND page for that point.

Once in flight, the FMGS considers the actual measured wind up to 200 NM ahead of the aircraft to permanently update the wind profile. This updated wind profile is used to compute the predictions and the performance data, but is not displayed to the crew.
The CRZ WIND pages display the propagated values in blue small font, and the pilot (or ACARS) entries in blue large font.

Note : The CRZ WIND page displays only ACARS ◁ or crew entered data. It never displays computed or propagated data (F-PLN B page only).

Example :



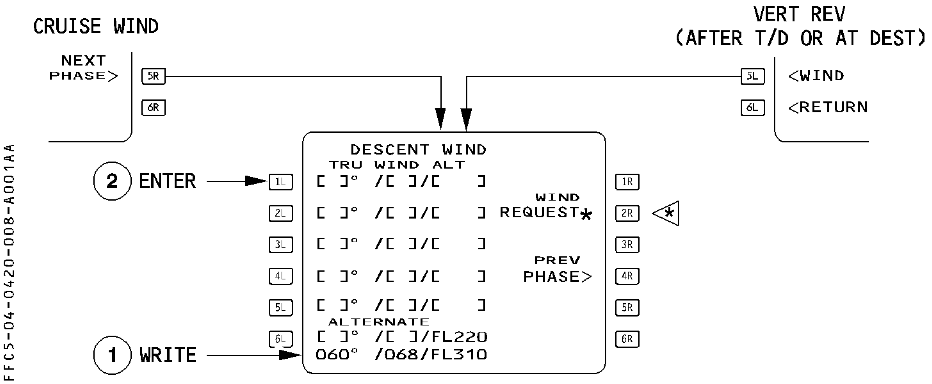
EFFECT OF WIND ENTRIES ON OPTIMUM FLIGHT LEVEL

The computation of the OPT FL considers the wind entries made at the different altitudes (normally at the different CRZ FL).
When flying the subsequent CRZ FL, the OPT FL proposed by the PROG page may be affected by the wind entries made at the previous CRZ FL ; these winds are propagated automatically and may be significantly different from the actual winds.
We recommend the following procedure : if the propagated winds at the lower altitudes are significantly different from the actual winds, enter the wind at these altitudes or if not available, the wind measured at the current CRZ FL.

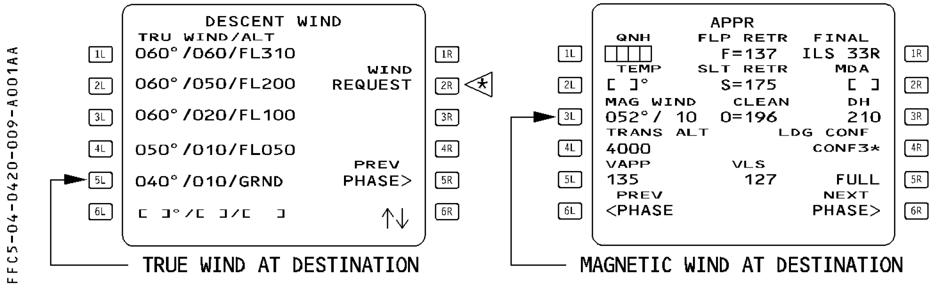
ENTERING THE DESCENT WINDS

R The pilot will enter as many as one wind at 5 different FL or altitudes. This wind data will be used for descent profile and prediction computation.
From the vertical revision page, or from the CRZ WIND page :

- **PRESS the WIND prompt.**
- **SELECT the DESCENT WIND page.**
- **ENTER up to 5 different "wind/altitude".**



A wind is written as true direction/velocity/flight level or altitude in feet.
If the crew enters "GRND" in the altitude field, the system uses the associated wind as the wind at destination.
The descent profile is corrected, as well as the tower wind entered in the PERF APPR page.
(The wind direction is then modified of the magnetic variation, if the airfield is magnetic North referenced).



When the winds have been entered, the F-PLN B page displays the forecast wind profile at all descent waypoints, using values it has interpolated from manual entries. Descent winds are not modifiable when the descent, approach or go-around phase is active. At descent phase transition, wind data switch from blue to green, and any attempted modification triggers the “NOT ALLOWED” message.

ENTERING THE ALTERNATE WIND

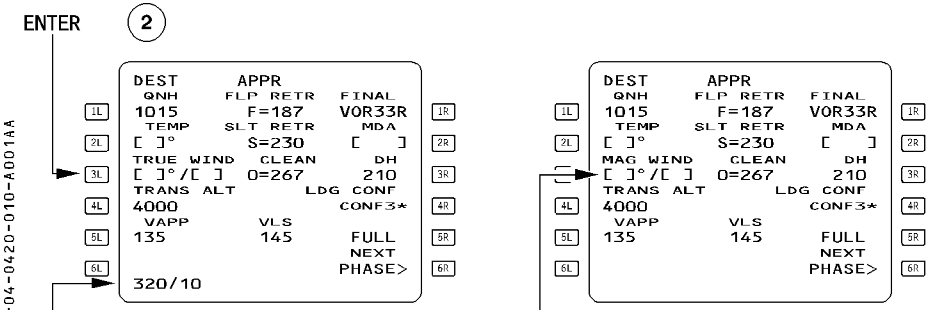
R Alternate wind is entered on the DESCENT WIND page. If an ALTN wind is not defined, the
R predictions are computed with a wind defaulted to zero. Alternate wind can be modified at
R any time. In addition, the alternate cruise (ALTN CRZ) level defaults to :
R – FL 220, if the length of the alternate flight plan (ALTN F-PLN) is less than 200 NM.
R – FL 310, if the length of the ALTN F-PLN is greater or equal to 200 NM.

The ALTN wind profile is as follows :

- ALTN CLB wind : Mean wind between ALTN CRZ wind, as entered on the DESCENT WIND page, and the wind at primary DEST, as entered on the PERF APPR page.
- ALTN CRZ wind : If no ALTN WIND has been entered on the DESCENT WIND page, the WIND at primary DEST (as entered on the PERF APPR page) is considered.
  In case of no entry by the flight crew, zero wind is assumed.
- ALTN DES wind : Mean wind between ALTN CRZ WIND and wind at FL 100.
  Wind at FL 100 = interpolation between wind at ALTN CRZ FL and zero at ALTN DEST.

ENTERING THE APPROACH WIND TEMPERATURE AND QNH

The wind at destination is entered on the PERF APPR page, in the 3L field. If the airport is magnetic North-referenced, the PERF APPR page displays MAG WIND. If the airport is true North-referenced, the PERF APPR page displays TRUE WIND.
The wind entry is copied into the true wind reference on the DESCENT WIND page, at ground level (GRND), and the F-PLN B page, at destination. A ground entry, on the DESCENT WIND page, is in the same way, automatically copied to the F-PLN B page and the PERF APPR page (magnetic or true, depending on the airfield reference).
The wind is modifiable in the descent, approach, and go-around phases.



PERF APPR PAGE (TRUE NORTH REF)

PERF APPR PAGE (MAG NORTH REF)

– **SELECT the PERF key on the MCDU**

– **PRESS the NEXT PHASE key (6R)**

– **WRITE QNH and temperature and enter them.**

– **WRITE the surface wind (magnetic or true, depending on the airport reference) into the scratchpad and enter it.**

Note : – At each wind entry, the descent profile is recomputed, therefore it is recommended to enter all winds, temperature and QNH at the same time to minimize recomputation time.

CONSTANT MACH SEGMENT

GENERAL

The pilot can enter the start and end points of a constant Mach segment, and its associated Mach number from the VERT REV page.
Only one constant Mach segment may be defined in the active flight plan, and only one in the secondary flight plan. No constant Mach segment can be defined in the alternate flight plan.

ENTERING A CONSTANT MACH SEGMENT

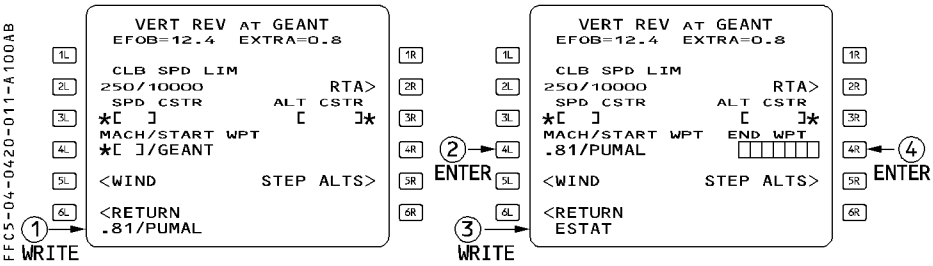
– **SELECT the F-PLN key on the MCDU.**

– **SELECT VERT REV at a waypoint.**
(except destination and alternate flight plan waypoint).

– **WRITE the Mach/start waypoint pair.**
R It is possible to enter only the Mach or the waypoint. But, for the first entry, a Mach entry is mandatory.
The waypoint must be located in front of the aircraft and must be part of the cruise.

– **ENTER it in the 4L field**
The END WPT prompt appears in the 4R field.

R



– **WRITE the end waypoint**
The end waypoint must be part of the cruise.

– **ENTER it in the 4R field**

EFFECT OF BARO REFERENCE SETTING

GENERAL

The baro reference selector of the EIS (Electronic Instrument System) allows the pilot to use the standard barometric reference (STD), sea level atmospheric pressure (QNH), or atmospheric pressure at airfield elevation (QFE option) for the barometer setting.
The selected value is displayed in the baro reference display window of the EFIS control panel and on the Primary Flight Display (PFD) below the altitude scale.
The barometer setting is used as a reference for the altimeter of the PFD and for the PFD target altitude. In flight, it affects the predicted altitudes on the MCDU and the descent path computation.

MCDU ALTITUDE PREDICTIONS

The FMGS predicts at each waypoint of the flight plan an altitude that is a function of all data in the lateral and vertical flight plans.

ON THE GROUND

The altitude predicted at each waypoint is displayed as altitude in feet above mean sea level (AMSL) when it is below the transition altitude and as flight level when it is above the transition altitude. The altitude constraints are also displayed, and they follow the same rule (feet or flight level).
The predicted altitude is equal to the airport elevation plus the height you must attain in order to reach the waypoint in the applicable mode (climb or descent)

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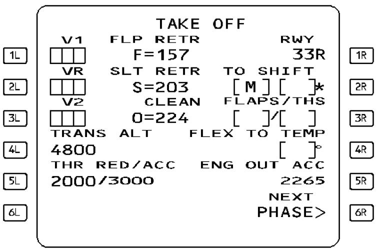
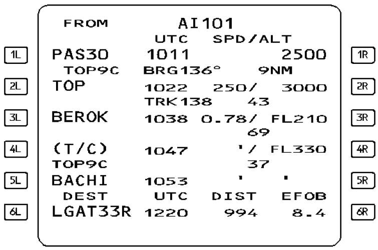


PERF TAKEOFF page



F-PLN A page

In flight

The predicted altitude is equal to the aircraft altitude (depending on the barometer setting), plus (or minus) the height you must attain to reach the waypoint in the applicable mode (climb or descent).

– In climb :
  Altitude predictions and constraints are displayed as altitude in feet above mean sea level (AMSL) at, or below, the transition altitude, and as flight level above it.
  For example : If the transition altitude is 5000 feet, and you insert an altitude constraint
R as 8000 feet, the MCDU F-PLN A page shows it as FL80.
– In descent :
  If "STD" is selected on the control panel of the EIS altitude predictions, and constraints above the transition level are displayed as flight levels, and those below the transition level are displayed as altitude AMSL.
  If sea level pressure (QNH), or field elevation pressure (QFE option), is selected on the EIS control panel, altitude predictions and constraints are displayed as altitudes AMSL, regardless of the transition altitude.
  For example : If the transition level is FL50 and you insert an altitude constraint of 8000
R feet in the descent profile, the MCDU F-PLN A page will display it as FL80 if "STD" is selected, and as 8000 feet if the "QNH" or "QFE" option is selected.

TARGET ALTITUDE ON PFD

The PFD target altitude may either be :
– The FCU-selected altitude, or
– A flight management altitude constraint, if the climb mode or descent mode is engaged, and the system predicts a level-off at a constraint that is achieved prior to reaching the FCU altitude.

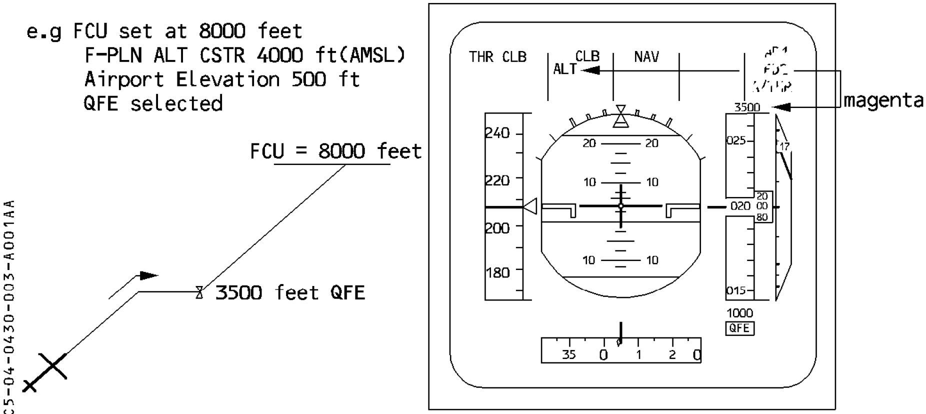
The PFD target altitude depends on the barometer setting :
– If "STD" is selected, the target is a flight level.
– If "QNH" or "QFE" is selected, the target is an altitude or a height.

The aircraft will level off accordingly.

Note : If the pilot changes the barometer pressure during ALT or ALT CST*, the aircraft may overshoot the target altitude, because the current value has been changed. However, the ALT* and ALT CST* modes allow the aircraft to regain the FCU altitude.*
As a general rule, avoid changing the barometer setting when in ALT or ALT CST*.*

NOTE FOR AIRCRAFT WITH QFE (Field Elevation Pressure) pin program

If QFE is selected on the EFIS control panel :
- The MCDU predictions follow the basic rules (altitudes are AMSL below the transition level, flight levels above it).
- The altitude constraints on the MCDU follow the basic rules.
- The target altitude on the PFD is QFE related :
  - · If the target altitude has been selected by the FCU, the aircraft will level off there.
  - · If the target altitude is an altitude constraint, the PFD automatically shows that constraint as corrected by the airport elevation.



PFD DISPLAY

PROCEDURES

a) The altitude constraints in departure and arrival procedures should be defined in the navigation database or by the pilot on the MCDU :
   - in terms of altitude AMSL below the transition altitude
   - in terms of flight level above the transition altitude

   If a departure procedure defines an altitude constraint as an AMSL altitude above the transition altitude, you must convert it to flight level, because the system and guidance will treat it as a flight level whenever you select the standard barometer setting.

b) In climb you should switch from QNH (or QFE) to STD on both EFIS control panels simultaneously when you reach the transition altitude.
   All MCDU altitude predictions and altitude constraints and all PFD altitude targets will be displayed as flight level.

c) In descent, when ATC clears you to an altitude below the transition altitude, you can select QNH (or QFE) on both EFIS control panels simultaneously.
   All MCDU altitude predictions and constraints and PFD targets are now altitude AMSL.

INTENTIONALLY LEFT BLANK

CLEAR KEY (CLEARING FUNCTION)

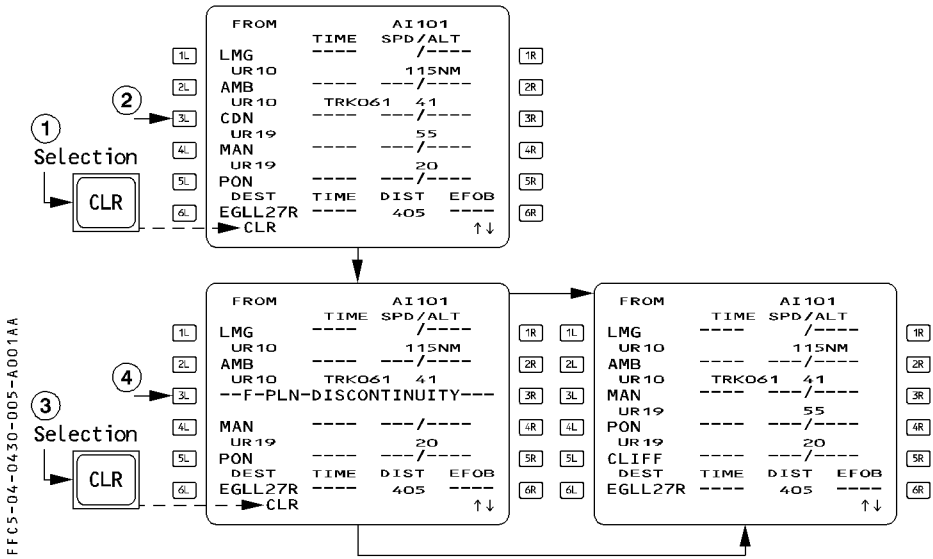
CLEARING THE SCRATCHPAD OF DATA OR MESSAGES

Press the "CLR" key with a single brief touch to erase the last alphanumeric character inserted in the scratchpad.
Press the key for more than three seconds to erase all the data inserted in the scratchpad.
If the scratchpad is empty, it displays "CLR".

CLEARING DATA FIELDS

From a empty scratchpad, press the CLR key, then select the prompt for the field you want to clear (3L for example).

- You cannot clear all data fields :
  - · If the field contains data that has a default value or a value computed by the FMGC, the data reverts to this value.
  - · Any attempt to clear the defaulted value has no effect.
- Clearing a constraint on the F-PLN A page deletes both the speed constraint and the altitude constraint associated with the waypoint.
- If you clear a data field that is a waypoint in the flight plan (primary or secondary) you delete this waypoint from the flight plan and create a discontinuity. The discontinuity can also be cleared in a similar way.



ENGINE OUT

When the FMGS detects an engine-out condition, the following occurs :

FLIGHT MANAGEMENT PART

- The managed target speeds are immediately set to a value that depends upon the flight phase.
- The system automatically calls up the current performance page, which has the E.O. CLR (engine-out clear) prompt displayed in the 1R field (except during takeoff, before the diversion point is reached).
  If the pilot presses the E.O. CLR key, the all engine operative predictions and performance will be restored. Reverting to one engine-out performance again is not possible, unless the system detects a new E.O. condition. Therefore, the pilot should not press the E.O. CLR key, if an actual engine-out is detected.
- The PROG page shows the recommended engine-out maximum (E.O. REC MAX) altitude.
- All preselected speeds, entered in the MCDU, are deleted. The crew can re-enter preselected speeds.
- Step climb (or step descent), if entered, is deleted.
- The time constraint is deleted.

FLIGHT GUIDANCE PART

- All selected modes remain available (the “HDG/TRK”, “V/S”, and “OPEN” modes, for example).
- In the Speed Reference System (SRS) mode, the takeoff speed is the highest of V2 and current speed, but no more than V2 + 15. The go-around speed target is Vapp, or the current speed if higher, but limited to VLS + 15 knots.
- The system limits Autopilot (AP) and Flight Director (FD) bank angles during the takeoff and approach phases, as follows :

R · 15° when the aircraft speed is below maneuvering speeds (F, S, or Green Dot speed)
R – 10 kt
R · Then linear increase to 25° up to maneuvering speeds (F, S, or Green Dot speed)
R – 3 kt
R · 25° above maneuvering speeds (F, S, or Green dot speed) – 3 kt.

AUTOTHRUST

The system extends the active range of the active engine from idle to maximum continuous thrust (MCT instead of CL thrust).
The Flight Mode Annunciator requests maximum continuous thrust on the live engine, at a time that depends on when the engine-out occurs.

Note : See 1.22.30 for Alpha Floor inhibition in engine-out.

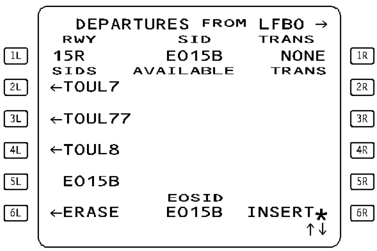
ENGINE-OUT CONDITIONS

The FMGS considers the aircraft to be in an engine-out condition, when one of the following conditions is present, and the aircraft has started the takeoff, or is in flight :

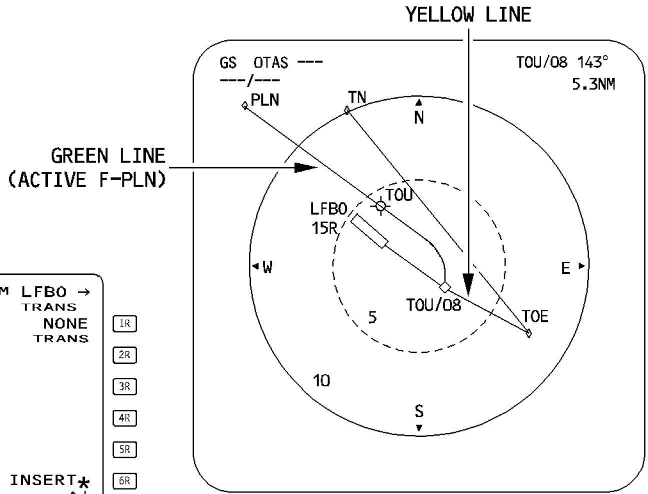
- One engine master switch is off, or
- N2 (or N3 for Rolls Royce engines) is below idle, or
- R One Thrust Lever Angle (TLA) is below 5°, and the TLA of at least one other engine is
R above 5°, or
- The FADEC shows an engine fault.

ENGINE-OUT SID OPERATIONS

An Engine-Out Standard Instrument Departure (EOSID), when defined in the database, is always for a specific runway. It is indicated on the bottom line of the SID page for that runway, and it can be manually selected.
The pilot can review the SID by either selecting the PLAN mode on the navigation display (solid yellow line), or by selecting it on the SID page. In the latter case, the navigation display shows the SID as a temporary flight plan.
The last point, if any, that is common to the SID and Engine-Out SID is called the Diversion Point (DP).



EOSID SELECTED, BUT
NOT INSERTED



EOSID ON PLAN MODE
(DISPLAYED WHETHER SELECTED OR NOT)
TOU/08 IS THE DIVERSION POINT (DP)

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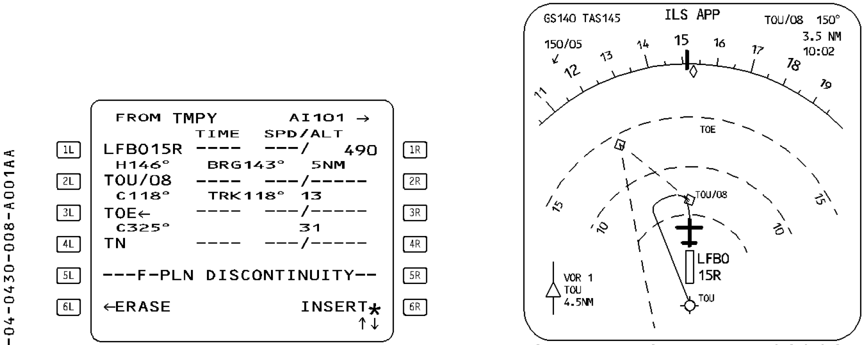
WHEN AN ENGINE-OUT CONDITION OCCURS BEFORE THE DIVERSION POINT

The MCDU automatically shows the engine-out SID as a temporary flight plan on the F-PLN page and on the ND. The EOSID can be inserted or erased.



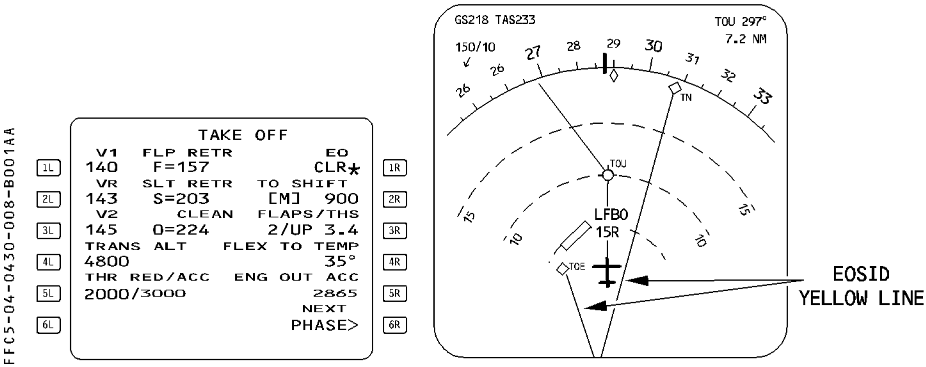
active F-PLN in green solid line
EOSID in dashed yellow line

WHEN AN ENGINE-OUT CONDITION OCCURS AFTER THE DIVERSION POINT

The navigation display shows the engine-out SID as a yellow line for your information. If necessary :

– **SELECT "DIR TO" a waypoint on the engine-out SID flight plan**

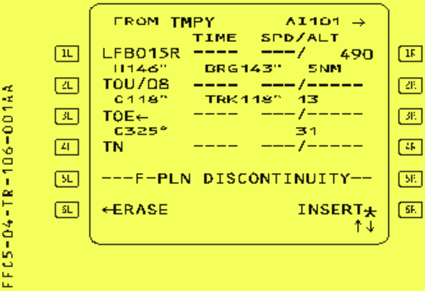
– **ADJUST the flight plan that results.**

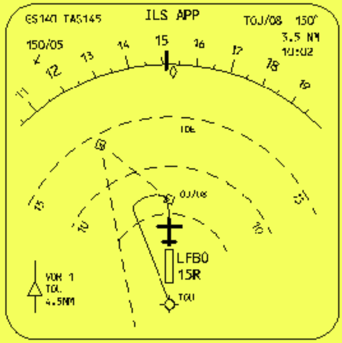


TR N° 106-1 PAGE 2 OF 2

WHEN AN ENGINE-OUT CONDITION OCCURS BEFORE THE DIVERSION POINT

The MCDU automatically shows the engine-out SID as a temporary flight plan on the F-PLN page and on the ND. The EOSID can be inserted or erased.



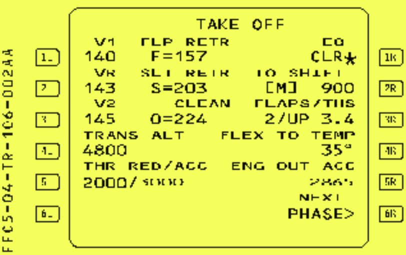


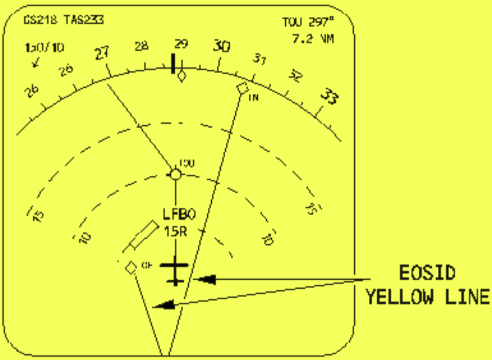
active F-PLN in green solid line
EOSID in dashed yellow line

WHEN AN ENGINE-OUT CONDITION OCCURS AFTER THE DIVERSION POINT

R — **REMAIN on the SID path**

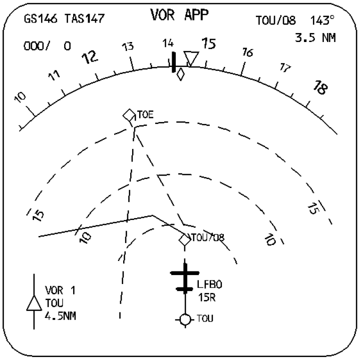
R *<u>Note</u> : The navigation display shows the engine-out SID as a yellow line for your*
R *information. Directing the aircraft to the EOSID should not be performed unless*
R *it allows obstacle clearance and the flight crew considers it is the best strategy*
R *for a particular case.*





BELOW THRUST-REDUCTION (THR RED) ALTITUDE

* The managed target speed changes.
* The PROG page displays the engine-out maximum recommended altitude.
* The PERF TO page comes up on the display automatically, with the "EO CLR" prompt in the 1R field.
* The MCDU and the navigation display show the engine-out SID as a temporary flight plan, or the navigation display shows it for information only, depending upon the diversion point location.
* The system computes the flight plan predictions when the aircraft transitions to the climb phase.



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Procedure

When the aircraft reaches the engine-out acceleration altitude :

– **PUSH the ALT pushbutton on the FCU.**
The target speed jumps to the engine-out long-range cruise, limited by SPD LIM/SPD CSTR.

– **CLEAN up your configuration as the speed increases toward target speed.**
When the aircraft is clean and has reached green dot speed , "LVR MCT" flashes on the FMA.

– **PULL the altitude selector knob to resume the climb.**
The OP CLB mode engages.

R – **MOVE the thrust lever(s) for the live engine(s) to "MCT" detent.**

ABOVE THRUST REDUCTION (THR RED) ALTITUDE

- The managed target speed changes.
- "LVR MCT" flashes white on the flight mode annunciator.
- The PROG page displays the engine-out maximum recommended altitude.
- The PERF TO page displays the "EO CLR*" prompt in the 1R field.
- The navigation display shows the EOSID.

Procedure

– **MOVE the thrust lever(s) of the active engine(s) to the MCT detent.**

R ● **When the aircraft reaches the engine-out acceleration altitude :**

– **PRESS the ALT pushbutton on the FCU.**
The target speed jumps to the engine-out long-range cruise, limited by SPD LIM/SPD CSTR.

– **CLEAN UP configuration as the speed increases.**

R ● **When the aircraft reaches Green Dot speed :**

– **PULL the ALT knob to resume the climb.**
The OP CLB mode engages.

Note : *If it is necessary, move the thrust lever(s) of the active engine(s) to the TOGA detent. The Flight Mode Annunciator will display "LVR MCT", flashing in amber, when the aircraft reaches Green Dot speed. If NAV mode is engaged and predictions are available, CLB mode may also be used to resume the climb.*

ENGINE-OUT IN CLB PHASE (above acceleration altitude)

R **ENGINE-OUT OCCURS WHILE AIRCRAFT IS BELOW EO REC MAX**

* The managed target speed changes to Green Dot speed.
  If the aircraft is in ALT or ALT* mode, the speed target is the engine-out long range cruise speed at that altitude, limited by SPD LIM or SPD CSTR.
  The target speed change is gradual, so as to prevent a strong thrust reduction.
* "LVR MCT" flashes amber on the Flight Mode Annunciator.
* The system computes the flight plan predictions down to the primary destination,
R assuming that the cruise phase will be flown at the lower of CRZ ALT or EO REC MAX.
* The MCDU shows the PERF CLB page with an "EO CLR*" (clear engine-out) prompt.
R * The PROG page shows the engine-out maximum recommended altitude (EO REC MAX).

Procedure

– **MOVE the thrust lever(s) for the live engine(s) to the MCT detent.**

– **SET the altitude on the Flight Control Unit to an altitude below the engine-out maximum recovery altitude, as cleared by ATC.**

– **INITIATE a diversion, when cleared to do so.**

R **ENGINE-OUT OCCURS WHILE THE AIRCRAFT IS ABOVE EO REC MAX**

* "LVR MCT" (maximum continuous thrust) flashes amber on the Flight Mode Annunciator.
* The climb mode (if engaged) reverts to open climb (OP CLB).
* The system computes the flight plan predictions down to the primary destination, assuming that the aircraft immediately drifts from the current altitude down to the EO MAX ALT at green dot, and then cruises at this altitude

R *Note : You cannot arm or engage CLB mode, above EO REC MAX.*

Procedure

Same as engine-out in cruise phase (see next page).

ENGINE-OUT IN CRUISE PHASE

The system sets the managed target speed to the long range engine-out cruise at that
R altitude. If the aircraft is above the Engine-Out Maximum Altitude (EO REC MAX), the target
R speed is the long range engine-out cruise speed at EO REC MAX. The target speed change is gradual, so as to prevent a strong engine thrust reduction.

∗ LVR MCT flashes on the Flight Mode Annunciator.
∗ The performance cruise page appears with the "EO CLR*" (clear engine-out) prompt, and displays the level off altitude assuming descent and cruise at green dot speed (obstacle strategy).
R ∗ The progress page displays "EO REC MAX".
∗ The system computes the flight plan predictions down to the primary destination,
R assuming that the cruise phase at the lower of CRZ FL or EO REC MAX.

Procedure

– **Perform the engine-out abnormal procedure.**

– **Refer to the FCOM Volume 3 : "SINGLE ENGINE OPERATIONS"**
  ∗ For standard strategy, refer to Chapter 3.06.30.
  ∗ For obstacle strategy, refer to Chapter 3.06.40.
  ∗ For fixed strategy (for A330 only), refer to Chapter 3.06.50.

– **Initiate a diversion, if necessary.**

Note : – *The engine-out descent strategy requires disconnection of the autothrust, and descent in OPEN DES mode.*
Disconnecting the autothrust prevents an automatic setting of THR IDLE, therefore, the autopilot will fly the target speed in OP DES mode with a thrust manually selected by the crew.
When reaching the FCU-selected altitude, or whenever normal descent is resumed to a lower altitude, reengage the autothrust.
R – *DES mode is not available above EO REC MAX.*

R Approximate increase in fuel consumption compared to all engines operative is 30 %.

ENGINE OUT IN DESCENT PHASE

* The managed target speed remains unchanged (ECON DES Mach number or speed, with any speed limitations).
* "LVR MCT" flashes on the Flight Mode Annunciator.
* The PERF DES page appears, showing the "EO CLR*" prompt.
* The PROG page displays the engine-out maximum altitude (EO REC MAX).
* The descent mode (if engaged) reverts to V/S, if the aircraft is above the EO REC MAX. If not, the descent mode is maintained.

Procedure

– **MOVE the thrust lever(s) for the live engine(s) to the MCT detent.**

– **If necessary, SELECT a suitable flight mode for descent.**

– **DISCONNECT the autothrust and ADJUST thrust, if necessary.**

Note : The system recomputes the descent and approach paths, based on 2 or 3 engine models for the A340, or on a single engine model for the A330.

ENGINE-OUT IN APPROACH PHASE

* The aircraft maintains approach speed (VAPP).
* "LVR MCT" flashes on the Flight Mode Annunciator.
* The PERF APPR page appears, showing the "EO CLR*" prompt.
* The PROG page displays the engine-out maximum altitude (EO REC MAX).

Procedure

– **MOVE the thrust lever(s) for the live engine(s) to the MCT detent.**

– **SELECT a suitable flight mode as for an all engine approach.**

CAUTION

R Below maneuvering speed (F, S, Green Dot) – 10 kt, the autopilot or flight
R director (AP/FD) cannot order a bank angle greater than 15°.
R Above maneuvering speed – 10 kt, this limit linearly increases until it reaches
R 25° at maneuvering speed – 3 kt. The limit is then 25° for all speeds above
R maneuvering speeds – 3 kt.

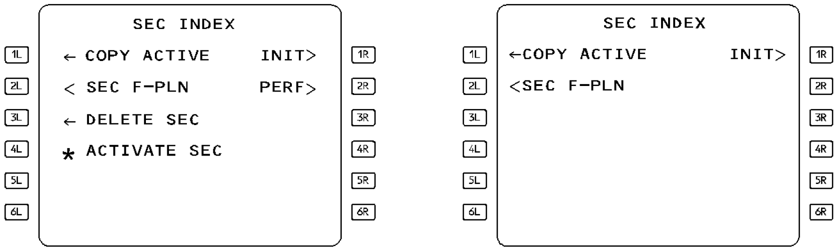
ENGINE-OUT IN GO-AROUND PHASE

The results and procedures for takeoff phase apply, however the displays do not show the engine-out SID.

Note : If ALT engages out of SRS mode, and an engine-out occurs simultaneously, an airspeed loss may be encountered during the altitude capture.*

SECONDARY FLIGHT PLAN

The secondary flight plan is an alternative flight plan that you can activate when required.
With respect to the secondary flight plan, you can :
- Construct it independently (it can be created while a temporary exists).
- Copy it from the active flight plan.
- Delete it completely.
- Activate it as primary flight plan using ACTIVATE SEC prompt.



FFC5-04-0430-015-A100AA

A SEC F-PLN EXISTS NO SEC F-PLN IS DEFINED

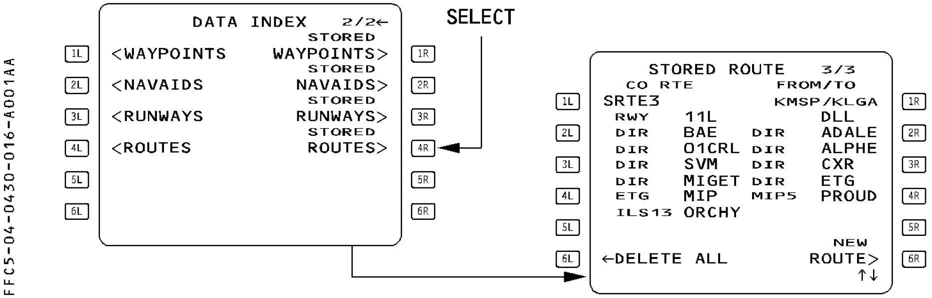
- The screen displays the "ACTIVATE SEC" prompt in flight :
  · when the heading (track) mode is engaged, or
  · when the navigation mode is engaged if the active legs of the primary and secondary flight plans are common.
- The screen displays the "INIT" prompt if the secondary flight plan is not a copy of the active flight plan.
  The secondary flight plan sequences with the active flight plan when it is a copy of the active.
  The navigation display shows the secondary flight plan in white.
  · In PLAN mode use the slew keys to review it (as you would for the primary flight plan).

Predictions
The system computes predictions using the same performance methods and performance factor it uses for the active flight plan. However, it predicts pseudo waypoints only for the Multifunction Control and Display Unit not for the Navigation Display (ND).

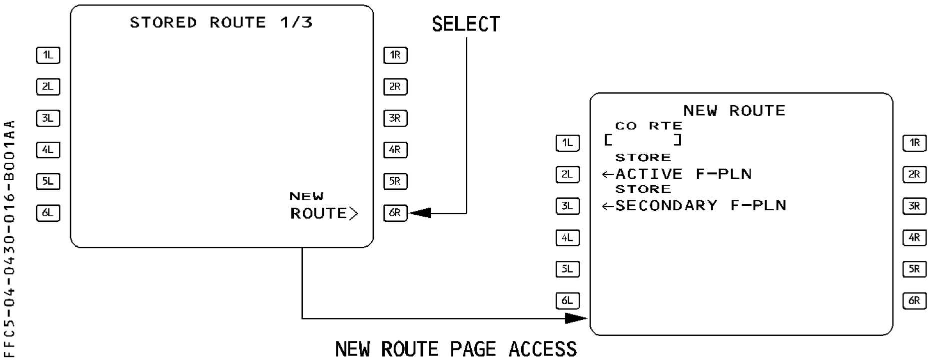
Use of secondary flight plan
The pilot will use the secondary flight plan in the following situations :
* When an alternate takeoff runway is probable
* To plan a diversion
* To prepare the next flight
* To compare predictions and evaluations.

STORED ROUTE FUNCTION

The stored route function allows the pilot to store or review as many as five different routes defined in an active or secondary flight plan.
This also allows you to store a company route that is not yet in the database but is expected to be flown several times (a charter route, for example).
Access the STORED ROUTES page from the DATA INDEX page.

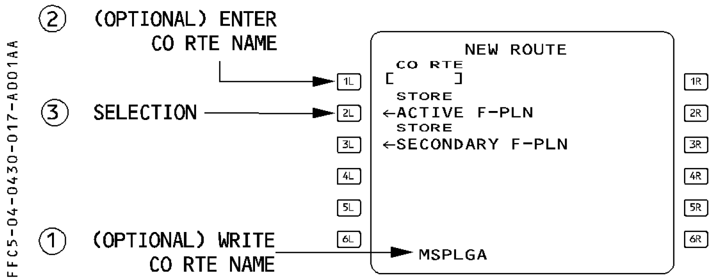


A stored route can be reviewed by using the slew key.
In order to store a new route, first define the route through the active flight plan (on the ground only) or the secondary flight plan (on the ground or in flight) then proceed as described below.



HOW TO STORE THE ACTIVE FLIGHT PLAN (DURING PREFLIGHT ONLY)

- **SELECT the DATA key on MCDU**
- **PRESS the next page key**
- **PRESS the "STORED ROUTES" key**
- **PRESS the "NEW ROUTE" key**
- **ENTER the company route name (optional)**
- **PRESS the "STORE ACTIVE F-PLN" key**



HOW TO STORE THE SECONDARY FLIGHT PLAN

- **SELECT the DATA key on MCDU**
- **PRESS the next page key**
- **PRESS the "STORED ROUTES" key**
- **PRESS the "NEW ROUTES" key**
- **ENTER the company route name (optional)**
- **PRESS the "STORE SECONDARY F-PLN" key**

Note : – *In either case, you may store a company route only if the active or secondary flight plan is complete from origin to destination.*
– *If you do not enter a name, the Flight Management Guidance System names the stored route automatically as "SRTE 1 (or 2 ...)" when it is stored.*
– *The system does not retain several elements of the flight plans when you store them :*
* *Pilot-entered holds*
* *Offsets*
* *Pilot-entered constraints*
* *Modifications to a terminal procedure*
* *Pseudo waypoints*

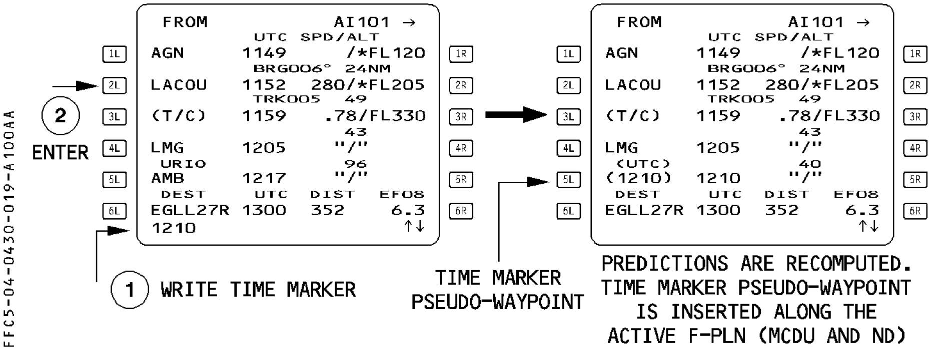
When this happens, it displays "REVISIONS NOT STORED".
– *If you already stored five routes, the system will reject a new entry and display "STORED ROUTES FULL" on the MCDU. Delete one stored route by clearing the CO RTE name before inserting a new one.*

TIME MARKER

The pilot can enter a time marker in the F-PLN A or B page. Once entered, the FMGS displays a pseudo waypoint along the flight plan on the MCDU and on the navigation display. This pseudo waypoint shows the predicted location of the aircraft at the entered time.

HOW TO INSERT A TIME MARKER

- **WRITE the time marker in the scratchpad. The entry format is HHMM.**
- **SELECT any left key of the F-PLN A or B page, to insert the time marker in the active flight plan.**
  The time marker is inserted in the flight plan according to time criteria, irrespective of the key choosen for entry.

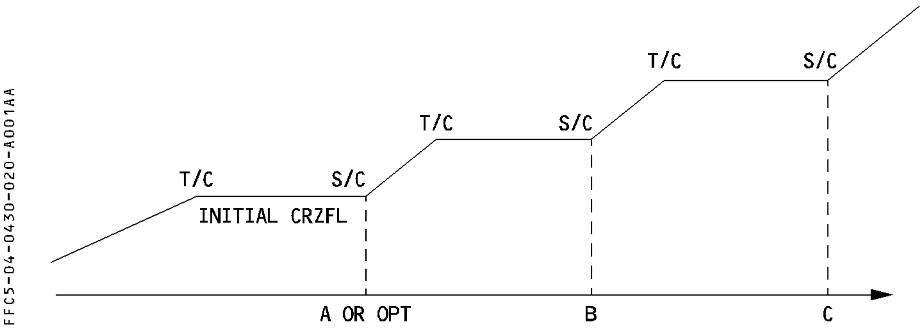


Up to 4 time markers may exist at a time. An attempt to enter a fifth time marker will cause the message "TIME MARKER LIST FULL" to appear on the scratchpad.
The FMGS updates the time marker position with the predictions.
When the current clock time equals or exceeds the time marker entry, the FMGS sequences the time marker (even in preflight).

R **STEP ALTS**

STEP CLIMB/STEP DESCENT

The STEP ALTS function allows to define the successive CRZ FLs and to determine the optimum position to initiate a climb from the initial (or current) CRZ FL to the next one.



PRINCIPLE

Geographic steps
Up to four geographic steps may be defined on the STEP ALTS page. These steps are initiated at a geographical position, along the F-PLN.
Rules
- The minimum step size is 1 000 feet
- A Step Climb (S/C) cannot follow a Step Descent (S/D)
- A STEP is automatically cleared :
  · If the S/C (S/D) is sequenced without any level change commanded by the flight crew.
  · If the flight crew achieves a LAT REV which deletes the associated waypoint from the F-PLN
  · By EO condition.
- A STEP is manually cleared :
  · On the STEP ALTS page, by CLEARING the corresponding field
  · On the F-PLN page, by CLEARING the (S/C) (S/D) pseudo waypoint.
- A STEP entry is IGNORED if the remaining CRZ distance is less than approximately 50 NM
- When the steps are inserted in the F-PLN, they are displayed :
  · On the MCDU as (S/C), (S/D), (T/C), (T/D) pseudo waypoints
  · On the ND by associated ⟋, ⟍, ↳ white symbols.

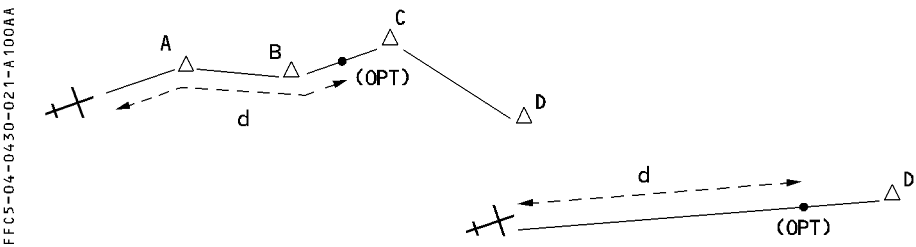
Optimum step

When geographic steps are inserted or an altitude is entered, the FM proposes an OPTIMUM STEP start of climb position for the first step climb altitude ahead : Fuel/time savings are displayed if above 100 kg/1 min. If no savings are found, no optimum step is proposed.

The OPT STEP is not automatically inserted : The flight crew has to insert it if appropriate. When inserted, the OPT STEP point (OPT), is then a fixed geographical point.

If subsequently some F-PLN parameters are changed (winds, new waypoints, ...) an update of the optimum position relative to the previous one may be proposed. If savings exist, this new optimum may be inserted to replace the previous optimum step point.

When an OPT STEP is inserted in the F-PLN, and the flight crew achieves a lateral F-PLN revision, the FM keeps the (OPT) along the new F-PLN at the same distance from the aircraft position as previously determined.



Rules

- The OPT STEP is only computed by the FM if data required for the prediction computation are inserted : F-PLN, CRZ FL, CI, GW, CG at least
- The search of the OPT STEP begins 20 NM beyond T/C before Cruise, or ahead of aircraft position
- The search of the OPT STEP ends 20 NM before the next STEP POINT or 300 NM before the TOD
- Only one OPT STEP is computed at a time.

Guidance

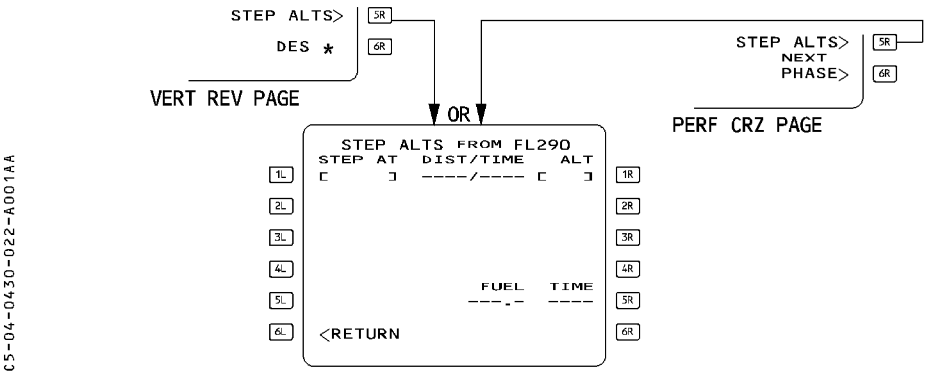
When reaching the step point, the steps must be initiated by the flight crew by selecting the new CRZ FL and pushing the FCU ALT selector knob. If sequenced without any flight crew action, the step is automatically deleted.

If the flight crew initiates the step :

- The CRZ FL is automatically reassigned to its new value
- The guidance is THR CLB/CLB for a step climb
  THR DES/DES with V/S = – 1 000 ft/mn for a step descent.

STEP entry

The STEP ALTS page is accessed : – Either from the VERT REV page
– Or from the PERF CRZ page.



DEFAULT PAGE AT ACCESS

For GEOGRAPHIC STEP

– **PRESS the F-PLN or PERF key**

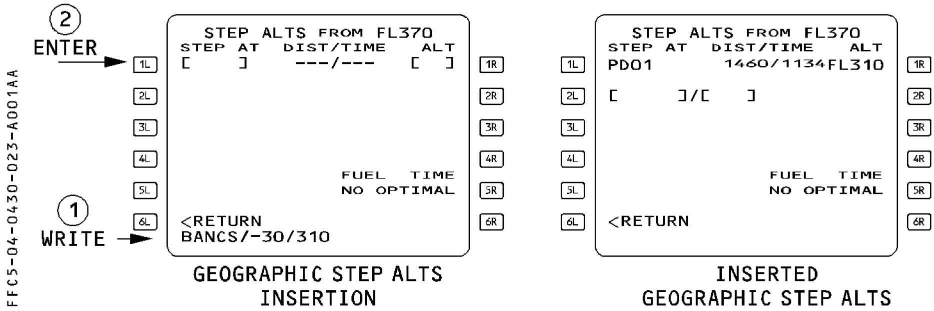
– **SELECT vertical revision at a cruise waypoint**

– **SELECT the STEP ALT prompt**

– **WRITE in the scratchpad the POSITION/NEW CRZ FL, and ENTER in field 1L to 4L.**

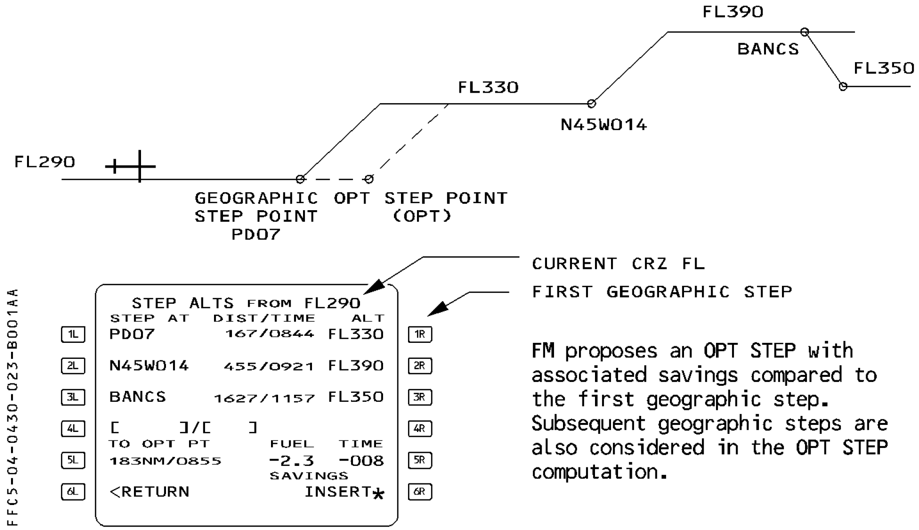
Note : – *The position may be a waypoint ident, PBD, or PD*
– *The flight crew may enter LMG/–20/350. The FM will compute the geographic step 20 NM before LMG to FL 350*
– *To modify an inserted STEP :*
· *Enter the CRZ FL using the [1R] key, to modify the CRZ FL only*
· *Enter the position using the [1L] key, to modify the position only*
· *Enter the position first and then the CRZ FL to modify both (it is not possible to modify both in a single entry).*

– **CHECK the PREDICTIONS**



For OPTIMAL STEP

When all geographical steps are inserted, and the predictions are available, the STEP ALTS page displays FUEL/TIME savings for the first step climb. If no significant savings are predicted, the NO OPTIMAL message is displayed.



If the flight crew wishes to INSERT the proposed OPT STEP :

– SELECT the INSERT prompt

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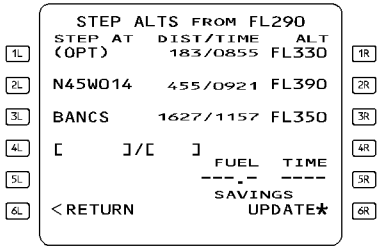

The computed (OPT) step replaces the initially inserted step position, and is then considered at a fixed geographic position. Savings are no longer displayed, and the UPDATE prompt replaces the INSERT prompt. This prompt allows the flight crew to update the (OPT) step position, taking into account possible F-PLN or inserted wind changes.
If pressed, a new OPT point is proposed with associated SAVINGS and INSERT prompt, or NO OPTIMAL.
UPDATE prompt has been pressed, the new OPT STEP point provides additional savings :

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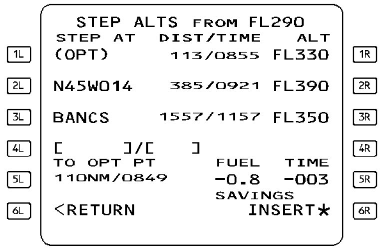


There are only 2 CRZ FLs in the F-PLN

The flight crew may obtain the OPT position of the STEP point, as follows :

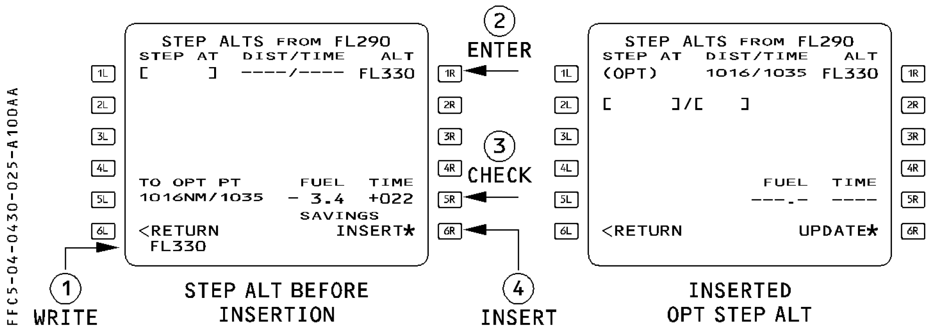
– **INSERT the initial cruise FL on INIT A page**

– **ENSURE that the ZFW and BLOCK fuel are inserted in INIT B page**

– **WRITE the new cruise FL in the STEP ALTS page, and INSERT it in the 1R field.**
Distance and time to optimum point and fuel/time saving are displayed.

– **CHECK the fuel and time savings and prediction in fields 5L and 5R.**
Savings are computed by comparing between the entered step altitude, and the origin altitude of the step.

– **INSERT if suitable.**



<u>Note</u> : No OPT STEP is available in the SEC F-PLN.

Messages

Messages may be displayed in the DIST/TIME field :
– "ABOVE MAX" if the inserted step altitude exceeds the MAX MAX ALT.
The "STEP ABOVE MAX FL" scratchpad message is associated with the "ABOVE MAX" message.
– "IGNORED"
This message is displayed in the following cases :
· Step climb is located before to the top of climb, or after the top of descent
· Step end is at less than 50 NM from top of descent. An optimum step point < 200 NM from top of descent cannot be inserted.
R – "STEP NOW" if the aircraft is within 20 NM from the step point.
"NOT ALLOWED" may be displayed in the scratchpad if :
– Four steps already exist in the F-PLN and an additionnal entry is attempted
– Any attempt to enter a step at the FROM waypoint or at a pseudo waypoint is done
– Two consecutive steps are entered at the same waypoint (e.g. step climb after step descent).

R **REQUIRED TIME OF ARRIVAL (RTA)**

A time constraint may be assigned at any waypoint of the F-PLN, downpath of the origin and the FROM waypoint. It can be an "AT", "AT OR BEFORE", or "AT OR AFTER" constraint. The FM computes a new managed speed profile from the aircraft position to the constrained waypoint, in order to match the 30–second difference (△T) between the time predicted at the constrained waypoint and the Required Time of Arrival (RTA). This modified managed speed profile can be checked using the speed prediction, displayed for each waypoint of the F-PLN page.

R The RTA function uses a speed range between Green Dot and VMO-10 (or MMO- 0.02). When the constrained waypoint is sequenced, the ECON SPD/MACH is resumed unless the constrained waypoint is located in a descent segment.

Note : 1. The FM does not compute a new managed speed profile when a RTA is entered in the descent profile, while the aircraft is in cruise, within 40 NM from the top of descent.

R *2. The managed speed target is not modified in the climb phase to avoid changes*
R *of flight path during the climb. The managed speed profile is modified once the*
R *aircraft is in cruise phase.*

The time constraint is inserted on the RTA page. A time constraint may be inserted at any waypoint of the primary or secondary flight plan.
If an engine-out condition is detected, the time constraint is automatically deleted and an RTA DELETED message is displayed on scratchpad.
If the aircraft enters a holding pattern, the downpath time constraint is deleted.
When inserted in the F-PLN, the RTA is displayed in magenta on the F-PLN page, as long as no predictions are available.
When the predictions are available, the time constraint is replaced by the new predicted time at the associated waypoint,and highlighted by a star (*) :
– The (*) is magenta, if the time constraint is matched with the 30–second criteria
– The (*) is amber, if the time constraint is missed.
Time constraint matching criteria :

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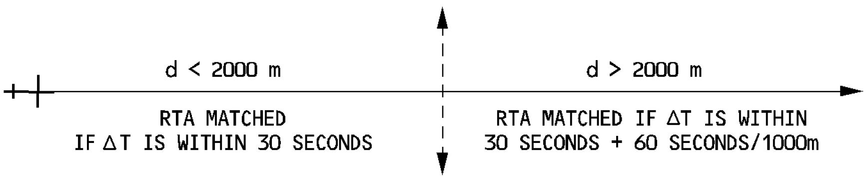
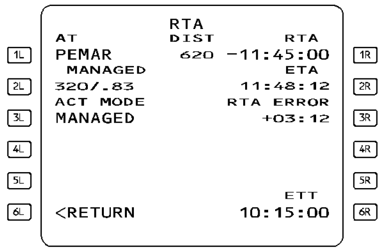


Note : △T is the time difference between the time predicted at the constrained waypoint and the RTA.

R **<u>RTA entry</u>**

- **PRESS the F-PLN key**
- **SELECT vertical revision at revised waypoint**
- **SELECT the RTA key**
- **ENTER a waypoint at which a time constraint is to be defined**
- **WRITE the RTA (+/– HHMMSS) into the scratchpad and ENTER by pressing the 1R key.**
  The display automatically reverts to the F-PLN A page.

FFC5-04-0430-027-A100AA



<u>Note</u> : – *The RTA can be cleared directly on the F-PLN A page using the CLR key.*
– *If a time constraint is inserted in the F-PLN, the OPT STEP function is no longer available. Therefore, if an OPT is to be inserted in the F-PLN, this shall be done before entering the RTA.*
– *The time constraint is automatically deleted in the following cases :*
· *Engine Out, or*
· *When entering a holding pattern, or*
· *In case of go-around, or*
· *A time constraint is entered at another waypoint while another time constraint already exists.*

A scratchpad message "RTA DELETED" is displayed.

ESTIMATED TAKEOFF TIME

The Estimated Takeoff Time (ETT) may be entered by the flight crew during the preflight phase at the origin airport. This time is used as the initialization time for predictions. The entry is accepted in the preflight phase, if the ETT is greater than the clock time.

PROCEDURE

– **PRESS the F-PLN key**

– **SELECT a vertical revision at origin**

– **SELECT the RTA page ◁**

– **WRITE the ETT into the scratchpad, and ENTER it in the UTC CSTR (ETT ◁) field.**
The display automatically reverts to the F-PLN A page.

Note : – *If the current time exceeds the ETT entry, the message CLK IS TAKE OFF TIME is displayed and the ETT is replaced by the clock time.*
– *When the takeoff is initiated, the takeoff time is automatically updated to the clock time.*
– *ETT entry is automatically deleted, if the origin airport is modified, or if the clock is inoperative.*
– *If a time constraint is entered at a waypoint in the F-PLN, the takeoff time required to match the constraint is automatically computed by the FM. This result is displayed in magenta as ETT at the origin.*

USE OF TIME/ETT CSTR

During preflight : – If an ETT has been entered, time predictions are based on the entered value (or clock time, if greater).
– If both an ETT and a time constraint have been entered, time predictions are based on the entered ETT value (or clock time, if greater). The managed speed profile is computed to match the time constraint, as closely as possible, using a pseudo cost index value. (Not displayed).
– If only a time constraint has been entered :
· Optimum speeds are computed to determine the ETT, so as to satisfy the time constraint.
· If necessary, flight time (based on optimum speeds) plus clock time (current) is greater than the time constraint. Optimum speeds are modified to match the time constraint as closely as possible.

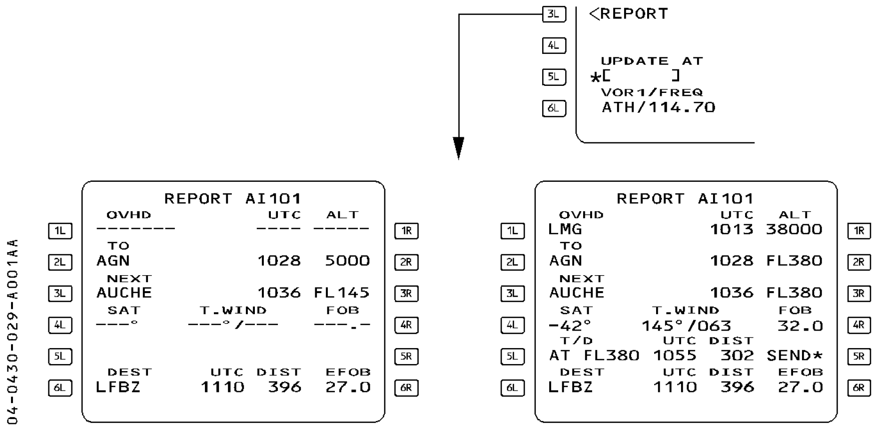
After Takeoff : The predictions are based on the current time.
Speeds are adjusted to satisfy the time constraint.

REPORT PAGE

The REPORT page allows the flight crew to achieve the position reporting.
It is tailored for Long-Range or oceanic flights, where a more complete report is required due to the lack of radar facility, and due to the potential requirement by ATC for specific weather data report.

REPORT PAGE ACCESS

The report page is accessed from the PROG PAGE.



REPORT PAGE IN PREFLIGHT PHASE

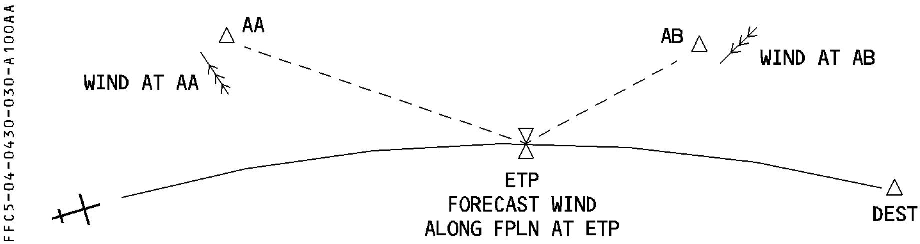
REPORT PAGE IN FLIGHT

Note : In case a DIRTO with ABEAM WPTs is achieved, or in case a FIX INFO with ABEAM or RADIAL intersection is inserted in the F-PLN, the TO WPT provided on the REPORT page will be the ABEAM WPT or the RADIAL intersect waypoint, if any, as on the F-PLN page.

DIVERSION

EQUITIME POINT

The EQUITIME POINT page displays the Equitime Point (ETP) computed along the F-PLN route between two referenced positions (airports, waypoints or NAVAIDS) defined by the flight crew (Refer to 4.03.20 for the page description).
At the first access to the page, the FM proposes origin and destination airports as defaulted positions.
The flight crew may overwrite these two positions and insert the wind in their vicinity at the applicable CRZ FL.
The FM then computes the resulting ETP, using the managed or selected speed and blending the forecasted winds along the F-PLN route with the inserted winds.
The FM provides :
· TIME and DIST from aircraft position (or origin on ground) to ETP
· The BRG/DIST from ETP to the defined positions
· TIME overhead each position, assuming the aircraft flies from present position to the defined position via the ETP
· (ETP) pseudo waypoint is displayed on the ND along the F-PLN
· ETP location with regard to the subsequent waypoint.



ETP ENTRY

– **PRESS the DATA key.**

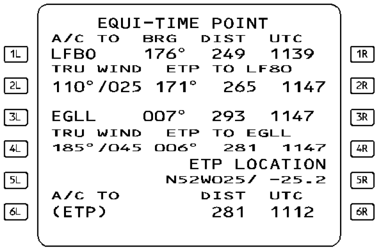
– **SELECT the EQUITIME POINT prompt.**
The EQUITIME POINT page is displayed. The origin and destination airports are used by default.

– **ENTER the REF POINT 1 in the 1L field.**

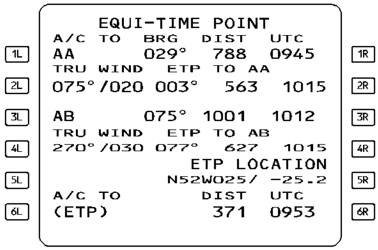
– **ENTER the associated wind in the 2L field.**
The wind to be inserted is the wind in the vicinity of the reference point at the CRZ FL.

– **ENTER the REF POINT 2 in the 3L field.**

– **ENTER the associated wind in the 4L field.**
The system displays the ETP location with regards to the next waypoint of the active flight plan following the ETP in the 5R field, and the A/C TO (ETP) predictions in the 6R field.



EQUI-TIME PAGE AT ACCESS
(DEFAULTED)



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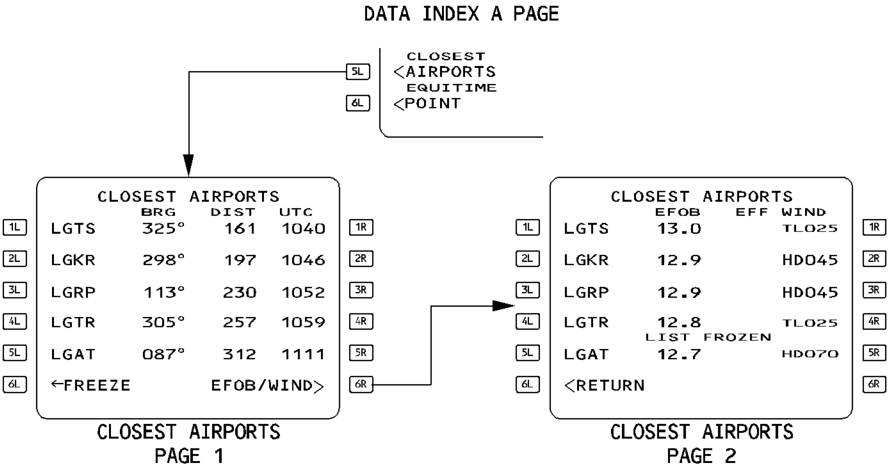
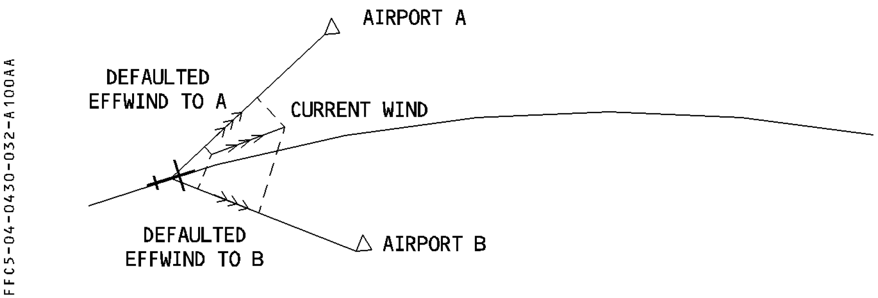
Note : – *The ETP pseudo waypoint is not displayed on the MCDU F-PLN page. In order to locate it easily, or when closing up the applicable ETP, the TIME MARKER may be used. This allows the flight crew to visualize ETP pseudo waypoint in advance on the F-PLN page or to prepare the next applicable ETP on the EQUITIME POINT page.*
– *The ETP is computed using speed according to current mode (managed or selected).*

CLOSEST AIRPORTS

The CLOSEST AIRPORT page displays the 4 closest airports from the aircraft position found in the navigation database (Refer to 4.03.20 for the page description) and the fifth airport, as selected by the flight crew.
For each airport, the FM computes :
- The BRG/DIST/ESTIMATED UTC from aircraft position to the corresponding airport
- The EFOB at the airport, assuming an EFFECTIVE WIND (defaulted or entered by the flight crew).





Note : When CLOSEST AIRPORTS, page 2, is selected, the list of airports is automatically frozen, as indicated on the page.

The FUEL/TIME predictions to the closest airports use simplified assumptions :
- Manage speed profile in cruise, with the effective wind from the CLOSEST AIRPORT page 2. In case of EO, Engine Out condition is considered.
- Continuous descent from CRZ FL down to the airport elevation.

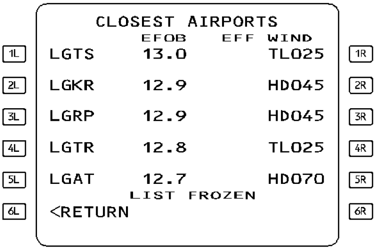
Note : *In case SELECTED SPD is used, the CLOSEST AIRPORT page still provides good use to choose the applicable closest airport for diversion purposes. However, when SELECTED SPD is significantly different from MANAGED SPD, the predictions in terms of time and fuel must be disregarded since they are misleading.*
The predictions may then be checked on the SEC F-PLN.

HOW TO EXECUTE A DIVERSION

Various features are provided to the flight crew in order to execute a diversion :
- The EQUITIME POINT
- The CLOSEST AIRPORTS page
- The SECONDARY F-PLN
- The ENABLE ALTN function
- The NEW DEST revision.

EN ROUTE DIVERSION WITH SEVERAL AIRPORTS AVAILABLE

– **SELECT the CLOSEST AIRPORTS page.**



CLOSEST AIRPORTS
PAGE 2

FFC5-04-0430-034-A001AA

– **SELECT the EFOB/WIND prompt.**

– **INSERT the effective wind at selected airport.**

– **CHECK the predictions and CHOOSE the adequate diversion airport.**

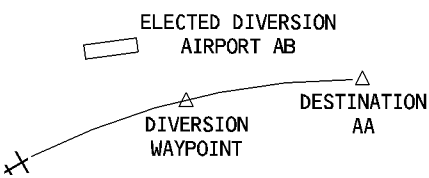
– **PREPARE the diversion flight plan on the secondary flight plan.**

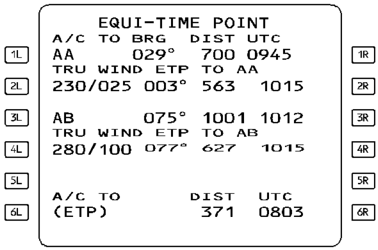
Note : Fuel/time predictions on CLOSEST AIRPORTS page assume managed speed profile.

EN ROUTE DIVERSION OVER OCEANIC OR DESERTIC AREA

The diversion airports are usually determined prior to departure or using the CLOSEST AIRPORT DATA.

– **SELECT the EQUITIME POINT page.**





EQUITIME POINT PAGE

FFC5-04-0430-034-B001AA

- **ENTER the airport idents in the 1L and 3L fields.**

- **ENTER the associated winds in the 2L and 4L fields.**

- **CHECK the ETP position and time.**

- **ENTER a predicted time at ETP as a time marker.**

- **PREPARE a diversion flight plan on the secondary flight plan.**

DIVERSION PREPARATION ON THE SECONDARY FLIGHT PLAN

This procedure shall be applied for all diversion cases, when the diversion airport has been selected, and when the "most probable diversion point of the F-PLN" has been selected.

R - **PRESS the SEC F-PLN key.**

- **PRESS the COPY ACTIVE prompt.**

- **SELECT a lateral revision at diversion waypoint.**

- **ENTER the ident of the diversion airport in the NEW DEST field.**
  Then finalize the flight plan between the diversion point and the diversion airport. If the diversion airport is no longer applicable or the ETP is sequenced, repeat the same procedure for the next diversion airport.

MISCELLANEOUS

In certain cases, the diversion airport may be simply chosen using the airports displayed on ND having selected AIRPORT on the EIS control panel.
During oceanic or desertic area flights, the PROG page may be advantageously used as follows :

- **ENTER the ident of the diversion airport in the 4R field of MCDU 1.**
- **ENTER the next diversion airport in the 4R field of MCDU 2.**
  The flight crew is then continuously provided with the instantaneous BRG/DIST to the selected diversion airports.
- **UPDATE the PROG pages when sequencing the ETP.**

EXECUTION OF THE DIVERSION

When the flight crew decides to divert :

- **PRESS the SEC F-PLN key.**
- **SELECT the ACTIVATE SEC prompt.**

R
R – **SELECT DIR TO required point.**

```
                 SEC INDEX
1L  ← COPY ACTIVE          INT>  1R
2L  < SEC F-PLN           PERF>  2R
3L  ← DELETE SEC                 3R
4L  * ACTIVATE SEC               4R
5L                               5R
6L                               6R
```

FFC5-04-0430-036-A001AA

A SEC F-PLN EXISTS

DIVERSION TO THE ALTERNATE AIRPORT

The primary F-PLN includes an alternate flight plan from the destination to the preferred alternate airport. All fuel prediction and management (XTRA fuel) take the alternate flight plan into consideration.
If the flight crew decides to divert at the end of the cruise, or beyond the last ETP, or in the descent or go-around phases, this will most probably be to the alternate airport.
When the flight crew decides to divert :

- **SELECT a lateral revision at suitable waypoint**

– **SELECT ENABLE ALTN**

– **CHECK the temporary flight plan and INSERT.**

R – **SELECT DIR TO required waypoint.**

R *Note : – In most cases, the LAT REV shall be selected at the TO WPT. This will facilitate the subsequent selection of the DIR TO waypoint.*

– The ALTN flight plan shall be finalized, whenever the landing runway is known
R *by the flight crew (before approach briefing).*
R *In most cases, this will ensure, that the most probable flight plan is displayed on the MCDU when ENABLE ALTN is selected.*

NAVIGATION

IRS ALIGNMENT

R IRs will be aligned, as per the recommendations in the SOP (3.03.06) and Supplementary
R Techniques' (3.04.34) chapters.

F PLN INSERTION and CROSSCHECK

On certain routes, the pilot has to define LAT/LONG waypoints, which must be entered as follows :

– **WRITE the waypoint longitude/latitude in the scratchpad.**
The format is 4500N/3000W.

– **PRESS a left key of the MCDU F-PLN page.**
This automatically triggers the NEW WAYPOINT page.

– **CHECK the coordinates and the proposed waypoint ident.**
If the pilot entered 4500N/3000W, the system proposes the ident N45W30.

– **PRESS the STORE prompt.**
The waypoint is inserted in the F-PLN, and stored in the navigation database (stored element).

– **A F-PLN crosscheck must be carefully performed by both crewmembers :**
  – Check the SID (F-PLN page and ND PLAN mode versus the SID chart including constraints).
  – En route segments :
    · If the F-PLN is defined by a company route : Check the ROUTE SELECTION page, versus the ATC F-PLN.
    · If the F-PLN is defined by a succession of airways : Check the AWY intersect waypoints on the AWY page, versus the ATC F-PLN.
    · If the F-PLN is defined by a succession of waypoints : Check the TRK/DIST of each leg, versus the computerized F-PLN.
  – Check the flight plan DISTANCE on the F-PLN page, versus the ground distance of the computerized flight plan.

– Once the flight plan is finalized, and all GW/PERF data are inserted :
  · PRINT the PREFLIGHT REPORT
  This report may then be used as the master document for the continuous monitor of the flight progress, until a major flight plan change will occur in flight.

IN FLIGHT PROCEDURES

Takeoff

– **If takeoff is achieved from an intersection, INSERT the corresponding TO SHIFT on the PERF TO page, to get an accurate position update at takeoff.**

Reaching the initial cruise FL

– **COMPLETE WIND/TEMP entry at waypoints, if not done during preflight**

– **COMPLETE STEP entry, check whether an OPT STEP is proposed for the next STEP on the STEP ALT page**

– **UPDATE the F-PLN with the latest ATC or Oceanic clearance**

– **PRINT the resulting predictions (if PRINTER is installed) : PRINT the INFLIGHT REPORT**
  This will be then used as the basic document to follow the proper completion of the flight, until a new major change is requested by ATC.

Before leaving radio navaid coverage

– **TUNE the last navaid within range and INSERT its ident on PROG page.**

● **When IRS ONLY NAVIGATION message comes up :**

  – **VALIDATE FMS position (raw data versus computed BRG/DIST on PROG page)**

  ● **If a significant deviation is noticed between the IRS deviations :**

    – **Determine the best 2 IRSs on DATA POS MONITOR page**
    eg
    IRS1 IRS 2 IRS3
    6.4 2.8 2.5 IRS 3/IRS2 are best.

Outside radio navaid coverage

– **USE NAV mode.**

– **KEEP FD bars displayed on both PFD.**
  Any FMS position mismatch is immediately detected by the FD bars of the slave FMS, which will not be properly centered.

– **When close to the TO waypoint : SELECT the report page**

– **When overhead the waypoint, CHECK the proper sequencing :**
· REPORT to ATC using REPORT page
· CHECK BRG/DIST to the new TO WPT on the ND
· CHECK Fuel and Xtra on FUEL PRED page

Modification of the F-PLN

– **PNF : ENTERS the new clearance in the MCDU**

– **PF/PNF : CROSSCHECK the correct insertion of the new clearance**

– **PRINT the resulting predictions (if PRINTER is installed) : INFLIGHT REPORT**
The previous print may be suppressed since the new print includes the history of the past waypoints.

When back into radio navaid coverage area

– **Manually TUNE for display the first navaid potentially in range**

Note : *Autotune of the navaid will only occur when within the figure of merit of the navaids.*

– **CROSSCHECK FMS accuracy whenever raw data are available**

Note : *If a VOR/DME update occurs, it is quite common to note that the aircraft enters a shallow turn to slowly catch up the new radio position.*

At the end of the flight

– **PRINT the POST FLIGHT REPORT (if the PRINTER is installed).**

Note : *When taxiing, the GS information provided by the worst IRS might be misleading*

– **CHECK the IRS drift on the POST FLIGHT REPORT or on the IRS MONITOR page (if printer is not installed)**

POLAR NAVIGATION

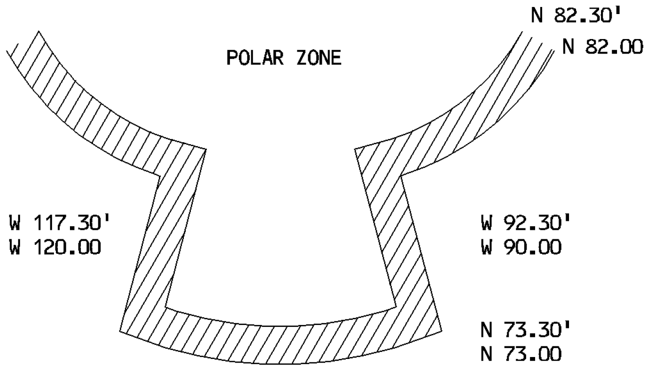
When a flight is scheduled to cross high latitude areas (usually beyond 60°), various precautions must be taken regarding ADIRSs, FMGSs, and EIS.
These precautions are mostly dictated by :
- The change from the MAG to TRUE heading (track) reference required by the airway reference changes in high latitude, or the inability of the IRSs to provide magnetic heading.
- Some particularities linked to the pole overfly.

DESCRIPTION

ADIRS

— **Alignment :**
The IRS may be aligned up to latitude 73N without any particular procedures.
Between 73N and 82N (north or south), the required alignment time is greater and a specific procedure has to be performed.
Beyond 82° North or South, no ADIRS alignment is possible.

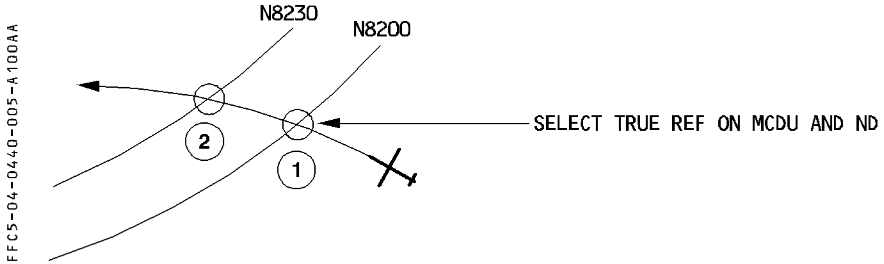
— **MAG-TRUE reference selection :**
The ADIRS are able to provide TRUE heading (track), regardless of the aircraft latitude.
The ADIRS are able to provide MAG heading (track) between latitudes 82°30 N and 60°30 S, except in the vicinity of the magnetic pole, as shown below :



FFC5-04-04-0440-004-A001AA

Note : 1. *The latitude values given in this diagram are average values. In reality, the polar area involves different hysteresis, combined with the track angle penetration of the aircraft in the zone.*
2. *All airfields where STARs and APPRs are MAG referenced — such as Svalbard — will be flown with magnetic reference selected.*
R 3. *Although located outside the above polar zone, Thule is "TRUE" oriented.*

The MAG/TRUE selection is achieved manually by pressing the NORTH REF pushbutton, or automatically if the aircraft enters the polar zone with MAG still selected. In this case the following messages and cautions are displayed.



When in 2, and MAG reference is still selected, following events will occur :

– the IRSs automatically revert from MAG to TRUE
– an indication TRUE appears on the ND and PFD heading scales. The GRID track information appears on ND.
– an amber caution is triggered on the ECAM :
  NAV EXTREME LATITUDE
  NORTH REF SEL. . . . . . TRUE
– the autopilot might disconnect, an amber caution HDG DISCREPANCY (associated with a CHECK HDG message on the PFD and on the ND) might be triggered (the IRS do not reach the polar zone simultaneously).

Note : The messages and cautions are triggered as soon as the first IRS reaches the polar zone ; once cleared, when the other two IRSs enter the polar zone, the messages are no longer displayed.

FMGS

– Flight Guidance part
  · When the pilot changes manually the heading reference from MAG to TRUE or vice versa,
    ∗ if NAV mode is engaged, there is no discontinuity in the lateral guidance.
    ∗ if HDG (TRK) modes are engaged, the HDG (TRK) target is automatically modified using current position variation ; thus there is no discontinuity in the lateral guidance.
  · if TRUE reference is selected, only CAT 1 ILS approaches may be flown.
  · if an automatic MAG/TRUE switching occurs when entering the Polar zone, the autopilot might disengage due to the fact that, most probably, the automatic switching will not occur simultaneously for the 3 IRSs. The AP OFF warning is displayed on the ECAM.

- Flight Management part
  - When the aircraft reaches 78 N (60 S), the aircraft position is computed using XYZ earth centered Cartesian coordinates.
    This allows the FM to provide continuously, regardless of latitude, a MIX IRS position, the FM position being linked to the MIX IRS one.
  - During preflight phase, if TRUE reference is selected (take off with TRUE reference is rare), the pilot is reminded of this selection by :
    - * CHECK NORTH REFERENCE amber message on ND and MCDU scratchpad if the origin airport reference does not match the one selected by the pilot.
    - * TRUE label above PFD/ND heading scales flashes for 10 seconds at slat extension.
    - * TRUE NORTH REF memo message flashes for 10 seconds at engine start or at slat extension.
  - Before approach, the pilot is reminded of the correct TRUE/MAG selection by :
    - * CHECK NORTH REF amber message on ND and MCDU scratchpad if the destination airport reference in data base does not match the one selected by the pilot and the aircraft reaches the arrival area (approximately 25 NM from destination airport).
    - * If true is selected, TRUE label pulses on PFD/ND during 10 seconds at slat extension, as well as the TRUE NORTH REF message on ECAM (as a reminder).
  - The tracks and bearings, provided on the MCDU F.PLN, PROG... pages are computed TRUE or MAG referenced, according to the TRUE/MAG cockpit selection
    - * if selection is TRUE, the bearing and track figures are displayed followed by a T.
  - if the pilot wishes to create a PBD, PB/PB waypoint or define a radial (DIR TO INTCPT), the rule for bearing or radial entry is as follows :
    - * if the bearing is inserted without specifying its reference, the reference is the one corresponding to the cockpit selection
    - * if the bearing is inserted with its specified reference (M for magnetic, T for true), the bearing is so defined : e.g. TOU/350 T/15.

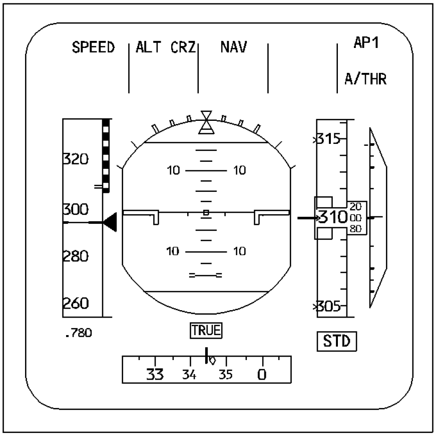
EIS PFD/ND

– **TRUE/MAG reference indication**

The TRUE/MAG reference selection is indicated by a specific label displayed above the heading scales of both EFIS DUs :

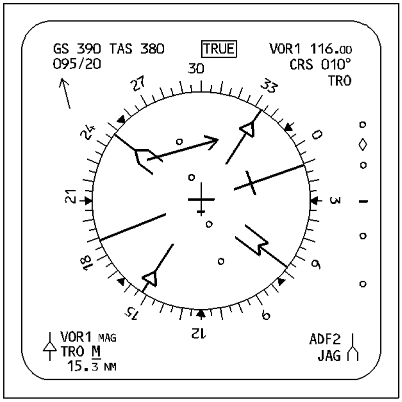
· If MAG is selected (which is the most common situation) no label is provided ; the bearing to the TO waypoint on the ND is displayed with the digits only.

· If true is selected (manually or automatically), a TRUE label is provided above PFD/ND heading scales.



FFC5-04-0440-007-A105AA

PFD : TRUE REFERENCE SELECTED



ND ROSE in ROSE-VOR mode:
TRUE REFERENCE SELECTED

· The GRID TRACK appears on the ND in all modes except in PLAN mode if no approach title is displayed.

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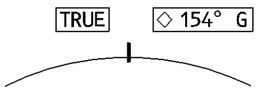

Note : If the ILS scale is displayed on PFD, the TRUE message is shifted on the right side.

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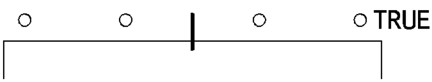
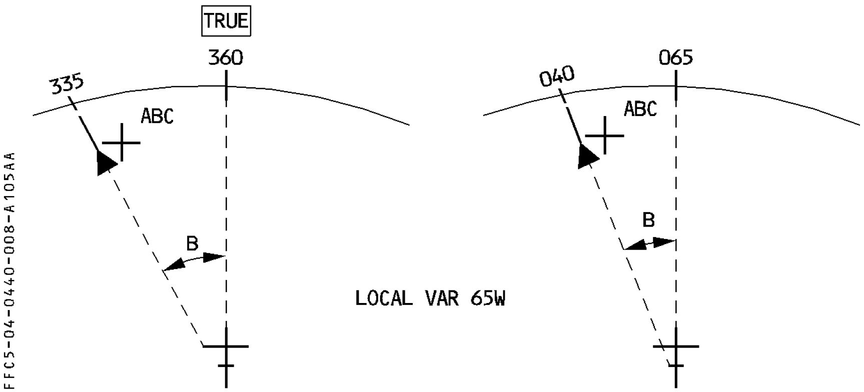


ADF and VOR bearing display

· The ADF needle represents the relative bearing between the aircraft and the NDB. The ADF relative bearing information (B) is thus independant of the TRUE/MAG selection, and the needle is always pointing to the same direction whatever is the selection. Furthermore (provided FM position is accurate) when the EFIS ND is in ARC or ROSE NAV modes, the ADF needle will point towards the NDB symbol as provided by the FMS.



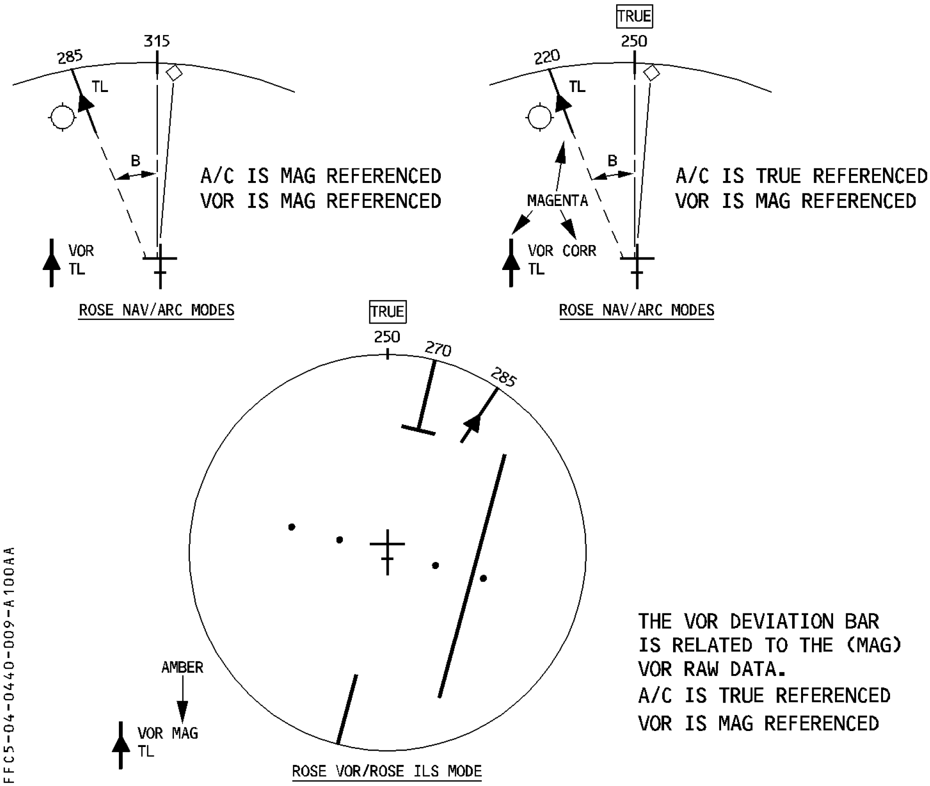
Note : the same reading is available on the DDRMI.

· The VOR bearing is measured by the VOR, at the VOR location :
∗ it is a TRUE bearing if the VOR station is TRUE referenced
∗ it is a MAG bearing if the VOR station is MAG referenced.
When the ND display mode is ARC or ROSENAV, the FM computed data (aircraft position, F-PLN legs, NAVAID position symbol...) are provided along with VOR needles, if selected.
→ it is important in these display modes, that there is a consistency between the FM data and the VOR raw data.
Hence, if the cockpit NORTH REF selection does not match the VOR station reference, there may be a discrepancy between the VOR raw data and the FM data, unless a correction is applied to the VOR data.

Principle

When the ND is in ARC/ROSE NAV mode, if there is a mismatch between the NORTH REF selection and the VOR station reference, the VOR needle is equal to the VOR raw bearing corrected by the local variation at the aircraft present position.
In that case, the needle is displayed in magenta colour, the label CORR (corrected) is displayed in magenta in the lower corner of the ND.
In all other ND display modes (ROSE VOR, ROSE ILS), the VOR raw data (with no correction) is displayed. MAG or TRUE (amber) is displayed next to the VOR identifier when its reference does not match the cockpit selection.

Example :
Local variation 65W – TL is a magnetic referenced VOR.



<table>
<tr><th rowspan="2">VOR transmitter Reference</th><th rowspan="2">ND display MODE</th><th colspan="2">Cockpit Reference Selection</th><th rowspan="2">DDRMI</th></tr>
<tr><th>TRUE</th><th>MAG</th></tr>
<tr><td rowspan="2">TRUE</td><td>ARC/ROSE NAV</td><td>VOR Raw data</td><td>VOR is corrected</td><td rowspan="4">VOR RAW DATA</td></tr>
<tr><td>ROSE VOR/ILS</td><td colspan="2">VOR RAW DATA</td></tr>
<tr><td rowspan="2">MAG</td><td>ARC/ROSE NAV</td><td>VOR is corrected</td><td>VOR Raw Data</td></tr>
<tr><td>ROSE VOR/ILS</td><td colspan="2">VOR RAW DATA</td></tr>
</table>

Note : ND in ROSE VOR/ROSE ILS modes and DDRMI VOR bearing indications are always identical.

DDRMI

R The heading provided by the DDRMI is directly linked to the NORTH REF cockpit selection.
R The VOR bearing indications are raw data, as provided by the station.

PROCEDURES

IRS alignment :

- **When a high latitude flight or polar flight is planned, it is most probably a long range type of a flight.**

  – **DELAY the completion of IRS alignment as long as possible.**

  – **Prior to pressing the ALIGN IRS prompt, SLEW the origin airport reference coordinates to the gate coordinates, if published.**

- **When the origin airport is located between latitude 73°N and 82° (North or South), IRS alignment should last at least 15 minutes. Consequently :**

  – **SET IRS selectors to NAV**

  – **START the STOP WATCH**

R – **ADJUST the origin airport coordinates to the gate coordinates, if published.**

  – **PRESS the ALIGN IRS prompt, after the 15-minute countdown or later.**

  Note : Beyond 82° North or South, no ADIRS alignment is possible.

Flight

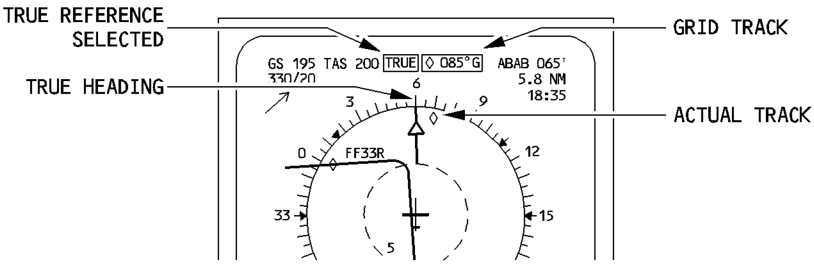
- **Takeoff :**

  – **If the "CHECK NORTH REF" amber message comes up on the ND and MCDU, verify that the NORTH REF selection matches the origin airport reference.**

  Note : The "CHECK NORTH REFERENCE" amber message and the associated alerts are dependant of a correct coding of the airport North reference (TRUE/MAG) in the navigation database. The runway orientation displayed on ND is also affected if the airport North reference is not correctly coded.

- **Cruise :**
  When reaching an area where the heading reference should be changed (oceanic area, airway or polar track defined in TRUE reference ...) ;

  – **SELECT TRUE by pressing the NORTH REF pushbutton.**
  When reaching 65 N with TRUE reference selected, the GRID TRACK is provided on the ND's upper right box. The ND compass still displays true track and heading. GRID TRK along with XTK are the cues to be used to monitor the proper lateral guidance.



If the "SELECT TRUE" message appears on the ND/MCDU, this indicates that the aircraft has reached the Polar zone with MAG reference still selected in the cockpit. Press the NORTH REF pushbutton to select TRUE.

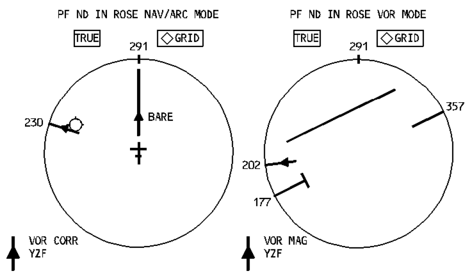
Note : If this is not achieved, an automatic switching will subsequently occur, along with the ECAM "NAV EXTREME LATITUDE" caution. The AP will most probably disengage with associated warnings.
In such a case :
Press the NORTH REF pushbutton to select TRUE.
Re-engage the AP.

– Use of VOR/DME
En route, the VOR/DME are basically used for either FM NAV ACCY crosscheck, or for reporting a given radial to the ATC.
The FM NAV ACCY crosscheck is achieved, as usual, by comparing the bearing/distance that is displayed on the ND, with the bearing/distance that is displayed on the PROG page.
In case the VOR used is defined in another reference (e.g MAG) than the one selected in the cockpit (e.g. TRUE), the bearing that is provided on ND is in magenta and is corrected. The VOR-corrected bearing should be within 5° of the FM-computed bearing (taking into account the meridian convergence and the difference in magnetic variation).
→ In case of doubt, set the NORTH REF to the VOR reference, and check the bearings.

CAUTION

The correction of VOR indications in ROSENAV or ARC ND modes depend on a correct navigation database coding. If the North reference (TRUE/MAG) that is coded for the VOR orientation is not correct, the VOR indication correction will be unduly applied.
If VOR needles are in magenta (CORR), check both the aircraft NORTH REF selection and the VOR station orientation on the navigation charts.

If the aircraft has to report on a given VOR radial, which is defined in a different reference (e.g MAG) from the cockpit reference (e.g. TRUE), check the RADIAL crossing on the PNF ND set to ROSE VOR mode, or use DDRMI. (Ex : The aircraft flies NCA 24): (NCA 24 is the TRUE referenced route). ATC requests the aircraft to report on RADIAL 357 from YZF (MAG-referenced).



FFC5-04-0440-012-A105AA

– Use of ADF
The Polar Zone NDBs are quite powerful, and the bearing can be received at long distances.

– USE these NDBs to check the reasonableness of the FM navigation by comparing the ADF bearing, that is displayed on the ND, with the FM-computed bearing, that is displayed on the PROG page.

– Flying the pole
  · In most cases, the autopilot will be in NAV mode.
  When approaching the pole, a CHECK HDG message appears, with the associated ECAM Procedure.
  * Disregard the ECAM Procedure.
  The message is due to the fact that the IRSs do not reach the pole simultaneously ; thus the headings do not turn simultaneously from 360 to 180°.
  · in case HDG mode is used (e.g FM1 + 2 failed and Back Up Nav is used)
  * the autopilot onside the best IRS is to be engaged.
  The offside HDG bug (▽) should be disregarded when close to the pole since, the IRS headings may differ.
– Approach
  · If CHECK NORTH REF amber message comes up on ND and MCDU, verify that the NORTH REF pusbutton is selected to the destination airport reference.

R *Note : The "CHECK NORTH REFERENCE" amber message and the associated alerts*
R *are dependant of a correct coding of the airport North reference*
R *(TRUE/MAG) in the navigation database. The runway orientation dipslayed*
R *on ND is also affected if the airport North reference is not correctly coded.*

  · If TRUE is selected for approach, only CATI ILS may be flown.

NAVIGATION PROCEDURES WITH FAILURES

LOSS OF ONE IRS

· Consequences
  * 2 IRS/2 FMGCs available
  * MIX IRS position of each FMGC = its onside IRS position
· Limitations
  None

Note : If FMS 1/FMS 2 POS DIFF message comes up, check the IRSs position. If they differ by more than 20 NM prior entry into MNPS area, consider a diversion.

PROCEDURES

– APPLY ECAM procedure (ATT/HDG switching if required)

– DETERMINE the best IRS

– USE the AP associated to the best IRS.

LOSS OF TWO IRSs

· Consequences :
 * 1 IRS/2 FMGC are still available. On navigation system available only
 * No AP/FD/ATHR
 * EFIS display on SINGLE SOURCE
· Limitation
 * If the aircraft is not yet in MNPS area, do not enter.
 * If the aircraft is within MNPS area, continue but advise ATC of navigation degradation.

PROCEDURES

– **APPLY ECAM procedure**

– **FLY the aircraft manually (ALTN LAW – PROT LOST)**
In order to recover EIS display on both sides, select EIS DMS switching to DMC 1(2)
EFIS SINGLE SOURCE message is displayed on PFD

– **SELECT TRK/FPV : adjust FCU TRK target so as to keep XTK = 0.0**
Specifics for Long Range

– **APPLY the normal procedures except those linked to unavailability of NAV mode**

– **When closing up the TO WPT : READ the OUTBND TRK the NEXT WPT**

– **When sequencing the waypoint, SELECT the OUTBND TRK on the FCU, and fly the FPV to the TRK symbol on the horizon.**
Note the TIME – GS – FOB when overhead.

– **ENVISAGE plotting technic on the chart at mid point of the leg.**

LOSS OF ONE MCDU

· Consequences
3 IRSs, 2 FMGCs, 2 MCDUs are still availble

Note : MCDU 3 is not able to achieve the Back Up navigation.

· Limitation
None

PROCEDURE

– **SELECT the failed MCDU off. The MCDU 3 automatically replaces it.**

LOSS OF ONE FMGC

· Consequences
  * 3 IRSs/1 FMGC/2 MCDUs are still available
  * Back up navigation is available on the failed side.
· Limitation
  None

PROCEDURES

– **CHECK BACK UP NAV function is available on the failed side**

– **SELECT MCDU MENU page**

– **PRESS NAV B/UP prompt and check that the F-PLN is displayed on the MCDU and ND**

– **SELECT MCDU MENU page back and deselect the NAV B/UP prompt.**

– **SELECT FM SOURCE switch to BOTH ON 1 or 2 position (ECAM procedure)**

– **SELECT the AP associated to the live FMGC**

– **APPLY normal procedures**

Note : If the FM fails on the master FG side with NAV mode engaged, the AP disengages ; the FD reverts to HDG (TRK) and SPD target reverts from managed to selected. Engage the other AP, NAV mode and SPD managed. Both PFD display the same FD (1FD1 or 2FD2 is displayed).

LOSS OF TWO FMGCs

· Consequences
  * 3(2) IRSs/2 BACKUP NAV still available
  * No AP/FD managed modes
  * No managed target speed or Mach
· Limitation
  * None : there are still two independant navigation systems.

Note : IRS positions must be monitored closely. If they differ by more than 20 NM prior entry into MNPS area, diversion might be envisaged.

PROCEDURES

– **CHECK/SELECT FM SOURCE selector to NORMAL**

- **SELECT NAV B/UP on both MCDU MENU pages**

- **SELECT NAV on both RMPs**

- **SELECT TRK/FPA and try to engage one autopilot in TRK/ALT mode. (If the 2 FGs are available, engage the autopilot onside of the best IR).**

- **SELECT proper speed/Mach target and engage A/THR**

- **REFER to BACK UP NAV operation (Refer to 4.06.10)**

- **Specifics for Long Range : USE TRK mode to keep XTK = 0.0 on the BEST IRS side**

● **When closing the TO WPT :**

  - **READ the OUTBND TRK to the NEXT WPT**

  - **COMPARE backup navigation FPLN distance to the NEXT WPT with the computerized F-PLN**

  - **When sequencing the WPT, SELECT the OUTBND TRK on the FCU and note : Time – GS – FOB when overhead**

  - **ENVISAGE plotting technic on the chart at mid point of the leg.**

<u>FMS 1/2 INDEPENDENT OPERATIONS</u>

· Consequences
  * no crosstalk between both FMGCs : they work independently
  * Any entry on one MCDU must be achieved on the other one
  * No monitoring between both FMGCs
· Limitation
  * None

PROCEDURES

- **APPLY the normal procedures, but all entries have to be duplicated**

- **Both pilots have to MONITOR separately each FMGC (especially in terms of navigation accuracy).**

<u>Note</u> : If the active F-PLN legs are different in both FMGCs, the flight director bars will only be centered on the engaged autopilot side.
If the autopilot is then changed, the aircraft will turn towards the active leg of the other FMGC.

MCDU BACK UP NAVIGATION

GENERAL

The MCDU NAV B/UP allows to link a MCDU to its associated IRS in order to allow the pilot to monitor the navigation and to be provided with some basic flight planning functions in case of FM 1 + 2 failure.

CAUTION

The MCDU NAV B/UP is to be used only in case of FM 1 + 2 failure. It can be selected temporarily in case of FM1 or 2 only failure, in order to ensure that the function is available on the failed side.
When in MCDU NAV B/UP on both sides, one FG at least must be available to engage AP and A/THR.

The MCDU NAV B/UP function provides :
- aircraft position using onside IRS or IRS 3
- F-PLN as memorized in the MCDU
- F-PLN display on ND
- F-PLN automatic sequencing
- AP/FD selected modes, if at least one FG is available
- Limited lateral revisions
- Mag (True) bearing depending on the pilot selection, from aircraft position to the TO WPT and associated distance
- True track between waypoints
- Time estimates computed with current GS from onside IRS
- Total time and distance to destination

The following features are not provided :
- No DATA BASE available :
  - No autotuning, NAVAIDS must be selected on RMP
  - No radio position, no GPS position
  - No EFIS CTL PANEL options
  - No LDG ELEV (must be manually selected on overhead panel)
- No performance data :
  - No CLB/DES/APP NAV/FINAL modes
  - No SPEED MANAGED
  - No automatic SPD/MACH change over
- Most of predictions are lost :
  - No EFOB
  - No XTRA
  - No ETA at DEST
- No multiple lateral F-PLN
- No AF/FD managed modes
- No crosstalk between MCDUs : F-PLN revisions have to be achieved on both MCDUs.

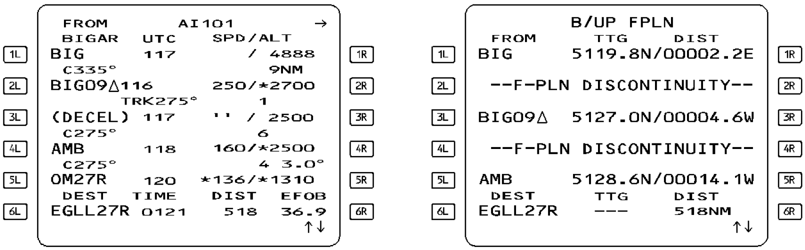
BACK UP NAV SELECTION

FM F-PLN download in MCDU

While BACK UP NAV is not active, the FM downloads permanently a condensed form of the F-PLN in the MCDU.
Downloaded information include :
- waypoint position
- waypoint identifier
- leg type
- discontinuity
- overfly
- turn direction

Heading legs, course to fix legs, ..., computed INTCPT positions, pseudo waypoints, ..., cannot be downloaded.
They are replaced by discontinuities.
Maximum of 150 waypoints are downloaded.

Example of downloaded F-PLN



F-PLN BEFORE FM FAILURE

DOWNLOAD B/UP F-PLN
-CF LEGS ARE PRECEDED BY A DISCONTINUITY
-PSEUDO WPT ARE NOT DOWNLOADED

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In that procedure, all the legs are coded as CF (Course to Fix) legs. This explains all the discontinuities resulting in the B/UP F-PLN.
These discontinuities may be cleared.

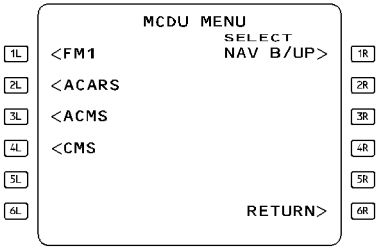
When the second FM fails

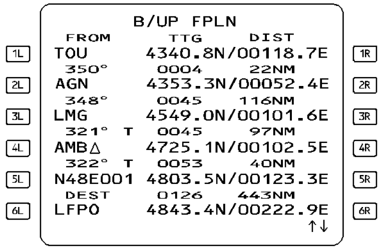
– **REENGAGE and SELECT the required AP and A/THR modes (if disconnected).**

– **SELECT the FM SOURCE SELECTOR to NORM**
MCDU MENU page is automatically displayed.
NAV B/UP prompt appears.

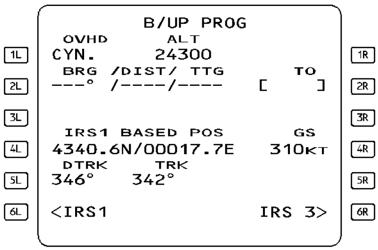
– **SELECT the NAV B/UP prompt on both MCDU.**

– **SELECT NAV on both RMP**
Tune the required navaids

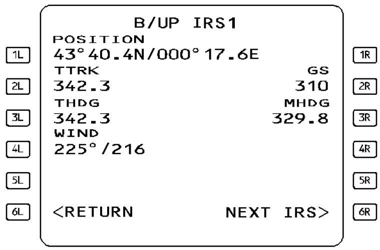




B/UP F-PLN PAGE



B/UP PROG PAGE



B/UP IRS PAGE

FFC5-04-0440-019-A001AA

– Only MCDU MENU
F-PLN key
PROG key
DIR key
– B/UP F-PLN page
B/UP PROG page
B/UP IRS 1, 2, 3 pages are available when BACK UP NAV is selected.

BACK UP NAV OPERATION

AP and A/THR

One FG at least must be available to allow the engagement of AP/FD and A/THR.
All FM managed modes are lost as well as managed speed. As a consequence :
- LAT F-PLN is flown in HDG/TRK modes
- VERT F-PLN is flown in OPEN/V/S/FPA modes
- SPD TARGET is manually SELECTED on the FCU
- SPD/MACH crossover is manually SELECTED on the FCU

It is recommended to use the TRK/FPA modes :
- SELECT the required TRK on FCU at waypoint sequencing (as no AP/FD coupling exists in NAV B/UP). F-PLN sequencing is automatic.
- MONITOR the track of the next leg prior reaching the TO waypoint (track between TO and next waypoints is true track).
- ADJUST the track to follow the F-PLN with X-TRK = 0
- USE OP DES or FPA to descend as suitable.
  FPA allows easy altitudes predictions :
  DNM = $\triangle$(FL)/FPA°

Navigation monitoring

The navigation accuracy check must be achieved periodically using the same principle as with FM navigation :

- **COMPARE computed data with raw data**

- **SELECT ON RMP the applicable navaid**

- **PRESS the [PROG] key**
  B/UP PROG page is displayed

- **WRITE in the scratchpad then ENTER the navaid LAT/LONG**

- **SELECT associated navaid needle on the EFIS control panel.**

- **COMPARE computed BRG/DIST with RAW DATA on ND**

· If the crosscheck is POSITIVE the ND may be used in ROSE NAV/MAP modes with raw data
· If the crosscheck is NEGATIVE the ND must be used in ROSE VOR/ROSE ILS modes.

Note : B/UP IRS pages may also be used to check the position.

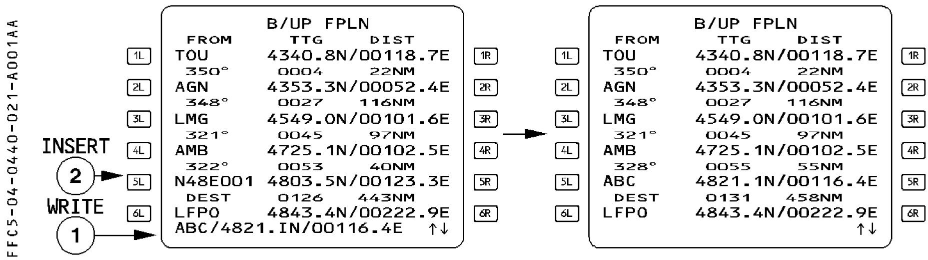
Flight Planning

The following revisions may be achieved :
- WPT insertion/deletion
- OVERFLY insertion/deletion
- DIR TO a waypoint
- CLR waypoints/discontinuities

Waypoint identifiers are either published waypoint identifiers if present in the MCDU active F-PLN, or coded LAT/LONG identifiers resulting from pilot entries.
All flight planning functions are directly applied on active F-PLN without LAT REV page.

Waypoint insertion

Waypoint insertion into the F-PLN is performed via the B/UP F-PLN page by selecting the line key adjacent to the desired point of insertion, whenever a pre-existing waypoint identifier or valid IDENT/LAT/LONG or LAT/LONG entry is displayed in the scrathpad.
Any waypoint entry which causes the number of legs in the route to exceed the maximum allowed results in the "F-PLN FULL" message.



Note : · If the inserted waypoint is entered only with LAT/LONG, its identifier would be : N48E001
· If the pilot writes a waypoint IDENT/LAT/LONG with an ident already used in the F-PLN, a message "NOT ALLOWED" is displayed.

Waypoint deletion

Waypoint and discontinuity may be deleted from the B/UP F-PLN page by using the CLR key.

Overfly insertion/deletion

Same as for the FM F-PLN.

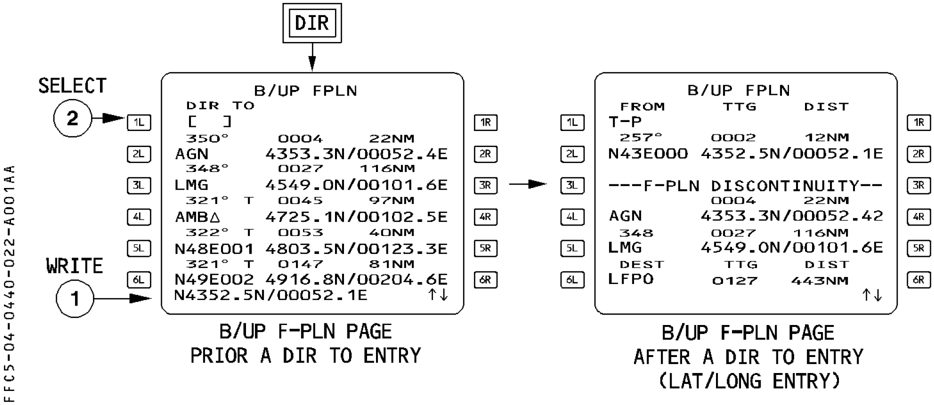
DIRECT TO a waypoint

The DIR TO function operates as for the normal F-PLN, except that RADIAL INTERCEPT and ABEAM functions are not available.

– **PRESS the DIR key.**

– **WRITE LAT/LONG (or IDENT/LAT/LONG) in scratchpad then INSERT in [1L].**

– **SELECT the proper track on FCU to have the aircraft turn towards the new TO waypoint.**



B/UP F-PLN PAGE
PRIOR A DIR TO ENTRY

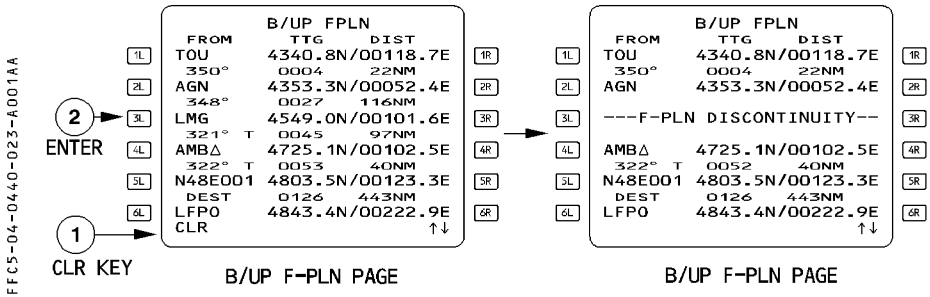
B/UP F-PLN PAGE
AFTER A DIR TO ENTRY
(LAT/LONG ENTRY)

In this example, the entered DIR TO waypoint is a LAT/LONG.
As this new waypoint is not identical to any waypoint in the F-PLN, a direct leg to that waypoint is created and followed by a discontinuity.
When the DIR TO function is completed, the B/UP F-PLN page is displayed with the DIR TO waypoint as the TO waypoint and T-P as the from waypoint.
In case of DIR TO is achieved to a waypoint belonging to the B/UP F/PLN, no F-PLN discontinuity is created.

<u>Note</u> : – *In case of DIR TO a waypoint associated with an OVERFLY condition, the OVERFLY is retained.*

CLR waypoint/discontinuity

CLR as for normal operation.



Approaches

– ND display selection rule
  As per normal operation, it depends upon the result of NAV ACCY CROSS CHECK. Furthermore it depends also whether the F–PLN is complete, including the approach.

F-PLN	NAV ACCY CHECK	ND	
		PF	PNF
Complete with appropriate approach	Positive	ARC or ROSE NAV Ref navaid Raw data	
	Negative	ROSE VOR/ILS	ARC or ROSE NAV or ROSE VOR/ILS Ref Navaid Raw Data
Incomplete	Positive or Negative	ROSE VOR/ILS	

End of descent

– **ADJUST manually the landing elevation on the overhead panel.**

– **SET the MDA on the standby altimeter.**

Non ILS approaches

– **SELECT on RMP the approach reference navaids.**
The autopilot and flight director available modes are TRK-FPA and HDG/VS
The autothrust available speed target is selected speed.

ILS approaches

Only CAT 1 approaches may be flown since the DH indication is not available.

– **CHECK the ILS frequency and course on the RMP.**

– **PUSH the LS pushbutton on the EIS control panel.**
The autopilot and flight director available modes are APP (LOC – G/S – LAND)
The autothrottle available speed target is selected speed

– **CHECK VAPP in the QRH.**

FLIGHT PLAN INITIALIZATION THROUGH ACARS OR ATSU

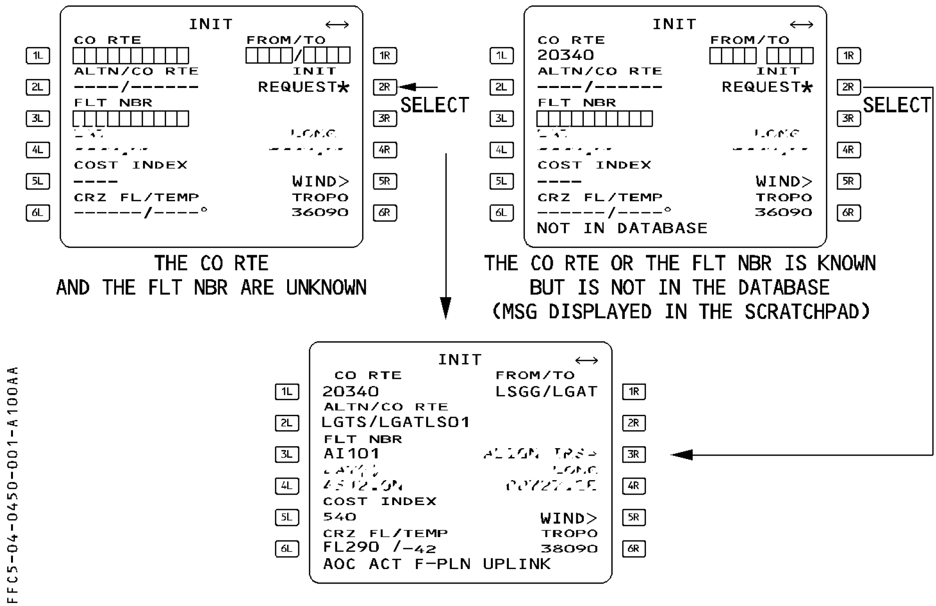
REQUEST FOR ACTIVE FLIGHT PLAN INITIALIZATION BEFORE ENGINE START

Before engine start, the flight crew may request a route for the active flight plan. When the
R route is received, “AOC ACT F-PLN UPLINK” message is displayed on the MCDU indicating that the flight plan has been received and automatically inserted.
After engine start, it is not possible to initialize directly the active flight plan since the received flight plan is automatically routed into the secondary, and the MDCU displays
R “AOC SEC F-PLN UPLINK”.

PROCEDURE

– **PRESS the INIT REQUEST * prompt.**
  – The star (*) disappears, and dashes appear in all the data fields except :
    · CO RTE, FLT NBR if previously displayed and
    · Fields with default values.

  The star is not displayed when the FMGS cannot communicate with the ACARS. No request can be sent.
  When an active flight plan exists, the INIT REQUEST prompt is removed from the active INIT page and no request can be sent for the active flight plan. If a flight plan is entered manually after the request, the uplink message is routed to the secondary flight plan.
R

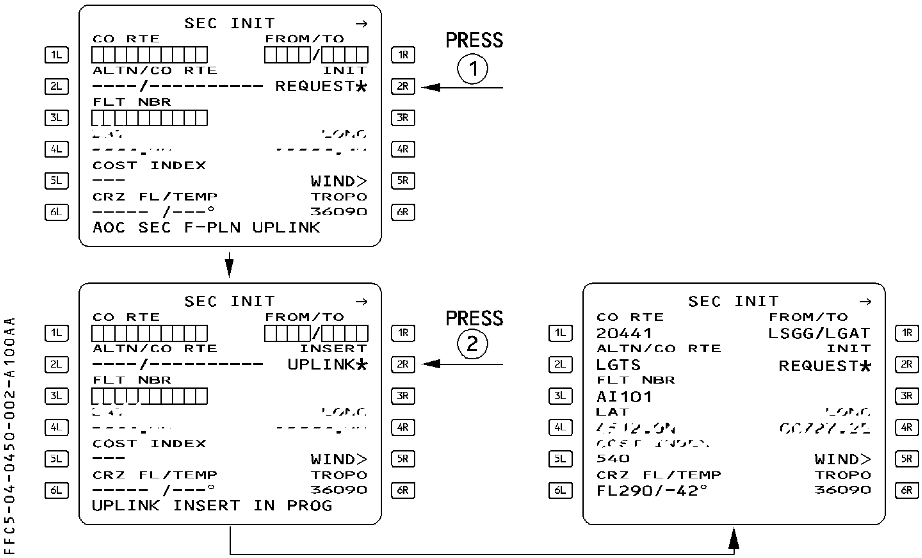


REQUEST FOR SECONDARY FLIGHT PLAN

A request for a secondary flight plan can be initiated anytime. Any flight plan received after engine start is automatically routed into the secondary flight plan.
When the flight plan is received, a message “AOC SEC F-PLN UPLINK” is displayed on the MCDU scratchpad.
R Before engine start, and if the SEC F-PLN is empty, any uplinked flight plan is automatically
R inserted into the secondary flight plan, and no flight crew action is required.
R After engine start, or if the SEC F-PLN is not empty, the flight crew must manually insert
R the uplinked flight plan via the INSERT UPLINK prompt.

PROCEDURE TO INSERT OR REJECT A SECONDARY FLIGHT PLAN

When the uplink message is received, the INIT REQUEST prompt of the INIT A page is replaced by INSERT UPLINK (2R field). Pressing the 2R key will insert the flight plan into the secondary one. Clearing the prompt will reject it.
If a temporary flight plan or a DIR TO is in progress, the uplink insertion is not accepted until the temporary flight plan or the DIR TO is completed.



TAKEOFF DATA

The takeoff data may be requested in the preflight or done phase for the active flight plan only. It is always associated with the active flight plan message.

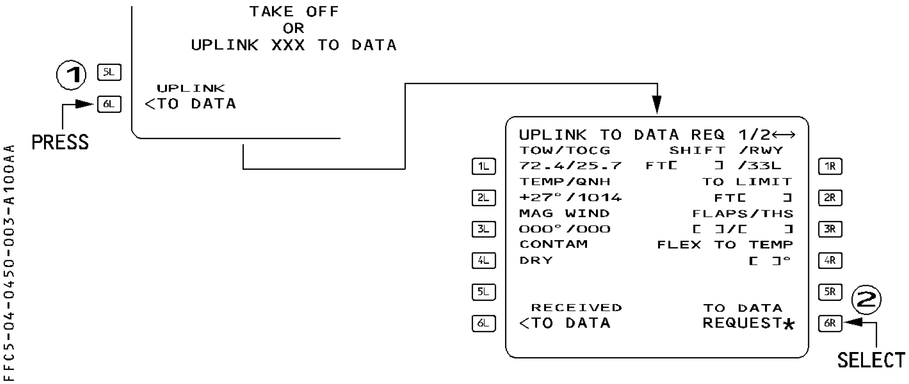
REQUEST FOR TAKEOFF DATA

In order to obtain takeoff data from the ground station :

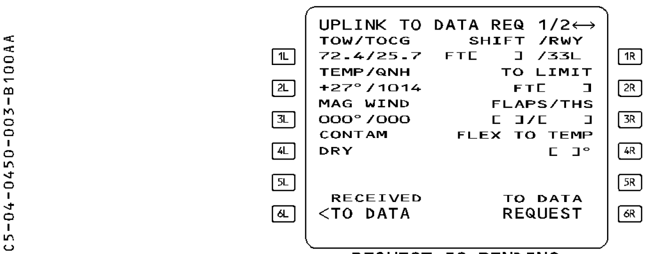
– **SELECT the PERF TAKEOFF page or UPLINK XX TO DATA page.**

– **PRESS the [6L] key.**

– **SEND the request by pressing the "TO DATA REQUEST" [6R] key.**



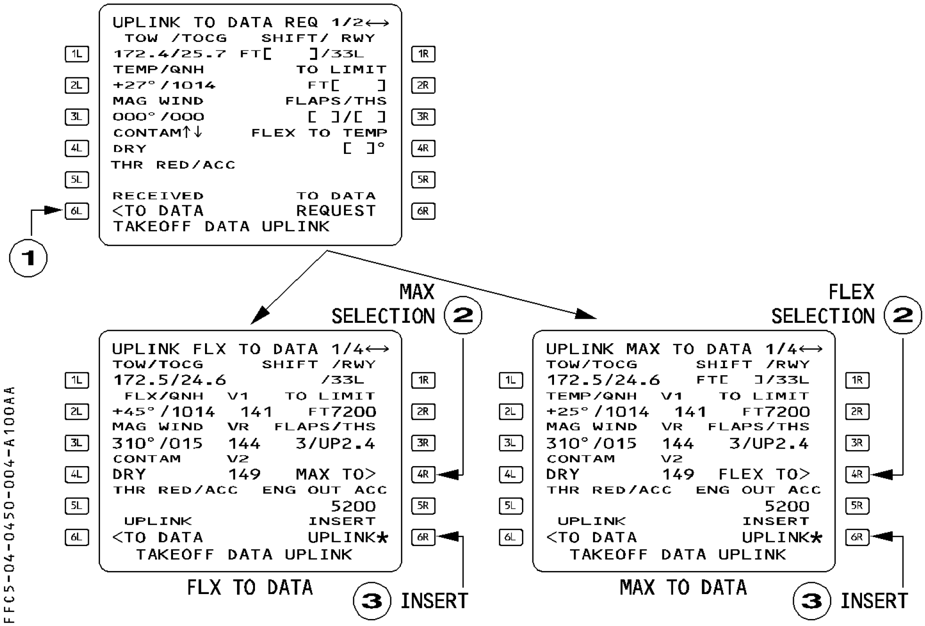
When TO DATA REQUEST is sent, data of the TO DATA REQ page are locked in and the
R
star displayed in the 6R field is removed.



REQUEST IS PENDING

PROCEDURE TO INSERT OR DELETE UPLINK TAKEOFF DATA

- **PRESS the 6L key “RECEIVED TO DATA” when the message TAKEOFF DATA UPLINK is displayed.**



This displays the uplink data on 2 different pages : UPLINK MAX TO DATA
UPLINK FLX TO DATA

- **SELECT the data corresponding to the thrust to be used (MAX or FLEX or DERATED) by pressing [4R]**

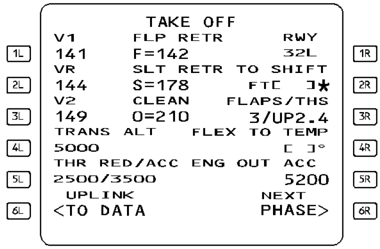
- **SELECT the active runway data by slewing the pages (1/4... 4/4).**

- **PRESS the [6R] key “INSERT UPLINK”**

UPLINK MAX TO DATA, UPLINK FLX TO DATA and UPLINK DERATED TO DATA pages are not modifiable.

R If the takeoff data displayed on this page are not relevant to the active runway entered in
R the flight plan, the INSERT UPLINK prompt is not displayed.

When the takeoff data have been inserted, the PERF TO page is amended of the new data.



FFC5-04-0450-005-A102AA

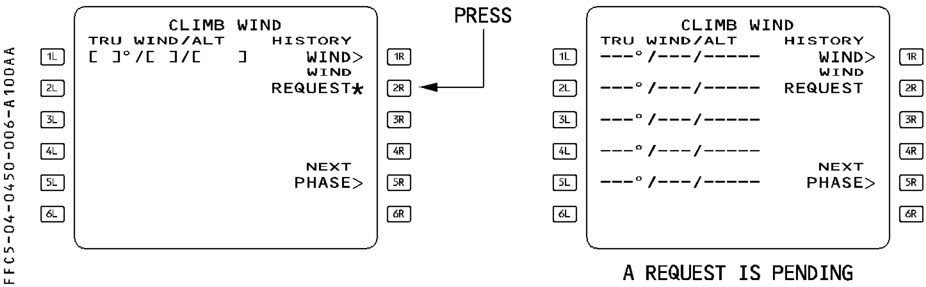
WIND DATA

REQUEST FOR WIND DATA

To send a wind request, press the “WIND REQUEST” selection key on any of the wind pages. This request is automatically sent to the ground for one or more flight phases and for the selected flight plan (primary or secondary). The content of the wind request message is not dependent on the selected wind page (CLIMB, CRUISE or DESCENT) but on the flight phase in progress.

- For the active flight plan or the secondary flight plan that is a “COPY ACTIVE”, a wind request sent by the flight crew :
  - · During the preflight or takeoff phase, initiates a demand for climb, cruise, descent and alternate winds.
  - · During the climb and cruise phase, initiates a demand for cruise, descent and alternate winds.
  - · During descent/approach and go around, no wind request is possible.
- For a secondary flight plan that is not a “COPY ACTIVE” there is no restriction linked to flight phase.

R For both the active and secondary flight plan :
R Before engine start, and if data has not been entered in any WIND page for the flight plan,
R the uplinked wind data is automatically inserted into the flight plan, and no flight crew
R action is required.
R If the uplinked wind message is received after engine start, or if data has been entered in
R any WIND page of the flight plan, the flight crew must manually insert the uplinked wind
R data via the INSERT UPLINK prompt.

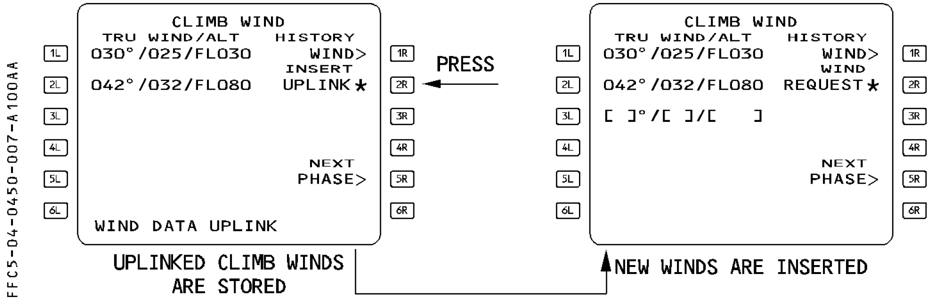


A REQUEST IS PENDING

When the amber star following the “WIND REQUEST” is not displayed, the FM is not able to communicate with the ACARS and the flight crew cannot send any request. When a temporary flight plan is active or a DIR TO is selected, an uplink message cannot be displayed and the “WIND UPLINK PENDING” scratchpad message remains displayed until the action is completed.

PROCEDURE TO INSERT WIND DATA

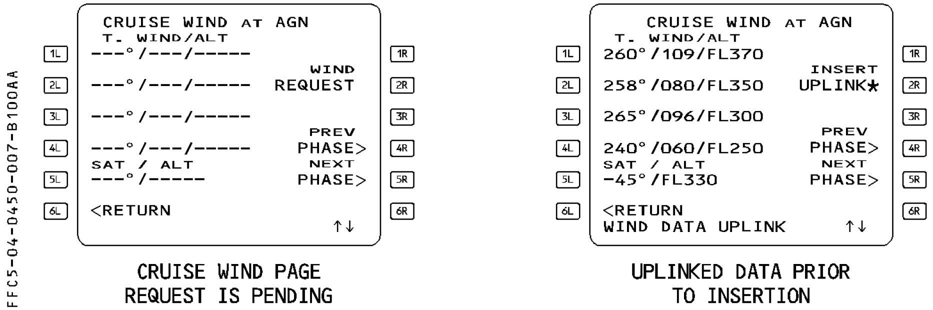
When the uplink message is received, the 2R field is modified, the amber “WIND REQUEST” is replaced by the blue “INSERT UPLINK*”. This prompt, when pressed, enables the flight crew to insert the uplink wind data, phase by phase.
To access, review, insert or delete the uplink wind data of other phases, the flight crew uses the “NEXT PHASE” or “PREV PHASE” key.
If the flight crew is not satisfied with the uplink winds, the flight crew will delete the winds, phase by phase clearing the “INSERT UPLINK” prompt. This will delete all the uplinked winds of the selected flight phase.



CLIMB WIND page

When a request is pending, the HISTORY WIND page cannot be accessed.
When the climb phase is active, the flight crew cannot request or modify the climb winds of the active flight plan, or the secondary flight plan if it is a “COPY ACTIVE”.

CRUISE WIND page



A wind request sent during the cruise phase will apply to downpath waypoints of the cruise, descent, approach and alternate phases.

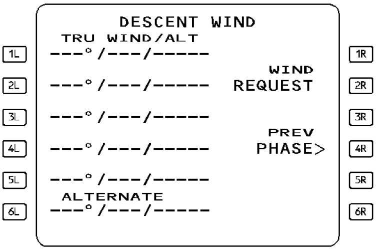
- If the uplink message contains more data and waypoints than the flight plan, the winds at extra waypoints are not considered and are automatically discarded. This is transparent to the flight crew.
- Clearing the INSERT UPLINK* prompt deletes all uplink wind data of the CRUISE phase. The CRUISE page reverts to the previous data.

Note : *During cruise, whenever uplink wind data is received and not inserted or cancelled CRUISE WIND page, access to the DIR TO function is not posssible. The "WIND UPLINK EXISTS" message is displayed on the MCDU scratchpad.*
Insert or cancel the uplinked wind message first and then access the DIR TO function.

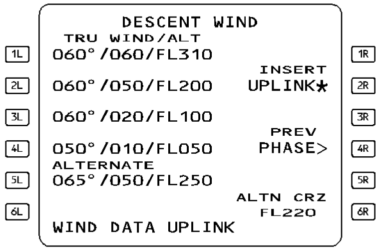
DESCENT WIND page

The procedures to insert, review or delete descent winds during the preflight, climb or cruise phase are described in the above wind general procedure.
In the descent, approach or go around phases, the flight crew cannot request or modify the descent winds of the active flight plan, or the secondary flight plan, if it is a "COPY ACTIVE".

FFC5-04-0450-008-A100AA



DESCENT WIND PAGE
REQUEST IS PENDING



UPLINKED DATA
PRIOR TO INSERTION

If the alternate wind is not available, dashes are displayed in the field.

PRINT FUNCTION

The PRINT function allows various reports to be printed either automatically (when linked to ACARS or ATSU ◁) or manually.
The manual PRINT function allows printing of FM-generated flight reports and additional data.

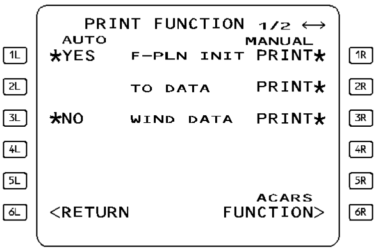
F-PLN	INITialization data
T.O.	Data
WIND	Data
PREFLIGHT	REPORT
IN FLIGHT	REPORT
POSTFLIGHT	REPORT

A detailed description of the PRINT FUNCTION pages is provided in 4.03.20
The print function is available if ACARS or ATSU (◁) are available or not.
The various flight reports contain most of the prediction information required by the flight crew to monitor the progress of the flight. The resulting documents can therefore be used as realistic master documents, based on the latest data provided by the flight crew to the computer in terms of ATC clearances and weather information.

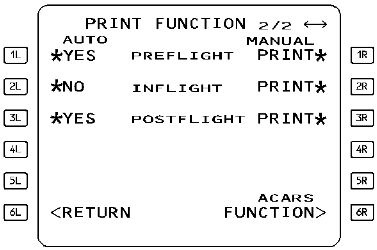
PRINT FUNCTION ACCESS

The PRINT FUNCTION page is accessed :
– From the DATA INDEX A PAGE, or
– From the ACARS FUNCTION page (if ACARS is installed).

FFC5-04-0460-001-A100AA



PRINT FUNCTION PAGE 1



PRINT FUNCTION PAGE 2

Note : For automatic printing, "time" is the time of the reception of the message. For manual printing, "time" is the time of the print request.

ON GROUND BEFORE ENGINE START

When the overall F-PLN data (lateral, vertical including winds, steps, constraints) and the ZFW and ZFWCG values have been inserted :

– **SELECT the FUEL PLANNING prompt [3R]**

● **If the computed BLOCK fuel does not correspond to the actual block fuel required for the flight :**

– **ENTER the actual block fuel required for the flight in the [2R] field**

– **PRINT the PREFLIGHT REPORT**
The flight crew may then use the PREFLIGHT report to monitor the progress of the flight.

Note : *Before printing the PREFLIGHT report, the flight crew must check that the F-PLN is complete (all F-PLN discontinuities must be cleared) and that all the F-PLN elements (including winds, steps, constraints, alternate airport) have been inserted, in order to obtain an accurate PREFLIGHT report.*

EXAMPLE

FM PREFLIGHT REPORT

DATE : 07 MAR 94
TIME : 07 : 24

A/C TYPE	: A330-300	DATABASE	: AB49402001
ENG TYPE	: CF6-80E1A2	CYCLE	: 03 FEB-03 MAR
FLT NUMBER	: V7	FROM/TO	: EINN/LFBO
CO RTE	:	ALTN	: LFBP
ALTN CO RTE	:		
PERF FACTOR	: +0.0	COST INDEX	: 100
IDLE FACTOR	: +0.0		

CRUISE FL/STEP START WPT

CRZ FL 1 : FL410

FLIGHT PLAN DATA

	DIST	TIME	CRZ FL	
DEST-LFBO	: 714	01:32	FL410	
ALTN-LFBP	: 80	01:52	FL220	
DEP RWY	: 24		ARV PRC	: . . . .
DEP PRC	:		APR PRC	: . . . .
			ARV RWY	: . . . .

WPT	TIME	SPD/ALT	FOB	T. WIND	TAS	SAT	CRS	DIST
PREDICTED VALUES								
EINN24	00:00	133/-0095	21.4	TL/040	-	+11	183	0
1520	00:00	159/01574	21.2	TL/040	163	+12	240	2
SHA	00:02	190/07098	20.8	TL/040	211	+01	059	3
CRK	00:10	295/29936	19.1	TL/040	459	-44	173	55
TIVLI	00:16	.82/39794	18.4	TL/040	467	-57	140	50
LND	00:27	.84/40998	17.4	TL/040	482	-57	140	99
NAKID	00:33	.84/40998	17.0	TL/040	482	-57	130	46
LIZAD	00:34	.84/40998	16.9	TL/040	482	-57	129	14
BALOT	00:38	.84/40998	16.6	TL/040	482	-57	130	37
BERAT	00:41	.84/40998	16.4	TL/040	482	-57	129	23
DIN	00:46	.84/40998	16.0	TL/040	482	-57	128	47
NTS	00:56	.84/40998	15.2	TL/040	482	-57	173	88
MINEL	01:02	.84/40998	14.8	TL/040	482	-57	153	46
VENAR	01:05	.84/40998	14.6	TL/040	482	-57	152	25
CGC	01:08	.84/40998	14.3	TL/040	482	-57	153	34
VELIN	01:14	320/28310	14.2	TL/040	482	-41	158	45
AGN	01:25	250/06506	14.0	TL/040	274	+02	157	72
LFBO	01:32	128/00550	13.7	TL/040	129	+14	001	27

FUEL PREDICTIONS

TAXI :	0.6	ZFWCG	: 20.0 %
TRIP (DEST) :	7.7	ZFW	: 113.0
RSV :	0.4	TOW	: 134.4
ALTN :	1.9	LW	: 126.7
FINAL :	1.9	CG	: —.-
EXTRA :	9.6		
BLOCK :	22.0		

MISC PERF DATA

TROPOPAUSE :	36090
CLB TRANS :	5000
CRZ TEMP :	-60

IN FLIGHT

When the aircraft has reached the CRZ FL, and when all the latest ATC clearances have been inserted in the FM, and when all the WINDS/STEPS have been properly updated :

- **ACCESS to the PRINT FUNCTION page**

- **PRINT the INFLIGHT REPORT**
  The inflight report provides the list of all the overflown F-PLN waypoints (HISTORY VALUES) with their associated data (Time, Alt, Fuel, ...), and the predictions to all the downpath waypoints (PREDICTED VALUES).
  This new document replaces the PREFLIGHT report, since it carries all the latest expected F-PLN changes. It is the new applicable master document used to monitor the progress of the flight.
  The inflight report will be printed after each important F-PLN modification.

  Note : If the selected Fuel Unit option is pounds, the HISTORY FOB values may be incorrectly printed in tons on the INFLIGHT REPORT. The CURRENT and PREDICTED FOB values, however, are correctly printed in pounds.

EXAMPLE

R

FM INFLIGHT REPORT

DATE : 24 OCT 06
TIME : 09 : 24

A/C TYPE	: A330-300	DATABASE	: AB49402001
ENG TYPE	: CF6-80E1A2	CYCLE	: 29 SEP–26 OCT
FLT NUMBER	: AIB 102	FROM/TO	: LFBO/EINN
CO RTE	:	ALTN	: EIDW
ALTN CO RTE	:		
PERF FACTOR	: +1.5	COST INDEX	: 90
IDLE FACTOR	: +0.0		

CRUISE FL/STEP START WPT
CRZ FL 1 : FL390
FLIGHT PLAN DATA

	DIST	TIME	CRZ FL	
DEST-EINN	: 730	10:24	FL390	
ALTN-EIDW	: 106	10:50	FL220	
DEP RWY	: 14R		ARV PRC	: . . . .
DEP PRC	: LMG3A		APR PRC	: . . . .
			ARV RWY	: . . . .

WPT	TIME	SPD/ALT	FOB	T. WIND	TAS	SAT	CRS	DIST
HISTORY VALUES								
LFB014R	08:29	126/536	21.6	HD/070	-	+12	142	0
1000	08:30	141/982	21.2	056'/003	141	+10	143	2
CURRENT POSITION : N43-37.9/E001-22.0								
	08:32	252/FL63	18.8	HD/070	297	-11	350	10
PREDICTED VALUES								
OSKAM	08:34	320/FL130	18.4	HD/070	387	-11	350	14
LMG	08:52	.84/FL390	18.2	HD/070	482	-57	359	119
VERAC	08:59	.84/FL390	18.0	HD/070	482	-57	310	48
MAIXE	09:01	.84/FL390	17.9	HD/070	482	-57	310	18
NTS	09:11	.84/FL390	16.2	HD/070	482	-57	310	70
DIN	09:24	.84/FL390	15.7	HD/070	482	-57	352	88
BERAT	09:31	.84/FL390	15.2	HD/070	482	-57	309	47
BALOT	09:34	.84/FL390	14.6	HD/070	482	-57	309	23
LIZAD	09:40	.84/FL390	14.3	HD/070	482	-57	310	37
NAKID	09:42	.84/FL390	14.1	HD/070	482	-57	309	14
LND	09:48	.84/FL390	13.6	HD/070	482	-57	309	46
TIVLI	10:03	.84/FL390	13.1	HD/070	482	-57	322	99
CRK	10:10	320/FL170	12.9	HD/070	407	-19	319	50
SHA	10:23	128/900	12.2	HD/070	130	+13	353	55
EINN	10:24	128/100	12.2	HD/070	128	+15	001	2

FUEL INFORMATION AT 08:32

WEIGHT	CG	FOB	RSV/RSW	FINAL	EXTRA
206.5	37.3%	18.8	0.4/5.0%	3.1	2.8

Note : *In case of a major failure such as an engine out, a new print will be done when time permits.*

REACHING THE GATE AFTER LANDING

The POSTFLIGHT REPORT gives a complete list of all the overflown waypoints during the flight (HISTORY VALUES).
Furthermore it provides :
– FUEL/TIME summary
– IRS Drift and G/S
When at the gate, after engine shutdown :
– ACCESS the PRINT FUNCTION page
– PRINT the POST FLIGHT REPORT

Note : If the selected Fuel Unit option is pounds, the HISTORY FOB values may be incorrectly printed in tons on the POSTFLIGHT REPORT.

EXAMPLE

R

FM POSTFLIGHT REPORT — DATE : 24 OCT 06 — TIME : 12 : 05

A/C TYPE	: A330-300	DATABASE	: AB49402001
ENG TYPE	: CF6-80E1A2	CYCLE	: 29 SEP-26 OCT
FLT NUMBER	: AIB 102	FROM/TO	: EINN/LFBO
CO RTE	:	ALTN	: LFBP
ALTN CO RTE	:		
PERF FACTOR	: +1.5	COST INDEX	: 90
IDLE FACTOR	: +0.0		

FLIGHT PLAN DATA

	DIST	TIME	CRZ FL	
DEST-LFBO	: —	11:52	FL—	
ALTN/——	: —	—:—	FL—	
DEP RWY	: 06		ARV PRC	: AGN2T
DEP PRC	:		APR PRC	: VOR32L
			ARV RWY	: 32L

WPT	TIME	SPD/ALT	FOB	T. WIND	TAS	SAT	CRS	DIST
HISTORY VALUES								
EINN06	10:17	134/44	27.5	043/005	-	+11	053	0
1550	10:18	163/1536	27.5	235'/019	165	+08	050	2
SHA	10:18	161/1691	27.4	236'/019	163	+08	049	0
ABCRK	10:27	305/FL280	24.9	295'/049	459	-41	149	53
TIVLI	10:33	.80/FL330	23.3	298'/057	448	-64	143	46
LND	10:44	.84/FL330	22.5	320'/034	477	-61	129	111
ABLIZAD	10:51	.84/FL330	21.2	326'/034	474	-61	141	47
ABBERAT	10:58	.84/FL330	19.4	313'/029	480	-59	141	21
ABOIN	11:03	.84/FL330	19.2	326'/030	479	-60	142	44
ABNTS	11:13	.85/FL330	19.0	330'/034	481	-60	142	126
ABVENAR	11:21	.84/FL330	17.2	335'/028	479	-60	143	24
CGC	11:25	.84/FL330	16.7	339'/031	476	-61	150	33
VELIN	11:31	.84/FL330	16.2	352'/028	476	-60	154	45
AGN	11:40	312/FL220	15.6	050'/024	429	-26	149	72
SOTAK	11:40	321/FL190	15.3	052'/025	425	-20	141	5
D191K	11:44	253/FL190	15.1	347'/015	288	+00	137	24
D165R	11:46	253/4360	14.6	309'/014	265	+04	103	11
CD32L	11:49	175/2967	13.9	293'/009	180	+05	322	5
FD32L	11:50	132/1609	13.2	308'007	132	+08	323	4
LFB 032L	11:52	132/674	13.2	326'/006	131	+11	321	3

FUEL AND TIME SUMMARY

START UP	SHUT DOWN	
FUEL : 27.8	FUEL	: 13.2
WEIGHT : 190.6	WEIGHT	: 176.0
TIME : 10.09	TIME	: 12:01
TO TIME : —.-	LDG TIME	: 11:52

IRS DATA AT : LFB032L

	IRS 1	IRS2	IRS 3
AVERAGE DRIFT	- 00.3 NM/H	00.4 NM/H	00.3 NM/H
RESIDUAL GND SPD	- 01.0 KTS	03.0 KTS	01.0 KTS

05.00 CONTENTS

05.60 DESCENT

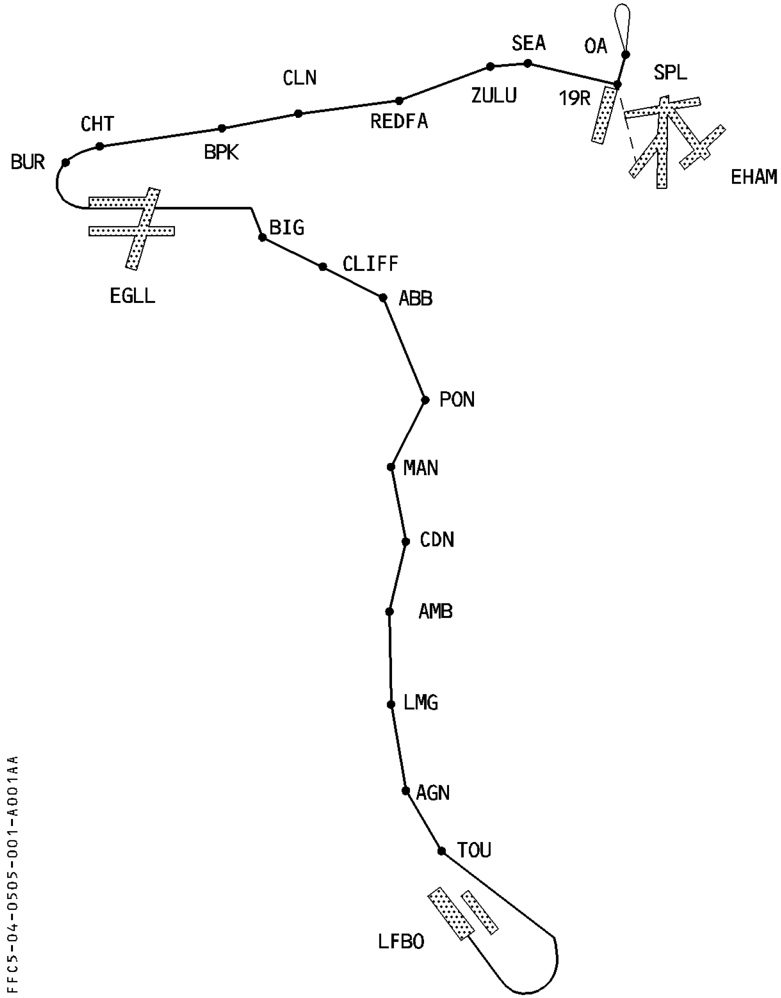
05.70 APPROACH

05.80 GO AROUND

INTRODUCTION

Note : This chapter is an amplification of the SOP. Anytime it was feasible, the same chapters and the same titles of paragraph were retained.

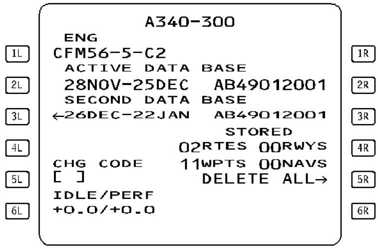
The following discussion of the FMGS uses this flight plan as an example.



FMGS INITIALIZATION

CHECKING THE CLOCK DATE

– **CHECK the CLOCK DATE and ADJUST if necessary.**
If the date in the active database does not match the clock date, the MCDU displays "CHECK DATA BASE CYCLE". If this message appears, check the period of validity in the second database and select it, if required.



FFC5-04-0510-001-A001AA

CAUTION
Cycling the database deletes the active and secondary flight plans. Do not cycle it while airborne because doing so will delete the flight plan, eliminate all speed predictions, and blank the ND. If the aircraft is in managed speed, Green Dot becomes the speed target.

CHECKING stored WAYPOINTS, NAVAIDS, RUNWAYS, or ROUTES

– **PRESS the DATA key.**

– **PRESS the next page key [→] .**

– **SELECT, successively, as required :**
· STORED WAYPOINT
· STORED NAVAIDS
· STORED RUNWAYS
· STORED ROUTES

– **CHECK the contents of each of these data storages and DELETE items, as appropriate.**

NAVAIDS DESELECTION

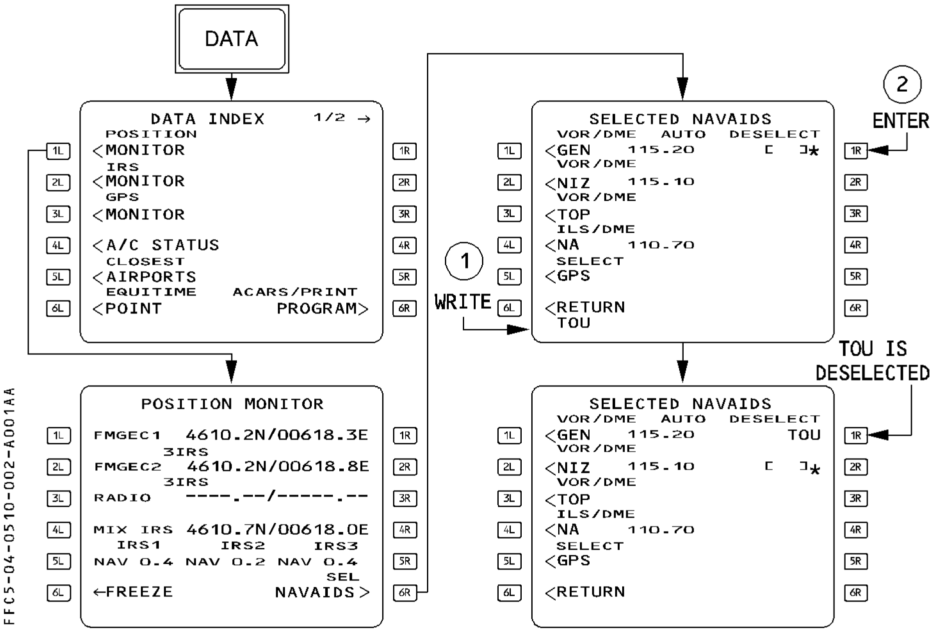
If NOTAMS indicate that selected navaids are unreliable or unserviceable, deselect them as follows :

– **PRESS the DATA key**

– **SELECT THE POSITION MONITOR page**

– **SELECT the SELECTED NAVAIDS page**

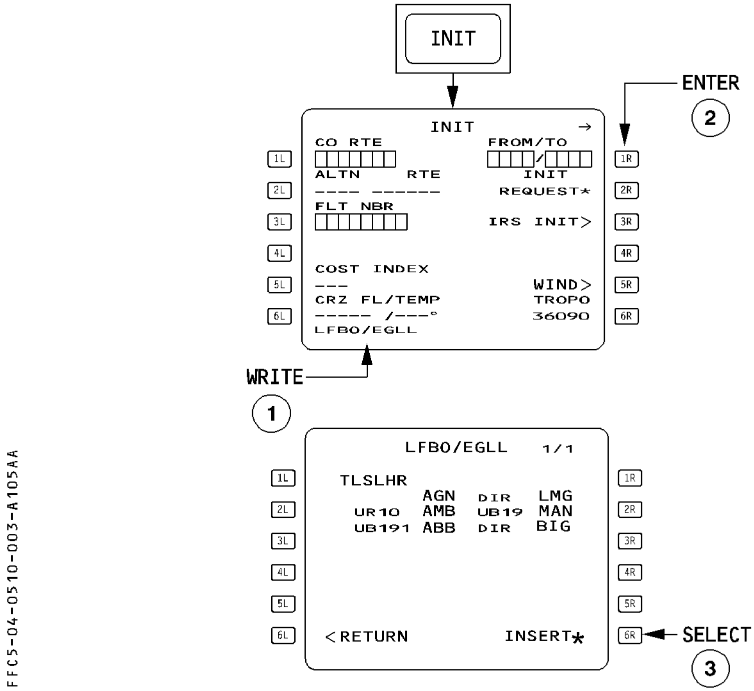
– **Under "DESELECT", INSERT the navaid identifier into the brackets.**
The pilot can make only six deselections.



FLIGHT PLAN INITIALIZATION

– Follow SOP instructions, when the route is a company route stored in the database.

● **If the company route is unknown, proceed as follows :**



– **WRITE a "FROM/TO" city pair, and ENTER it :**
If one or more company routes run between the cities, the ROUTE SELECTION page appears and defines them.

– **INSERT the preferred company route.**

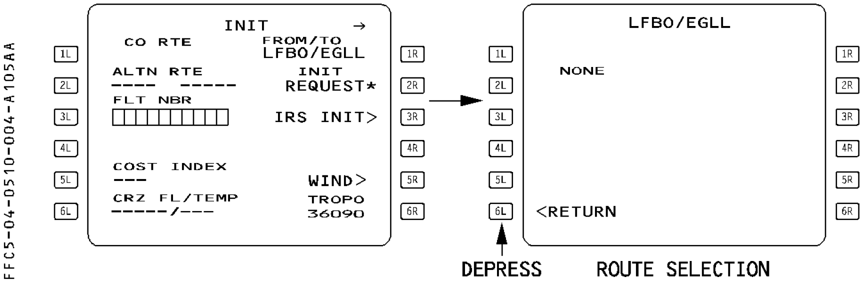
- **If the database does not contain a company route :**
  The flight plan will be constructed manually :

  – **PRESS the INIT key.**

  – **ENTER a city pair in the FROM/TO field.**
  The ROUTE SELECTION page comes up with "NONE".

  – **SELECT RETURN [6L] key, then construct the flight plan manually.**

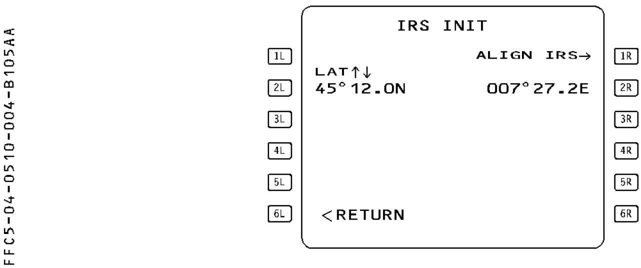
R



If waypoints, navaids or airports are not in the nav database, the pilot must define and store them manually, using the data "stored" function.

ALIGNING IRS

· The pilot can enter the latitude with N or S preceding or following the value (for example, N4350.5 or 4350.5N), and the longitude with E or W preceding or following the value (for example, E00364.5 or 364.5E, W11020.3 or 11020.3W).
Leading zeros may be omitted.

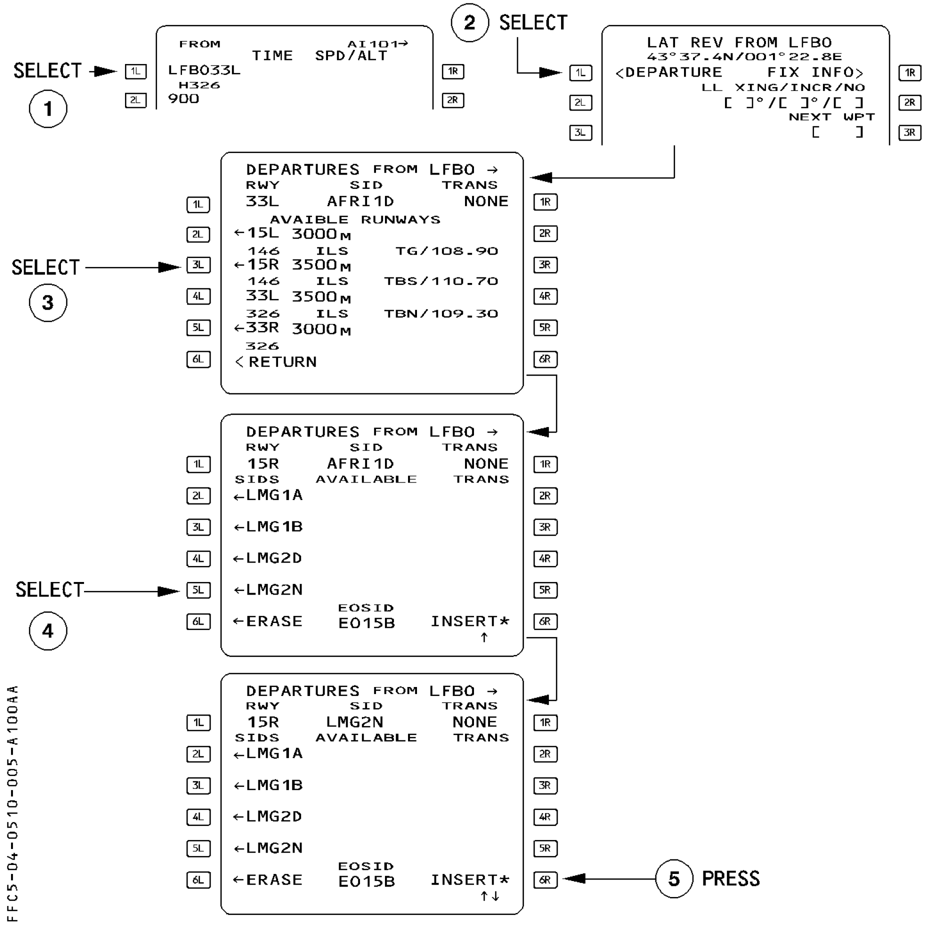


· If the airport reference point is modified after the completion of the alignment, the MCDU displays the "RESET IRS TO NAV" message. During a stopover, it should be considered as a reminder for a quick realignment.

- **If the "RESET IRS TO NAV" message comes up later :**
  - Check the latitude and longitude, shown on the IRS INIT page, against the position of the IRSs in NAV MODE on the IRS pages (accessed via the IRS MONITOR page).
  - If these positions differ, RESET the ADIRS CDU mode by switching the selector switches OFF and back to NAV within five seconds. (All three IRSs must be switched OFF, and then all three switched to NAV.)

LATERAL FLIGHT PLAN

SELECTING A DEPARTURE



You may use the [→] and [←] keys to access the listings of runways, SIDs, and transitions.

Procedure

– **PRESS the F-PLN key on MCDU**

– **SELECT the DEPARTURE prompt [1L] key**

– **SELECT the RWY in USE, SID and TRANS**

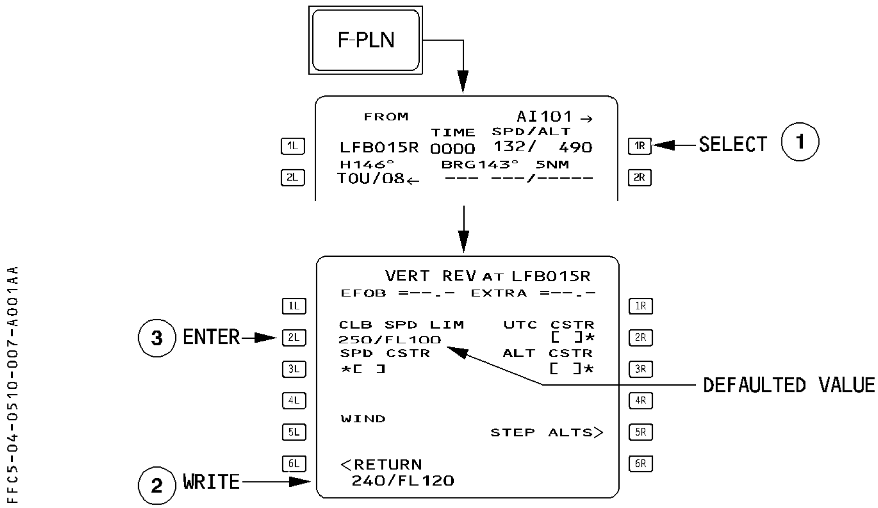
– **CHECK the resulting temporary F-PLN**

– **If it is correct, INSERT it using [6R] key.**

– **If it is not correct, ERASE it using [6L] key.**

VERTICAL FLIGHT PLAN

– ENTERING/MODIFYING A SPEED LIMIT



– PRESS the F-PLN key on MCDU

– SELECT the VERTICAL REVISION at FROM waypoint

– WRITE a new speed limit/altitude and ENTER.

The pilot can insert one climb speed limit and one descent speed limit into the vertical flight plan, or modify or clear the limits that are already in it.

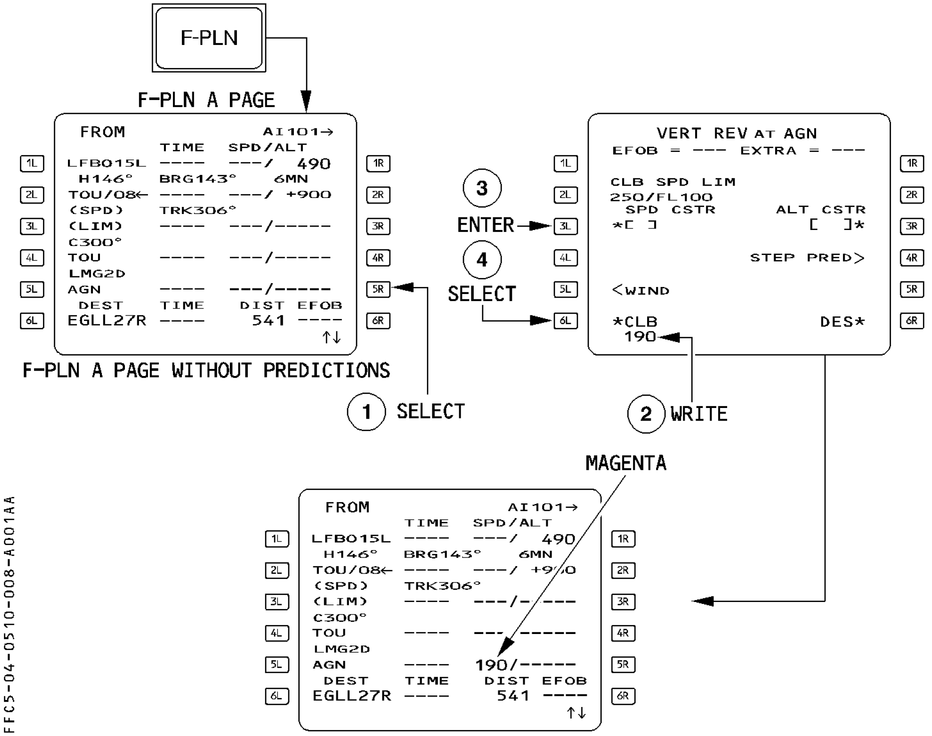
The speed limit is defined by a speed and an altitude (for example, 230/9000), which means that the managed speed target will be limited by the speed limit when the aircraft flies below the specified altitude.

250 knots at 10,000 feet is the default speed limit in the vertical flight plan in both climb and descent. The vertical revision page presents the climb speed (CLB SPD) limit if the revised waypoint belongs to a SID or is between departure and top of climb.

The vertical revision page shows the descent speed (DES SPD) limit if the revised waypoint belongs to a standard terminal arrival route (STAR) or is between top of descent and destination.

It can be deleted by a clear action, field reverts to brackets. It can also be cleared directly on the F-PLN A page by clearing the SPD LIM pseudo waypoint.

ENTERING A SPEED CONSTRAINT



Procedure

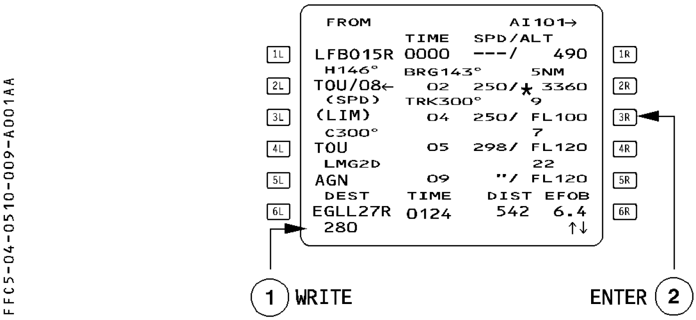
- **PRESS the F-PLN key on MCDU**
- **SELECT the VERT REV page at revised waypoint**
- **WRITE the speed constraint value into the scratchpad and ENTER it in 3L.**
- **INSERT the constraint using the appropriate *CLB or DES* prompt when displayed. If CLB and DES are not displayed, insertion occurs when the value is entered in 3L.**
  The system displays the climb (CLB) or the descent (DES) prompt at [6L] or [6R] when the predictions are not yet available or when the waypoint is part of the cruise phase as originally defined.

When predictions are not yet available, the constraints are displayed on the F-PLN A page in magenta.
When predictions are available, the speed constraint is highlighted by a star (*).
* If the predicted speed matches the constraint, the star is magenta.
* If the prediction is that the aircraft will miss the speed constraint, the star is amber.
  If a speed constraint cannot be met (by more than 10 kt), the FMGS generates the message "SPD ERROR AT WPT XX".

The pilot or the database may assign speed constraint to any waypoint in the climb or the descent phase except the FROM, origin, or destination waypoints, and any pseudo waypoints.
When a speed constraint is assigned to a waypoint, the constraint will limit the managed speed target as follows :
– In takeoff or climb phase until you pass the constrained waypoint.
– In descent and approach phase, after passing the constrained waypoint.
Speed constraints are observed by the FMGS when NAV mode and speed managed are active.

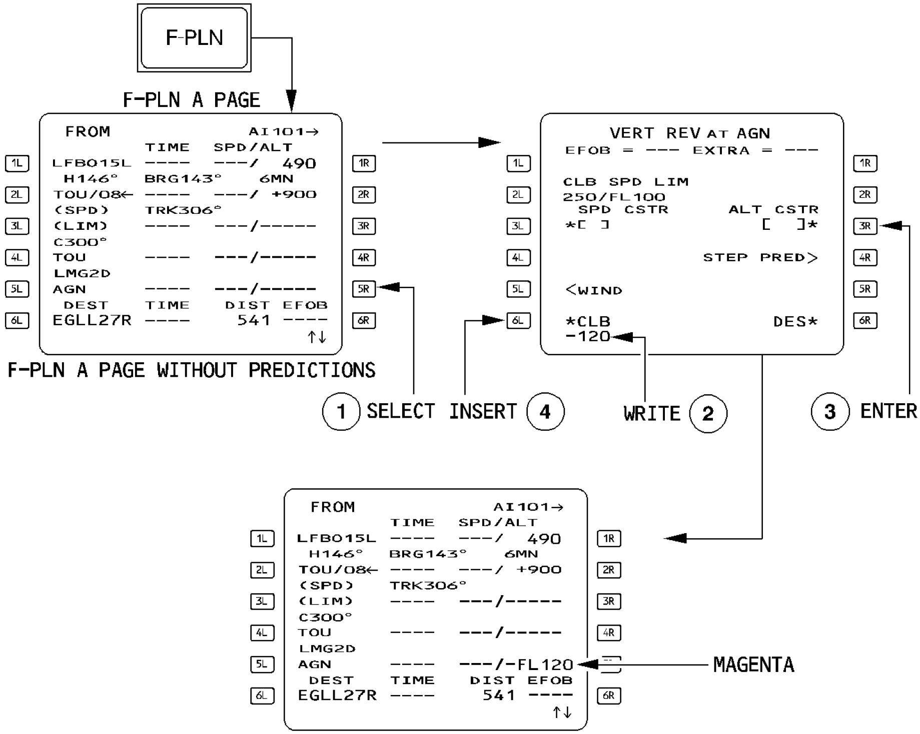
ENTERING A SPEED CONSTRAINT THROUGH F-PLN A PAGE

You may also enter a speed constraint through the F-PLN A page.



Use the CLR key to delete them directly from the flight plan page, as well. However if there is also an altitude constraint assigned at that point, the clear action deletes it too.

ENTERING AN ALTITUDE CONSTRAINT



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<u>Procedure :</u>

– **PRESS the F-PLN key on MCDU.**

– **SELECT the VERT REV page at the revised waypoint.**

– **WRITE an altitude constraint in the scratchpad, and ENTER it in 3R.**

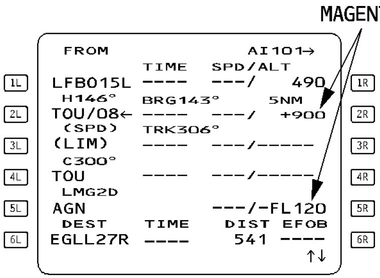
– **INSERT the constraint using the *CLB or DES* prompt, when it is displayed. Otherwise, the value is inserted when it is entered in 3R.**
The system displays the *CLB or DES* prompt, when the predictions are not yet available, or when the waypoint is part of the cruise phase, as originally defined.

R *<u>Note</u> : In case of QFE operations, the height constraints must be converted and entered*
R *as an altitude in feet.*

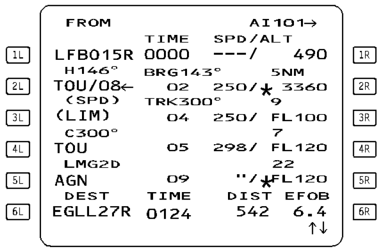
The pilot or the database may assign an altitude constraint to any waypoint in the climb or descent phases except the FROM, origin, or destination waypoints, or any pseudo waypoint.

An altitude constraint may be defined as an "at", an "at or above", or an "at or below" constraint. In certain procedures, the database may define an altitude constraint as a window in which the aircraft should fly.

- Enter "AT" constraints with no sign.
  Enter "AT or ABOVE" constraints preceded by a + sign (+FL 130, for example).
  Enter "AT or BELOW" constraints preceded by a – sign (–15000, for example).
  Use four digits when entering altitude. Include the lead zero (0500 feet, for example).
  For flight level, enter a two- or three-digit number, with or without the letters "FL". The lead zero is optional. (Examples : + FL120 or +120 ; –FL090 or –90 or –090)
- Enter the altitude value as either altitude or flight level ; the MCDU displays the selected value as an "ALT" or "FL," as appropriate for the transition altitude.
  The constraint must be higher than the thrust reduction altitude and lower than the cruise flight level.
  Once inserted in the flight plan, the altitude constraint (ALT CSTR) is displayed in magenta as long as predictions are not available.
  When predictions are available, the altitude constraints are replaced by the predicted altitude at relevant waypoints highlighted by a star.
  * if the predicted altitude matches the constraint the star is magenta if the predicted altitude is missed (by more than 250 feet), the star is amber.



F-PLN A PAGE WITHOUT PREDICTIONS

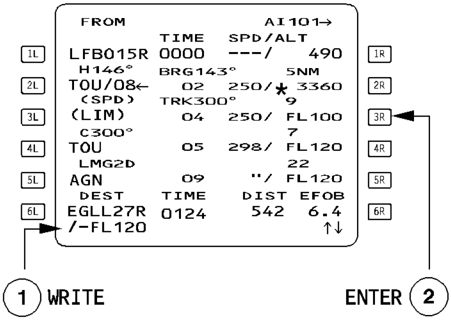


F-PLN A PAGE WITH PREDICTIONS AND STARS

FFC5-04-0510-011-A001AA

Entering an altitude constraint altitude F-PLN A page

The pilot may also enter an altitude constraint directly through the F-PLN A page. When entering the value into the scratchpad do not forget the slash e.g. /–120 or /–FL 120. If the slash is omitted the value will be considered as a speed constraint if it is within the range value.

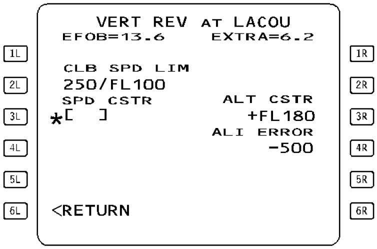


FFC5-04-0510-012-A001AA

Use the CLR key to delete them directly from the flight plan page, as well. However, if there is also a speed constraint assigned at that waypoint, the clear action deletes it too.

The vertical revision page displays “ALT ERROR”, value along with the difference between the constraint and the predicted altitude at the revised waypoint.

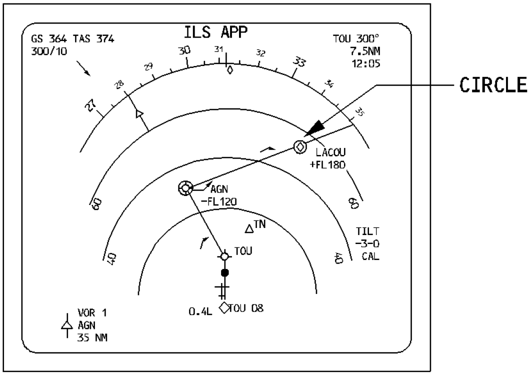
FFC5-04-0510-013-A001AA



ND display

An altitude-constrained waypoint is marked by a circle (○) on the navigation display.
This circle is white when the guidance does not take the altitude constraint into account.
It is magenta if the guidance system takes the altitude constraint into account and predicts that it will be matched.
It is amber if the guidance system takes the altitude constraint into account and predicts that it will not be matched.

FFC5-04-0510-013-B001AA



The aircraft should be at or below FL120 at AGN and above FL180 at LACOU.

ENTERING AN ESTIMATED TAKEOFF TIME (ETT)

In preflight phase :

– **SELECT the SEC F-PLN key on the MCDU.**

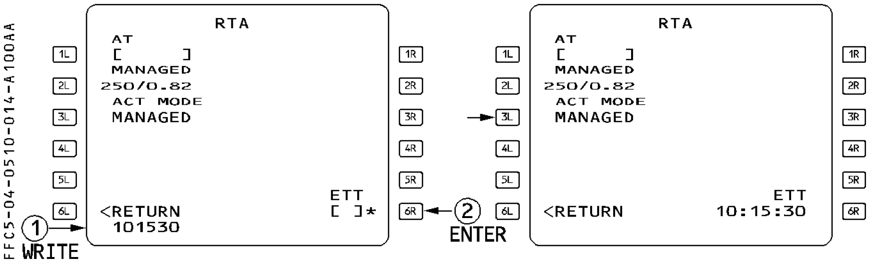
– **SELECT a VERT REV at any waypoint**

– **SELECT the Required Time of Arrival (RTA) prompt [2R] .**
The MCDU displays the RTA page.

– **WRITE the Estimated Takeoff Time.**
The format is HHMMSS (entry of seconds is not mandatory).

– **ENTER it in the 6R field**

R



The display automatically reverts to the F-PLN A page.
If the aicraft has not taken off by the time entered as the estimated takeoff time, the MCDU displays the "CLK IS TAKE OFF TIME" message, meaning that the system will replace your estimated takeoff time with the actual time.
When begining the takeoff roll, the system automatically adopts that clock time as the takeoff time.
If the origin airport is changed, or the clock time is invalid, the system automatically deletes the estimated takeoff time.

FLIGHT PLAN CHECK

– **CHECK the EOSID on the ND plan mode (yellow line).**

Note : If the details of the EOSID require review, select the EOSID as a TMPY F-PLN and review it as TMPY. Then, ERASE it.

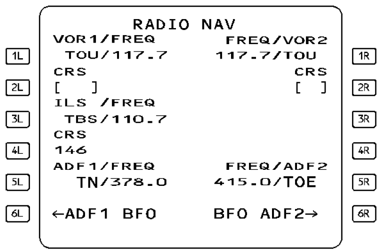
SECONDARY F-PLN

Refer to 4.04.30 for details.

RADIO NAV

Whenever a navaid ident is correctly decoded, in agreement with that published, no audio check is necessary.
Morse decoding is displayed on the ND for VOR/DME, VOR/TAC, DME, NDB, and on the PFD for ILS.
Preferably use the identifier for navaid entry.
If the NDB ident is not in the database, be sure to include a decimal point when entering the frequency (e.g. 315. or 325.7).

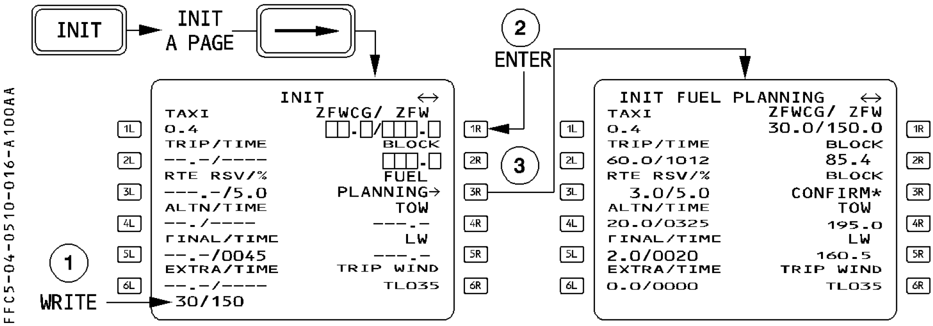
FFC5-04-0510-015-A110AA



R **FMGS DATA INSERTION**

R **WEIGHT/CG INSERTION AND FUEL PLANNING**

R The flight crew must enter the Zero Fuel Weight (ZFW) and Zero Fuel Weight Center of
R Gravity (ZFWCG) values on the INIT B page, to allow the FMS to perform the fuel planning
R computations.
R



R **Procedure**

R – **PRESS the INIT key, and the Next ("→") key to access the INIT B page.**

R – **ENTER the ZFWCG and ZFW value in the [1R] field.**
R The "FUEL PLANNING →" prompt appears in the [3R] field.

R *Note : As long as the final loadsheet is not available, the flight crew should insert the*
R *estimated ZFWCG/ZFW in order to get fuel estimates. The ZFWCG and ZFW*
R *values must be updated with the final loadsheet values.*

R – **CHECK/MODIFY the TAXI [1L] and RTE RSV [3L] values.**
R The TAXI and RTE RSV fields display the default values specified in the AMI file (for
R example, "0.4T" for TAXI, and "5.0 %" for RTE RSV). The flight crew may modify these
R values.

– **CHECK/MODIFY the TRIP WIND value in the [6R] field.**
If no wind profile has been entered in the F-PLN, the flight crew may enter an average TRIP WIND in this field, to have more realistic fuel/time predictions.

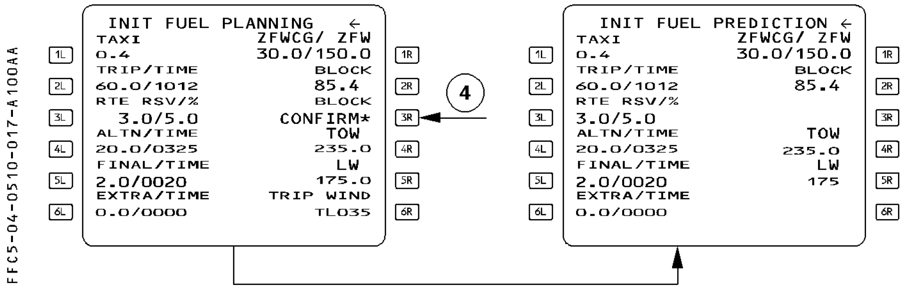
Note : 1. If the flight crew has already defined a wind profile, even partially (such as climb wind), it is not possible to enter a TRIP WIND.
2. If the flight crew enters a TRIP WIND, and subsequently enters a wind profile on the WIND pages, the TRIP WIND will be deleted, and the FMS will use the wind profile defined on the WIND pages for predictions computations.

– **PRESS the FUEL PLANNING prompt [3R].**
The FMS computes the required BLOCK fuel in order to have EXTRA fuel = 0, based on the parameters entered on the INIT and F-PLN pages. The computed BLOCK fuel value is displayed in the [2R] field, and a BLOCK CONFIRM prompt appears in the [3R] field.

Note : In order to obtain a realistic BLOCK fuel computation, the flight crew should ensure that the F-PLN initialization has been completed (including ALTN if necessary), and that flight parameters, such as CRZ FL, steps climbs (if any), and winds, have been inserted, before using the FUEL PLANNING function.

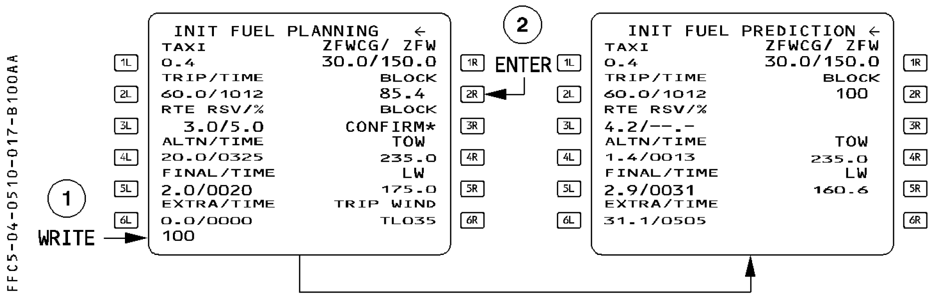
The flight crew must check the FMS-computed BLOCK fuel value against the actual block fuel required for the flight. Fuel planning must not be based only on FMS predictions.

R ● **If the computed BLOCK fuel corresponds to the actual block fuel required for the flight :**
R



R – **PRESS the BLOCK CONFIRM prompt [3R].**
R The FMS computes all the predictions, based on the computed BLOCK fuel.

R ● **If the computed BLOCK fuel does NOT correspond to the actual block fuel**
R **required for the flight :**
R



– **ENTER the desired BLOCK fuel in the [2R] field.**
The FMS computes the predictions, based on the entered BLOCK fuel, and estimates the EXTRA fuel value.

● **When the BLOCK fuel has been entered :**

– **CHECK/MODIFY the FINAL/TIME [5L] values.**
If the flight crew modifies the FINAL or TIME values, the EXTRA fuel value will be modified accordingly.

Note : – *The ALTN value computed by the FMS may differ from the value retained on the operational flight plan, since some computation hypothesis (such as, for example, the route, wind profile, CRZ FL, CI) may differ.*
– *The system computes part of the characteristics speeds displayed on the*
R *PFD (VLS, F, S, Green Dot) from the ZFWCG and ZFW entered by the flight crew on the MCDU (used by the fuel computer FCMC to compute the aircraft GW and CG). Therefore, the flight crew must carefully check these data.*

– **PRINT the PREFLIGHT REPORT, if necessary**
When the final loadsheet values (ZFWCG/ZFW/BLOCK) have been entered, and the FUEL PLANNING is completed, the flight crew may print the pre-flight report, which provides a copy of the F-PLN with the associated FMS predictions.

TAKEOFF WITH NO GROSS WEIGHT ENTRY - GROSS WEIGHT LOST BY THE FMGS

If no GW is entered, or if the GW value is lost by the FMGS due to a power interruption, managed speed will be available only during takeoff phase (and providing V2 has been inserted).
After engine start, the MCDU displays "INITIALIZE WEIGHTS".
If the flight crew does not respond, the following occurs :
· At takeoff, the Speed Reference System (SRS) mode remains active until the aircraft reaches the acceleration altitude (ACC ALT), or until another vertical mode engages.
· When the aircraft leaves the SRS mode, the speed target becomes the current speed and is no longer managed.

● **To regain normal speed target, the flight crew must :**

– **SELECT the appropriate climb speed on the FCU and PULL out the knob.**

– **INSERT GW on FUEL PRED page.**

– **PUSH the SPD selector knob on the FCU to get managed speed.**

INSERTING GW AND CG AFTER ENGINE START

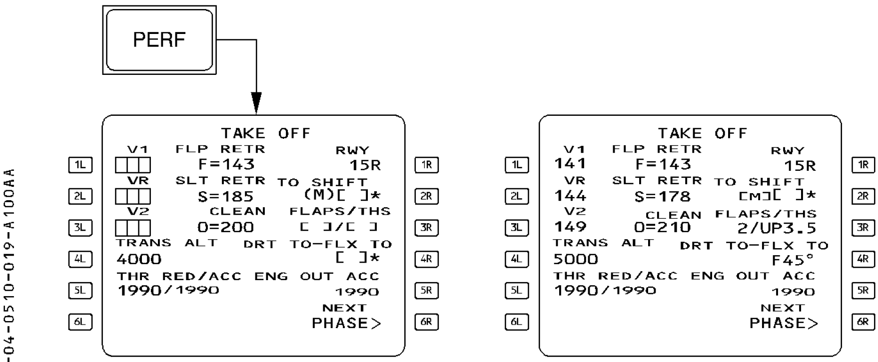
The fliight crew must enter the ZFWCG and ZFW values on the INIT B page before engine start. If this is not done, the flight crew can enter GW and CG after engine start on the FUEL PRED page.

– **PRESS the FUEL PRED key.**

– **INSERT GW. This allows performance computation.**

– **MODIFY CG, if necessary. The CG is defaulted to 25 %.**
The FCMC (or the flight envelope part of the FMGEC as backup) continuously updates and sends the Gross Weight (GW) and Center of Gravity (CG) during the flight.

TAKEOFF DATA INSERTION



PAGE BEFORE PILOT ENTRY

PAGE COMPLETED

Procedure

– **PRESS the PERF key on MCDU**

– **WRITE successively and ENTER V1, VR, V2 and takeoff shift.**

– **WRITE FLX TO or DRT TO.**
(see procedure next page)

– **CHECK/MODIFY the TRANS ALT* (transition altitude)**

– **CHECK/MODIFY the THR RED ALT* (thrust reduction altitude)**

– **CHECK/MODIFY the ACC ALT* (acceleration altitude)**

– **CHECK/MODIFY the ENG OUT ACC* (engine out acceleration altitude)**

– **CHECK V1, V2 on PFD****

* Altitudes less than 400 feet above airfield elevation cannot be selected

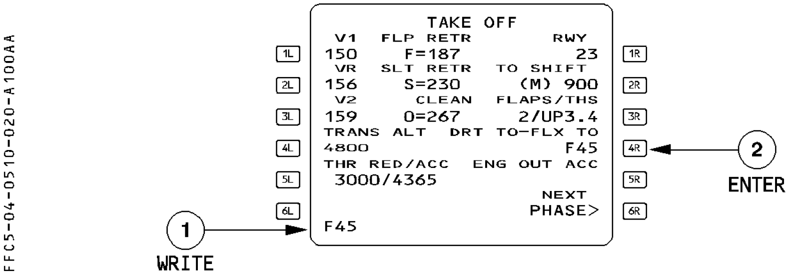
** If the PFD does not display V2 at the top of its speed scale, check that at least one FD is ON

ENTERING A FLEX TEMPERATURE

– **WRITE FXX (XX being 2 digits).**

– **ENTER the FLEX temperature using the [4R] key.**

R The thrust limit mode and the N1 rating limit are displayed on the ECAM E/WD.

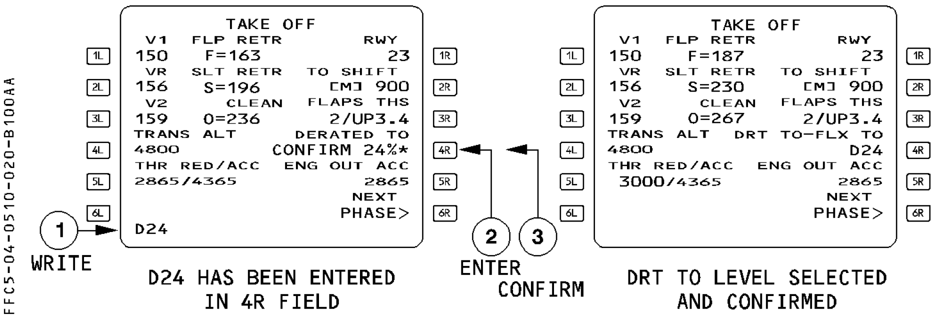


ENTERING A DERATED LEVEL

– **WRITE DXX (XX being 2 digits). Six derate levels are possible : 04, 08, 12, 16, 20, 24 %.**

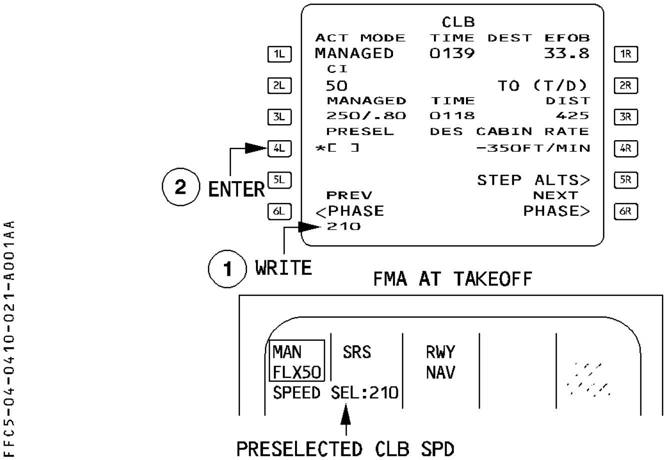
– **CONFIRM the selection with the [4R] key.**

R The thrust limit mode and the N1 rating limit are displayed on the ECAM E/WD.



CLIMB SPEED PRESELECTION

If the managed speeds for the initial climb are not suitable, the pilot can preselect an appropriate climb speed on the "PERF CLB" page as long as the climb phase is not active.
The CLB SPD preselection applies when :
- ATC specifies an initial climb speed.
- The initial climb speed must be lower than normal because :
  - There are to be turns greater than 120° in the initial climb out.
  - Obstacle clearance or some other situation requires a high climb angle.
  - The airfield has a risk area to be cleared expeditiously (birds reported, for example).



Procedure

– PRESS the PERF key on MCDU

– PRESS the NEXT PAGE on MCDU

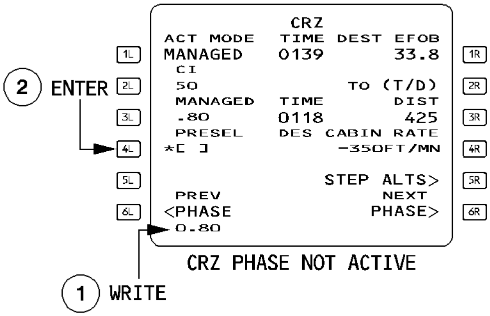
– WRITE a climb speed and ENTER it in [4L]

– To revert to managed speed, select MANAGED by pressing [3L] key.
When the aircraft is transitioning into the climb phase, the preselected value becomes the target speed :
- The selected speed target is active.
- The primary flight display shows the target speed in blue.
- The speed window of the FCU displays the new speed or Mach number.

CRUISE MACH (SPEED) PRESELECTION

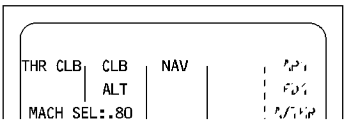
The pilot preselects a cruise Mach when it requires a Mach number other than the economy cruise Mach number.
When the aircraft transitions to the cruise phase, the speed target symbol goes to the preselected value and MACH (or SPD) becomes selected (blue target on PFD, target MACH shown in the speed/Mach window of the FCU).

PERF CRZ PAGE



CRZ PHASE NOT ACTIVE

FMA IN CLB TOWARDS CRZ FL



FFC5-04-0510-022-A001AA

Procedure

- **PRESS the PERF key on MCDU**
- **PRESS the NEXT PAGE key on MCDU until CRZ page is accessed.**
- **WRITE a cruise Mach (or speed) into the scratchpad and ENTER it in [4L] .**
- **To revert to managed speed, PRESS the [3L] key.**
  The pilot may modify the cruise Mach or speed on ground or in climb. When the cruise phase is active, the pilot cannot preselect a cruise Mach or speed.

ENTERING A HEADING/TRACK PRESET FUNCTION

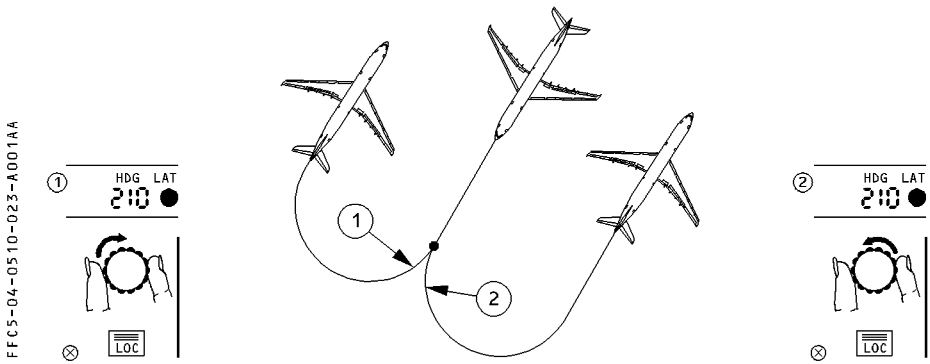
The heading/track preset allows the pilot to preset a heading or a track for takeoff or goaround before he commands the aircraft to take up that heading or track (manual activation).
The flight crew can enter a heading or a track preset while the aircraft is on the ground and until takeoff.

Procedure
Before takeoff :

– **SET the appropriate HDG or TRK in the FCU window.**
This disarms the navigation mode and allows the runway mode to remain engaged after takeoff.

To activate the preset after takeoff :

– **PULL the HDG/TRK selector knob.**
The heading or track mode engages on the preset value.



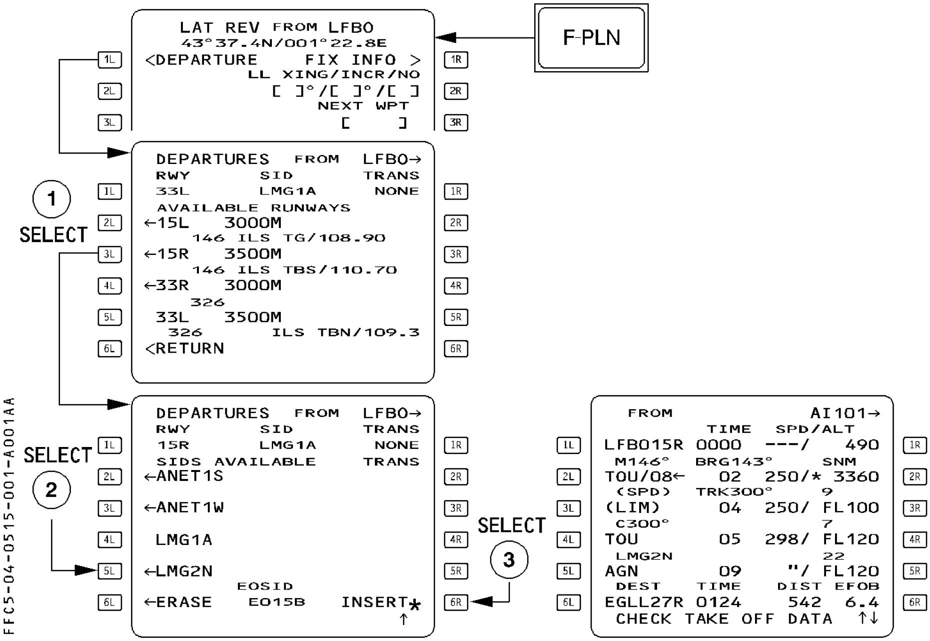
The direction the pilot rotates the HDG/TRK selection knob usually determines the direction of the turn. A left rotation (decreasing heading) produces a left turn ; a right rotation produces a right turn.
However, when a heading has been preset before takeoff or a go-around, the direction of the turn will be such as to cause the shortest turn at the moment of engagement.

CANCELLING THE HEADING/TRACK PRESET FUNCTION

The pilot can cancel the heading preset by pushing the HDG/TRK selector knob back in again. This makes the navigation mode engage or arm.

CHANGE OF RUNWAY

R



Procedure

- **PRESS the F-PLN key on the MCDU.**
- **SELECT the LAT REV at origin.**
- **SELECT the DEPARTURE prompt [1L].**
- **SELECT the new RWY in use.**
- **SELECT the appropriate SID and TRANS.**
- **CHECK the resulting temporary F-PLN and INSERT it.**
  CHECK TAKE OFF DATA comes up in the scratchpad, if the PERF TO page was filled in.

– **ENTER the new V1, VR, V2, FLEX TEMP (or derated level) or CONF as appropriate**

Note : · *If the previously selected SID is compatible with the new runway, it automatically appears in the temporary flight plan. Any revision the pilot may have made to the previous SID will not be transferred.*
If the pilot still wants it, he has to reenter it.

TAKEOFF FROM INTERSECTION

– **Use RTOW or FCOM to revise takeoff parameters**

– **PRESS the [PERF] key on MCDU**

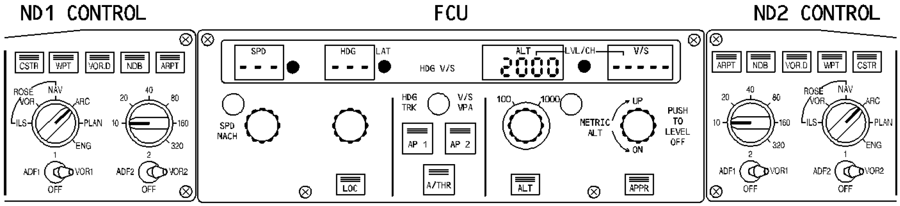
– **ENTER the takeoff shift**

– **ENTER the new V1, VR, V2, FLX TEMP (or derated level), or CONF, as appropriate**

Note : The insertion of the shift in takeoff position permits the system to make an accurate revision to its navigation data at takeoff.

FCU SELECTION FOR TAKEOFF

FFC5-04-0520-001-A100AA



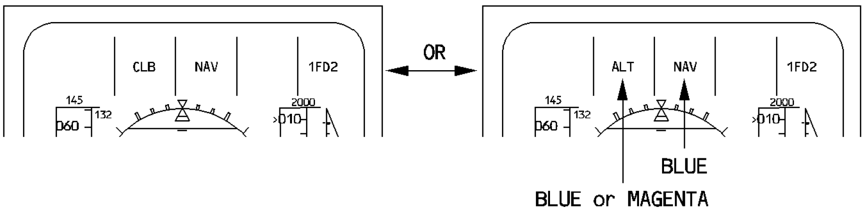
Procedure

- **ENSURE that HDG – V/S modes are selected (change over pb).**
- **CONFIRM or SELECT the first cleared altitude**
- **CROSS CHECK on PFD the target altitude**
- **CONFIRM both FDs ON**

FMA MODE CHECK

- **CHECK that the FMA CLB (or ALT) mode is armed on column 2.**

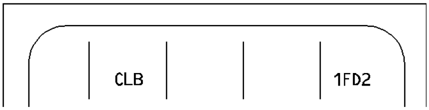
FFC5-04-0520-001-B100AA



Note : ALT (in blue or magenta) may be displayed instead of CLB if the FCU altitude or a constraint is set at or below the acceleration altitude.

If a HDG/TRK was preset, NAV is disarmed.

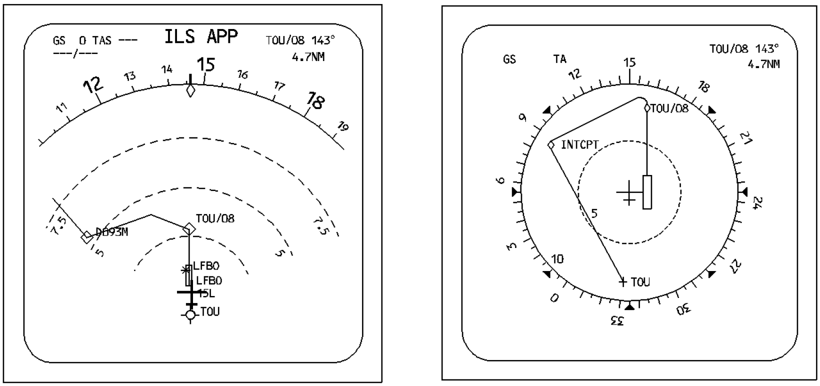
FFC5-04-0520-002-A001AA



SELECTING A NAVIGATION DISPLAY

R · SET the minimum range to display the first waypoint after departure, or as required for
R weather radar.

FFC5-04-0520-002-B001AA

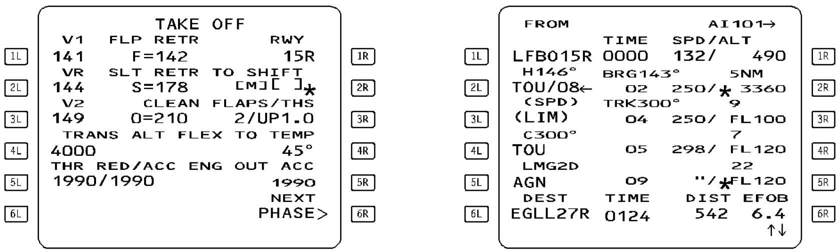


ARC mode
FOR DEPARTURE IN GENERAL DIRECTION OF RUNWAY HEADING

Rose NAV mode
FOR DEPARTURE IN DIRECTION OPPOSITE TO THAT OF RUNWAY HEADING

SELECTING TAKEOFF DISPLAYS FOR PILOT'S AND COPILOT'S MCDU

FFC5-04-0520-002-C001AA



PF SELECTS PERF T.O. PAGE

PNF SELECTS F-PLN A PAGE

MONITORING THE TAKEOFF

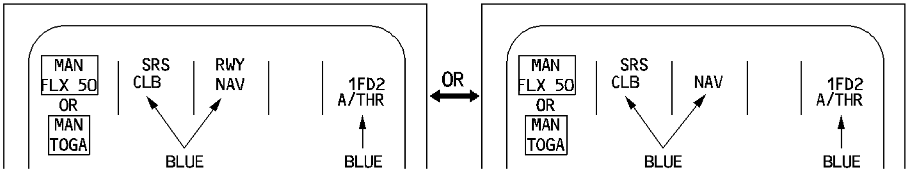
- **At power set (thrust levers in FLX or TOGA position)**

  – **CHECK that the navigation is updated to the runway threshold by verifying that the aircraft symbol is centered on the runway threshold of the navigation display.**

  – **CHECK the FMA for appropriate mode selection**

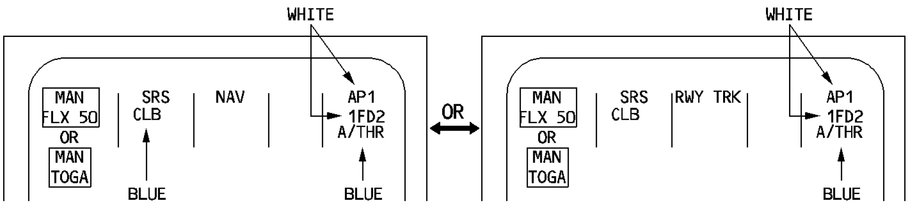
  <u>*Note*</u> *: – RWY mode appears if an ILS is tuned to a station corresponding to the departure runway. Otherwise no lateral mode comes up until the aircraft has lifted off.*
  – Until the aircraft is airborne, do not rely on the wind displayed on the NDs.

FFC5-04-0530-001-A001AA



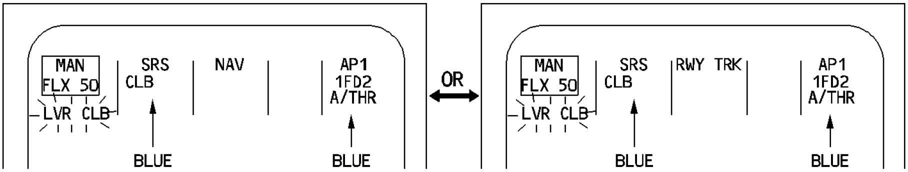
R - **At 30 feet**
R · If NAV is armed, it automatically engages.
R · If NAV is not armed, RWY TRK mode engages and remains displayed until the crew
R selects another lateral mode.

FFC5-04-0530-001-B001AA



- **At 100 feet :**
  Engage AP1 or AP2.
  The FMGS has an internal delay that prevents the AP to be engaged during 5 seconds after lift-off.
- **At thrust reduction altitude :**
  "LVR CLB" flashes in the first column of the FMA

FFC5-04-0530-002-A001AA



Procedure

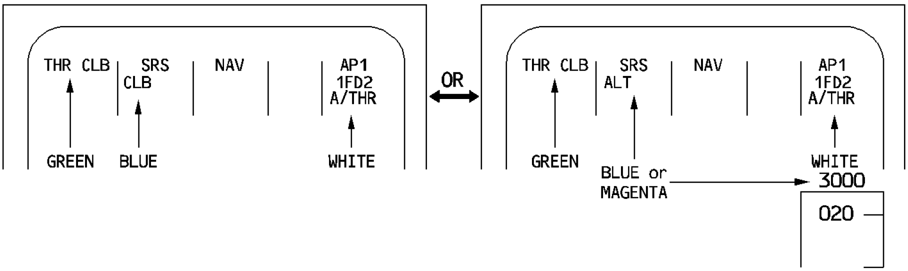
- **SET the thrust levers to the CL detent .**
  Autothrust automatically activates.

- **CHECK that A/THR turns to white in the 5th FMA column.**

- **CHECK that THR CLB appears in green in the 1 st FMA column.**

R

FFC5-04-0530-002-B001AA

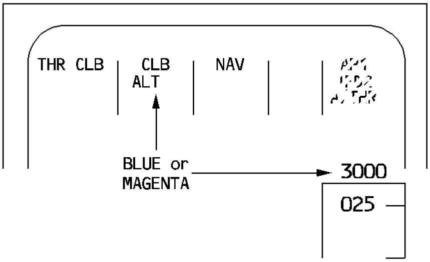


Depending on the next level off altitude, CLB or ALT is armed and displayed in the second column.
ALT is armed :
- In blue, if the next predicted level-off is the FCU-selected altitude (target altitude blue at the top of the ALT scale).
- In magenta, if the next predicted level-off is an ALT CSTR (target altitude magenta at the top of the ALT scale).

● **At acceleration altitude**

The vertical phase automatically switches to climb.
CLB mode engages. The target speed jumps to initial climb speed on the PFD.

FFC5-04-0530-003-A001AA



Procedure

– **CHECK that "CLB" appears in green in the second FMA column.**
- The speed reference system (SRS) mode remains engaged until CLB phase is engaged, which occurs at ACCEL ALT or at any other vertical mode engagement, whichever comes first.
- If during takeoff the FCU altitude is set below the current aircraft altitude, the system ignores the FCU altitude and the aircraft remains in SRS mode until the pilot selects an altitude above the aircraft altitude or engages any other mode.

PRESELECTING HEADING OR TRACK

Procedure

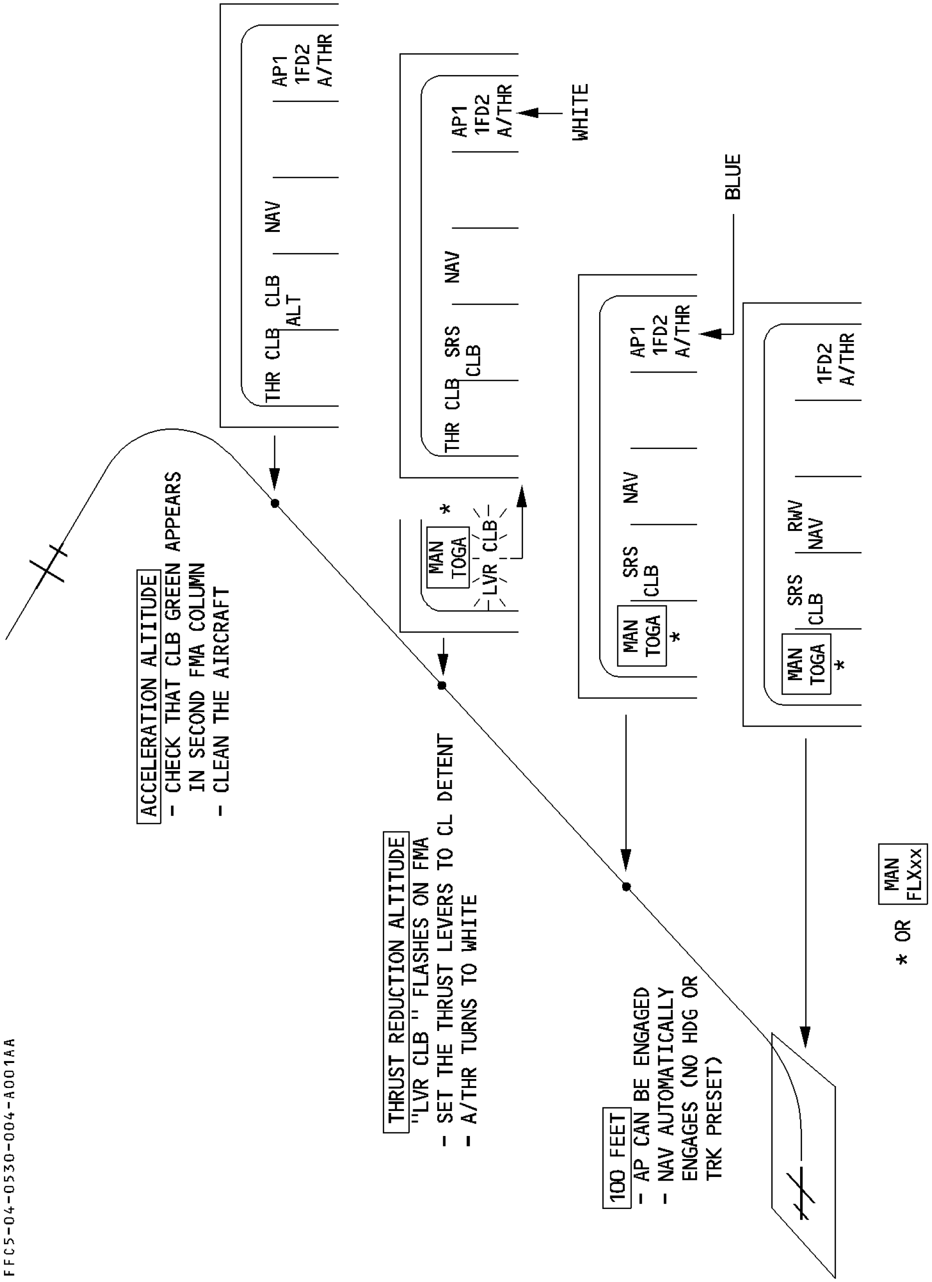
● **If a HDG or a TRK was preselected on the ground :**

– **PULL OUT the HDG/TRK selector knob when required**

– **CHECK that the HDG/TRK mode is active and displayed on the FMA**
When a HDG or TRK is preset, OP CLB mode will engage at the acceleration altitude. (CLB mode is not available in HDG/TRK mode).

NORMAL TAKEOFF PROFILE

R

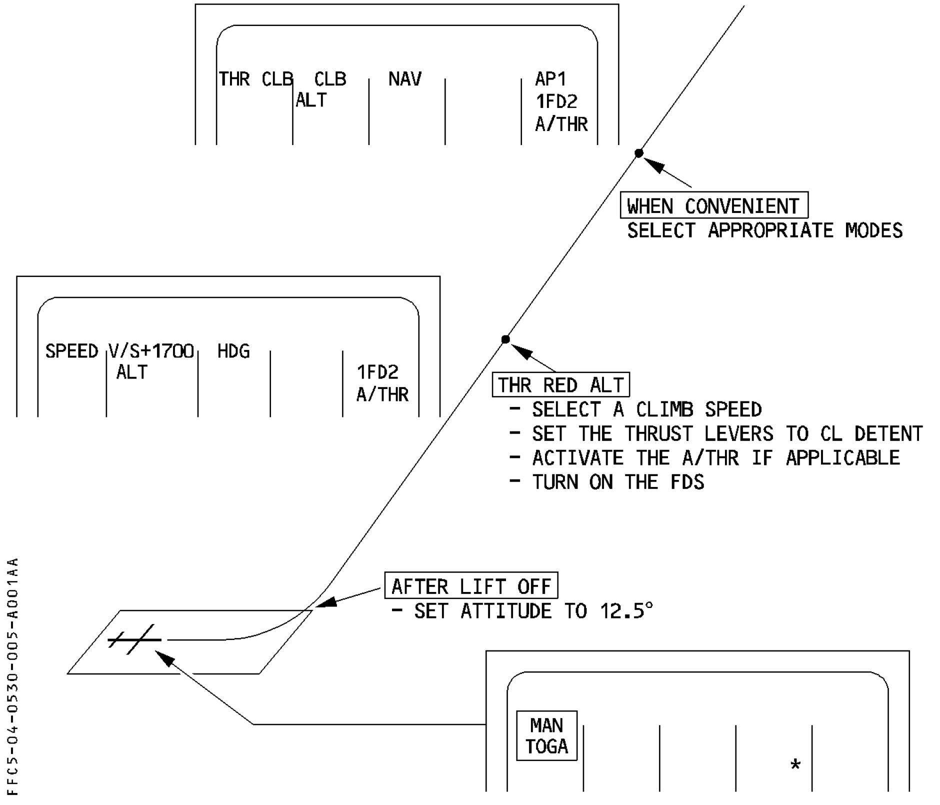


FFC5-04-0530-004-A001AA

NO FLIGHT DIRECTOR TAKEOFF

If a takeoff is initiated without FDs, the system responds as follow :
- There are no FD bars.
- There is no autothrust arming.
- There is no guidance available.
- The target speed on the PFD is that selected on the FCU or is defaulted to 100 knot.
- Setting the thrust levers to the CL detent does not activate autothrust.

Note : Do not engage the autothrust prior to selecting a target speed on the FCU.



Procedure

– Establish initial climb of 12,5°

● When reaching the thrust reduction altitude (THR RED ALT)

– SELECT a climb speed

– SET the thrust levers to CL detent

– ACTIVATE the autothrust

– TURN ON the FDs (basic modes engage)

– SELECT appropriate mode.

– Failure of both FDs after the start of takeoff
- The FD bars disappear.
- The FCU window displays the target speed, which synchronizes on V2 or the current speed (if it is higher).
- The autothrust remains armed.
- At thrust reduction altitude, LVR CLB flashes. If the pilot set the thrust levers to the CLB detent, the autothrust becomes active in selected SPD mode (no FDs selected). If the current speed is greater than the target speed, the thrust decreases.
- At acceleration altitude the target speed does not change, since it is selected.

TAKEOFF WITH NO V2 ENTRY

If V2 is not inserted the speed reference system (SRS) will not engage for takeoff. Five seconds after lift off V/S mode will engage. When V/S engages the current airspeed becomes the FCU target speed.
To regain a normal speed target, the pilot must :

– SELECT the appropriate climb speed on FCU and PULL out the knob.

● At ACC ALT :

– PUSH the A/THR pusbutton on the FCU.

– SET the thrust levers to CL detent.

– PUSH in the SPD selector knob to get a managed speed target.

TAKEOFF USING THE LOCALIZER OF THE OPPOSITE RUNWAY

If the localizer, of the ILS associated with the opposite runway, has to be used for takeoff :

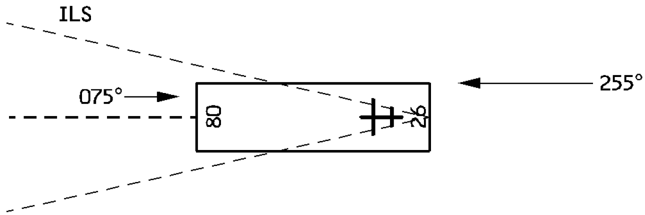
– **SELECT the RAD NAV page.**

R – **ENTER the ILS IDENT.**
R If the ILS is in the database, the system tunes the proper frequency. Check that the ILS
R front course is displayed in the CRS filed.

R *Note : This may trigger the "RWY/ILS MISMATCH" message. Disregard it.*

R ● **If the ILS is not in the database :**

– **INSERT the takeoff runway course with a "B".**
R



ILS ON RUNWAY 08 (CRS = 075°)
BACK COURSE TAKEOFF ON RUNWAY 26
INSERT CRS = B255

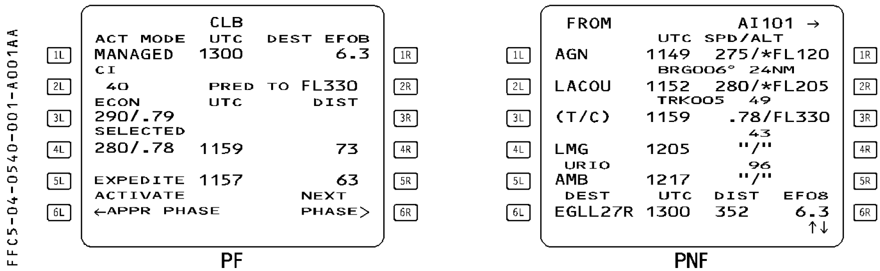
FFC5-04-0530-007-A200AA

– **DESELECT the LS pushbutton on ISIS.**
ISIS displays the LOC reverse deviation.

– **SELECT ROSE-ILS on one ND.**

MONITORING THE CLIMB PHASE

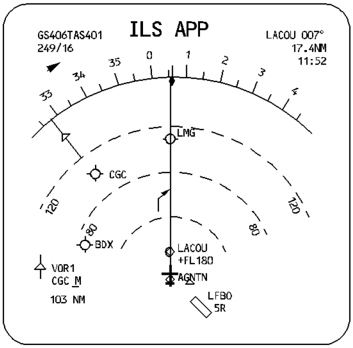
The PF MCDU should display the PERF CLB page allowing him to monitor the climb.
The PNF MCDU should display the F-PLN page to allow the pilot to monitor time, speed and altitude predictions. This page also displays matched or missed information for constraints.



– CHECK on FMA vertical mode CLB if NAV is engaged.
– CHECK on FMA vertical mode OP CLB if HDG/TRK is engaged.

MONITORING THE ND (ROSE NAV or ARC)

Displays the lateral and vertical paths, in the current AP/FD active modes.



FFC5-04-0540-002-A001AA

THE BLUE SYMBOL INDICATES WHERE THE FCU ALTITUDE WILL BE REACHED.

THE MAGENTA SYMBOL INDICATES WHERE THE NEXT F-PLN ALT CSTR WILL BE REACHED.

IF THE FCU ALTITUDE IS SET AT NEXT ALT CSTR, THE SYMBOL IS BLUE.

SYMBOL AROUND WAYPOINT INDICATES AN ALTITUDE CONSTRAINT :

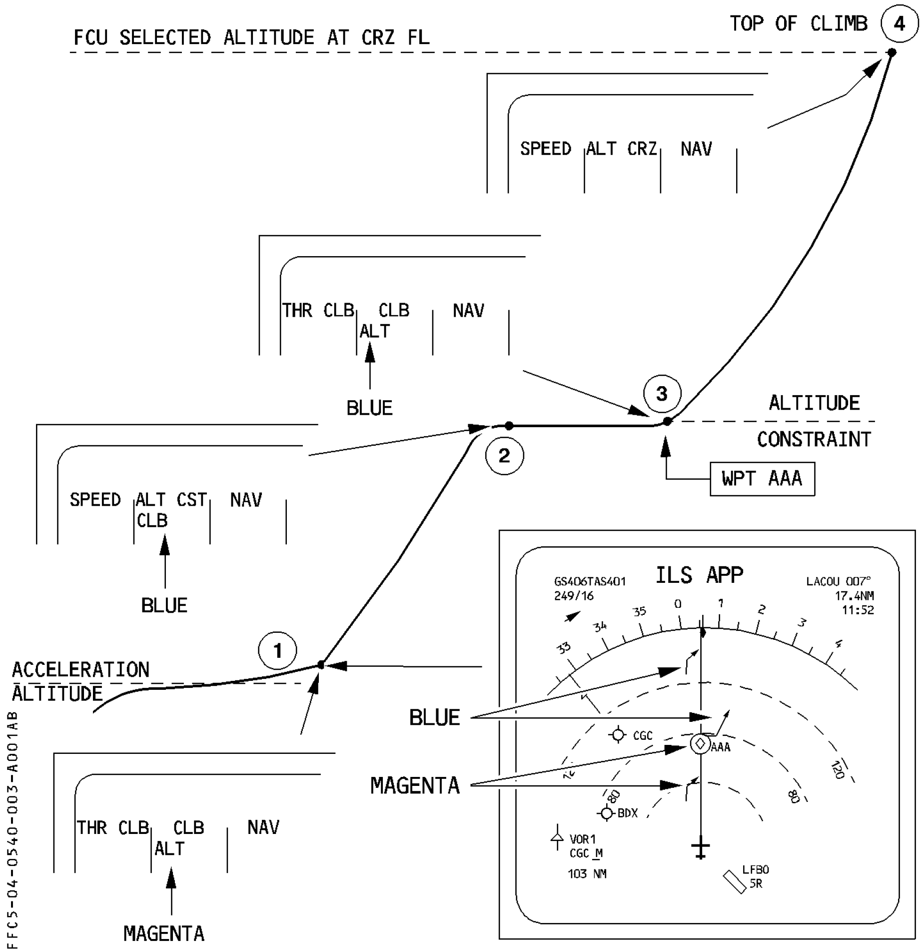
WHITE	:	DISREGARDED IN THE CURRENT AP/FD MODES
MAGENTA	:	PREDICTED AS MATCHED IN THE CURRENT MODES
AMBER	:	PREDICTED AS MISSED IN THE CURRENT MODES.

MONITORING THE AP/FD MODES and FMA

If CLB mode is engaged, the flight mode annunciator (FMA) and the navigation display (ND) show the tactical situation as follows :

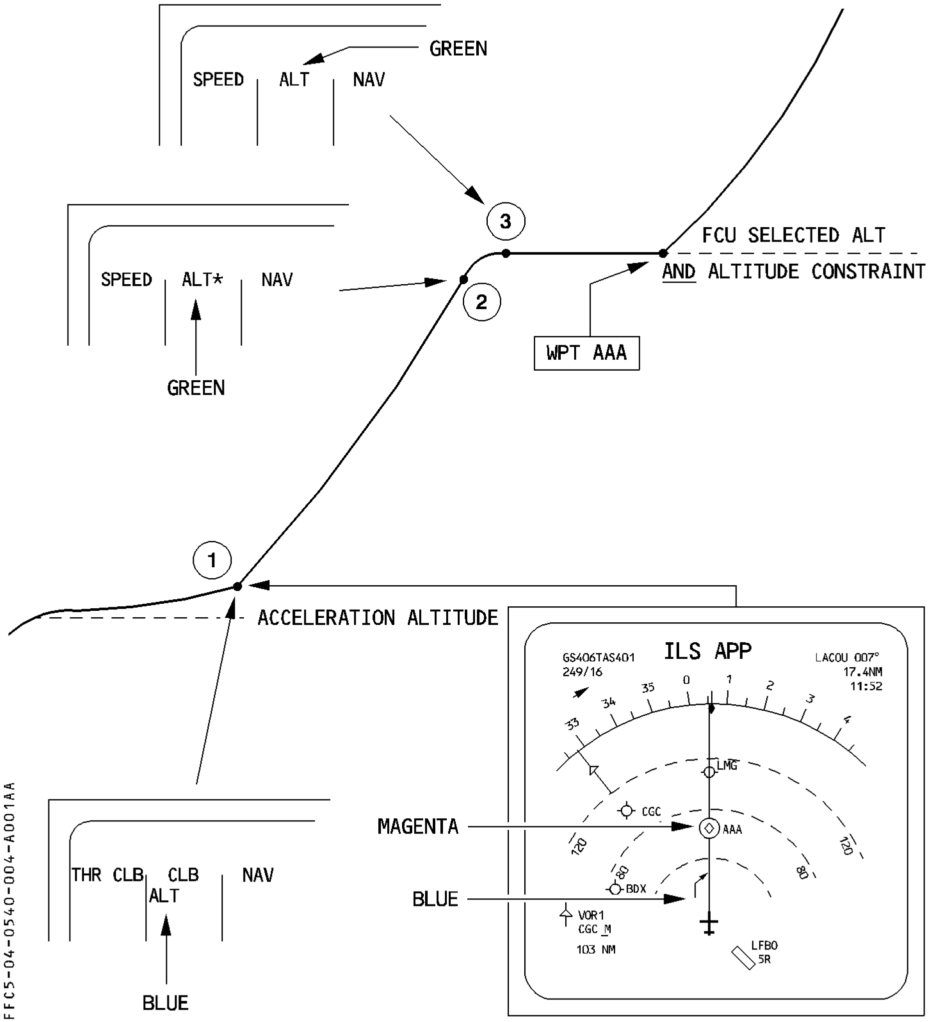
CASE 1

The FCU selected altitude is set above the next altitude constraint



CASE 2

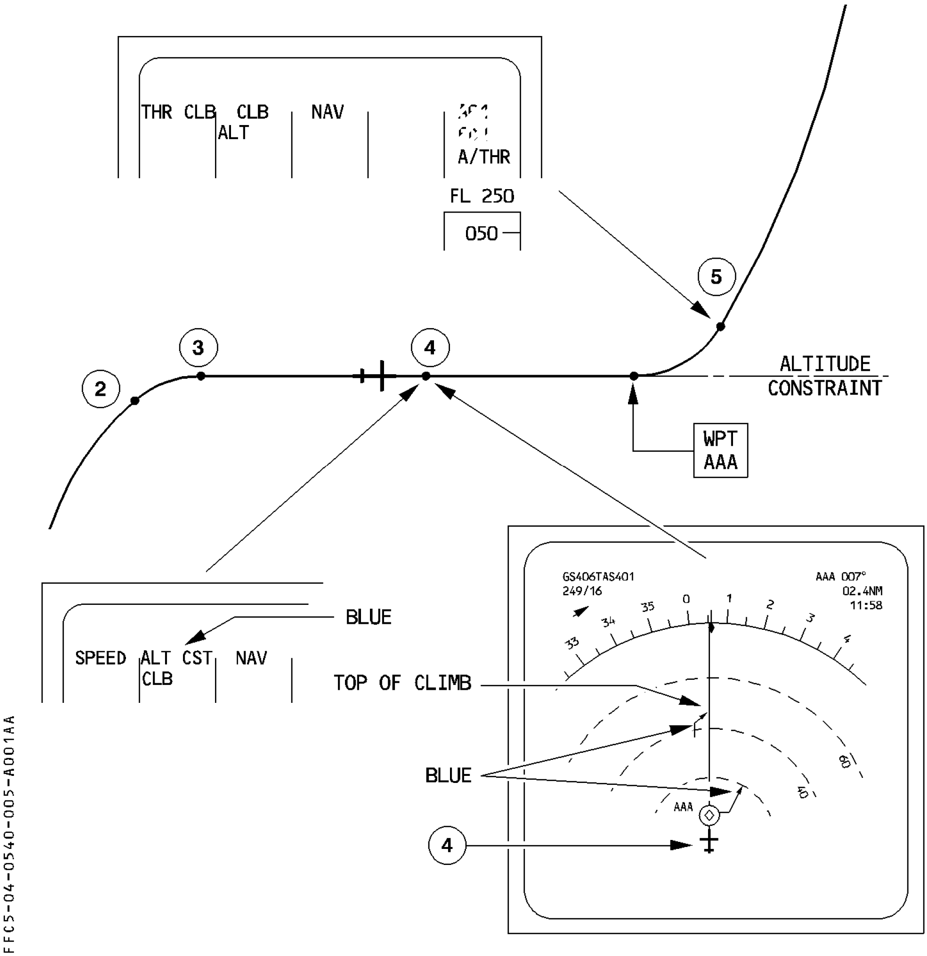
The FCU selected altitude is set at the next altitude constraint
This aircraft will automatically levels off at this altitude.



To resume the climb automatically when the waypoint AAA is reached, apply the following procedure during the level off (Position 4) :

– **SELECT the FCU altitude to the next constraint (if any) or the cruise FL.**

– **PUSH the FCU ALT selector knob to arm CLB mode.**



Recommendation :

– **To ensure that you will not miss the next constraint, it is recommended to select the FCU altitude to the next constraint as described above.**

MONITORING THE CONSTRAINTS

SPEED, ALTITUDE and TIME constraints can be checked using MCDUs. Each constraint is preceded by a star that indicates if the constraint is matched (magenta star) or missed (amber star).

Altitude constraint

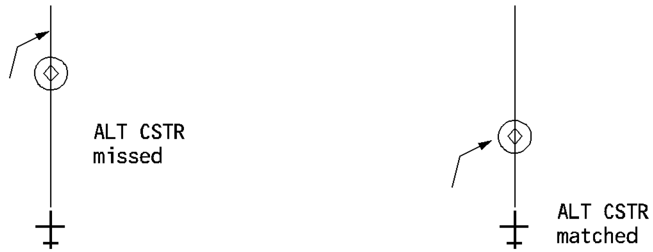
If an altitude constraint is predicted as missed, use the following procedure :

- **SET the FCU ALT to the next ALT CSTR**

- **CHECK the position of the level off symbol on the ND (blue arrow) with respect to the waypoint with the constraint.**

- **DECREASE the target speed until the constraint is met.**

FFC5-04-0540-006-A001AA

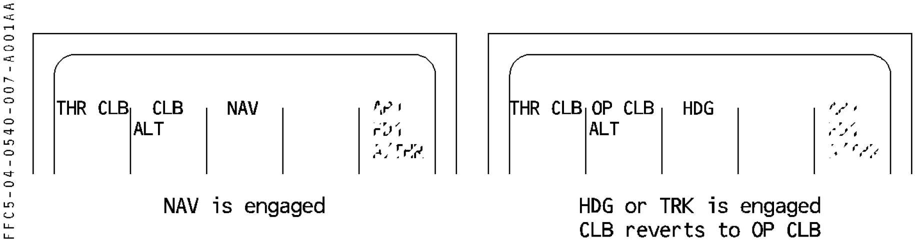


Speed constraint

- **CHECK the SPD CSTR predictions on the MCDU.**
  - A magenta or amber star (*) indicates that the aircraft will match or miss the constraint.
    If the aircraft is to miss the constraint by more than 10 knot, the MCDU scratchpad displays “SPD ERROR AT WPT ---- ”.

HDG/TRK MODE ENGAGEMENT

If HDG/TRK is engaged, the guidance does not consider any F-PLN constraint. Therefore if the pilot disengages NAV, CLB mode reverts to OP CLB.



NAV is engaged

HDG or TRK is engaged
CLB reverts to OP CLB

SPEED SELECTION

If a specific speed is required :

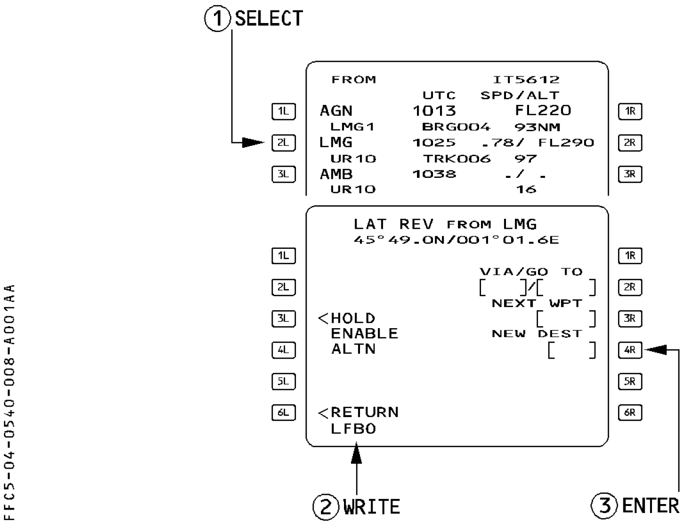
- TURN and PULL the SPD selector knob. (This changes the target speed to blue on the PFD speed scale).
- Predictions on the F-PLN page assume that the speed remains selected until the next SPD LIM or SPD CSTR, or the next phase, whichever comes first.

IMMEDIATE RETURN TO ORIGIN AIRPORT

If the SEC F-PLN has been prepared for an immediate return to the airport of origin :

- **ACTIVATE the SEC F-PLN.**
- **PERFORM a DIR TO the appropriate waypoint.**

If no SEC F-PLN has been prepared for an immediate return to the airport of origin :



- **PERFORM a lateral revision at TO waypoint**
- **ENTER the departure airport ident in the NEW DEST field and INSERT the temporary flight plan.**
- **PERFORM a lateral revision at the new destination**
- **SELECT : APPR – STAR – VIA – TRANS and INSERT**

● **When cleared to divert :**

  - **PERFORM a DIR TO the suitable waypoint.**
  - **ENTER QNH, WIND, MDA/MDH, LDG CONF.**
  - **CHECK RAD NAV page.**

REACHING CRUISE FLIGHT LEVEL

Upon reaching the cruise flight level, the pilot should be sure that the FMA displays "ALT CRZ" in its second column, which ensures that the aircraft is at CRZ FL (CRZ MACH, predictions valid, soft N1 (EPR) available).
It the FMA does not display ALT CRZ at the assigned FL (as may occur when the ATC-assigned FL is lower than the preplanned FL selected initially) :

– **PRESS the [PROG] key.**

– **ENTER the current cruise flight level.**

Note : If the current cruise flight level is above the preplanned FL, selecting the FCU updates it automatically.

If the pilot selected the speed target during the climb phase and planned to use ECON MACH for the cruise phase, SET MANAGED SPEED appears on the PFD and MCDU as a reminder.

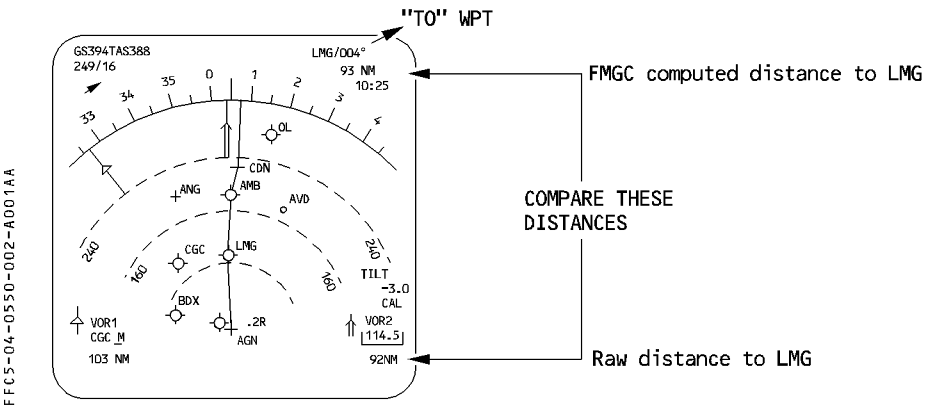
– **PRESS the FCU speed selector knob to activate the managed Mach/speed.**

MONITORING THE NAVIGATION ACCURACY

On aircraft equipped with GPS PRIMARY, the navigation accuracy check is not required as long as GPS PRIMARY is available. ◁
Otherwise, navigation accuracy shall be checked periodically in cruise.
The PROG page displays an estimated accuracy as being high or low (center of sixth line).
"HIGH" means that the FMGS estimates the FM position accurate enough to meet the EN ROUTE criteria.
"LOW" means that the pilot must compare raw data from tuned navaids with corresponding data computed by FM and shown on the ND or MCDU PROG page. The appearance of the message "NAV ACCUR DOWNGRAD" on the MCDU calls for a similar crosscheck.

Note : *The pilot should make such a comparison periodically, even if the PROG page is displaying "HIGH" and navaids are available : this allows him to quantify the FM position error.*

The method for checking the accuracy is explained in the SOP and in 4.02.20.
A quick check is explained here below when the TO waypoint is a DME type. (VOR/DME
R or DME or VOR/TAC or TAC).



POSITION DISCREPANCY

If the MCDU or the ECAM displays one of the following messages :
IRS ONLY NAVIGATION (10 min IRS nav mode, en route) on the MCDU
FMS 1/2 POS DIFF (5 nm pos difference between FMs) on the MCDU
GPS PRIMARY LOST (FM-IRS threshold function of Δt) on the ECAM
CHECK IRS X/FM POS (FM-IRS threshold function of Δt) on the ECAM
FM/IRS POS DISAGREE (FM-IRS threshold function of Δt) on the ECAM
FM/GPS DISAGRE (> 0.5 nm)
R NAV ACCUR DOWNGRAD (EPE > required RNP)
or, if there is a discrepancy between the raw data position and the FM position :

– **PRESS the [DATA] key on MCDU.**

– **SELECT the POSITION MONITOR page.**

– **SELECT "FREEZE".**
On the other MCDU : Select the GPS MONITOR page.

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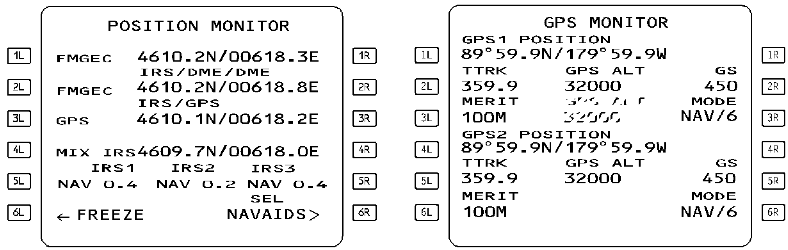

MONITORING THE PREDICTIONS

The F-PLN page and FUEL PRED page show fuel and time predictions. These predictions are meaningful if the flight plan and entered winds are accurate enough.

Procedure

- **UPDATE the F-PLN to show accurate predictions.**
- **Periodically CHECK the wind on the F-PLN B page, and update it when the current wind is significantly different.**
- **Monitor the fuel by checking :**
  · Estimated fuel on board (EFOB) at destination (F-PLN page)
  · EFOB at alternate and extra fuel (FUEL PRED page)

● **If the extra fuel is negative, modify successively the following data until the extra fuel becomes null or positive :**

- **CHECK current cruise flight level versus the optimum level (OPT FL)**
  If advisable, REQUEST reassignment to the OPT FL (or OPT FL + 2000)
- **Decrease the cost index down to zero if necessary (MIN FUEL). If the extra fuel is positive, set CI = LRC.**
- **SELECT another ALTN on the ALTN page and CHECK whether or not XTRA FUEL becomes positive.**
- **Continue to check different alternates until you find one for which XTRA FUEL is null or positive.**

● **When an alternate is not necessary, you may select "NO ALTN" option :**

- **CHECK the required conditions (weather, runways, etc.) for NO ALTN.**
- **SELECT "NO ALTN" on the ALTN selection page.**
- **ADJUST FINAL TIME on the FUEL PRED page.**
- **CHECK XTRA FUEL.**

The pilot must ensure that the aircraft flies the cruise flight level entered on the PROG page. Then, the aircraft will :

R
- Fly at ECON CRZ MACH.
- Benefit from the A/THR SOFT mode.
- Present accurate predictions.

This is displayed on the Flight Mode Annunciator (FMA) :

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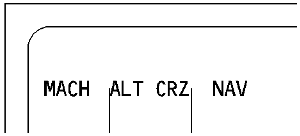


TYPICAL FMA AT CRZ FL

ENTERING A STEP CLIMB OR A STEP DESCENT

The pilot may use the STEP ALT page to enter up to four geographic steppoints, or one optimal step (computed by the FM) at any waypoint of the cruise.

Procedure

– **PRESS the PERF key.**

– **SELECT the "STEP ALTS" prompt.**
The PERF PAGE displays this prompt in cruise phase. The pilot may also select the STEP ALTS page, using a vertical revision at a cruise waypoint.

Entering an OPTIMAL STEP (only step climbs)

– **WRITE a step altitude, or FL in the scratchpad.**

– **ENTER it in the [1R] field.**

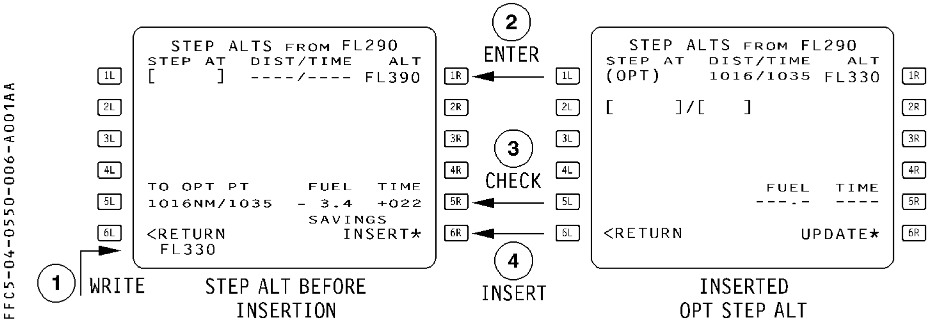
– **CHECK the FUEL and TIME SAVINGS, and predictions on the 5L and 5R fields.**

– **INSERT it, if adequate.**
R After insertion, the optimum step climb is only updated when the pilot presses the
R UPDATE prompt [6R].
R The ND shows symbols for the start of climb and the top of climb. The MCDU shows associated pseudo waypoints.
It is possible to convert an optimum step to a geographic step by overwriting the [1L] field (see geographic step).

R ● **When reaching the step climb pseudo waypoint :**

R – **REQUEST climb clearance.**

– **ADJUST the FCU altitude to the STEP ALT, and PUSH.**



Entering a GEOGRAPHIC STEP

– **WRITE a step altitude into the scratchpad.**
The format is :
· Place/altitude (or FL)
· Place/distance/altitude (or FL)
The place must be along the track.

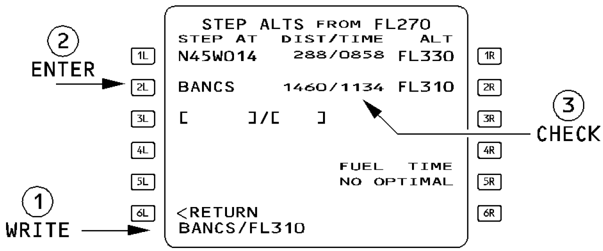
– **ENTER it in [1L] to [4L] field.**
It is possible to independently modify either the place or the altitude of an existing step altitude. It is not possible to modify with a single entry both the place and the altitude : An entry "place/xxx" will be taken by the system as an along track off set of xxx nautical miles.

– **CHECK the predictions**

● **When reaching the step climb or descent pseudo waypoint :**

– **REQUEST climb or descent clearance.**

– **ADJUST the FCU altitude to the STEP ALT, and PUSH.**



INSERTED
GEOGRAPHIC STEP ALT

FFC5-04-0550-007-A001AA

The DIST/TIME field may display the following messages :
– ABOVE MAX if the step altitude exceeds the MAX ALT.
R – IGNORED if the step end point is less than 50 NM from the top of descent.
R – STEP NOW if the aircraft is within 20 NM from the step point.
If the aircraft passes the step waypoint without commencing a climb or a descent, the system deletes the step from the vertical F-PLN automatically ("STEP DELETED" appears) and recomputes the predictions.
A step is not deleted if the FCU altitude is moved only partially towards the step altitude. The flight phase remains at cruise, when a step is initiated.

R
R
R *Note : For an altitude restriction defined at a waypoint located less than 50 NM before the top of descent, and at an altitude lower than the cruise flight level, it is recommended to enter an altitude constraint, rather than a step.*

IMMEDIATE CHANGE OF LEVEL IN CRUISE

when the pilot changes his flight level without inserting a step :

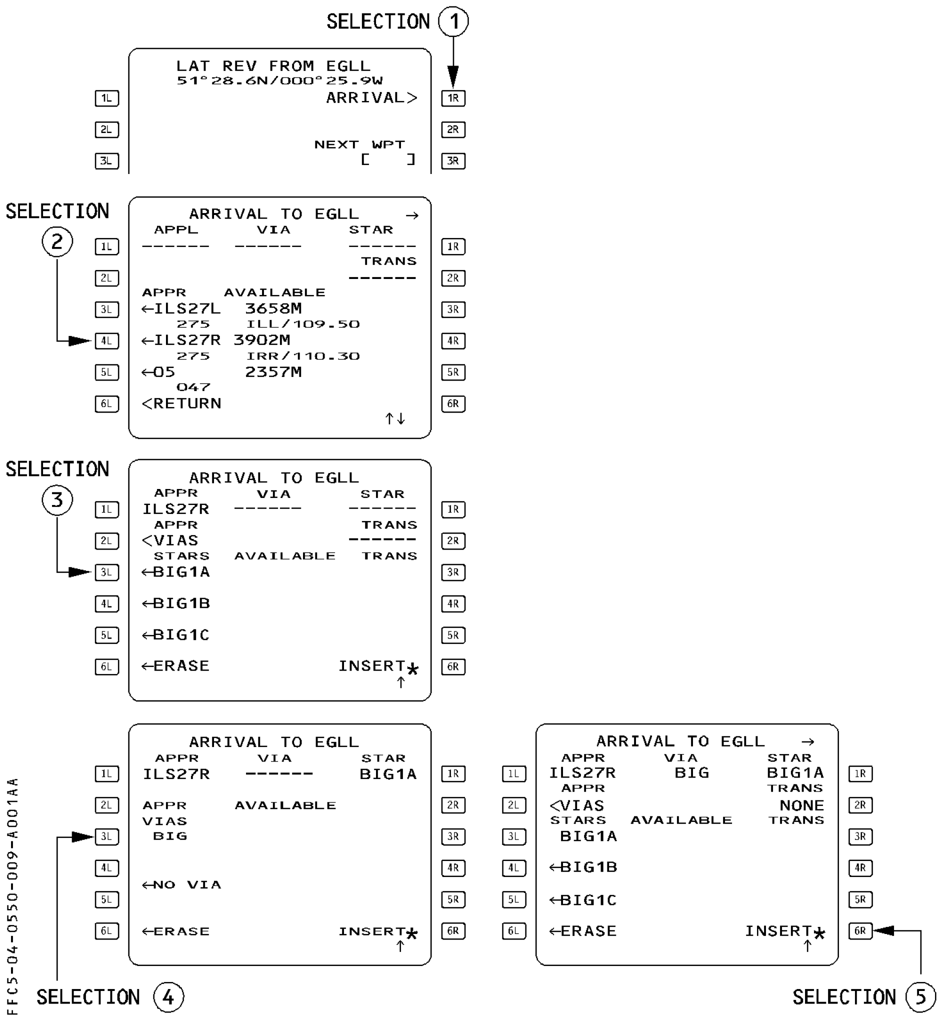
- If the FCU-selected altitude is above the previous CRZ FL, the CRZ FL on the PROG page changes to the new flight level.
- If the FCU-selected altitude is lower than the previous CRZ FL and if the distance to DEST is more than 200 NM, the CRZ FL on the PROG page changes.
  In that case Mach target is managed as follows :
  · At the start of the descent, the Mach target is the managed Mach number at the initial cruise flight level.
  · When the aircraft reaches the new flight level, the Mach target switches either to the Mach number for the lower CRZ FL, or to the speed for the lower CRZ FL if the aircraft reaches the crossover altitude. This logic prevents the aircraft from exceeding Vmo during descent.
- If the FCU-selected altitude is lower than the previous CRZ FL and the aircraft is within 200 NM of its destination, the system activates the descent phase.
  The pilot may reactivate the cruise phase by entering a new cruise flight level in the PROG PAGE

PREPARATION FOR DESCENT AND APPROACH

The preparation for descent and approach consists of :
- Entering PERF and WIND data
- Defining the lateral and vertical F-PLN
- Checking the tuning (auto or manual) of the appropriate navaids

After receiving the arrival information, the pilot should use the following procedure.

REVISION OF LATERAL F-PLN



– **PERFORM a lateral revision at destination**

– **SELECT an ARRIVAL**

– **SELECT an APPROACH, a STAR, a TRANSITION, a VIA.**
When the pilot selects successive items, the page are automatically sequenced. But pressing the [→] key brings up the APPR and STAR page successively.

– **CHECK the temporary revision including the missed approach.**

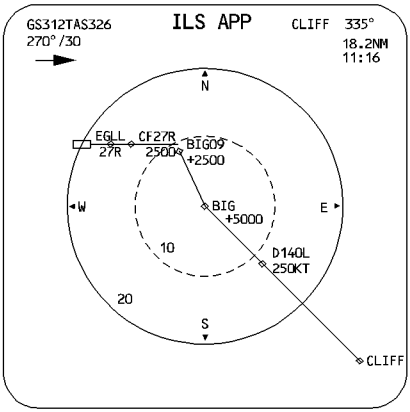
– **INSERT the temporary revision, [6R] key.**

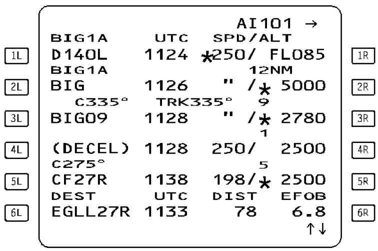
REVISION OF VERTICAL FLIGHT PLAN

– **CHECK the speed and altitude constraints as displayed on the ND. (Use the CSTR pusbutton).**

– **ENTER any additional speed or altitude constraints using the vertical revision page.**
In order not to be too fast when commencing approach, you may insert a speed constraint at the FAF (Final Approach Fix).
When all computations are completed :

– **REVIEW the flight plan using the approach chart.**
When the destination runway changes and if the previously selected STAR is compatible with the new runway, the system selects it automatically in the temporary F-PLN. If the pilot has entered any revision or constraint on this STAR, it will not be transferred. The pilot must reenter it in order to retain it for this approach.





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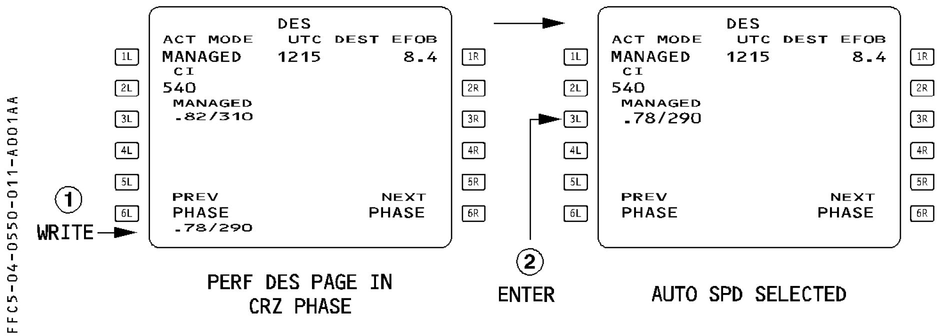
ENTERING THE WINDS FOR DESCENT

Refer to 4.04.20.

PRESELECTING A MANAGED SPEED/MACH

As long as the descent phase is not active, the PERF DES page may either be used to select a speed, or a Mach number, or both, to replace the optimum descent speed.
The Flight Guidance Computer then uses the entered speed, instead of the optimum speed for computing the descent profile.
When the system switches to the descent phase, it sets the MANAGED target speed to the entered speed. From there, the speed may only be modified by using the FCU selector knob.
Once in descent phase, the pilot cannot modify the MANAGED speed again.



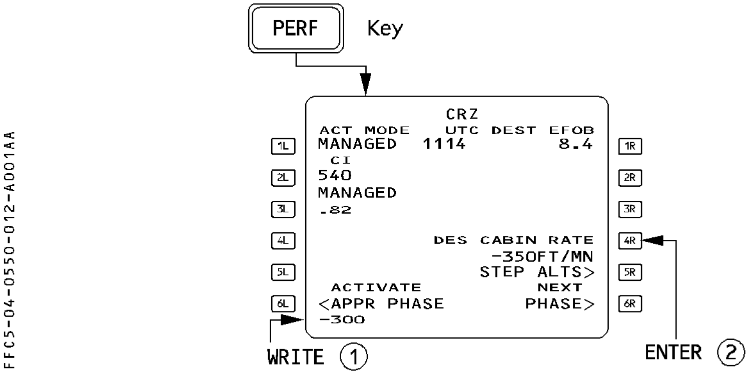
PERF DES PAGE IN CRZ PHASE

AUTO SPD SELECTED

Procedure

- **PRESS the PERF key on the MCDU.**
- **SELECT the “NEXT PHASE” prompt.**
- **WRITE the descent speed into the scratchpad and ENTER it.**
  The 3L field displays the imposed managed speed value.

MODIFYING THE CABIN RATE



Procedure

- PRESS the PERF key on MCDU
- WRITE the new cabin rate into the scratchpad
- ENTER it in the [4R] field.

ENTERING THE APPROACH DATA

– **From PERF DES page, SELECT "NEXT PHASE" [6R] key to display the APPR page.**

– **ENTER QNH, TEMP, WIND at destination (magnetic or true North reference depending on the airport's reference). MDA/MDH or DH**
(The PFD displays the MDA/MDH or DH only when the distance to destination is less than
250 NM).

– **CHECK and, if necessary, MODIFY**
· LDG CONF (landing configuration)
· Vapp (the FM-computed value may be modified)
· TRANS ALT (transition altitude)

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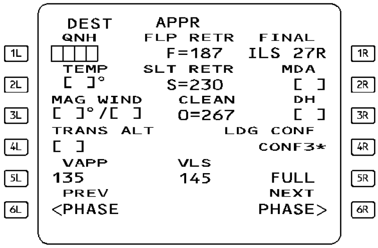

The scratchpad displays "ENTER DEST DATA" if the approach page is not completed when the aircraft is 180 NM from destination.

– **SELECT "NEXT PHASE" in order to display the GO AROUND page.**

– **CHECK and, if necessary, MODIFY the THR RED ALT and the ACC ALT.**

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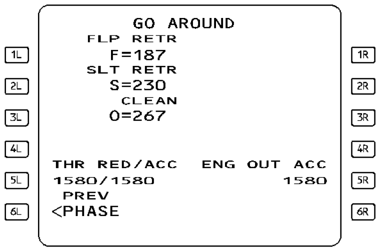

SELECTING THE RADIO NAVAIDS

– **CHECK or SELECT the NAVAIDS appropriate for the approach.**
For an ILS procedure, the ILS will be autotuned.
NDBs must be entered manually.

<u>Note</u> : When the destination has a VOR/DME, ENTER it manually in the VOR field. Enter its identifier in the BRG/DIST field of the PROG page. This allows you to perform a permanent NAV accuracy check.

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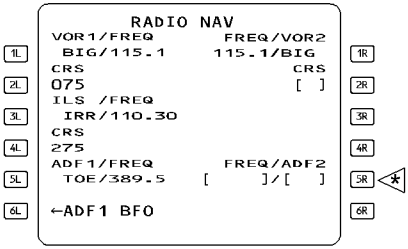


COST INDEX FOR LONG-RANGE CRUISE

The pilot can use the table on this page to find an approximate value for the cost index for long-range cruise.
This unique cost index allows a specific ± 1 % around the specific range at long-range cruise speed. This cost index is valid for CRZ FL = OPT ALT ± 10 000 feet.

R

AIRCRAFT	ENGINE	CI LRC	
		kg/min	100 lbs/hr
A340-200/300	CFM 5C4	50	67
	CFM 5C3	50	67
	CFM 5C2	50	67
A340–500/600	RR 553/556	140	185
A330	GE 1A2/1A3/1A4	40	53
	PW 4168/4164/4168A	30	40
	RR 772/772B/772C/768	40	53

R **DESCENT INITIATION**

The top of descent, displayed on the F-PLN page (T/D) and on the ND (⤵), is a position that the system calculates, assuming that the aircraft will begin its descent in DES mode with managed speed, and that the system will guide the aircraft along the descent profile computed with all the vertical F-PLN data (ALT CSTR, MANAGED MACH/SPD, SPD CSTR, SPD LIMIT) to reach VAPP at 1000 feet AGL.

R *Note : The ND does not display the top of descent ⤵ when HDG (or TRACK) mode is engaged.*

Procedures

When the aircraft reaches the top of descent (T/D) :

- **SELECT the altitude target.**
- **PUSH the ALT selector knob. DES mode engages.**
- **CHECK the FMA annunciators.**

R **DESCENT MONITORING**

DES MODE ENGAGED

When DES mode is engaged, NAV mode is engaged, and the system takes into account all altitude and speed constraints.
The key parameter for monitoring the descent is the vertical deviation (VDEV) displayed on the PFD and on the PROG page, which indicates whether the aircraft is on, above, or below the descent profile.

Procedure

– **SET the ATC cleared altitude on the FCU (considering also what is the safe altitude).**
If the lowest safe altitude is higher than the ATC-cleared altitude, check with ATC that this constraint applies.
If it is confirmed, SET the FCU altitude to the safe altitude until it is safe to go to the ATC-cleared altitude.

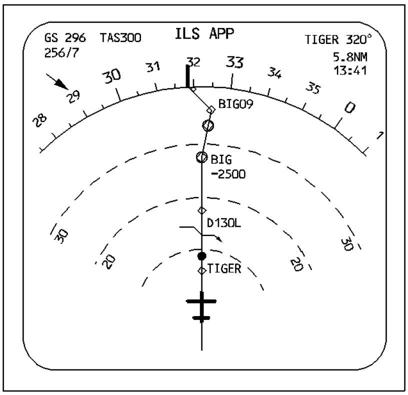
– **MONITOR the vertical deviation (VDEV) on the PFD and the PROG page.**

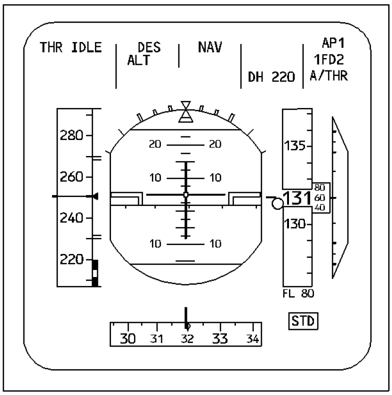
– **MONITOR the speed change that occurs when the aircraft reaches a speed change symbol (magenta ball) under managed speed.**

– **MONITOR the FMA (ALT*, ALT CST*, ALT, ALT CST) when the aircraft reaches level symbols.**

● **If the aircraft is on the descent profile**
The aircraft is considered to be on the vertical profile when it is within 50 feet of it. VDEV is close to zero, and the system predicts that it will match constraints until the aircraft levels off at the next FCU altitude.

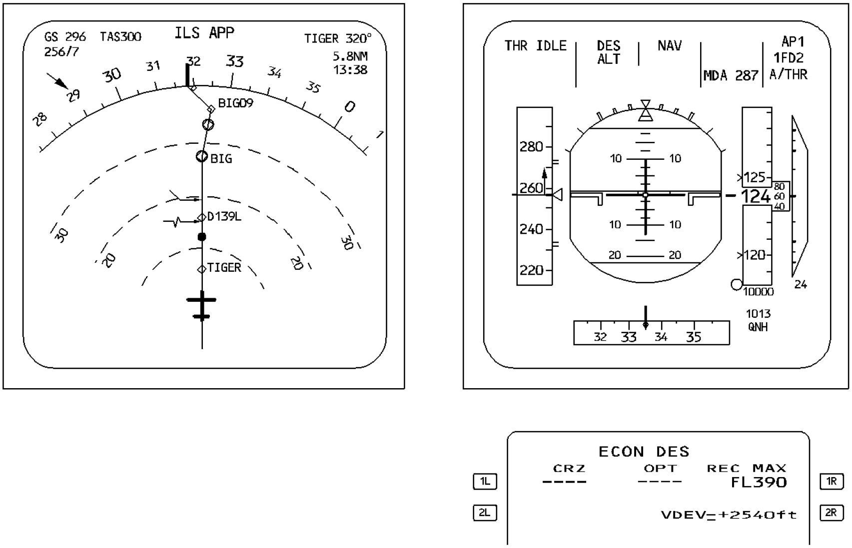
– **MONITOR the predicted descent point after the next level-off.**
The autothrust adjusts the thrust for the particular segment. The first FMA column may display "THR IDLE" or "SPEED".





FFC5-04-0560-002-A001AA

- **If the aircraft is above the descent profile**
  VDEV is down on the PFD and positive on the PROG page.
  The autothrust sets IDLE thrust and the AP increases speed by calling for down elevator. If the aircraft reaches the upper limit of the managed speed range, the aircraft diverges and maintains the upper limit speed.



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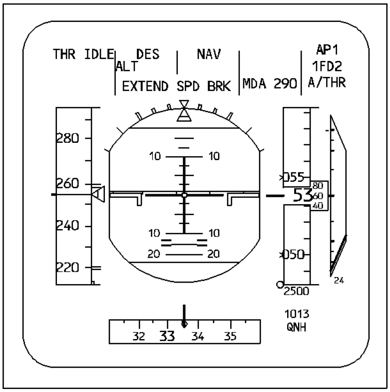
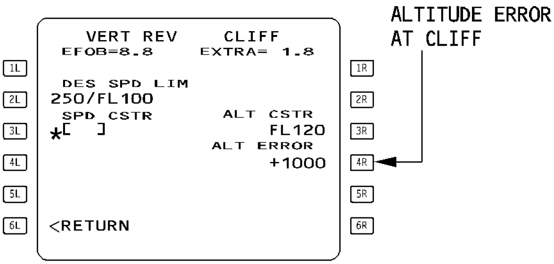
Procedure

– **SELECT a descent speed higher than the upper limit when possible.**

– **MONITOR the intercept symbol ∿→ .**
When this symbol reaches the next ALT CSTR waypoint "EXTEND SPD BRK" appears on the PFD indicating that speedbrakes must be extended in order to match the next altitude constraint. This is an advisory message.

<u>Note</u> : *When DES mode is engaged, the speedbrake extension will not necessarily increase the descent rate. It does so only if the aircraft is above the profile. If the aircraft is on or below the profile : the system will add thrust to keep the aircraft on profile and within the speed target range.*





- **If a speed constraint is predicted to be missed :**

– SELECT an appropriate speed.

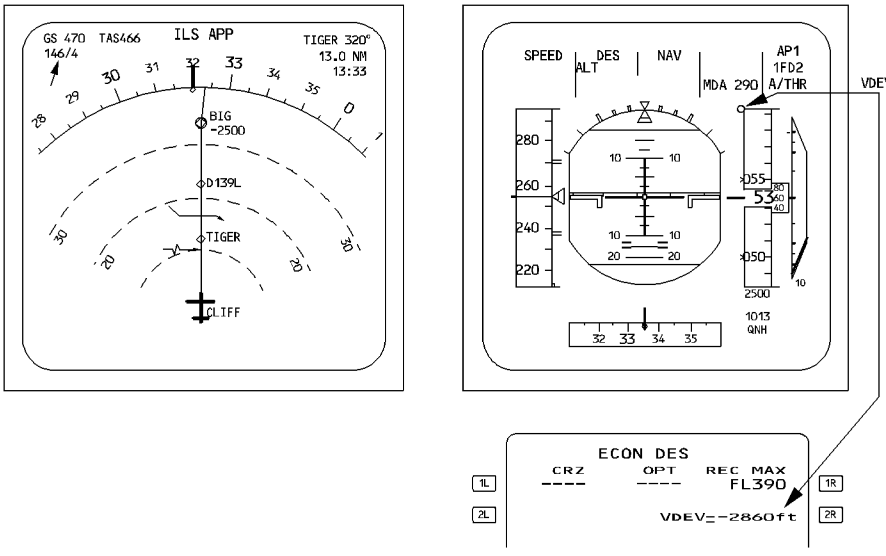
– RESUME managed speed when the aircraft is back on the descent path.

- **If the aircraft is below the descent profile :**
  VDEV is up on the PFD and negative on the PROG page. The system maintains the target speed (managed or selected speed).

  – **MONITOR the intercept symbol ([↗]) on the ND, and any leveling off at the next ALT CSTR.**

R ● **If the aircraft is flying above the max descent speed limit altitude, or 5 000**
R **ft above the destination elevation :**
R The FMGS maintains the V/S at – 1 000 ft/min and the target speed, until the aircraft
R reaches the altitude constraint or intercepts the descent profile.

R ● **If the aircraft is flying below the max descent speed limit altitude, or 5 000**
R **ft above the destination elevation :**
R The FMGS maintains the V/S at – 500 ft/min and the target speed, until the aircraft
R intercepts either the altitude constraint or the descent profile.



FFC5-04-0560-005-A105AA

If the rate of descent has to be increased (ATC requirement) :

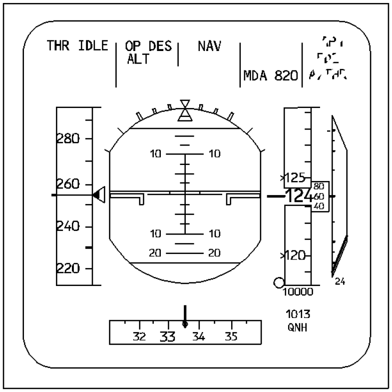
– **SELECT OP DES mode.**

– **Increase the target speed, or extend the speedbrakes.**

OP DES, V/S or FPA MODE ENGAGED

- In either case, the aircraft is no longer guided on the descent profile and altitude constraints are disregarded. If NAV mode is engaged the ND displays a white circle on waypoints with an altitude constraint. If NAV mode is disengaged, the circles are removed.
- The PFD still shows VDEV for reference purposes.
- The target altitude is always the FCU selected altitude (shown in blue).
  On the ND, level-off symbol is blue (no constraint). If NAV mode is engaged and the speed target managed, speed constraints are taken into account.

FFC5-04-0560-006-A001AA



Vertical position may also be accessed by using the energy circle displayed on the navigation display when HDG/TRK is engaged.

Procedure

– **SET the FCU altitude as cleared by ATC, while also considering the applicable safe altitude.**
If the next safe altitude is higher than the ATC-cleared altitude, check with ATC that this constraint applies.
If confirmed, set the FCU altitude at the safe altitude until it is safe to fly at the cleared altitude.

– **MONITOR the speed target when the aircraft reaches the speed change symbol.**

– **MONITOR the FMA ALT*, ALT, upon reaching the level symbol.**

– **MONITOR the energy circle on the ND when in HDG/TRK mode.**

The MCDU F-PLN page presents SPD/ALT constraint-matching predictions, which assume that DES mode is reengaged immediately.

– **CHECK the predictions before reengaging DES mode (in order to resume the descent profile).**

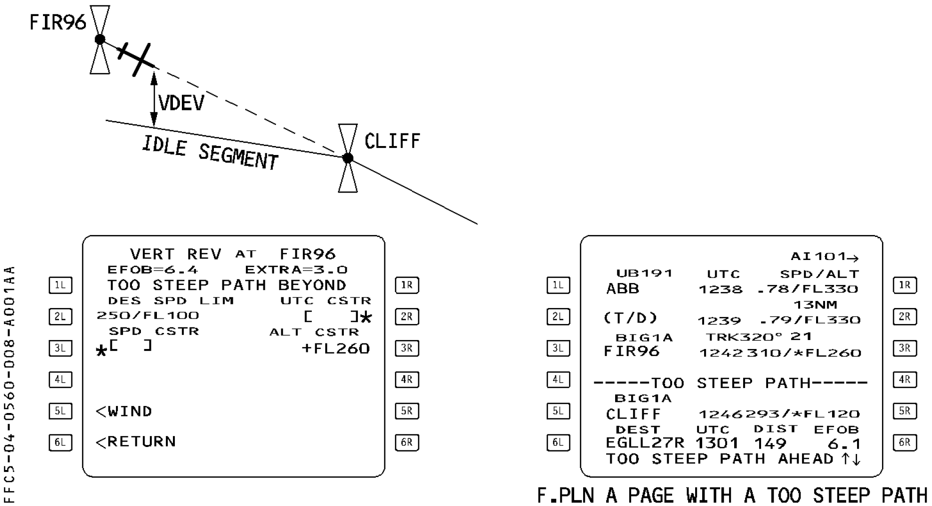
Note : *VDEV is available on the PFD even in HDG mode ; it is a valuable tool for monitoring the descent as long as cross-track error (XTK) is less than five nautical miles*
The aircraft decelerates for approach automatically only if it flies over the DECEL pseudo waypoint with NAV mode engaged (or LOC, LOC).*

MONITORING THE NAVIGATION IN THE TERMINAL CONTROL AREA

If the MCDU "SYSTEM (AREA) (PROCEDURE) RNP IS XX.X" message is displayed, the pilot will manually verify the entered RNP value in the REQUIRED field of the PROG page, and clear or modify it, if it is not in accordance with the RNP value specified in the area (Nav or approach chart).

TOO STEEP PATH

"TOO STEEP PATH AHEAD" appears on the MCDU scratchpad, when the system predicts this situation. TOO STEEP PATH is displayed on the F-PLN page.
When the aircraft is crossing the first waypoint of a TOO STEEP PATH, the system computes a flyable descent profile (with an idle segment). The VDEV makes a jump because it is related to a new profile.



F.PLN A PAGE WITH A TOO STEEP PATH

Procedure :
When passing the first waypoint of the TOO STEEP PATH :

- **MONITOR VDEV and predictions at the next CSTR waypoint.**
- **If required, EXTEND the speedbrakes before seeing the "EXTEND SPD BRK" message.**
- **CONSIDER using a holding pattern, if necessary.**

HOLDING PATTERN

A hold may be required during the descent and manually inserted.

- **Procedure**

  – **PRESS the F-PLN key.**

  – **SELECT the lateral revision page.**

  – **SELECT the HOLD prompt.**

  – **CHECK the HOLDING data, and MODIFY it if necessary.**

  – **CHECK the temporary flight plan and INSERT the holding pattern in it.**

  Note : If the holding fix is close to the DECEL pseudo waypoint and the speed is managed, manually activate the approach phase to change the managed target speed to approach speed (VAPP). This will avoid having an inappropriate increase of speed.

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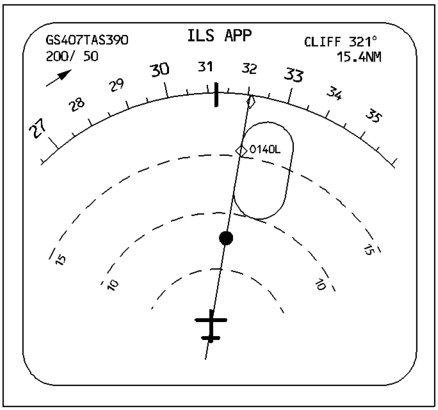
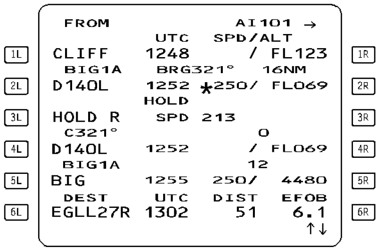




MANUAL TERMINATION

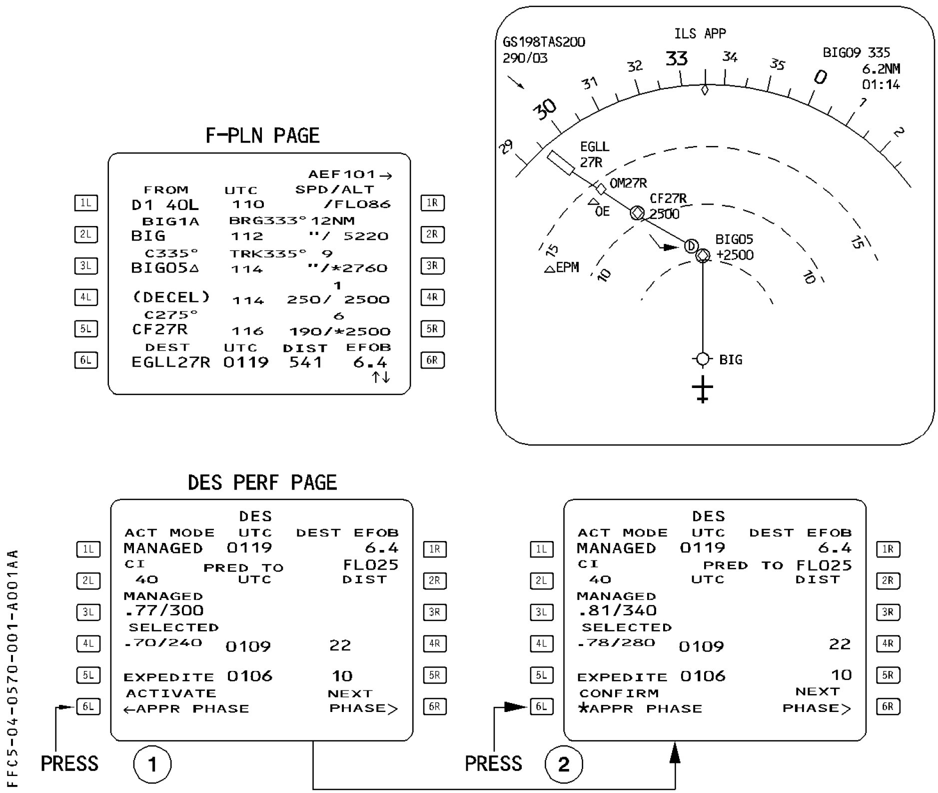
You should not use DES mode when entering a leg with manual termination. Manual termination, which is defined as a track or a heading with no termination, is always part of a database procedure.
The computed descent flight profile may not be adequate when flying this type of leg.

INITIAL APPROACH

UPON REACHING THE INITIAL AREA

– ACTIVATE the APPROACH PHASE, either

- Automatically, when flying over the DECEL pseudo waypoint (NAV/APPR NAV or LOC* or LOC mode engaged), or
- Manually on the PERF page, when the HDG mode is engaged, if an early deceleration
R is required, or when flying a go-around.



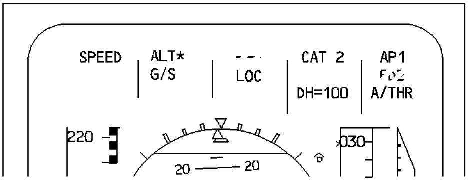
MANAGED SPEED

– **CHECK that managed speed is active : MONITOR the target speed.**

<u>Note</u> : *The aircraft decelerates automatically at DECEL pseudowaypoint when managed speed is active and NAV mode is engaged (DECEL point displayed in magenta).*

During the approach, the autothrust maintains the maneuvering speed of the current configuration. (GD, S, F, VAPP).

FFC5-04-0570-002-A100AA



If ATC requires a specific speed :

<u>Procedure</u>

– **SWITCH to selected speed (turn and pull the speed selector knob on the FCU).**

– **ADJUST the aircraft configuration accordingly.**

If ATC orders successive step descents down to the final approach flight path :

– **Use the V/S or FPA mode.**

– **MONITOR VDEV.**

NAV ACCURACY

As required by the SOP.
Without installed GPS and when no DME is available for the accuracy check, use HIGH/LOW on the PROG page.
In this case, consider a “HIGH” to be equivalent to a positive crosscheck.

ATC CLEARANCE

– **MODIFY the F-PLN, RAD NAV, and PERF APPR data to agree with the latest clearance and landing information.**

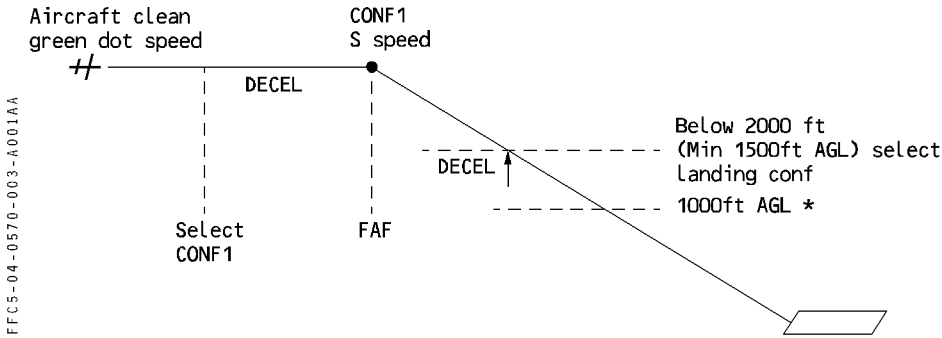
ILS APPROACH

INTERMEDIATE/FINAL APPROACH (ILS approach entered in the F-PLN)

The preferred technique for flying an ILS approach is to fly a decelerated approach using the AP/FDs, the LOC and G/S modes, autothrust in the SPEED mode, managed speed target is recommended.

Decelerated approach

The decelerated approach technique brings the aircraft down to 1 000 feet, at VAPP. In most cases, the interception of the final descent path is achieved with Conf 1 at S speed.



∗ The approach must be stabilized at approach speed (mini ground speed) in the landing configuration before reaching 1 000 feet AGL.

APPROACH MODE ACTIVATION (LOC - G/S)

When cleared by ATC and when appropriate :

– **PRESS the APPR pushbutton to arm the APPR mode for the approach entered in the flight plan.**

Note : If a non precision approach is selected in the active flight plan and if the pilot manually tunes an ILS on the RAD NAV page, the MCDU and PFD display "CHECK APPR SELECTION". This message is a reminder to the pilot that, although an ILS is tuned on RAD NAV page, the available approach guidance modes are APP NAV - FINAL when the APPR pushbutton is pressed in on the FCU.

The FCU APPR pushbutton arms or engages LOC and G/S modes, if :
· An ILS approach is entered in the flight plan, or
· No approach, or only a runway, is entered in the flight plan, and an ILS is manually-tuned on the RAD NAV page, or
· Both RMPs are set to NAV, and an ILS is selected.

AUTOLAND

– **CHECK that the FMA displays the aircraft capability (CAT2 or CAT3) for the intended ILS approach.**

– **MONITOR the radio automatic callout.**

● **At 350 feet RA :**

– **CHECK that "LAND" is displayed on the FMA.**
If LAND is not displayed, do not perform an autoland. A go-around must be performed, if visual references are insufficient.

– **CHECK ILS course.**

● **Between 50 and 40 feet RA :**

– **CHECK that "FLARE" is displayed on the FMA.**

● **At approximately 30 feet RA :**

– **CHECK that "IDLE" is displayed on the FMA and that autothrust starts to reduce thrust toward IDLE.**

● **At 10 feet, "RETARD" callout comes up :**

– **MOVE the thrust levers to IDLE.**
Autothrust disconnects.

● **At touchdown :**

– **CHECK that "ROLL OUT" appears on the FMA.**

● **At the end of the rollout :**
R Disconnect the autopilot.
R If the flight crew does not disconnect the AP at the end of the rollout, and uses the
R nosewheel steering handwheel to taxi the aircraft off the runway, the following will
R occur :
R – The AP will try to steer the aircraft back to the runway centerline, if the nosewheel
R steering handwheel is released and the aircraft heading is less than 20 degrees off
R the runway centerline.
R – The AP will automatically disconnect, if the aircraft heading is 20 degrees or more
R off the runway centerline.

MANUAL LANDING

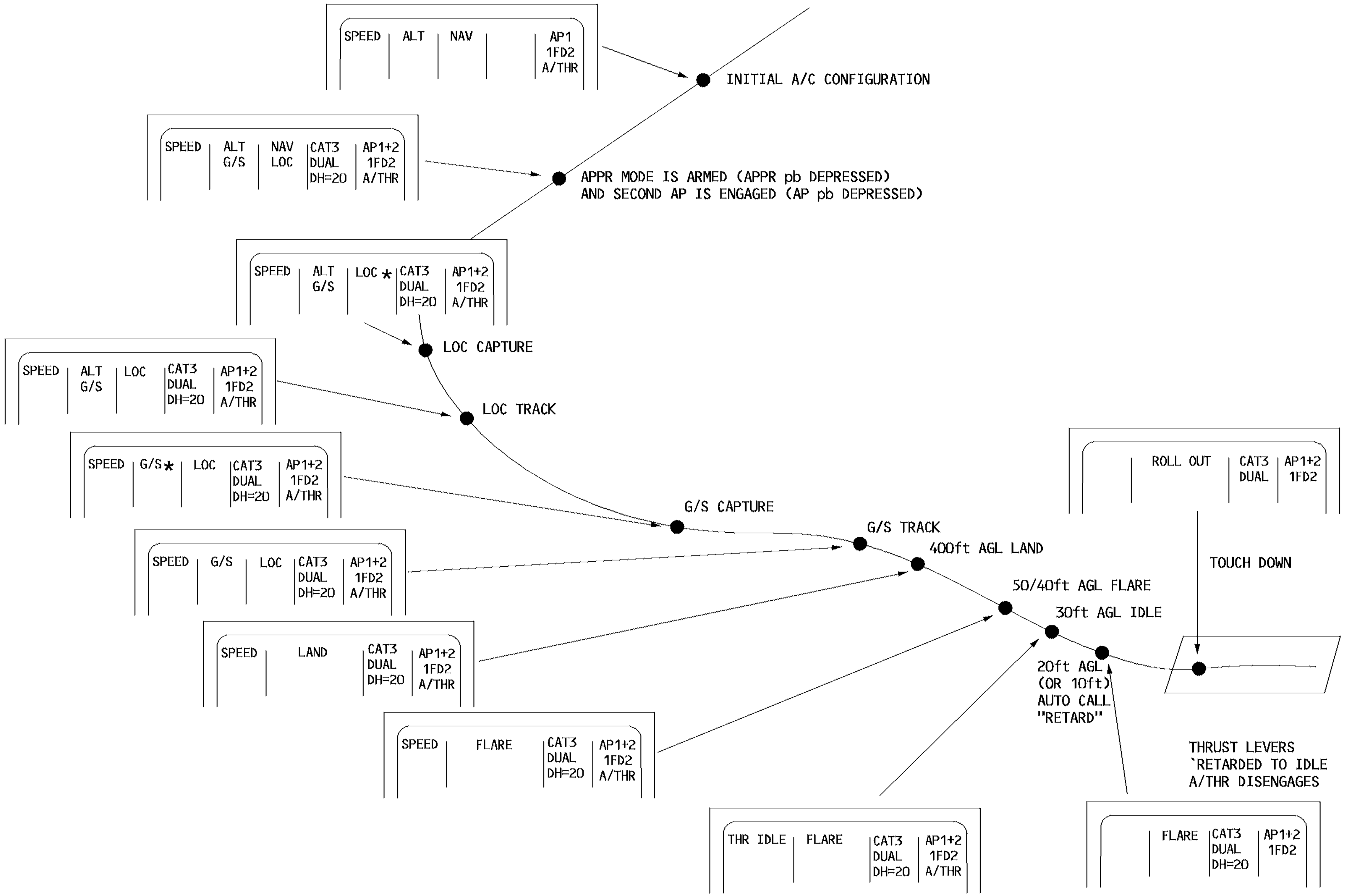
- **at DH**

  – **DISCONNECT the autopilots. SPEED mode remains engaged.**
- **At 20 ft "RETARD" automatic call out comes up**

  – **MOVE the thrust levers to IDLE if they are not there already. (The autothrust disconnects).**
- **At touch down**
  "ROLL OUT" appears on the FMA and the yaw bar comes up on the PFD.

  Note : The retard call out is only a reminder when a manual landing is performed.

STANDARD ILS AUTOMATIC APPROACH



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EARLY SELECTION OF APPROACH MODE LOC - G/S

Pressing the APPR pushbutton arms LOC and G/S.
The RA signal is not valid above 8200 feet AGL (TRT) or 5000 feet AGL (Collins). If the aircraft is cleared for an ILS approach when it is higher than 8000 feet AGL or 5000 feet AGL (Collins), proceed as follows :

– **PRESS the APPR pushbutton on the FCU.**

● **When aligned on the localizer check LOC and G/S engagement :**

  – **CAT 1 is displayed on FMA. (Radio altimeters not yet valid).**

  – **Check that the FMA displays the correct capability for the intended approach when the aircraft is below 5000 feet AGL.**

GLIDE SLOPE INTERCEPTION FROM ABOVE

If the aircraft is above the glide slope, the system will not capture the G/S automatically. The pilot must bring the aircraft onto the glide slope beam, and selects an appropriate V/S to intercept it. Refer to SOP.

DATA LOCK

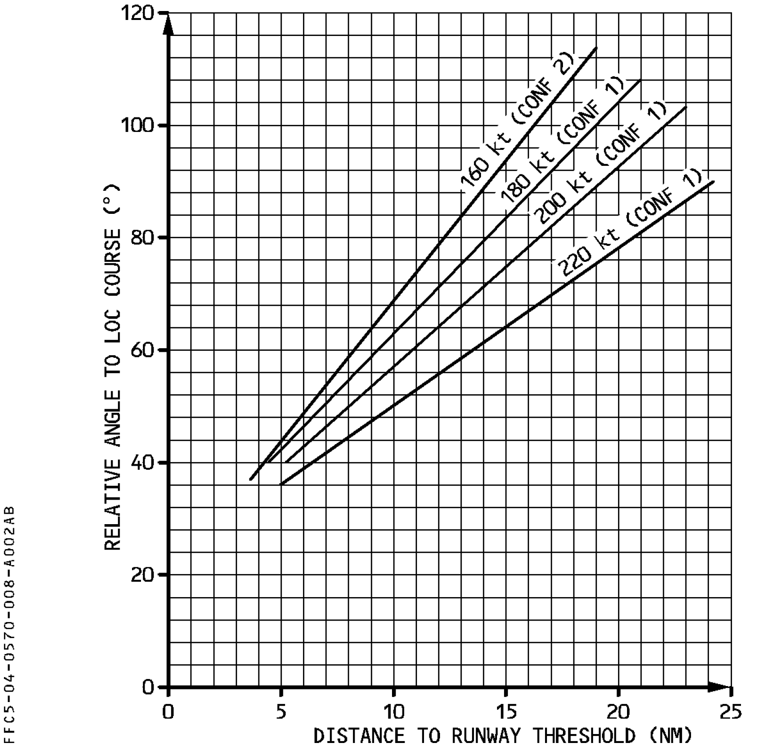
When the aircraft reaches 700 feet RA with APPR mode (LOC and G/S) armed or engaged, the ILS frequency and course are frozen in the receiver.
This function (ILS tune inhibit) is available when at least one AP/FD is engaged. Any attempt to change ILS frequency or CRS through the MCDU or RMP does not affect the receiver.
If the speed is managed, the system does not accept any modifications the flight crew may enter on the PERF APPR page (surface wind, selected landing configuration, or VAPP) for speed guidance purposes below this altitude.
When the aircraft reaches 400 feet RA, LAND mode engages. The flight crew can disengage this mode only by engaging the GO AROUND mode.

R **USE of RMPs for ILS/DME**

R If both FMGCs fail, the flight crew can use the RMPs (Radio Management Panels 1 and 2)
R for back up tuning. Either RMP controls ILS. Prior to select an ILS frequency on one of the
R RMPs, the flight crew has to select “NAV” button from RMP1 and RMP2.

R **LOCALIZER (LOC) BEAM CAPTURE**

R The flight crew must always monitor the capture of a LOC beam. During this evolution, the
R PFD and ND must indicate that associated deviation indications move toward the centre
R of the scale. To avoid performing a false capture, the flight crew must be careful not to arm
R the LOC too early.
R The following graph shows the angle of interception versus distance to the runway
R threshold that ensures that the aircraft will not overshoot the axis by more than one and
R a half dot.
R



The capture begins when the deviation is two dots or less. It is programmed to line the aircraft up on the beam with a single overshoot, even if the intercept angle is large.

Note : ICAO requires loc beam to ensure a normal capture within 10 NM and +/– 35 degrees of the course centerline. Some current ILS systems just meet the requirement and are subject to false capture outside these limits.

SWITCHING FROM NON ILS TO ILS APPROACH

If an ILS approach is possible when a non ILS was previously scheduled, use one of the following procedures :
1. Use a secondary flight plan to prepare the alternate ILS approach, time permitting.

– **COPY the ACTIVE flight plan.**

– **REVISE the ARRIVAL : insert the ILS approach and the applicable STAR/VIA.**

– **On the RAD NAV page, TUNE in the ILS manually.**

– **REVISE the PERF APPR page.**

2. ATC changes the clearance from the non-ILS to the ILS approach.

● **If a secondary flight plan has been prepared :**

  – **ACTIVATE the SEC F-PLN and adjust.**

  – **Follow subsequent standard procedures.**

● **If a secondary flight plan has not been prepared :**

  – **REVISE the ARRIVAL on the primary F-PLN, inserting the ILS approach.**

  – **REVISE the PERF APPR page.**

  – **Follow subsequent standard procedures.**

CAUTION

If the pilot decides to fly the ILS approach without revising the arrival of the primary flight plan (a non ILS approach is in the F-PLN), LOC and G/S modes will not be available when he presses the APPR pushbutton.
Consequently, he should :
· Manually TUNE in the ILS on the RAD NAV page : CHECK that the CHECK APPR SELECTION message comes up.
· Press the ILS pushbutton and select ROSE ILS on the EIS CONTROL panel.
· Use HDG, V/S or TRK, FPA modes to fly the ILS.

TASK SHARING DURING CAT I, CAT II and CAT III APPROACH AND LANDING

FCOM 3.01.22 provides all limitations regarding CAT I, CAT II and CAT III approaches and landings. This includes precautions to be taken when performing autoland on CAT I ILS beam with good visibility.
Anytime a precision approach is performed the PNF must announce that a flight parameter is being exceeded, if :
— During glide beam capture
R · Pitch attitude goes below 0 degrees, or above 10 degrees (nose up).
· Vertical speed exceeds plus 500 feet/minute or minus 1 250 feet/minute.
— During final approach
· Speed goes below speed target minus 5 knots or above speed target plus 10 knots (announce "SPEED")
R · Pitch attitude goes below 0 degrees, or above 10 degrees (announce "PITCH")
· Bank angle becomes greater than 7 degrees (announce "BANK")
· Descent rate becomes greater than 1 000 feet/minute (announce "SINK RATE")
· There is too much LOC or GLIDE deviation (announce "LOCALIZER" or "GLIDE").
If the flight crew suspects that autopilot guidance is not effective, they should :
— Use the instinctive disconnect pushbutton to disconnect the autopilot, or
— Perform an automatic go-around.
The flight crew may perform a CAT II/CAT III approach, if :
— The FMA displays the correct category
— The required systems and functions are operative
— The airport is approved for either a CAT II or CAT III operations
— They are qualified to perform the specific approach.

CAT III Approach

AUTO CALL OUT RA is mandatory.
Autothrust in SPEED MODE is mandatory.

Note : AUTO CALL OUT is not mandatory for CAT 2 approach : The PNF may perform this function.

TASKSHARING FOR CAT I APPROACH (or better)

R

PF	PNF
At 350 feet AGL (or RA)	
· Check ILS course on the PFD · Announce "LAND" when displayed on FMA	
At Decision Altitude (or Decision height) + 100 feet*	
	· Monitor or announce "HUNDRED ABOVE"
At Decision Altitude (or Decision Height)*	
	· Monitor or announce "MINIMUM"
If external visual references are sufficient	
· Announce "CONTINUE"	
<u>If automatic landing not performed</u>	
· Disconnect the APs and perform the landing	· Monitor auto callouts or announce, as appropriate : 300 feet 200 feet 100 feet 50 feet 30 feet 20 feet 10 feet
· At "RETARD" annunciation, retard thrust levers to IDLE, if not yet performed	
<u>If automatic landing performed</u>	
Refer to "Task Sharing for CAT III Approach without DH" : From 40 ft RA to Touchdown	
If external visual references are <u>not</u> sufficient	
· Announce "GO-AROUND, FLAPS" and execute	

(*) : Decision Height, if QFE is used.

<u>Note</u> : – CAT I minimum (DH or DA) is always baro-referenced and should be entered in the MDA/MDH field of the PERF APPR page.
– Pin Programming allows Operators to select the required callouts.

TASK SHARING FOR CAT II APPROACH

R

PF	PNF
At 350 feet RA	
· Check ILS course on PFD · Commence outside scanning · Announce "LAND" when displayed on FMA	
At Decision Height + 100 feet	
	· Monitor auto callout "HUNDRED ABOVE"
At Decision Height	
	· Monitor auto callout "MINIMUM".
If external visual references are sufficient	
· Announce "CONTINUE"	
<u>If Automatic landing not performed</u>	
· Disconnect the AP's and perform the landing	· Monitor auto callouts or announce as appropriate : 400 ft 300 ft 200 ft 100 ft 50 ft 30 ft 20 ft
· At "RETARD" annunciation, retard thrust levers to IDLE if not yet performed	10ft "RETARD" auto callout*
<u>If Automatic landing is performed</u>	
Refer to "Task Sharing for CAT III Approach without DH" : From 40 ft RA to Touchdown	
If external visual references are <u>not</u> sufficient	
· Announce "GO-AROUND, FLAPS" and execute	

* "RETARD" auto callout comes up at 10 feet if LAND mode is engaged with one or two APs engaged. Otherwise it is announced at 20 feet.

TASK SHARING FOR CAT III APPROACH WITH DH

R

PF	PNF
At 350 ft RA	
· Check ILS course on PFD · Commence outside scanning · Announce "LAND" when displayed on FMA	
At Decision Height + 100 ft	
	· Monitor auto callouts "HUNDRED ABOVE"
At Decision Height	
	· Monitor auto callouts "MINIMUM"
If external visual references are sufficient	
· Announce "CONTINUE"	
At 40 ft RA	
	· Check FLARE on FMA and announce
At 30 ft RA	
· Monitor thrust reduction and flare by flight instruments	· Monitor auto callouts
At 10 ft RA	
Auto callout "RETARD"	
· RETARD both thrust levers to IDLE · Monitor lateral guidance by external reference	· Monitor engines parameters
At TOUCH DOWN	
	· Check ROLL OUT on FMA and announce
· Select and control reverse thrust	· Check reverse green and announce · Announce 70 kt
· Disengage the APs at the end of the Roll out (when leaving the runway at the latest)	
If external visual references are not sufficient	
· Announce "GO-AROUND, FLAPS" and execute	

TASK SHARING FOR CAT III APPROACH/LANDING WITHOUT DH

R

PF	PNF
At 350 feet RA	
· Check ILS course on PFD · Announce "LAND" when displayed on FMA	
At 100 feet RA	
· If no failure is detected, announce "CONTINUE"	· Monitor auto callout
At 40 feet RA	
	· Check FLARE on FMA and announce
At 30 feet RA	
· Monitor thrust reduction and flare by flight instruments	· Monitor auto callouts
At 10 feet RA	
Auto callout "RETARD"	
· RETARD both thrust levers to IDLE · Monitor lateral guidance by external reference	· Monitor engines parameters
At TOUCH DOWN	
	· Check ROLL OUT on FMA and announce
· Select and control reverse thrust	· Check reverse green and announce · Announce 70 kt
· Disengage the APs at the end of the Roll out (when leaving the runway at the latest)	

R *Note : In case of CAT III without DH, the pilot should enter "NO" in the DH field of the MCDU to avoid false "HUNDRED ABOVE" or "MINIMUM" auto callouts which would not be applicable.*

LANDING CATEGORIES

Each FMGC computes its own landing category : CAT1, CAT2, CAT3 single, and CAT3 dual and displays the corresponding landing category on the FMA.
Each category depends upon the availability of aircraft systems and functions.
When the landing category downgrades, a triple clic aural warning is activated.

FAIL-OPERATIONAL AUTOMATIC LANDING SYSTEM

An automatic landing system is fail-operational if, in the event of a failure below alert height, the remaining part of the automatic system allows the aircraft to complete the approach, flare, and landing. A CAT 3 DUAL system is a fail-operational automatic landing system.

Note : *In the event of a failure, the automatic landing system operates as a fail-passive system.*

FAIL-PASSIVE AUTOMATIC LANDING SYSTEM

An automatic landing system is fail-passive if, in the event of a failure, there is no significant out-of-trim condition or deviation of flight path or attitude, but the landing is not completed automatically. A CAT3 single system is a fail-passive automatic landing system.

Note : *With a fail-passive automatic landing system the pilot assumes control of the aircraft after a failure.*

Below 200 feet (radio altimeter), the FMGS freezes the landing capability until LAND mode is disengaged or both autopilots are off.
Therefore a failure occuring below 200 feet does not change the category of the system.

ALERT HEIGHT

The alert height is the height above touch down, above which a CAT3 autoland would be discontinued and a missed approach executed, if a failure occured in either the airplane systems or the relevant ground equipments.
Below the alert height, if such a failure occurs, the flare, touchdown and roll out may be accomplished using the remaining automatic system.

WARNINGS FOR ILS APPROACH

AUTOLAND warning

With "LAND"or "FLARE" in green on the FMA and at least one AP engaged, the AUTOLAND red light appears on the glareshield when the aircraft is below 200 feet RA and one of the following events occurs :
- The autopilots are lost, or
- The aircraft gets too far off the beam (LOC and G/S flash on PFD), or
- Loss of LOC signal above 15 feet, or loss of glide signal above 100 feet (transmitter or receivers), or
- The difference between both radio altimeter indications is greater than 15 feet.

When the Autoland light comes on, Autoland must be discontinued, (Refer to 4.05.70 pages 17, 18, 19). AUTOLAND warning flashes 3 seconds when the AP is manually disconnected (instinctive disconnect pushbutton) below 200 feet.

Warning of excessive beam deviation

This warning is a flashing of the LOC and G/S scales on the PFD and ND ROSE ILS. It occurs whenever :
- G/S deviation is greater than 1 dot (above 100 feet RA).
- LOC deviation is greater than 1/4 dot (above 15 feet RA).

Warning associated with ILS "landing capability"

- Any downgrading in the aircraft's capability for automatic approach and landing sounds a triple-click aural warning.

Failure of both localizer and glideslope receivers

The PFD and ND (rose ILS mode) display red LOC and G/S flags (if the LS pushbutton has been pressed green). LOC and G/S scales disappear from the PFD.
If LOC or G/S modes are engaged and at least one AP/FD is engaged
- The AP disengages.
- The FD reverts to its HDG - V/S or TRK - FPA modes.

Failure of localizer or glideslope transmitter (when captured)

R — The corresponding index is lost.
R — The LOC and G/S scales flash.
R — The corresponding FD bars flash.
R Above 200 feet RA, if the transmitter failure lasts less than 7 seconds, the FMA retains the
R LOC and G/S modes (or the LAND mode) and the autopilots are able to regain these modes.
R If the failure lasts longer than 7 seconds, the AP disengages and the FD reverts to its
R HDG-V/S or TRK-FPA modes.
R Below 200 feet RA, if the transmitter failure occurs, the AUTOLAND warning appears,
R indicating that the crew must perform a GO AROUND (if insufficient visual references) with
R one or 2 autopilots engaged.

FAILURES AND ASSOCIATED ACTIONS ABOVE 1000 FT FOR CAT II or CAT III

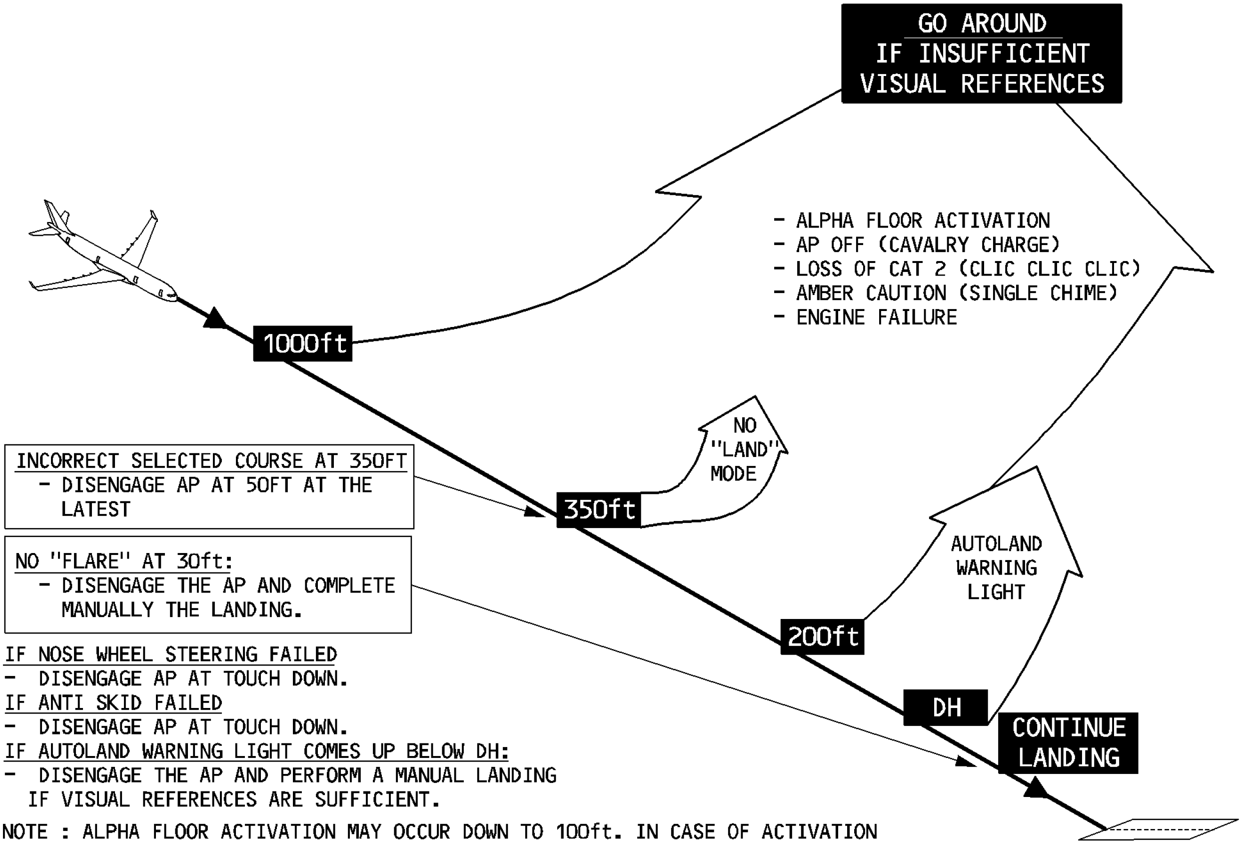
R

<table>
<tr><th>FAILURE
(for multiple failures, the most limiting applies)</th><th>ACTION TO BE PERFORMED ABOVE 1000 FT</th><th>LANDING CATEGORY</th></tr>
<tr><td>ONE ENGINE OUT</td><td>Complete ECAM procedure. Land in CONF3</td><td>CAT III SINGLE</td></tr>
<tr><td>LANDING CAPABILITY DECREASE</td><td>Try to recover</td><td>As displayed on FMA</td></tr>
<tr><td>"AP OFF" warnings</td><td>Try to recover</td><td>As displayed on FMA</td></tr>
<tr><td>LOSS OF A/THR</td><td>Switch AP, and try to re-engage</td><td>CAT II
(if A/THR not recovered)</td></tr>
<tr><td>NOSEWHEEL STEERING</td><td></td><td>CAT III SINGLE
(DH = 50 feet)
Disengage AP at touch down</td></tr>
<tr><td>ANTI-SKID</td><td></td><td>CAT III SINGLE
Disengage AP at touch down</td></tr>
<tr><td>AMBER "CHECK ATT" ON TWO PFDs</td><td>Check with standby horizon, use switching to recover (no switching below 1000 feet)</td><td rowspan="6">CAT III SINGLE
(if the warning disappears)
CAT I
(if not)</td></tr>
<tr><td>AMBER "CHECK HDG" ON TWO PFDs AND TWO NDs</td><td>Check with standby compass, use switching to recover (no switching below 1000 feet)</td></tr>
<tr><td>RED "HDG" ON ONE PFD AND ONE ND</td><td rowspan="4">Use switching to recover (no switching below 1000 feet)</td></tr>
<tr><td>RED "ATT" ON ONE PFD</td></tr>
<tr><td>RED "SPD" ON ONE PFD</td></tr>
<tr><td>DIAGONAL LINE ON ONE PFD AND ONE ND</td></tr>
<tr><td>RED "RA" ON TWO PFDs</td><td>AP and FD not available</td><td>CAT I
(minimum RVR as per regulation)</td></tr>
<tr><td>SLATS/FLAPS FAILURE
(LESS THAN CONF 3)</td><td></td><td>CAT I
Disengage AP at or above 500 feet</td></tr>
</table>

R

FFC5-04-0570-017-A001AA

FAILURES AND ASSOCIATED ACTIONS BELOW 1000FT DURING A CAT II APPROACH



IF NOSE WHEEL STEERING FAILED
- DISENGAGE AP AT TOUCH DOWN.

IF ANTI SKID FAILED
- DISENGAGE AP AT TOUCH DOWN.

IF AUTOLAND WARNING LIGHT COMES UP BELOW DH:
- DISENGAGE THE AP AND PERFORM A MANUAL LANDING IF VISUAL REFERENCES ARE SUFFICIENT.

NOTE : ALPHA FLOOR ACTIVATION MAY OCCUR DOWN TO 100ft. IN CASE OF ACTIVATION BELOW 1000ft, GO AROUND IF INSUFFICIENT VISUAL REFERENCES.

R

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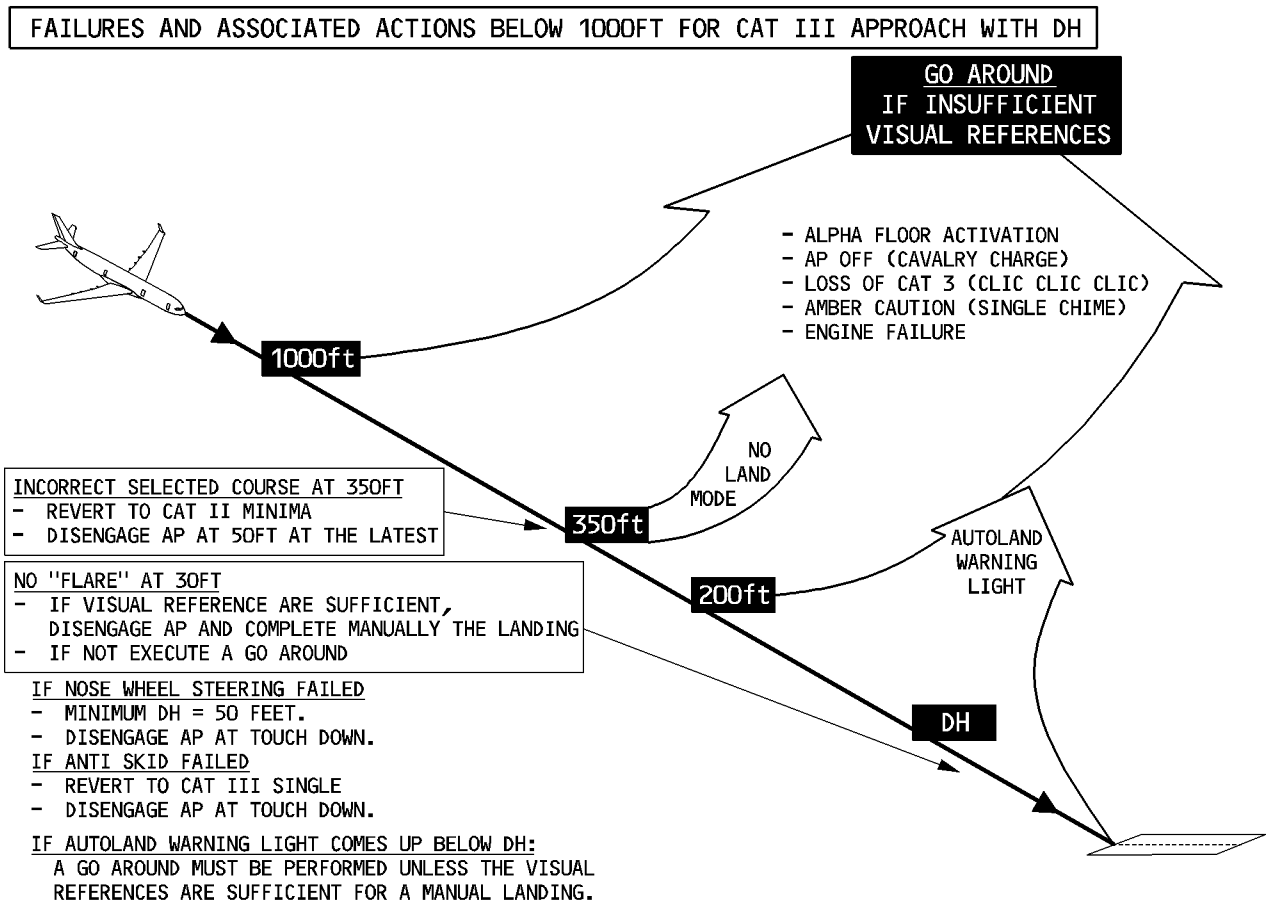

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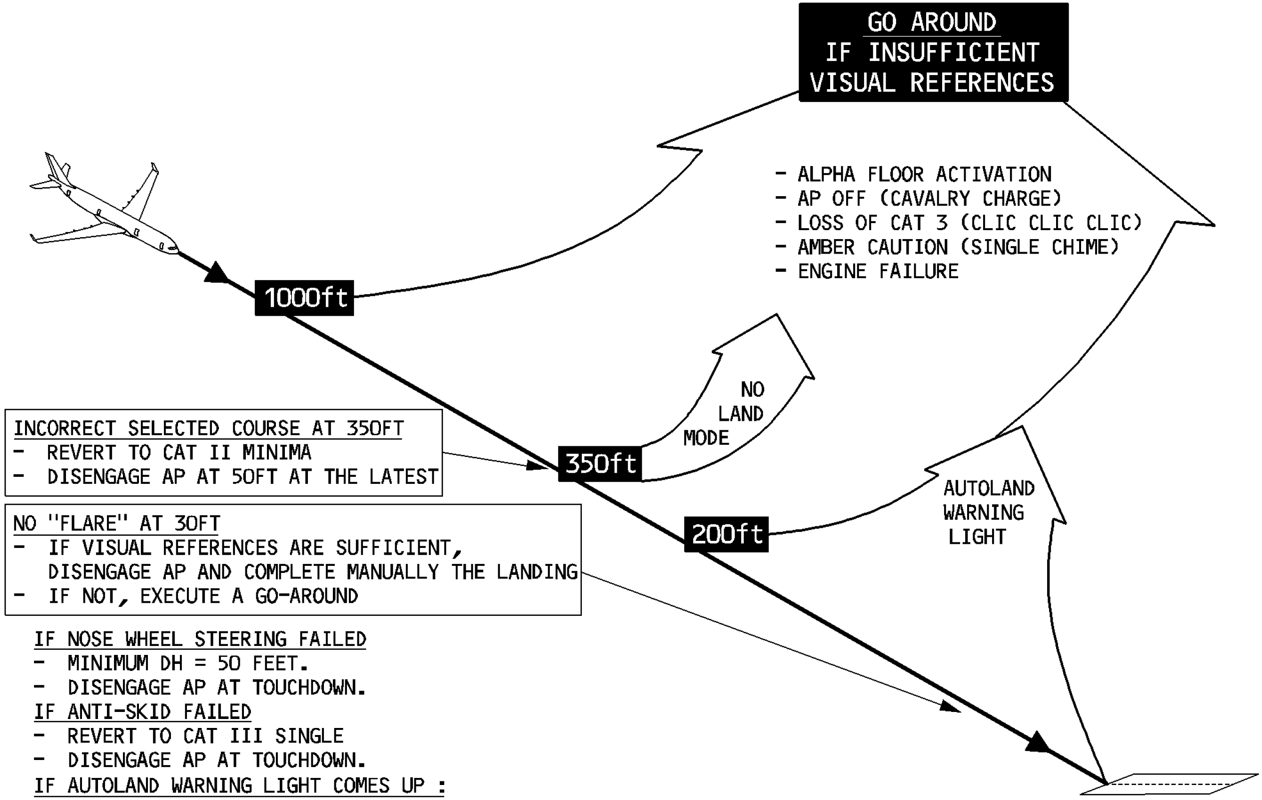
FAILURES AND ASSOCIATED ACTIONS BELOW 1000FT FOR CAT III APPROACH WITHOUT DH



IF NOSE WHEEL STEERING FAILED
- MINIMUM DH = 50 FEET.
- DISENGAGE AP AT TOUCHDOWN.

IF ANTI-SKID FAILED
- REVERT TO CAT III SINGLE
- DISENGAGE AP AT TOUCHDOWN.

IF AUTOLAND WARNING LIGHT COMES UP :
A GO AROUND MUST BE PERFORMED UNLESS THE VISUAL REFERENCES ARE SUFFICIENT FOR A MANUAL LANDING.

BACK-COURSE LOCALIZER APPROACH

Selection

- **If the back-course approach is in the database :**
  During the approach preparation :

  – **SELECT lateral revision at destination.**

  – **SELECT the ARRIVAL**

  – **SELECT "B/C APPR"**
  The ILS frequency and BACK CRS are automatically tuned on the RAD NAV page.

  – **INSERT the back-course approach**

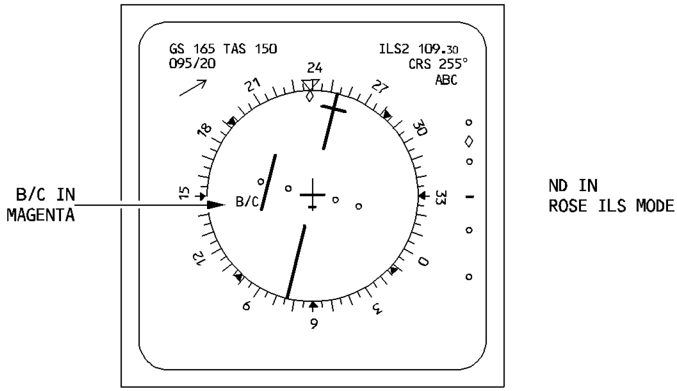
- **If the back-course approach is not in the database :**

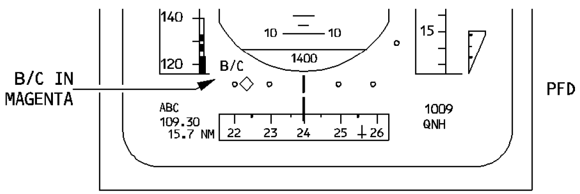
  – **PRESS the RAD NAV key on MCDU**

  – **INSERT the ILS frequency**

  – **INSERT the current final APPR CRS**
  The pilot insert the approach course as Bxxx (B means back-course).

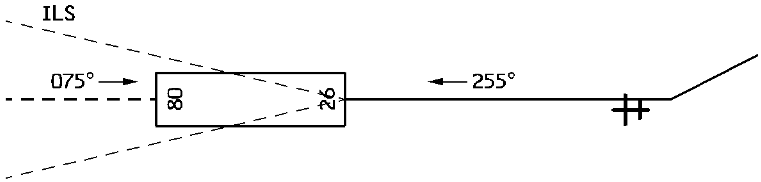
The PFD and ND display B/C in magenta :





FFC5-04-0570-020-A001AA

Example



FFC5-04-0570-021-A100AA

– Standard ILS APPR procedure on RWY 075
– B/C LOC APP procedure on RWY 255

INSERT CRS = B255

Note : No title is displayed on the ND.

Procedure

● **Initial and intermediate approach :**

The preferred technique is stabilized approach using AP/FD and A/THR.

– **ACTIVATE the approach phase on the MCDU PERF page.**

– **CHECK the NAVAIDS.**

– **PRESS the LS pushbutton on the EFIS control panel.**

– **DESELECT the LS pushbutton on ISIS.**
Since ISIS displays the LOC reverse deviations.

– **SELECT the AP/FD in V/S FPA mode.**

– **SELECT ROSE ILS on the ND control panel.**

When cleared for the approach :

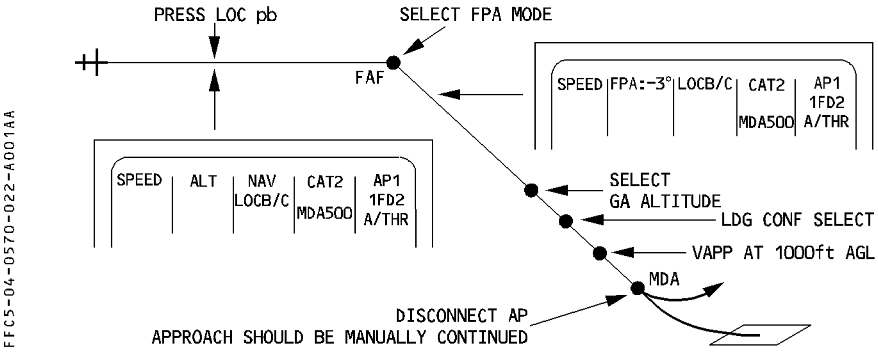
– **PRESS the LOC pushbutton on the FCU.**
the LOC B/C mode arms.

– **CHECK LOC B/C blue on the FMA.**

CAUTION
DO NOT ARM THE APPR MODES.

– **MONITOR the LOC capture.**
LOC B/C*, then LOC B/C green, on the FMA.

- **Final approach**
  Refer to SOP 3.03.19, non precision approach.



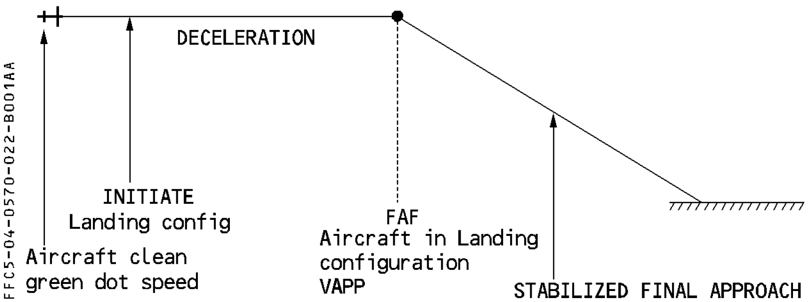
NON PRECISION APPROACH

APPROACH SPEED TECHNIQUE

Airbus recommends the stabilized approach procedure to perform non precision approaches.

STABILIZED APPROACH

The “stabilized approach” brings the aircraft to intercept the final descent path in the landing configuration and at VAPP.
Managed speed is best for the stabilized approach and VAPP should be inserted as a speed constraint at the final approach fix.



MANAGED NON PRECISION APPROACH

The Non Precision Approach (NPA) can be flown in lateral and vertical managed guidance (FINAL APP), or in lateral managed guidance (NAV) associated with selected vertical guidance (FPA or V/S).

Note : For the conditions for using these AP modes, refer to FCOM 3.01.22 and 3.03.19.

APPROACH PREPARATION

- **SELECT the intended approach on the F-PLN page.**
  Check the FM lateral and vertical flight path against the published approach chart, using the MCDU and the ND PLAN mode with constraints displayed.

- **ENTER VAPP as SPD constraint at the FAF, with a vertical revision of the F-PLN page.**

● **For an approach in overlay to a conventional approach with radio navaid :**

  - **SELECT/CHECK the appropriate navaid is selected on the RAD NAV page.**

R ● **For RNAV or GPS approach, GPS PRIMARY must be available at the ETA at**
R **destination. For more information about this check, refer to FCOM 3.03.19.**

INTERMEDIATE APPROACH

- **SELECT ROSE NAV or MAP mode, and VOR or ADF raw data, as appropriate on the ND.**

● **For RNAV or GPS approach :**

  - **CHECK that both GPS receivers are operative in NAV mode on the GPS MONITOR page.**

  - **CHECK that GPS PRIMARY is available on the PROG PAGE.**

- **SELECT TRK/FPA display, when established on the final approach course.**

- **USE managed speed.**

- **KEEP A/THR active.**

Note : For additional recommendations, refer to the dedicated FCOM Bulletin on the use of the FINAL APP mode.

FINAL APPROACH

When cleared for approach :

- **If managed lateral and vertical guidance is intended :**

  – **SELECT APPR pushbutton on the FCU.**

  – **CHECK APP NAV green and FINAL blue on the FMA.**

  – **CHECK that blue descent arrow is displayed on ND at the FAF.**

  – **CHECK that the F-PLN on ND and the V-DEV on PFD are correct.**

  After sequencing the FAF :

  – **CHECK that FINAL APP green is displayed on the FMA.**

  – **CHECK on the ND the TO waypoint, the F-PLN to the MAP and the missed approach procedure (blue line).**

  – **SELECT the go-around altitude on the FCU.**

  – **MONITOR the approach lateral and vertical flight path with the available raw data.**

- **If managed lateral and selected vertical guidance is intended :**

  – **CHECK NAV and FPA on the FMA.**

  Upon reaching the FAF :

  – **Select a FPA to the final descent path.**
  Anticipate the selection of the FPA to smoother interception of the final descent path.

  After sequencing the FAF :

  – **CHECK, on the ND, the TO waypoint, the F-PLN to the MAP, and the missed approach procedure (blue line).**

  – **SELECT the go-around altitude on the FCU.**

  – **ADJUST the FPA to fly the intended vertical flight path.**

R **At MDA/MDH :**

R
- **If visual references are acquired and confirmed by both crewmembers :**

R

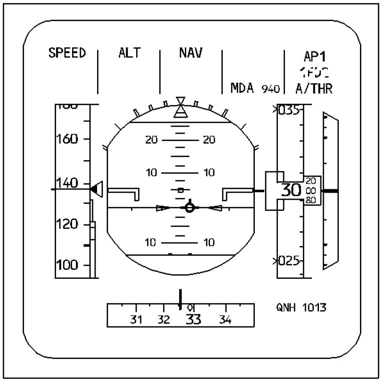
R
  - **DISCONNECT the AP and FD and continue visually.**

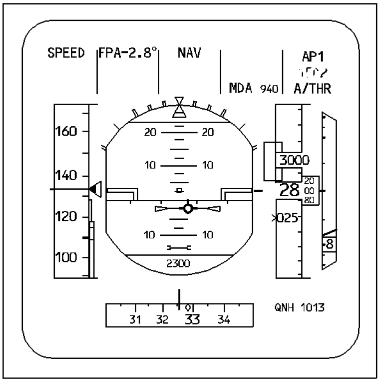
R
- **If visual references are not acquired :**

R

R
  - **INITIATE a go-around.**

NON PRECISION APPROACH - MANAGED LATERAL SELECTED VERTICAL GUIDANCE





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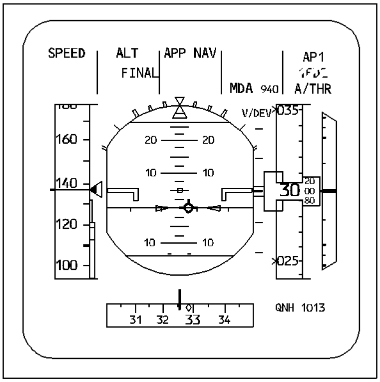
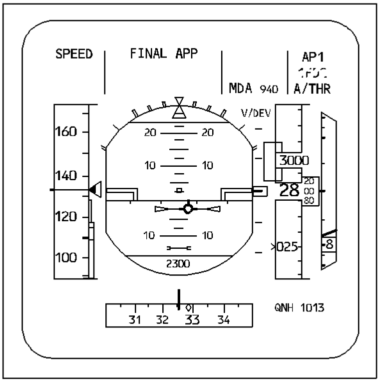
PFD in intermediate approach, FPD and FPV selected. The pilot did not press the APPR pushbutton, the V DEV scale is not displayed. (If GPS is installed, the V DEV scale is dispayed, when the approach phase is active).

PFD when established on final path: The vertical guidance is the final path angle, as selected by the pilot (FPA); the lateral guidance is computed by the FM (NAV).

NON PRECISION APPROACH – LATERAL AND VERTICAL MANAGED GUIDANCE



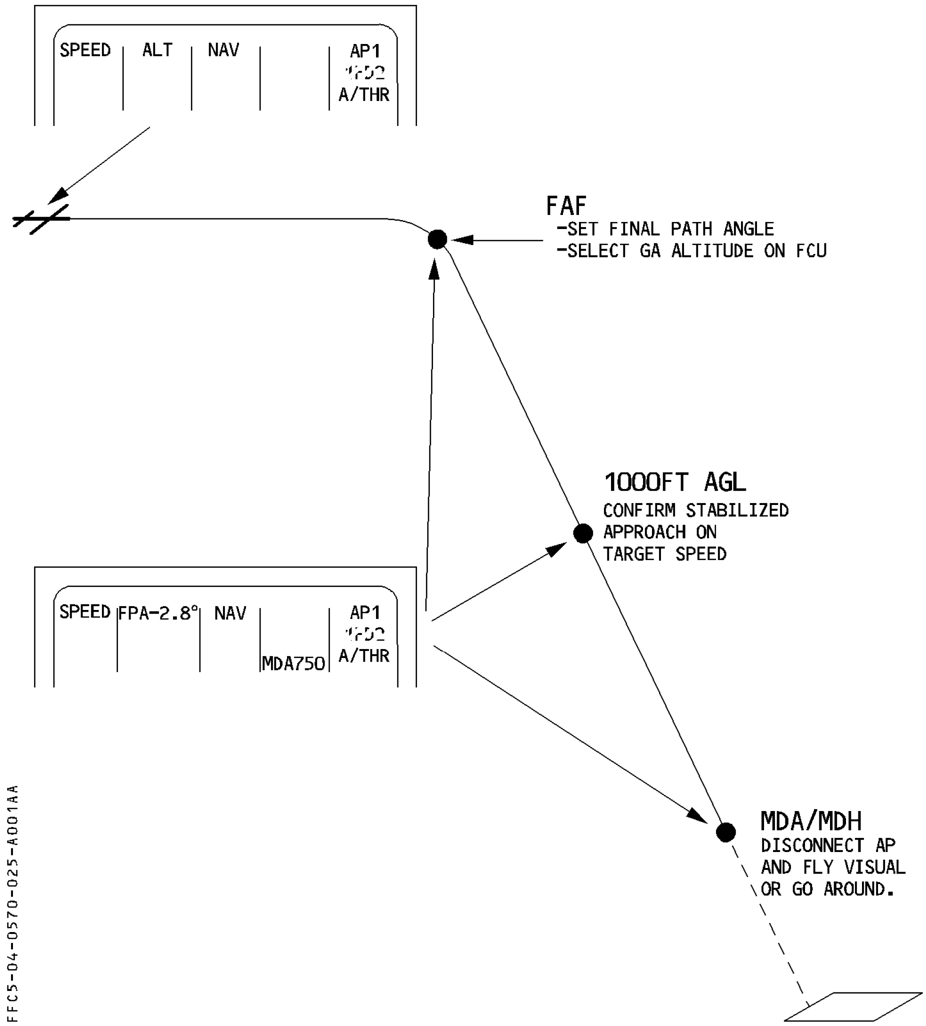


FFC5-04-0570-024B-B001AA

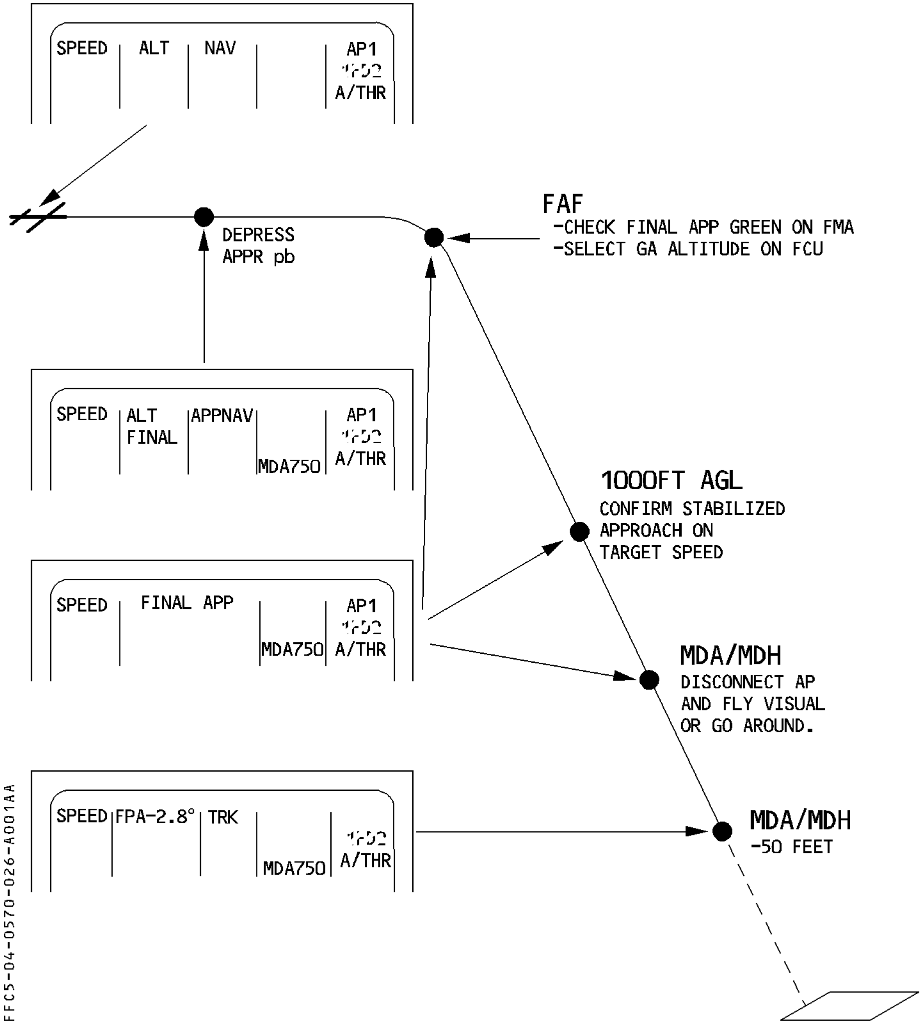
PFD in intermediate approach, FPD and FPV selected. The pilot has pressed the APPR pushbutton, the FINAL managed mode is armed, the V DEV scale is displayed. (If GPS is installed, the V DEV scale is displayed, when the approach phase is active). Each V DEV graduation indicates 100 feet; the rectangle shows the computed vertical path versus the aircraft position.

PFD when established on final path: The lateral and vertical guidances are managed by the FM (FINAL APP).

R **NON PRECISION APPROACH PROFILE – MANAGED LATERAL AND SELECTED VERTICAL**
R **GUIDANCE**
R



R
R
NON PRECISION APPROACH PROFILE - LATERAL AND VERTICAL MANAGED GUIDANCE



CAUTION

When FINAL APP NAV modes are engaged, the AP/FD will disengage at MDA/MDH minus 50 feet (if entered) or Missed Approach Point whichever comes first.
R The FDs will revert to basic modes (HDG/V/S or TRK/FPA).

SELECTED NON-PRECISION APPROACH

The non precision approach is flown in selected modes (TRK-FPA or HDG-V/S) when
* the approach is not stored in the database or
* GPS PRIMARY is lost and the navigation accuracy is negative.

INTERMEDIATE APPROACH

Procedure

- **USE TRK-FPA mode**
- **SELECT ND in the ROSE VOR mode**
- **KEEP the autothrust active**
- **USE managed speed**

FINAL APPROACH

Upon reaching the final approach fix

- **SELECT a final approach track on the FCU**
- **SELECT an FPA (flight path angle) to the final descent path angle**
  Anticipate the selection of FPA to smooth the interception of the final path.
- **SELECT a go around altitude on FCU.**
- **USE raw data to monitor aircraft position and flight path.**
- **AT MDA/MDH**

● **If visual references are acquired**

- **DISCONNECT the autopilot and continue the approach visually.**

● **If visual references are not acquired**

R - **INITIATE a go around**

LOC APPROACH TYPE

– **SELECT the LOC pushbutton in intermediate approach, to arm the LOC mode.**

CAUTION

R Do not select the APPR pushbutton.

– **SELECT the ND in ROSE ILS mode.**

● **Upon reaching the final approach fix :**

– **MONITOR LOC engagement.**

– **SELECT the FPA to the final descent path angle.**

Note : In case of a dual Radio Altimeter (RA) failure, the LOC pushbutton can be used to arm the LOC mode, as it does not depend on the RA signal.

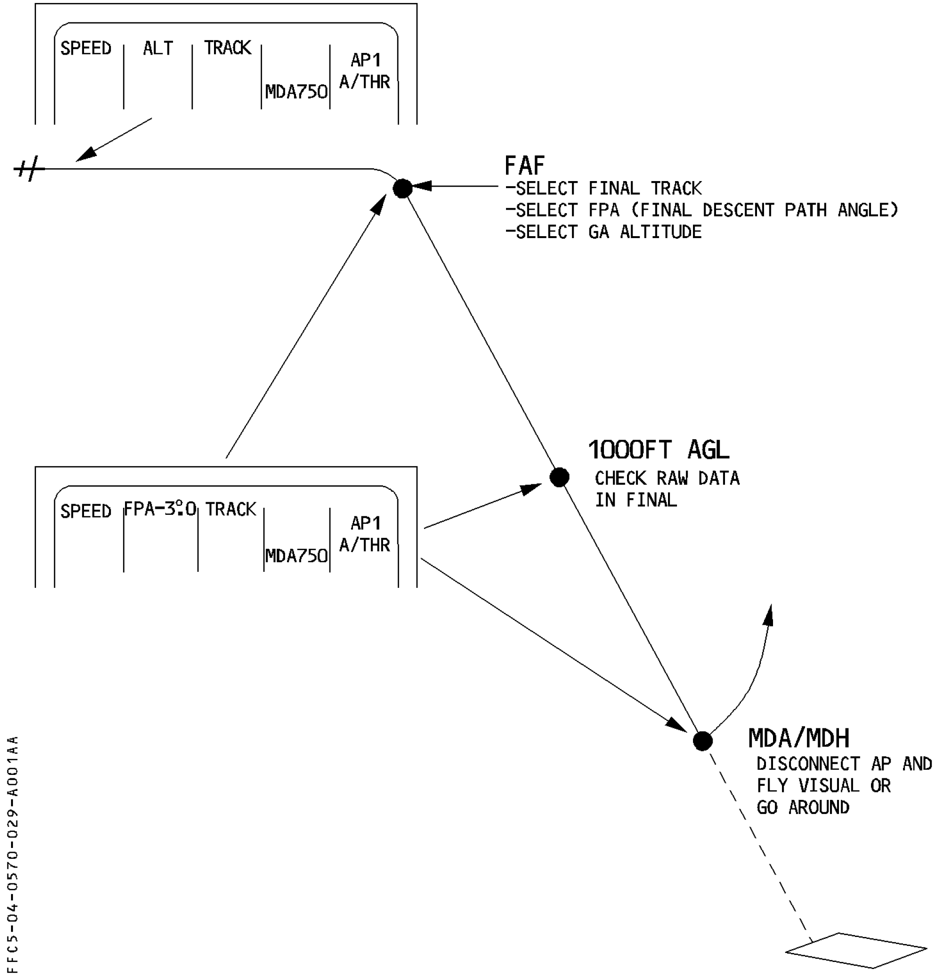
NON DIRECTIONAL BEACON (NDB) APPROACH TYPE

When the flight plan calls for an NDB approach, the system automatically tunes the ADF only when the aircraft is passing the first fix of the approach. Therefore, it is convenient to manually tune the ADF earlier (before activating the approach phase).

– **Proceed, as described above, using selected modes.**

NON PRECISION APPROACH PROFILE - SELECTED GUIDANCE

R



R *Note : If the distance to the runway is not properly assessed, a step descent approach*
R *may be considered and a level-off at MDA may be performed while searching for*
R *visual references. If the pilot has no visual reference at the MAP, at the latest, he*
R *must initiate a go-around.*

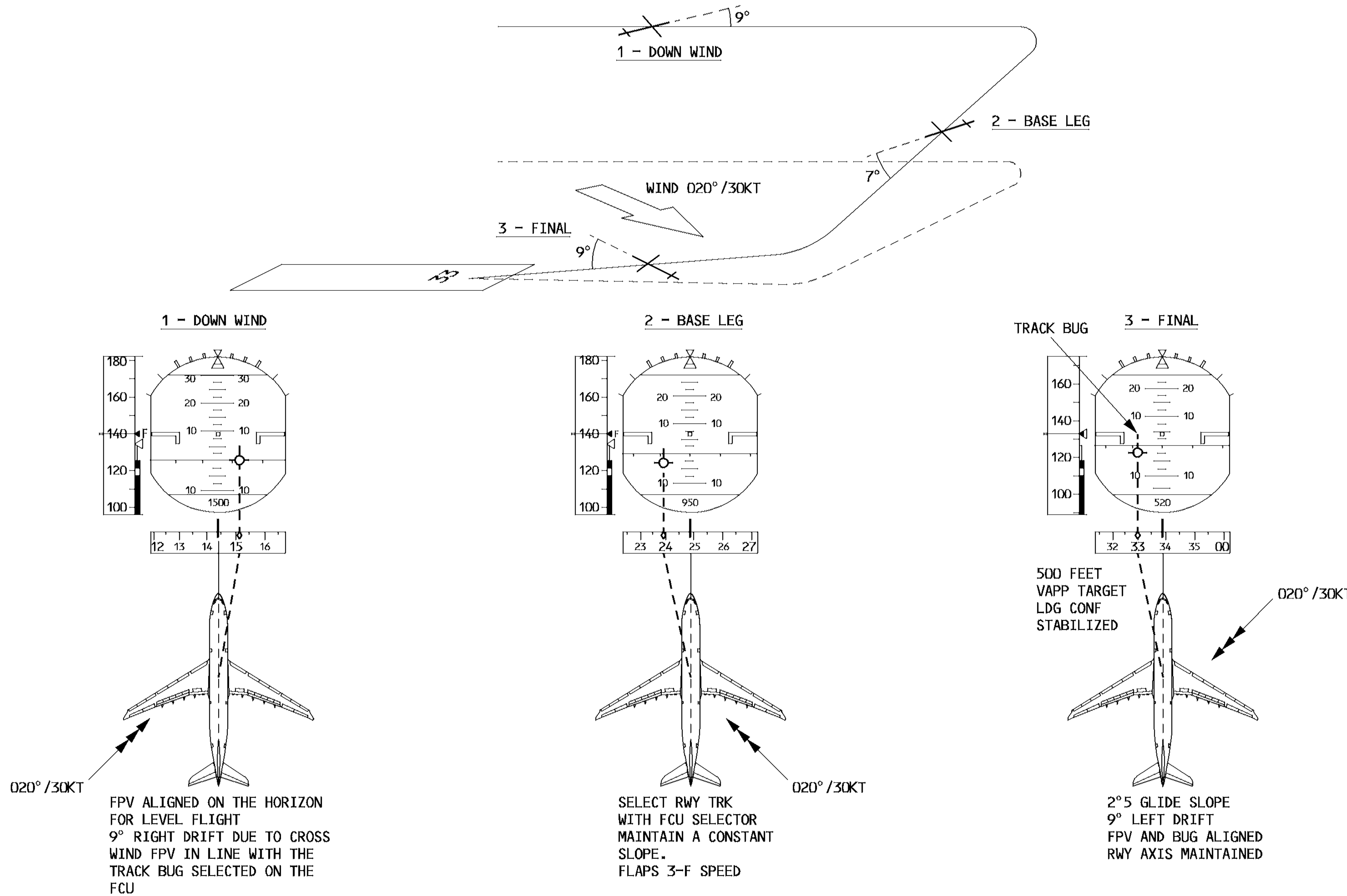
CIRCLING APPROACH

If the pilot chooses not to follow the SOP procedure, select both FDs OFF and fly visually. If the runway in use is not the flight plan runway, the ground speed and the VAPP will not be computed properly, and the speed on final may be higher than excepted. Therefore, select the approach speed directly on the FCU.

VISUAL APPROACH

When flying visual, the pilot may select an appropriate STAR and RWY in use on the MCDU. The ND displays the extended runway centerline five nautical miles out from the runway. This helps the pilot during the final turn.
Along with the FPV, the PFD displays a track bug that may help the pilot to fly the downwind leg and intercept final. The FPV should be flown laterally with reference to the track bug.

VISUAL APPROACH PROFILE

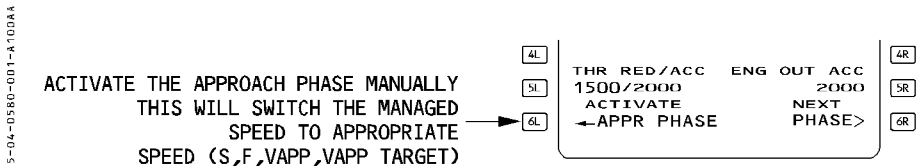


FFC5-04-0570-031-A001AA

MONITORING THE GO-AROUND

Engage the GO-AROUND phase and GO-AROUND modes by setting the thrust levers to the TOGA position, if at least CONF1 is selected.
When the GO-AROUND phase is engaged, the previously-flown approach is automatically strung back into the flight plan at the end of the missed approach procedure.
In the GO-AROUND phase, the system makes no predictions. Consequently, CLB and DES modes are not available, and the flight crew must monitor constraints.
When the aircraft leaves the GO-AROUND phase, all predictions and modes become available again. During a GO-AROUND phase, the managed speed is green dot.

CAUTION
If ALT* engages, as the aircraft emerges from SRS mode, and an engine-out occurs more or less simultaneously, the aircraft may lose airspeed as it tries to capture altitude.



PERF PAGE, GO-AROUND PHASE ACTIVE

HEADING/TRACK PRESET FUNCTION IN GO-AROUND PHASE

The flight crew can use the heading/track preset, when LOC*, LOC, LAND, FINAL, or GA is engaged.
- SET the appropriate heading, or track value, in the window of the FCU.
- When necessary, PULL the HDG/TRK selection knob to engage the mode on the preset value.

GO-AROUND FROM AN INTERMEDIATE APPROACH ALTITUDE

To interrupt the approach, or to perform a go-around, from an intermediate altitude in the approach, and if TOGA thrust is not required, proceed as follows :

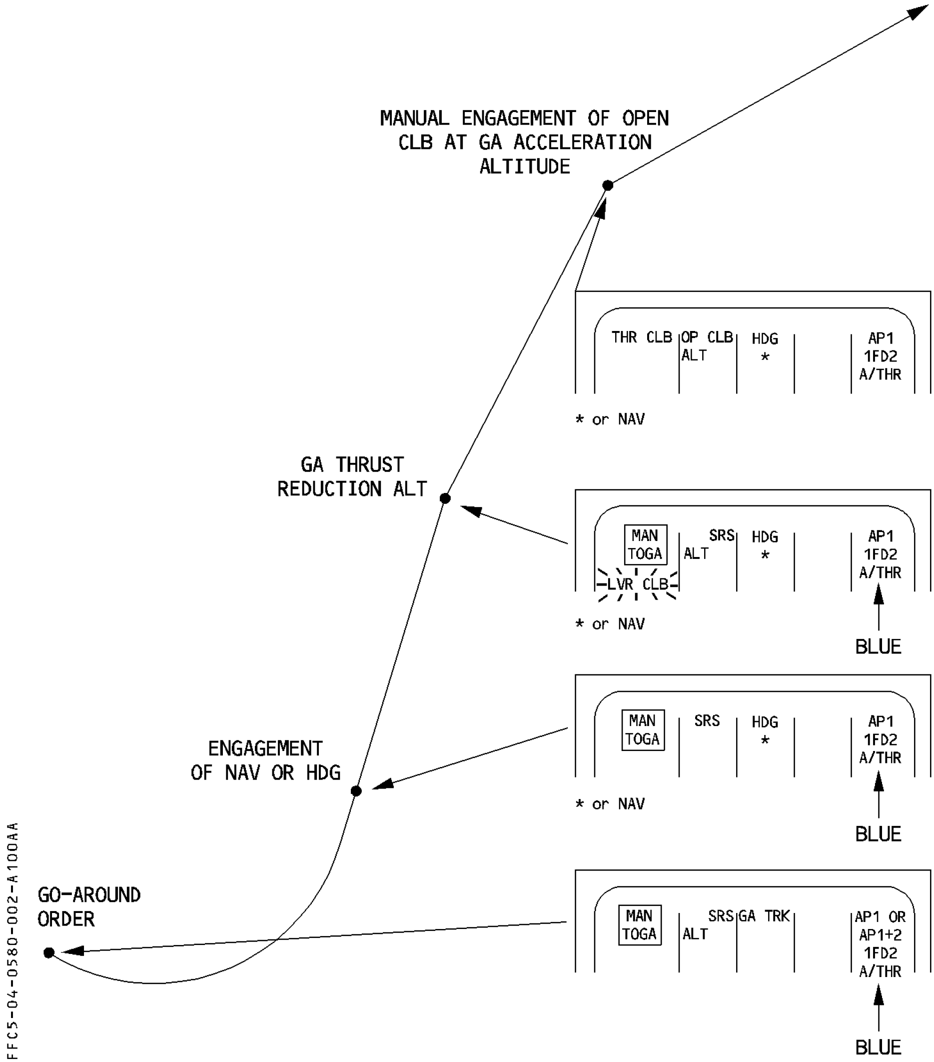
- **SET the thrust levers to TOGA detent, then retard the thrust levers as required.**
  This enables to engage the GO-AROUND phase, with associated AP/FD modes.

- **SELECT the applicable AP/FD and A/THR modes on the FCU.**

  Note : If the thrust levers are not set briefly to TOGA detent, the FMS does not engage the GO-AROUND phase, and flying over, or close to the airport (less than 7 NM) will sequence the destination waypoint in the F-PLN.

GO-AROUND PROFILE

– **Apply SOP procedures**



MISSED APPROACH : TRY AGAIN

If the pilot intends to fly another approach to the destination
– The flight plan has all the data necessary for the missed approach.
– Green Dot is the target speed.

● **When cleared by ATC to follow the missed approach procedure**

– **ENGAGE NAV mode or**

– **TURN and PULL the HDG selector knob to set a heading**
HDG or TRK or NAV modes can be engaged only above 100 feet.

● **When entering the initial approach area**

– **Activate the approach phase on the MCDU PERF GO AROUND page.**

● **If the APPR phase is not activated :**
– Managed approach speed will not be available.
– The system will not furnish predictions.
– MDA/MDH/DH warnings will not appear on the PFD.

MISSED APPROACH : DIVERT

● **If the crew decides to divert to the alternate :**

– **ENABLE ALTN, preferably at the TO waypoint.**

● **When cleared to a waypoint**

– **PERFORM a DIRECT TO.**

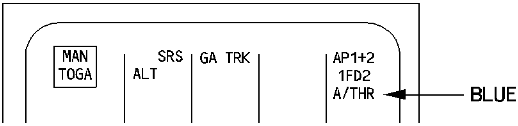
The system reverts automatically to CLB phase and modifies the target speed from Green Dot to initial speed.
The system automatically sets the CRZ FL at the defaulted alternate CRZ FL (FL 220 or 310), and retains the previous cost index.
The pilot may adjust these as necessary.

Note : Diversion may also be initiated by entering a NEW DEST in the LAT REV page at the TO Waypoint or using the secondary F-PLN if prepared. Refer to 4.04.10.

R

TASK SHARING DURING A GO-AROUND

PF	PNF
-Announce "GO AROUND, FLAPS" simultaneously set thrust levers to TOGA -Monitor the flight path	Retract flaps one step and monitor engine parameters



When rate of climb is positive

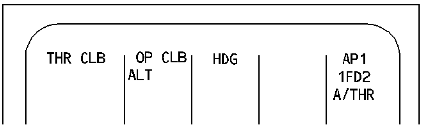
PF	PNF
-Announce "GEAR UP" -Select NAV or HDG mode, according to ATC clearance	-Announce "POSITIVE CLIMB" -Retract the gear and confirm "GEAR UP-FLAPS"

At go-around thrust reduction altitude THR RED

"LVR CLB" flashes on the FMA
-Set thrust levers to CL detent

At go around acceleration altitude (ACC ALT)

-Monitor that the target speed increases to Green Dot.



A call out must be done by the PNF as follows:

"BANK": if bank angle becomes greater than 7°
"PITCH": if pitch attitude becomes greater than 20° or less than 10° up
"SINK RATE": if there is no climb rate

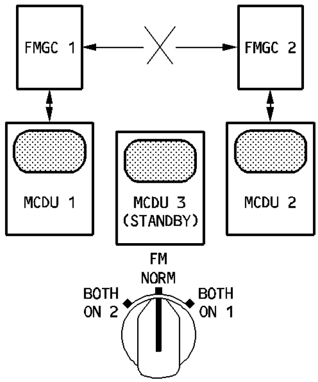
● If the speed target does not increase to Green Dot:
-CHECK and PULL the altitude selector knob to engage OP CLB
The speed target increases to Green Dot
-Retract flaps on schedule.

FFC5-04-0580-004-A001AA

06.00 CONTENTS

06.00 CONTENTS

INDEPENDENT MODE



FFC5-04-0610-001-A110AA

The system selects automatically this degraded mode under specific abnormal conditions e. g. different database validity on both FMGCs.
While this is occuring :
"INDEPENDENT OPERATION" message is displayed on both MCDU scratchpads.
The "IND" annunciator light illuminates amber on the top of the MCDU.
On POS MONITOR pages and GPS MONITOR pages, FM and GPS positions from the opposite FMGC are not displayed.
On RAD NAV page, navaids tuned on the opposite MCDU are not displayed. Corresponding fields are blank.

R **Procedures on ground**

R If each FMGC is loaded with a different database, the FMGS will operate in independent
R mode only.

R – **CHECK the database number and validity.**

R – **CROSSLOAD the database to restore the dual operation.**
R Crossload function is available on ground only (in preflight or done phase) when an
R independent operation is detected.

Procedures in flight

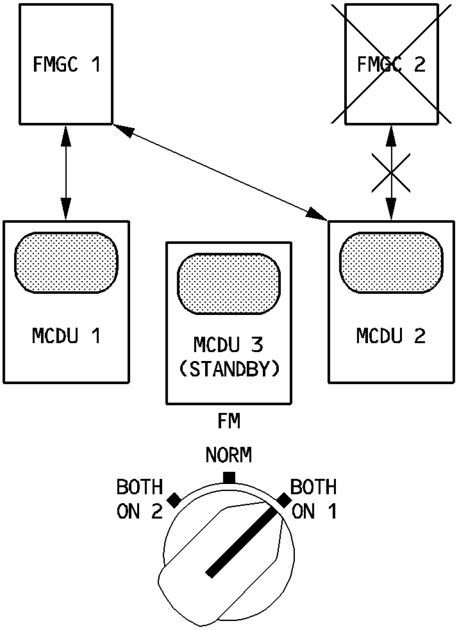
– **Do not switch the navigation databases.**

– **Make the same entries on both MCDUs to have both AP/FD similar orders.**
– Both FGs being valid, 2 APs may be engaged for CAT II or CAT III operations.

● **In the event of a go around and when the second AP is disconnected.**

– **ENSURE that the FMGC in command has correct flight plan orders and a nav database up to date.**

SINGLE MODE



FFC5-04-0610-002-A001AA

The system degrades to the single mode when one FMGC has failed, and the pilot has selected the FM source switch to the healthy FM.
While this is occuring :
corresponding ND displays "OFF SIDE FM CONTROL" amber message.
Both POS MONITOR pages display the same position (operative FMGC position).
Both FDs are driven by the same FMGC.
Any entry on either MCDU is sent to the operative FMGC.

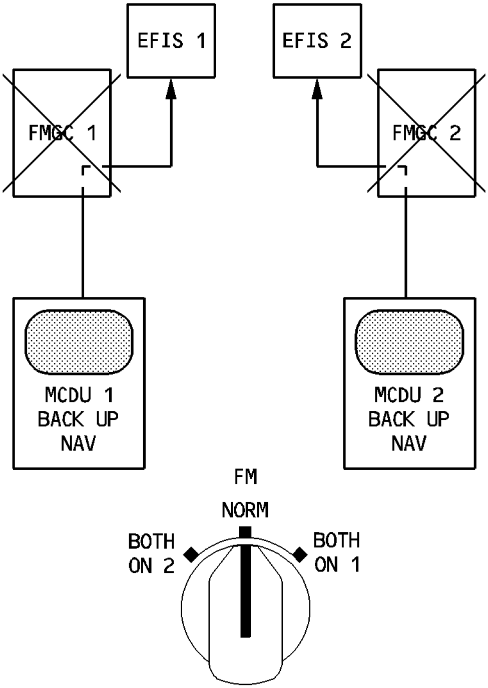
Procedures

● **If a transient failure triggers a single mode of operation :**

- **DO NOT USE the MCDU(s) until PLEASE WAIT message is suppressed**
- **SET both NDs on the same range and mode to display the same information from the operative FMGC.**
- **When convenient, RESET the failed FMGC using the procedure described in this chapter.**

BACK UP NAVIGATION MODE

The pilot selects on the MCDU menu page this degraded mode when both FMGCs have failed. He recovers the navigation function through the MCDU and ADIRS.
The MCDU continuously memorizes the active flight plan in its internal memory.
If both FMGCs fail, the back up navigation provides the following functions :
- Flight Planning
- Aircraft position using onside IRS or IRS 3
- F-PLN display on ND
- No AP/FD NAV mode
- Limited lateral revision
- F-PLN automatic sequencing



FFC5-04-0610-003-A001AA

Note : MCDU 3 is not able to operate as back up navigation even when it replaces MCDU 1 or 2. The back up navigation mode is only accessible on the MCDU MENU page if the FM source selector is set to NORM position.

AUTOMATIC FMGS RESET AND RESYNCHRONIZATION

FM RESET

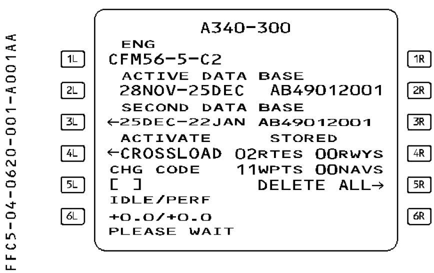
When the FM software cannot work properly or receives instructions to perform impossible operations, it automatically resets itself. A resynchronization with the other FM always follows.
When the reset is a minor one, the system will recover by itself.
When the reset is a major one :
– Resets recur at short intervals (several in two or three minutes).
– The memories are cleared, leading to the loss of F-PLN, GW, CI, CRZ FL, MCDU-entered speeds and navaids and to database switching.

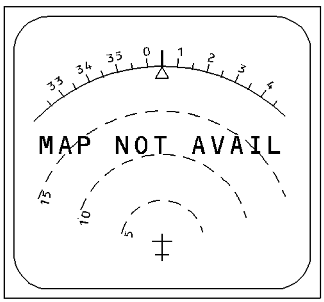
FM RESYNCHRONIZATION

An FM resynchronization automatically occurs after an FM reset but it may occur independently each time self comparisons between FM1 and FM2 reveal discrepancies.
One single resynchronization lasts approximately 25 seconds.
If several resynchronizations occur within 5 minutes, independent mode commences.

FMGC STATUS DURING A RESET/RESYNCH

While a RESET/RESYNCH occurs :
– The ND shows "MAP NOT AVAIL".
– The MCDU reverts to the A/C STATUS page, with "PLEASE WAIT" displayed in the scratchpad with the FM FAULT light illuminated.
– Autotuning of Navaids (VOR, DME, ADF) are lost on the failed side.
– AP and managed modes may be transiently lost (reversion to HDG/V/S or TRK/FPA).
– If the pilot presses a key while the scratchpad is showing "PLEASE WAIT", there is no change at MCDU level. This is normal, and the crew should no respond by pulling the MCDU circuit breaker.





SINGLE RESET or DUAL RESET WITH AUTORECOVERY

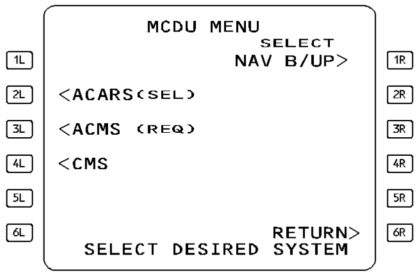
If the RESET/RESYNCH succeeds, all functions are recovered.

Procedure

- **RESELECT the convenient MCDU page**
- **REENGAGE managed modes and AP.**
  WAIT one minute after the "PLEASE-WAIT" message has disappeared before engaging the AP/FD of the failed FMGC.

SINGLE LATCH

If 4 successive resets occur, the failing FMGC will latch and single mode mode operation commences.
While this is occuring :
- Failed side ND displays "MAP NOT AVAIL" and the ND of the failed side displays "OFF SIDE FM CONTROL".
- The MCDU of the failed side displays the MCDU menu, and the FM FAULT light illuminates.
- If AP and FD was previously engaged on the failed side, the AP FD disengage and the righthand column of the FMA shows that the operating FD is offside.
  ECAM displays the warning "AP OFF" and "FM1(2) FAULT", and the master warning light and audio remind the pilot of the AP disengagement.
- All functions are restored on the operative side



MCDU MENU PAGE on the failed side

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Procedure

– **ENGAGE the non affected AP.**

R – **ENGAGE managed modes.**

– **RESET the affected FM with the FMGEC reset breaker on the overhead panel.**

- **If successful, a resynchronization is launched.**
- **If unsuccessful the FMGC operates in single mode :**

– **PULL the FMGEC reset breaker of the affected FMGC.**

– **SELECT FM source BOTH ON 1 or 2.**
R Both NDs operate in the range and mode selected on the EFIS control panel
R corresponding to the FM source.

DUAL RESET WITH LOSS OF DATA AND AUTORECOVERY

3 successive dual resets, without result erase all pilot entered data (F-PLN, GW, CRZ FL, CI...)
When the FMGS recovery is obtained :
– Database cycle may have switched.
– The FM position bias is lost. The FM position returns to the MIX IRS position.
– Autotuning of VOR/DME are restored, based on aircraft IRS position.
R – FMGS tuning of the ILS and ADF ◁ is not possible.
– Lateral and vertical managed modes cannot reengage.
– "CAB PR LDG ELEV FAULT" ECAM message is displayed.
– "REENTER WEIGHT/CG" MCDU message is displayed.

Procedure

When the system has recovered the managed speed may not reengage, because its target would be green dot. The PERF/IDLE factor is reset to 00/00. If a PERF/IDLE factor was entered, the performance may be slightly modified after recovery.

– **SELECT the initial database.**

– **SELECT DIR TO the required downpath waypoint.**

– **SELECT LAT REV at downpath waypoint and redefine DESTINATION.**

– **SELECT the FUEL PRED page and reenter GW and CG values read on the ECAM fuel page.**

– **SELECT the PROG page and enter CRZ FL.**

– **SELECT the PERF page and enter CI.**

– **CHECK or reengage (as appropriate) the relevant speed/Mach target and vertical mode.**
Redefine the flight plan for the remainder of the flight, as the opportunity presents itself.

– **PERFORM a NAV accuracy check, when possible.**
An FM position update will be considered, if MIX IRS and actual positions differ by more than 20 NM.

DUAL LATCH

– Both FMGCs are inoperative. FM and FG capability are lost.
– Both NDs display "MAP NOT AVAILABLE". Navaid tuning is not performed.
– AP/FD and A/THR are lost.
– Both MCDUs revert to the MCDU MENU page.
– The following messages are displayed on the ECAM :
"CAB PR LDG ELEV FAULT"
"AUTO FLT AP OFF", if the AP was engaged
"AUTO FLT A/THR OFF", if the A/THR was engaged.
– "AUTO FLT FM1 + 2 FAULT".

Procedure

– **FLY raw data.**

– **TUNE necessary navaids, using the RMPs.**

– **Successively RESET both FMGCs, with the FMGEC reset breakers that are located on the overhead panel.**

● **If successful, refer to dual reset with loss of data and auto recovery**

Note : A recovery will result in the loss of all pilot-entered data.

● **If unsuccessful :**

– **FLY raw data.**

– **SET the FM source to NORM.**

– **SELECT the NAV B/UP prompt on both MCDU DATA pages.**
(Refer to 4.04. HOW TO USE, concerning navigation backup operation)

– **SET the landing elevation of the destination on the overhead panel.**

FMGS RESET DURING ILS APPROACH

- **Above 700 feet AGL**
  ILS tuning may be lost. The loss of ILS tuning, due to a dual reset, will cause a loss of the LOC and G/S, and the disengagement of the APs and FDs. In this case :

  – **PERFORM a go-around, if not stabilized at 1000 feet AGL, and if visual references are not acquired.**

- **Below 700 feet AGL**
  A single or double reset does not affect an ILS approach below 700 feet AGL. ILS frequency is locked and AP/FDs remain engaged.

  – **CONTINUE the approach.**

FMGS RESET DURING NON PRECISION APPROACH

During a non ILS approach, if the master FMGC fails, AP/FD and managed modes are lost and FDs engage in basic modes.

R – **PERFORM a go-around, if not stabilized at 1000 feet, and if visual references are not acquired.**

MANUAL RESET OF FMGCs

On rare occasions, the FMGS may require manual resetting.
If this occurs in flight, reset one FMGC at a time.
The aircraft has two reset breakers per FMGC :
- The FM reset-breaker resets the flight management part of the FMGC.
- The FMGEC reset-breaker resets the flight management, flight guidance, and flight envelope parts.

Resetting the FM or FMGEC reset-breakers disconnects the onside autopilot.
The FM further resynchronizes to reset one or both FM.
Resetting the FM or FMGC reset-breaker does not increment the reset counter : There is no limitation to the number of reset-breaker resets.

ERRONEOUS PREDICTIONS

The FMGS may temporarily display erroneous predictions that can affect such data as ECON speed/Mach, optimum flight level, fuel or time predictions. If erroneous predictions are observed :

On ground, or in flight :

- **CHECK the cruise temperature (sign and value), the gross weight, and the cruise flight level.**
- **REENTER the same cost index to restart a computation (In descent or approach, a cost index change does not restart a computation), or**
- **MAKE a COPY ACTIVE, then activate the secondary, or**
- **MAKE a DIR TO the "TO" waypoint.**

R ## SPURIOUS ENGINE-OUT INDICATION

R If a spurious engine-out is detected :

R **Procedure**

R - **PRESS the EO CLR prompt of the MCDU PERF page**

R - **RE-ENGAGE previous vertical mode**

R - **RE–ENTER preselected speeds (if any).**
R No other consequences are to be expected.

R **MCDU LOCKED OR BLANKED**

R When an MCDU locks up, or becomes blank, all FMGS functions remain available. However, the pilot cannot enter information in the MCDU, and cannot display any other MCDU page. (The page that was on display, when this occured, remains on display).

Procedure

R – **SWITCH OFF the locked or blank MCDU, and SWITCH it ON after ten seconds.**

Note : During a RESET/RESYNC, if the crew presses a key while the scratchpad is showing "PLEASE WAIT", there is no change at the MCDU level. This is normal, and the pilot should not respond by switching off the MCDU.

IMPOSSIBILITY TO REVISE THE ACTIVE FLIGHT PLAN

It may not be possible to revise the active flight plan, if the master FMGC changes while sequencing the TO waypoint.

Procedure

– **WAIT for the sequencing of the next waypoint, which will restore normal MCDU operation, or**

– **Manually RESET one of the FMGCs, using the reset buttons on the overhead panel.**

NO MANAGED SPEED DURING MANUAL APPROACH

During manual approach with FD and ATHR not engaged, if the FM1 part is faulty and the FG1 part is valid, the FMGC 1 does not compute managed speed and remains master.
As a consequence VAPP is not displayed on PFD.
To recover managed speed, the FMGC 2 should be forced master:

Procedure :

– Engage FD 2 or AP2 or ATHR to force the FMGC 2 priority.

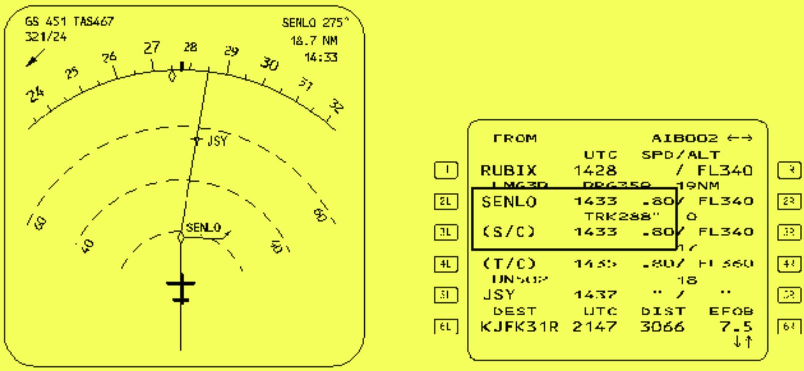
DUAL FMS RESET AFTER A “CLEAR FROM” IN THE F-PLN

A dual FMS reset, with loss of all pilot-entered data, may occur when the following conditions are met :

— 2 steps (at least) are defined in the active F-PLN, and the first step is defined at the current “TO” waypoint
— The flight crew clears the “FROM” waypoint (or “PPOS”) on the active F-PLN (by a CLR action on 1L key on the F-PLN page), to force a F-PLN sequencing.

A step defined at the “TO” waypoint can be identified by the flight crew :

— <u>On the ND</u> : A white climb/descent arrow is displayed next to the “TO” waypoint, or
— On the F-PLN page : The TO waypoint is followed by a Step Climb (S/C), or Step Descent (S/D) pseudo-waypoints in the F-PLN waypoint list.



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The reset can occur, in all flight phases, except DESCENT, APPROACH and GO AROUND phases (where no step can be defined).

Procedure

● **If there is a step defined on the current “TO” waypoint of the active F-PLN :**

— Do not clear the “FROM” waypoint.
In order to sequence the F-PLN, the flight crew may either :
— Delete the STEP at the “TO” waypoint, prior to clearing the “FROM” waypoint, or
— Perform a ”DIR TO” or “DIR TO RADIAL IN”, as appropriate.

CROSSLOAD OF NAV DATABASE

Both FMGCs are sometimes loaded with 2 different NAV databases. The DUAL mode of operation is not possible until both FMGCs receive the same database. The MCDU displays
R "FMS1 / FMS2 A/C STS DIFF".
This may occur when a spare FMGC is loaded on an aircraft very late before the flight.
The crossload procedure will be applied to restore the DUAL mode of operations.
CROSSLOAD can be initiated during the preflight or done phases only.

CAUTION
The MCDU to be used is the MCDU of the FMGC loaded with the correct NAV database.

R

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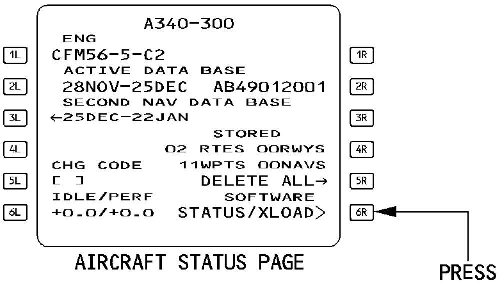


AIRCRAFT STATUS PAGE

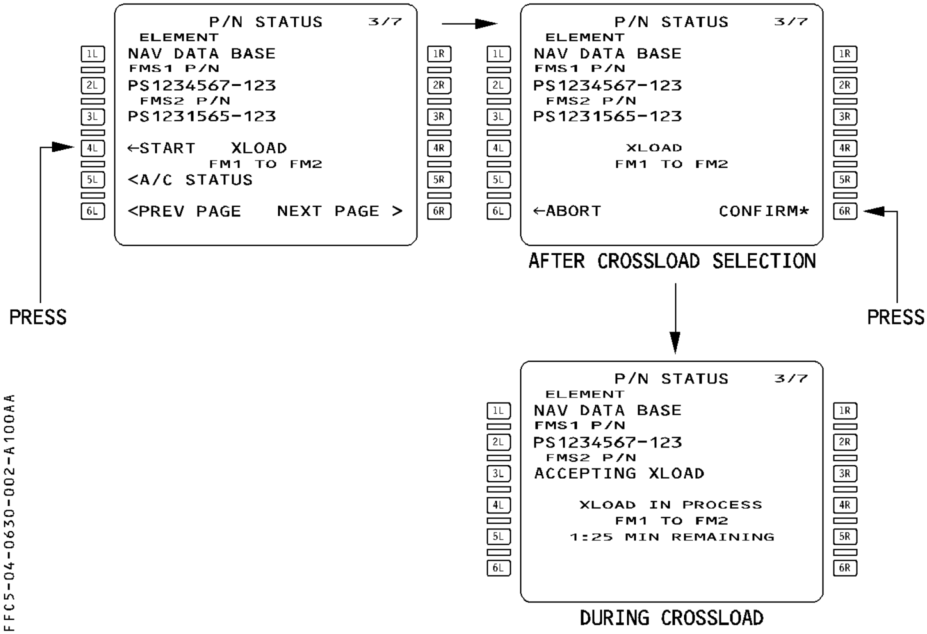
Procedure :

– **PRESS the "SOFWARE STATUS/XLOAD" key, on the field [6R].**
The P/N STATUS page appears.

– **SELECT "P/N STATUS" page 3.**
The navigation database part numbers are displayed.

– **PRESS "START XLOAD" key, on the field [4L].**

– **PRESS "CONFIRM" key, on the field [6R].**
Crossloading is initiated and "XLOAD IN PROCESS" is displayed on both MCDUs.



<u>Note</u> : *If flight phase transitions from PREFLIGHT or DONE while crossload is in process, the crossload is aborted. If crossload is unsuccessful "CROSSLOAD ABORTED" is displayed on both MCDU's scratchpad. This message is also displayed following a failed or incomplete data base loader operation.*

Upon successful completion of the crossload, "CROSSLOAD COMPLETE" message is displayed on each MCDUs scratchpad. A RESYNCH occurs and both MCDUs return to the AIRCRAFT STATUS page.

FMGC RESPONSE TO FAILURE CASES

This table shows how the FMGC responds to failures in other parts of the system.

R

<table>
<tr><th>FAILURE CASE</th><th>AP/FD</th><th>A/THR</th><th>LANDING CAPACITIES</th></tr>
<tr><td>FIRST IRS FAILURE</td><td>NO EFFECT</td><td>NO EFFECT</td><td>CAT 3 SINGLE</td></tr>
<tr><td>SECOND IRS FAILURE</td><td>TOTAL LOSS</td><td>TOTAL LOSS</td><td>RAW DATA</td></tr>
<tr><td>FIRST ADC FAILURE *</td><td>NO EFFECT</td><td>NO EFFECT</td><td>CAT 3 SINGLE</td></tr>
<tr><td>SECOND ADC FAILURE</td><td>TOTAL LOSS</td><td>TOTAL LOSS</td><td>RAW DATA ONLY</td></tr>
<tr><td>FIRST LGCIU FAILURE</td><td>NO EFFECT</td><td>NO EFFECT</td><td>NO EFFECT</td></tr>
<tr><td>SECOND LGCIU FAILURE</td><td>NO EFFECT</td><td>NO EFFECT</td><td>NO EFFECT</td></tr>
<tr><td>LOSS OF ONE FMS COMPUTATION</td><td colspan="2">LOSS OF ONE AP/FD/ATS EXCEPT IN APPR mode BELOW 700 FT AND GO AROUND MODES</td><td>NO EFFECT BELOW 700 FT</td></tr>
<tr><td>FIRST SFCC FAILURE</td><td>NO EFFECT</td><td>NO EFFECT</td><td>NO EFFECT</td></tr>
<tr><td>SECOND SFCC FAILURE</td><td>NO EFFECT</td><td>NO EFFECT</td><td>NO EFFECT</td></tr>
<tr><td>FIRST RADIOALTIMETER FAILURE</td><td>NO EFFECT</td><td>NO EFFECT</td><td>CAT 2</td></tr>
<tr><td>SECOND RADIOALTIMETER FAILURE</td><td>TOTAL LOSS OF ILS APPR MODE</td><td>NO EFFECT</td><td>ILS APPR*** MODE INOP</td></tr>
<tr><td>TOTAL LOSS OF THE FCU</td><td>TOTAL LOSS EXCEPT IN LAND AND GO AROUND</td><td>TOTAL LOSS</td><td>RAW DATA EXCEPT IN LAND MODE (CAT 2 MAX)</td></tr>
<tr><td>FIRST ILS RECEIVER FAILURE</td><td>NO EFFECT</td><td>NO EFFECT</td><td>CAT 1</td></tr>
<tr><td>SECOND ILS RECEIVER FAILURE</td><td>TOTAL LOSS IN APPR mode (ILS)</td><td>NO EFFECT</td><td>(ILS) APPR MODE INOP</td></tr>
<tr><td>FIRST/SECOND PRIM FAILURE**</td><td>NO EFFECT</td><td>NO EFFECT</td><td>CAT 3 single</td></tr>
<tr><td>TOTAL PRIM FAILURE</td><td>NO EFFECT</td><td>NO EFFECT</td><td>CAT 1</td></tr>
<tr><td>FCMC FAILURE</td><td>NO EFFECT</td><td>NO EFFECT</td><td>NO EFFECT</td></tr>
</table>

* The FMGC internal test may eliminate one ADR. In this case, the FMGC no longer checks this ADR until autopilot reengagement. If CAT III DUAL is lost on the FMGC in command without failure, the pilot may recover it by changing the autopilot in command.

** One SEC must also be available. The autopilot is lost if PRIM2 and SEC2 are lost, due to ailerons uplift.

R *** LOC mode can be armed through the LOC pushbutton.

R

FAILURE CASE	AP/FD	A/THR	LANDING CAPACITIES
FIRST YAW DAMPER OR RUDDER TRIM FAILURE	NO EFFECT	NO EFFECT	CAT 3 SINGLE
SECOND YAW DAMPER OR RUDDER TRIM FAILURE	TOTAL LOSS OF AP EXCEPT IN LAND MODE BELOW 200 FT AND BEFORE ROLL OUT	NO EFFECT	CAT 1 NO EFFECT BELOW 200 FT if previously CAT 2/3
FIRST BSCU FAILURE	NO EFFECT	NO EFFECT	NO EFFECT
SECOND BSCU FAILURE	NO EFFECT	NO EFFECT	CAT 3 SINGLE
FIRST FWC FAILURE	NO EFFECT	NO EFFECT	CAT 3 SINGLE
SECOND FWC FAILURE	NO EFFECT	NO EFFECT	CAT 1
LOSS OF PFD DATA ON ONE SIDE	NO EFFECT	NO EFFECT	CAT 1
TOTAL LOSS OF ONE FMGC	LOSS OF ONE AP/FD	LOSS OF ONE ATS	CAT 3 SINGLE
SINGLE HYDRAULIC FAILURE	NO EFFECT	NO EFFECT	CAT 3 SINGLE
DOUBLE HYDRAULIC FAILURE	TOTAL LOSS OF AP	NO EFFECT	CAT 1

The following index lists the main terms used in the FMGS chapter.

A

D

F

H

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J

K

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N

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P

S

T