
Proposed ACJ: General Comment

Comment: It is important to check that where JAR 25 ACJ material is used, standards are not imposed that are higher than intended for Part 23 aircraft.
Part 25 is used for:- 393(a), 571(a), 573(b), 603, 611, 903(a)(1), 903(f), 905(a), 1182.
A great deal of this material is based on FAA ACs, although some FAA ACs have not yet been considered by the JAR 23 Study Group. Nor have copies of the ACs been made available to commentators.
Also, under the new proposed procedures (San Diego) there may not be any discussions with FAA on changes to these ACs.

Response: Noted. The question of harmonisation of advisory material is a policy matter which is outside the scope of this NPA. Whilst it is agreed that FAA/JAA documents might not always be developed jointly, it is suggested that this is not unique to JAR-23.
One of the main concerns in the development of ACJ has been the inadvertent introduction of standards that are higher than intended for JAR-23 aircraft. It is considered that the ACJ material provided in NPA 23-3 achieves the necessary balance, building on existing experience whilst not introducing any unnecessarily severe interpretations.
Although it is agreed that much of the JAA text associated with JAR-23 is derived from a US source, many of the ACJ text proposals that address the areas of JAR-23 originally identified as requiring ACJ material resulted from a review of the complete FAA AC. If it is felt that other aspects of existing FAA ACs require further consideration, commentators are invited to make specific proposals, either through their JAR-23 Study Group representative, or direct to JAA HQ. AC texts can be requested either from JAA HQ or through the commentators respective domestic Authority.

Proposed ACJ: Other Advisory Material comments.

Comment: As general observations it is considered that Advisory Material to correspond with the following is also required:-
1) AMJ20X - Certification of Aircraft Propulsion Systems Equipped with Electronic Controls, and
2) AMJ25-11 - Electronic Display Systems.

Response: Not accepted. Although it is agreed that the JAR-23 Study Group and relevant Specialist sub-group should review the these two FAA ACs for JAR-23, it should also be noted that availability of resources tends to dictate a long time scale to complete this task. The commentator is therefore invited to make specific proposals, either through their relevant JAR-23 Study Group representation, or direct to JAA HQ.

Proposed ACJ: General Comments.

Comment: The intent of the ACJs is fine. It is also correct to emphasise, as in the Flight Test Guide Foreword, that "...the material is neither mandatory nor regulatory..." and again "...alternative means (or compliance) proposed by the applicant will be given due consideration". Nevertheless in one respect ACJ material can become de facto requirements. This is where authorities do not agree to an alternative approach or to a submission that a test is unnecessary. By dismissing the applicants arguments the authorities effectively turn advisory material into the only means of showing compliance that they will accept. The ACJ becomes a "hip pocket requirement".

For this reason, comments should not be dismissed on the grounds that the ACJ "is only advisory".

In numerous instances the ACJ proposes the adoption of FAA ACs, in their entirety. The JAA Regulation Director in his covering letter of 1 July 1996 admits that some FAA ACs have not yet been considered by the JAR 23 Study Group. Nor have copies of the ACs been made available to commentators. In this respect the ACJ vetting process is incomplete.

NPA 23-3 requires copy reading. There are many minor errors and failures to translate FAA AC units into JAR ones.

Response: Noted. It is agreed that ACJ material does not generally represent the only means of showing compliance with requirements, and that an applicant is always free to suggest an alternative means of compliance. However it should also be remembered that there are some isolated instances where manufacturers design limitations and existing technology do tend to dictate that only one means of compliance is practical.

It is hoped that no comments are ever dismissed without a reasonable rationale.

The comments concerning the availability of FAA ACs for review are noted. It is hoped that any commentor that has such a problem will either request copies of the relevant documents from JAA HQ or domestic Authority.

Proposed ACJ: ACJ 23.307

Comment: The ACJ states in part "Static testing to ultimate load may be considered as adequate substitute for a formal stress analysis where static loads are critical in the design of the component. It is not understood how static or dynamic testing can be considered as an adequate substitute to formal stress analysis unless the test program provides for a statistically meaningful basis, or, the manufacturer/modifier has a proven understanding of the loads/stress state through previous experience with a similar design. Further explanation is required in the text to justify the situations when this type of substitution can be considered"

Response: Comment noted, but not accepted.
 Recognising that:-

- the wording of ACJ 23.307 is the same as CAM 3 3.174-4, which is well known and understood;
- it is standard practice to carry out static tests in lieu of stress analysis for demonstrating compliance against strength requirements; and
- the ACJ paragraphs 6 and 7 already provide guidelines for considering process and material variability,

it is not considered necessary to add further indications, because the decision whether a static/dynamic test is sufficient on its own to comply with the strength requirements has to be reached on a case-by-case basis during the certification activity.

Proposed ACJ: ACJ 23.307 Paragraph 3.
Comment: It is suggested that the phrase "... a 100% ultimate load test." should be replaced with "... ultimate load testing." This would more correctly imply a programme rather than an unspecified test, which could be inappropriate.

Response: Accepted. The ACJ is amended as follows:-

3. If the structure or parts thereof are outside the manufacturer's previous experience, the manufacturer should establish a strength test programme. In the case of a wing, wing carry through, fuselage and empennage this will usually involve a ~~100%~~ ultimate load ~~test~~-testing.

Proposed ACJ: ACJ 23.307 Paragraph 7
Comment: The paragraph should read "with mean M and standard deviation σ ," the coefficient of variation expressed as a percentage, Cv%, is defined by $C_v\% = 100\sigma / M$. In Table 1, the last value of Tf should be 1.55.

Response: Accepted. The ACJ is amended as follows:-

Test factor [Tf] vs. Coefficient of Variation [Cv%]

Cv%	5	6	7	8	9	10	12	14	15	20
Tf	1.00	1.03	1.06	1.10	1.12	1.15	1.22	1.30	1.33	1.55

For a population with mean M and standard deviation σ , the coefficient of variation expressed as a percentage, Cv%, is defined by -

$$Cv\% = 100 * \sigma / M.$$

Proposed ACJ: ACJ 23.341(b) Gust load factors
Comment: At the bottom of the Proposed ACJ, the following text should be added:-
"Any Kg value (even 1.2) has to be shown as conservative for the specific design."
It is for clarification only. The Kg=1.2 offered by ACJ 23.341(b) is for preliminary design and must be validated, as asked for by "Explanatory notes to ACJ material for JAR 23."
Therefore the ACJ text should reflect clearly this concept.

Response: Not accepted. The proposed ACJ material is intended simply to offer a starting point for the designer. In this respect, the proposed ACJ text is adequate. However, it is proposed to make a minor change to the text of the proposed ACJ text by amending the phrase "... will not provide" to read "... may not ...", i.e.:-

The gust alleviation factor Kg as specified in JAR 23.341(c) ~~will~~ may not provide the conservatism required by 23.341(b).

Proposed ACJ: ACJ 23.371(a)
Comment: The second sentence would be better English if it stated: "Experience has shown ..."

Response: Accepted. The text will be amended to read:-

The aerodynamic loads specified in JAR 23.371 include asymmetric flow through the propeller disc. ~~Experiences in the past have shown~~ Experience has shown that the effects of this asymmetric flow on the engine mount and its supporting structure are relatively small and may be discounted, if propellers are installed having diameters of nine feet or less.

Proposed ACJ: ACJ 23.423, 441 & 455
Comment: The statement "For power-controlled surfaces the deflection time should be measured." intimates that this is all that is required for power controls. The sentence would be better deleted.

Response: Not accepted. However, for clarification, editorial amendments are proposed as follows:-

Proposed ACJ 23.423 Manoeuvring loads - Horizontal surfaces

(a) For unpowered control surfaces, ... be assumed as:

*for aerobatic category aeroplanes:
0.2 sec for pedal controlled surfaces;*

*for normal, utility and commuter category aeroplanes:
0.3 sec for pedal controlled surfaces.*

(b) For power-controlled surfaces the deflection time should be measured.

Proposed ACJ 23.441 Manoeuvring loads - Vertical surfaces

(a) If a manoeuvre analysis is ... may be assumed as:

*for aerobatic category aeroplanes
0.2 sec for pedal controlled surfaces;*

*for normal, utility and commuter category aeroplanes
0.3 sec for pedal controlled surfaces.*

(b) For power-controlled surfaces the deflection time should be measured.

(c) For aeroplanes direction.

(d) For T-tails

Proposed ACJ 23.455(a)(2) Ailerons

(a) If a manoeuvre ... be assumed as:-

*for aerobatic category aeroplanes
0.1 sec for stick controlled surfaces
0.2 sec for wheel controlled surfaces*

*for normal, utility and commuter aeroplanes
0.2 sec for stick controlled surfaces
0.3 sec for wheel controlled surfaces*

(b) For power-controlled surfaces the deflection time should be measured.

Proposed ACJ:

ACJ 23.443

Comment:

The definitions for the various symbols do not make it clear whether the span / area / height of a wing or tail surface is to include that part of the fuselage to which the surface is attached or passes through. This is probably most significant for the vertical tail height / area.

Response:

Accepted. To avoid different interpretations, a definition has to be included in ACJ material. As the ACJ is offering an alternative approach to the rational evaluation, it is felt appropriate to err on the conservative side and therefore to insert a definition of 'Sh' and 'bh' which lead to a higher value of rolling

moment. It is therefore proposed to add the following text at the end of the Proposed ACJ:-

"In computing 'Sh' and 'bh' the horizontal tail root has to be assumed on a vertical plane through the centreline of the aeroplane fuselage."

Proposed ACJ: ACJ 23.443
Comment: The text in line 1:- "... by the vertical tail surfaces and their supporting structure ..."should read "... by the vertical tail surfaces, their supporting structure ..."
Response: Partially accepted. The text contains a typing error; the text was intended to read:-

For aeroplanes where the horizontal tail is supported by the vertical tail, the tail surfaces and their supporting structure including the rear portion of the fuselage should be designed to withstand the prescribed loading on the vertical tail and the rolling moment induced by the horizontal tail acting in the same direction.

Proposed ACJ: ACJ 23.562.
Comment: In the case of small aircraft where safety harness is attached directly to major structure (i.e. not to seats or seat rails) it is not believed that crew injury in survivable accidents has shown a need for full scale dynamic tests. The data bases from instrumented aircraft and car crash tests should enable criteria to be laid down which will result in acceptably safe crew restraint. It should also be possible to cover the lumbar compression and head impact clearance aspects. The JAA should avoid imposing expensive specialised tests on small aircraft manufacturers if it is possible to show compliance by other means. The JAR 23 Study Group should be asked to develop suitable criteria, drawing on crash test data from both sides of the Atlantic.
Response: Noted. ACJ 23.562 is an acceptable means of compliance for 23.562(a), (b) and (c). JAR 23.562 paragraph (d) offers to manufacturers (small aeroplane manufacturers included) the possibility of following an alternative approach that achieves an equivalent or greater level of occupant protection that required by 23.562(a), (b) and (c). Therefore small manufacturers are not obliged to carry out full scale dynamic tests if they are able to provide alternative rational data.

Proposed ACJ: ACJ 23.607(b)
Comment: It is felt that the proposed ACJ adds nothing to the understanding of the requirement and could be deleted.
Response: Not accepted. ACJ 23.607(b) was developed to highlight one type of "particular installation" to which JAR 23.607(b) refers, and to clarify the need to address the normal operating environment. Furthermore, recognising that it is intended to harmonise JAR 23 with FAR 23 Amendment 48 in this area, where the words "temperature and vibration" have been deleted, there is a greater need for such ACJ 23.607(b) material.

Proposed ACJ: ACJ 23.629
Comment: Text under fourth paragraph could be revised as follows:-
"Full scale flight flutter test..., and when modifications to the type design have such a significant effect on the critical flutter mode that only limited confidence could be given to rational analysis alone."

Reasons for proposed text/comment

1. In order to have better consistency between fourth and fifth paragraphs of ACJ 23.629.

To take care of comments for CAA letter J1-23/95/0349 27 March 1995 (Mr Minter) and for Socata letter DT/N No. 98/95 - RJ/CL 1 March 1995 (Mr Jung), received after JAR 23 Study Group approval of ACJ text.

Response: Accepted. The proposed wording makes the 4th and 5th paragraphs more consistent. Amendments to the proposed ACJ are accepted as follows:-

Full scale flight flutter test should be carried out when the adequacy of flutter analysis has not been confirmed by previous experience with aeroplanes having similar design features, and when modifications to the type design have such a significant effect on the critical flutter modes that only limited confidence could be given to rational analysis alone.

Proposed ACJ: ACJ 23.629, Paragraph 3.
Comment: In the 1st sentence, 3rd phrase, the word "already" is poorly chosen and would be better worded:-
"... this can also happen due to environmental conditions ..."
Response: Accepted. The printing errors which have occurred will be corrected as follows:-

For modifications to the type design which could effect the flutter characteristics, and for derivatives of existing aeroplanes freedom from flutter, control reversal and divergence may be shown by rational analysis alone, if this analysis

(including any ~~FEM- Finite Element Model~~ used) has been Verified during the certification of the basic aeroplane model.

Aeroplanes showing compliance with the damage-tolerance criteria of JAR 23.573 with the extent of damage for which residual strength is demonstrated may alter their stiffness and their natural frequencies of main structural elements; for composite structures this can happen ~~already~~ also due to environmental conditions (temperature and humidity). If no exact measurements are available a variation in stiffness of at least $\pm 20\%$ should be assumed.

Proposed ACJ: ACJ 23.671

Comment: The 2nd sentence "Furthermore ... etc." is only a repeat of 23.685. It does nothing to amplify 23.671 and should be deleted as the requirement is already properly stated in 23.865.

Response: Accepted. The 2nd sentence is only a repeat of JAR 23.685 and does not amplify JAR 23.671. The requirement is already properly stated in 23.685. This sentence will therefore be deleted.

In designing and manufacturing control systems attention should be given to minimise friction in the systems and to avoid jamming and interference with other parts in operation, due to vibration and accelerations.

~~Furthermore, the design of control systems should prevent incorrect assembly of parts of the control system (see also JAR 23.685).~~

Proposed ACJ: ACJ 23.683

Comment: Sub-paragraph (1)(VI) should start:-"The minimum control surface ..."

Response: Accepted. The text will be amended as follows:-

(vi) ~~A-~~The minimum control surface travel from the neutral position in each direction being measured should be 10 percent of the control surface travel measured with no load on the surface.

Proposed ACJ: ACJ 23.865

Comment: (a) The intent of the ACJ, as expressed in the proposal, is that engine mounts should either be constructed of fireproof material, or shielded to achieve the same level of safety. However, the wording of the explanatory note appears to suggest that non-fireproof parts which are certificated as part of the engine would be acceptable.

It is necessary to make clear what is intended by JAR 23.865 for the entire engine mount system.

(i) Under FAR 23.865, the engine-certificated portions are specifically excluded (which for some engines could mean excluding a significant portion of the system) and under FAR 33 the engine-certificated portions or areas of the system are not required to have any specific fire-strength capability. So under FAR 23.865 / FAR 33, it seems to be theoretically acceptable for fire to result in engine detachment as a consequence of failure of engine-certificated portions of the mount system.

(ii) Under current JAR-E, the engine-certificated portions or areas of the mount system are required to be fireproof by construction or by protection, thus any aircraft with JAR-E certificated engines will have fireproofness of the engine-supplied portions/areas of the mount system irrespective of what is required or intended for compliance with the aircraft code.

(iii) This JAR-E requirement for mount system fireproofness exists only because that was believed necessary for compatibility with JAR Aircraft Codes.

(iv) The fact that the FAR 23.865 words "..., excluding those portions that are certificated as part of the engine, ..." were specifically omitted from the JAR 23.865 version, implies that the JAR 23 safety objective of fireproofness is intended to be applicable to both the airframe-supplied and the engine-supplied portions of the entire mount system.

(b) In addition to the above, it is not understood why the currently proposed ACJ text is specifically limited to engine mounts when the JAR 23.865 requirement also applied to flight controls, other flight structure and vibration isolators, all of which could benefit from having ACJ material. Therefore, it is proposed that the ACJ should be made clearer and more generally applicable, by replacing the existing text with:-

"The option given in the requirement, allowing compliance by means of shielding, is intended to provide an equivalent level of safety to that provided by being constructed by fireproof materials. The requirements of JAR 23.865 are applicable to the entire engine mount system, including any portions of the system that are provided by the type-certificated engine. In complying with JAR 23.865, appropriate credit may be taken for compliance by the engine with the relevant requirements of JAR-E (i.e. JAR E 530(e) effective from 27 May 1991, JAR-E 530(a) prior to that date). If it is necessary to apply shielding, care should be taken to ensure that its installation does not invalidate the type certification of the engine."

Response:

Not accepted. Current FAR and JAR texts for 23.865 are harmonised. The commenter has not used the latest version of FAR 23 for his comment i.e. Amendment 23-49. The issues raised in the comment are considered to have been covered by the last sentence of the proposed ACJ. The commenter's proposed text simply adds a reference to

a JAR E paragraph which, it is considered, does not improve the proposed text.

Proposed ACJ: ACJ 23.903(a)(1)

Comment: It is not clear why Engines not Type Certificated to JAR-E may need to show compliance with the "**appropriate** issue of JAR-E" rather than with the "**applicable** issue of JAR-E".

Response: Not accepted. The choice of the word "appropriate" is consistent with JAR 25 and will be retained.

Proposed ACJ: ACJ 23.905(a)

Comment: Similarly it is not clear why Propellers not Type Certificated to JAR-P may need to show compliance with the "**appropriate** issue of JAR-P" rather than the "**applicable** issue of JAR-P".

Response: Not accepted. The choice of the word "appropriate" is consistent with JAR 25 and will be retained.

Proposed ACJ: ACJ 23.905(e)

Comment: The first paragraph of this ACJ concentrates on pusher propellers which are close to the fuselage. While this is important the text appears to imply that less importance is given to the hazard from ice in the case of wing mounted pusher propellers.

The following alternative wording is suggested:-

"Ice shed from the forward fuselage and wings may cause significant damage to pusher propellers that are very close to the fuselage and well back from the aeroplane nose. Similarly, ice shed from the wings may cause significant damage to wing mounted pusher propellers. Account should be taken of these possibilities."

Response: Accepted. The first paragraph is amended as follows:-

~~For pusher propellers that are very close to the fuselage and well back from the front of the aeroplanes nose, ice shed from the forward fuselage, and from the wings, may cause significant propeller damage and should be taken into account by the applicant.~~

Ice shed from the forward fuselage and wings may cause significant damage to pusher propellers that are very close to the fuselage and well back from the aeroplane nose. Similarly, ice shed from the wings may cause significant damage to wing mounted pusher propellers. Account should be taken of these possibilities.

Proposed ACJ: ACJ 23.907(a) (Explanatory Note text and proposed ACJ text)

Comment: CAA fully supports the intent of this proposed ACJ but in the interests of ensuring the correct interpretation of JAR 23.907(a) the following small change is suggested:- Change the "**ACJ 23.907(a)**" text to:- "The definition of a conventional fixed pitch wooden propeller should be taken to include a propeller with a load carrying wooden core and a simple cover of composite material, ... etc. ..."

Response: Not accepted. The proposed sentence is believed to be sufficiently clear. Only wooden-core propellers, where the wood is the load carrying part, are referenced.

Proposed ACJ: ACJ 23.909(d)(1)(Explanatory Note text only)

Comment: It is not correct to state that this ACJ material originated from JAR-E. We suggest that it originated from FAA-AC 23.909 (as was intended according to the comment-response document for Draft JAR-23 Issue 4) Explanatory Note Title "ACJ 23.933(b)(3) Reversing Systems" & proposed ACJ 23.933(b)(2) Reversing Systems

Response: Not accepted. The origin of the ACJ text is confirmed as being JAR-E 100(b).

Proposed ACJ: ACJ 23.933(b)(3) (Explanatory Note title)

Comment: In view of the fact that sub-paragraphs (b)(2) and (b)(3) of JAR 23.933 have almost identical final sentences, and relate only to propeller systems, we suggest that the proposed ACJ should be re-identified as:- "**ACJ 23.933(b)(2) and (b)(3) Propeller** reversing systems."

Response: Not accepted. The proposed ACJ text comes from FAR 23.933(b)(2) and is acceptable for 23.933(b)(2) only. However, in the light of further review, it has been agreed to move the ACJ text into the requirement text.

Proposed ACJ: ACJ 23.959(a).

Comment: The unusable fuel tests have 2 purposes;
1. To determine the unusable fuel in individual tanks so that fuel contents gauges can be set to indicate zero when the usable fuel has been consumed (JAR 23.1337(b))
2. To determine the total unusable fuel on board as an item that needs to be included in the empty weight (JAR 23.29).
To meet 1. a multi-tank system, with collector tank, can be satisfactorily tested by switching to another fuller tank when all usable fuel in the tank under test has been exhausted. The unusable fuel in that tank can then be measured after flight and the contents gauge zero set. There seems no need to add the volume of fuel remaining in the collector tank, as proposed by the ACJ.

To require the unused fuel in the collector tank to be measured in flight involves draining the collector tank on the ground. This means that a duplicate fuel supply to the engine has, unnecessarily, to be provided for the test.

For 2 above, the unusable fuel in the collector tank can be worked out from the tank geometry and so calculating the unusable quantity in the critical flight attitude as determined in the individual tank tests. Alternatively it can be done by putting the aircraft in that attitude on the ground and running engines until they malfunction. Any effect of sideslip is small on small collector tanks. The ACJ recognises that unusable fuel tests on simple systems may be satisfactorily determined by ground tests. Where this is not the case, it should still be possible to decide in advance the flight case which will be critical and not test other cases. However the cases to be considered need to include the let-down and landing approach as these can be critical when seriously short of fuel.

3. The term "collector tank" is considered preferable to "header tank"; the latter term is associated with expansion and top-up systems, typically liquid cooling systems.

Response :

(1) Not accepted. It is not agreed that the collector tank does not need to be added to the unusable fuel, but it is nevertheless recognised that the amount need not be determined by flight test if it can be determined by geometrical analysis.

(2) Accepted. The following new paragraph (c) text covering the descend and approach case.

c. Descent and Approach.

Make a continuous power-off straight descent at V_{FE} with gear and flaps down or follow emergency descent procedures contained in the Aeroplane Flight Manual (AFM). Continue the test until the first indication of interrupted fuel flow is observed.

Make a continuous power-off glide at $1.3 V_{SO}$ until first indication of interrupted fuel flow is observed. Simulate turbulent air or smooth air condition, whichever is most critical. Verify that with the unusable fuel quantity established with critical tests no interruption of fuel flow will occur when simultaneously making a rapid application of MCP and a transition to a speed in accordance with JAR 23.65 from a power-off glide at $1.3 V_{SO}$.

Establish a power-off $1.3 V_{SO}$ descent in a landing configuration. Maintain a $1\frac{1}{2}$ ball sideslip in direction found to be critical

for fuel system design with sufficient aileron to maintain constant heading (or utilise the maximum side slip anticipated for the type of aeroplane). The test should be conducted by slipping for 30 seconds. Continue the test until the first indication of interrupted fuel flow is observed. Verify that with the unusable fuel quantity established with critical tests no interruption of fuel flow will occur when slipping for 30 seconds, followed by a maximum power straight ahead baulked landing climb for 1 minute.

If there are any other conditions which will result in higher unusable fuel quantities, these conditions should also be examined.

(3) The comment referring to header and collector tanks is rejected, on the basis that the definition of a header tank is included in the ACJ text and therefore use of the term is not misleading.

Proposed ACJ: ACJ 23.961
Comment: The paragraphs starting: "If significant fuel pressure ..." has a mis-spelling in its 3rd line: "... expecting ..." should be "... expected ..."
Response: Accepted. The suggested editorial correction is agreed as follows:-

If significant fuel pressure fluctuation occurs during testing of the critical flight condition but pressure failure does not occur, additional testing should be considered to determine that pressure failure may not occur during any ~~expecting~~ expected operating mode. Also, landing.

Proposed ACJ: ACJ 23.1141(g) (Proposed ACJ text only.)
Comment: This text does not meet the intent of clarification as expressed in the "Explanatory Note" relating to this ACJ. It would be helpful to add a new first sentence, using the words of the Explanatory Note and stating that:-
"Compliance entails sensing the valve's position, not the position of the valve's selector. The required means to indicate the valve position ... etc. ..."
Response: Not accepted. The commenter's interpretation is correct, but the proposed text change is not agreed. The requirement is for an indication of the position of the valve, and it is believed that current text is sufficiently clear in this regard, i.e. that the position of the switch must be indicated and not the position of the valve.

Proposed ACJ: ACJ 23.1189(a)(5) (Proposed ACJ text only.)
Comment: It is suggested that the ACJ text should be changed and slightly extended to state:-
"The hazardous amount of flammable fluid for this requirement is established as **0.95 litres (1.67 Imperial pints / 1.0 US quarts) or more.**"
Response: Not accepted. The problem of dimensions and units is well known and is a matter of editorial policy, which is under the direction of JAA Headquarters.

Proposed ACJ: ACJ 23.1303(b)(5)
Comment: Flight and Navigation Instruments. It is noted that the proposed ACJ material contains no guidance on the suitability of attitude displays and their characteristics. It is suggested that consideration be given to including the text of ACJ 25.1303(b)(5).
Response: Not accepted. A review of extensive existing ACJ material is considered to be beyond the scope of this NPA 23-3. Although it is agreed ACJ 25.1303(b)(5) might contain information relevant to JAR-23, it should be noted that the original focus for the development of ACJ text for JAR-23 came from Authorities and Industry specialists' consideration of comments received on the Draft requirements. If it is felt that there is a genuine need for additional guidance, commentators are invited to provide specific proposals either through their relevant representation on the JAR-23 Study Group, or direct to JAA HQ.

Proposed ACJ: ACJ 23.1321(a)
Comment: Instrument Arrangement and Visibility. It is suggested that the material contained in ACJ 25.1321(a) should be considered for Commuter Category aeroplanes.
Response: Not accepted. Specialist consideration of the proposed text concluded that it is adequate and reflects current practice.

Proposed ACJ: ACJ 23.1322
Comment: Warning Caution and Advisory Lights. It is suggested that ACJ material needs to be provided to give guidance for alerting systems on the basis of NPA 25D-189 and the existing AMJ 25.1322.
Response: Not accepted. The existing advisory material is considered adequate and therefore further material is unnecessary. Part 25 aeroplanes are more complex in this area, and therefore part 25 text is considered inappropriate. However, the JAR 23 Study Group would welcome a text proposal for future consideration.

Proposed ACJ: ACJ 23.1323(g)
Comment: The separation could be more specifically stated, as:-
"... separated vertically by at least 30 centimetres ..."
For example two pitot heads separated by 30 cms longitudinally but only a few cms vertically could well be vulnerable to a single strike.
Response: Accepted. The text will be amended as follows:-

"Pitot tubes for duplicate airspeed indicators are usually located on opposite sides of an aircraft fuselage but may be situated on the same side provided that they are separated vertically by at least 30 centimetres."

Proposed ACJ: ACJ 23.1329
Comment: Automatic Pilot. It is suggested that the wording of ACJ 25.1329 plus any appropriate inputs from JAR-AWO, including HUDs, should be considered for inclusion.
Response: Noted. The JAR 23 Study Group would welcome proposals, with justification, for future consideration..

Proposed ACJ: ACJ 23.1351
Comment: In addition to the above specific points it is considered that ACJ material is required for the clarification of:-
1) the 5 minutes attention getting time for the battery endurance, and
2) laboratory testing of the electrical system if the proposed JAR 23.1363 (see 23.1351(a)(2) comment) is not adopted.
Response: Not accepted. In Day/VMC, over rural areas, no electrical power is required. In a control zone, 5 minutes endurance is considered adequate to inform ATC. The commenter is invited to clarify his concerns.

Proposed ACJ: ACJ 23.1351(a)(2)
Comment: Electrical Systems and Equipment - General. The technical content of the proposed ACJ is acceptable. However, it is recommended that the wording "for normal, utility or aerobatic category aeroplanes" be deleted. This would then allow the ACJ to be applicable to both sub-paragraphs (2)(i) and (2)(ii) as the same principle is involved for laboratory testing of aeroplanes in any category. Alternatively, the text could be proposed for a new paragraph 23.1363 to harmonise with JAR and FAR 25 and 29.1363 which would have almost identical wording.

Response: Not accepted. JAR 23 requires tests for all aeroplanes, except commuters. Furthermore, JAR and FAR paragraph 23.1363 have been harmonised.

Proposed ACJ: ACJ 23.1351(b)(5)(iv)

Comment: The following text is recommended "Throwover Switching" refers to the means used for the selection of an alternative independent electrical power source provided to maintain the electrical supply to ensure the continued operation of equipment or systems. This switching can be achieved by manual or automatic means".
In justification of the proposed change of wording it is argued that the word "maintenance" has been replaced so as to avoid any confusion that the switch could be used to enable repairs to be carried out. Similarly "Interpretation of mechanical selection or solid state switching" has been suggested for deletion to eliminate possible confusion in the interpretation of the words "mechanical selection" insofar as the mechanical selection being carried out is by electrical means.

Response: Accepted. The text will be amended as follows:-

"Throwover Switching" refers to the means for the selection of an alternate independent power source provided to allow the maintenance of the electrical supply and to ensure continued operation of equipment or systems. This switching can be achieved by manual or automatic means. ~~and can embrace either a mechanical selection or solid state switching.~~

Proposed ACJ: ACJ 23.1353(h)

Comment: Storage Battery Design and Installation. The following text is recommended:-
"When ascertaining that the installed aeroplane battery capacity is adequate for compliance with 23.1351(h) account should be taken of any services or equipment essential for the continued safe flight and landing of the particular aeroplane in accordance with the approved emergency procedures and in any approved condition of operation. Account should also be taken of those services which cannot readily be shed. In order to ensure that services will function adequately for the prescribed period, the duration of battery supply should normally be based on a battery capacity of 72% of the nameplate rated capacity at the one hour rate. This figure takes into consideration the battery state of charge, the minimum capacity permitted during service life and the battery efficiency and is based on a battery capacity of 80% of the nameplate rated capacity, at the one hour rate, and a 90% state of charge."

This revised wording is proposed because it reflects current certification practice and to remove the word "manufacturers" to reflect current policy.

Response: Accepted. The text will be amended as follows:-

"When ascertaining that the installed aeroplane battery capacity is adequate for compliance with 23.1351(h) ~~manufacturers should take into account~~ account should be taken of any services or equipment essential for the continued safe flight and landing of the particular aeroplane in accordance with the approved emergency procedures and in any approved condition of operation. Account should also be taken of those services which cannot readily be shed. In order to ensure that services will function adequately for the prescribed period, the duration of battery supply should normally be based on a battery capacity of 75% of the 'nameplate' rated rating of the battery is available (this is to take into consideration loss of capacity with age, and a realistic state of charge). ~~Recognition time may depend on the kind of warning systems.~~ capacity at the one hour rate. This figure takes into consideration the battery state of charge, the minimum capacity permitted during service life and the battery efficiency, and is based on a battery capacity of 80% of the nameplate rated capacity, at the one hour rate, and a 90% state of charge.

Proposed ACJ: ACJ 23.1459

Comment: Flight Recorders. It is suggested that the text of ACJ 25.1459(b), as appropriate to the relevant size of commuter aeroplane, should be considered for inclusion.

Response: Accepted. ACJ 25.1459 has been reviewed, and is considered to be useful additional material. It is proposed to adopt the wording of this ACJ as follows:-

ACJ 23.1459(b) Flight Recorders

The phrase 'as far aft as practicable' should be interpreted as a position sufficiently aft as to be consistent with reasonable maintenance access and in a position to minimise the probability of damage from crash impact and subsequent fire.

Proposed ACJ: ACJ 23.1581(a)(3)

Comment: AFM. We have significant reservations about the GAMA Handbook Spec. Who is co-ordinating this review?

Response: Noted. The material of GAMA Handbook Spec. is intended to be reviewed and adapted for JAR 23 by the JAR 23 Flight sub-group.

Proposed ACJ: ACJ 23.1581(a)(3) (Explanatory Note).

Comment: It is not appropriate to rely on the GAMA Spec. 1, which refers specifically to the FAA and FARs, without serious consideration. The task of drafting this ACJ should be referred to the Flight Manuals Working Group which has experience of Flight Manuals and has already produced an AMJ on the subject for JAR-25.

Response: Not accepted. The proposal to allocate this task to the JAR 25 AFM Working Group is not supported. For general aviation aeroplanes, a comprehensive Operating Instruction (e.g. POH) is necessary for safety reasons. For Part 25 aeroplanes, the AFM is primarily a basis for a company-specific operating instructions to be prepared by the operator and approved by the Authority. Furthermore, for Part 25 aeroplanes, type ratings are required, for which Training Manuals are also produced. Specialist consideration within the JAR 23 Study Group of existing AFM-ACJ material will be undertaken as a priority action item.

Proposed ACJ: ACJ 23.1585(a) (Explanatory Note)

Comment: If one was looking for an interpretation of the Flight Manual term "abnormal", one would not immediately think to look in a Flight Test Guide which then refers you on the GAMA Spec. 1.

Response: See previous response.

Proposed ACJ: ACJ A23.1

Comment: The definitions for the various symbols do not make it clear whether the span / area / height of a wing or tail surface is to include that part of the fuselage to which the surface is attached or passes through. This is probably most significant for the vertical tail height / area.

This comment applies also to ACJ 23.443.

Response: Accepted. The ACJ does not define how to consider span, area and height of a wing or tail surface. There are several definitions available in the aviation literature (especially for vertical fins) depending on the different surface configurations; on the other hand there is not a general definition valid for all the possible configurations.

It is therefore felt necessary to indicate that the chosen values have to be agreed with the Authority in respect to the limits of applicability of Appendix A. It is proposed to add the following sentence to the ACJ as follows:-

Values for spans, areas and heights to be inserted in the formulae should be agreed with the Authority in respect to the limits of applicability in Appendix A.