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D E C I S I O N
of 19 October 1999

Case Number: T 1180/97 - 3.2.1

Application Number: 90200161.9

Publication Number: 0437868

IPC: B64D 29/06

Language of the proceedings: EN

Title of invention:

Apparatus and methods for reducing aircraft lifting surface flutter

Patentee:

The Boeing Company

Opponent:

DaimlerChrysler Aerospace Airbus GmbH

Headword:

-

Relevant legal provisions:

EPC Art. 54, 56, 101(1)
EPC R. 55

Keyword:

"Examination of opposition - admissibility - (yes)"
"Novelty (yes)"
"Inventive - (yes) after amendment"

Decisions cited:

G 0004/95, T 0926/93, T 0522/94, T 0114/95

Catchword:

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Boards of Appeal

Chambres de recours

Case Number: T 1180/97 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 19 October 1999

Appellant: DaimlerChrysler Aerospace Airbus GmbH
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Representative: -

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Decision under appeal: Interlocutory decision of the Opposition Division
of the European Patent Office posted 13 October
1997 concerning maintenance of European patent
No. 0 437 868 in amended form.

Composition of the Board:

Chairman: F. A. Gumbel
Members: P. Alting van Geusau
J. H. van Moer

Summary of Facts and Submissions

- I. The mention of the grant of European patent No. 0 437 868 in respect of European patent application No. 90 200 161.9, filed on 19 January 1990, was published on 3 August 1994.
- II. Notice of opposition was filed on 30 April 1995 on the grounds of Article 100(a) EPC. In respect of an alleged lack of novelty and inventive step the opposition was supported by the documents
- D1: AGARD Report No 668, "Consideration on Wing Stores Flutter", ASYMMETRIC STORE FLUTTER, A. Lotze, July 1978, pages 1-19,
- D2: FLUTTER OF AIRCRAFT WITH EXTERNAL STORES, H. Katz, McDonnell Aircraft Company. Presented at Aircraft/Stores Compatibility Symposium, November 1969, AGARD.
- III. By decision dated 13 October 1997 the Opposition Division maintained the patent in amended form on the basis of claims 1 to 6 filed with letter dated 7 July 1997.

The independent claim 1 upheld by the Opposition Division reads as follows:

- "1. An Aircraft which is configured to prevent wing flutter, the aircraft comprising:
- a. a first wing (12) and a second wing(12) arranged on opposite sides of the aircraft;
 - b. a first wing element (10) and a second wing

element(10), and
c. first means (70) for attaching the first wing element (10) to the first wing (12) and second means (70) for attaching the second wing element (10) to the second wing (12),
the first and second wing element (10) being attached to their associate wing (12) in a manner that when the first wing element (12) and the second wing element (10) are subjected to a force, the first wing element (10) is caused to oscillate at a different frequency than the second wing element (10), and
the first attaching means (70) including means for transmitting oscillations of the first wing element (10) to the first wing (12), and the second attaching means (70) including means for transmitting oscillations of the second wing element (10) to the second wing (12), in a manner that the first wing (12) oscillates at different frequency than the second wing (12), characterised in that the first and second wing elements (10) are engine nacelles which are suspended from the first and second wings (12)."

The Opposition Division was of the opinion that, starting from the closest prior art as represented by D1, neither D1 nor D2 addressed the idea that the permanent structure of an aircraft in its fly-away condition could be made constantly asymmetric or pointed to the use of the engine nacelles as the elements which were caused to oscillate at different frequencies.

IV. On 5 December 1997 a notice of appeal was lodged against that decision together with payment of the appeal fee. In the statement of grounds of appeal,

filed on 13 February 1998, the appellant (opponent) referred to a number of additional documents (D3 to D6) for further substantiation of an alleged lack of novelty and inventive step of the subject-matter of the patent in suit.

- V. In a communication issued in preparation for oral proceedings, the Board pointed out that during the oral proceedings it had to be discussed whether the evidence in D3 to D6 should be considered as late-cited within the meaning of Article 114(2) EPC and, if so, whether the content of these documents was sufficiently relevant to be introduced into the proceedings.

The Board further expressed the provisional opinion that the clarity of the amended claims should be discussed. In respect of the requirement of inventive step the Board raised the question whether the skilled person would recognize the link between pylons as used in D1 and D2 and engine support means in the form of nacelles and whether he would then apply the teachings of D1 and D2 in order to mount the engines in the suggested manner when a flutter speed problem was involved.

- VI. With letter dated 17 September 1999 the appellant requested that either one of the experts Mr D. Schierenbeck or Mr W. Peschel be allowed to speak during the oral proceedings. The appellant relied furthermore on an additional prior art document (D8) for substantiation of its opinion according to which the skilled person would consider aero-engines mounted under the wing as falling within the general concept of wing "stores".

VII. With letter dated 20 September 1999 the respondent filed new claims in accordance with four new auxiliary requests (A to D).

VIII. Oral proceedings were held on 19 October 1999 in the presence of both parties.

During the oral proceedings the respondent filed new claims 1 to 6, based on the auxiliary request B filed with letter dated 20 September 1999, and an adapted description (columns 1 to 8).

The respondent requested that the appeal be dismissed for reason of inadmissibility of the opposition and that the patent be maintained as granted,

- as a first auxiliary request, that the patent be maintained on the basis of the documents accepted by the Opposition Division,
- in the alternative on the basis of the auxiliary request submitted during the oral proceedings, or
- on the basis of one of the auxiliary requests A, C or D submitted with the letter dated 20 September 1999.

The respondent further requested that the appellant's expert should not be heard. In case the Board should hear the expert, postponement of the hearing and apportionment of costs in the respondent's favour was requested.

Current claim 1 of the auxiliary request B reads as

follows:

"1. An Aircraft which is configured to prevent wing flutter, the aircraft comprising:

- a. a first wing (12) and a second wing(12) arranged on opposite sides of the aircraft;
- b. a first wing element (10) and a second wing element(10), and
- c. first means (70) for attaching the first wing element (10) to the first wing (12) and second means (70) for attaching the second wing element (10) to the second wing (12),

the first and second wing element (10) being attached to their associate wing (12) in a manner that when the first wing element (12) and the second wing element (10) are subjected to a force, the first wing element (10) is caused to oscillate at a different frequency than the second wing element (10), and

the first attaching means (70) including means for transmitting oscillations of the first wing element (10) to the first wing (12), and the second attaching means (70) including means for transmitting oscillations of the second wing element (10) to the second wing (12), in a manner that the first wing (12) oscillates at different frequency than the second wing (12), characterised in that the first and second wing elements (10) are engine nacelles which are suspended from the first and second wings (12), and the attaching means (70) of which have different side bending frequencies."

At the end of the oral proceedings the Chairman announced that since the discussions during the oral proceedings had not shown that any of the documents D3

to D8 were more relevant than D1 and D2, the Board did not see a reason to consider these documents any further in its written decision.

- IX. In support of its requests for setting aside the decision under appeal and revocation of the patent in its entirety the appellant essentially relied upon the following submissions:

The opposition should be considered admissible because, contrary to the opinion held by the respondent, the notice of opposition contained sufficient detail to meet the requirements of Rule 55(c) EPC. Admittedly the documents D1 and D2 referred to in the notice of opposition were filed after the 9 month time limit. However, this did not constitute a ground for inadmissibility of the opposition: as long as the prior art documents were clearly indicated in the notice of appeal, later submission of the documents themselves was not excluded by the EPC. Anyhow the respondent had not appealed and could thus not return to the granted version of the patent. For these reasons the respondent's main request should be rejected.

Considering the respondent's request not to allow the expert to make oral submissions during the oral proceedings, the appellant pointed out that its intention to rely on the expertise of Mr Peschel had been announced well in advance of the oral proceedings. Although apparently the respondent was not informed immediately of the appellants request, the appellant held the opinion that for fulfilment of the conditions mentioned in the enlarged Board of Appeal decision G 4/95, the filing date of such a request with the EPO

was the only relevant date to be observed by the appellant and in this respect one month was considered to fulfill the requirement.

Considering the subject-matter of the patent in suit, document D2 which related to the combination of features of the precharacterising portion of claim 1 clearly represented the closest prior art. Contrary to the opinion expressed by the respondent this document was not limited to military aircraft but taught in general terms the possibility of asymmetrical support of external stores for avoiding wing flutter problems. The term "external stores" included the underwing engines of an aircraft so that the skilled person would read this into the disclosure of D2. Although D2 was essentially concerned with the effect of pitch movement on the wing torsion, the fact that wing torsion and wing bending were interrelated effects, as was also acknowledged in the patent in suit, it would be obvious to apply the teachings of D2 either in respect of the torsion or bending modes of the wings. In this respect D2 explicitly mentioned the secondary effect of pylon roll flexibility on page 2-3.

Therefore, when faced with the problem of wing flutter the skilled person would arrive at the subject-matter of the patent in suit when interpreting and applying the teachings of D2 in the manner he would do in the normal execution of his abilities thus without inventive activity being involved.

- X. The respondent disputed the appellant's view and its arguments may be summarised as follows:

The question of admissibility of the opposition could be raised at any stage of the proceedings because this was an indispensable procedural prerequisite for considering the opposition and as such had to be established by the EPO of its own motion and in so far it was not necessary for it to be an appellant. Although sufficiently substantiated objections were submitted in respect of the granted claim 7 so as to fulfill the requirements of Rule 55(c) EPC, the objections raised against the rest of the claims did not meet these formal requirements and as such did not support the request for revocation of the patent in its entirety. Therefore the opposition was not admissible and, as a consequence, the patent should be maintained in its granted form.

The appellant's request for admittance during the oral proceedings of an expert making oral submissions, arrived at the representative's office on 30 September 1999, thus about 19 days in advance of the oral proceedings. Such a short period was not sufficient for the respondent to arrange for its own expert to attend the oral proceedings or to properly prepare himself. In case the Board were to consider allowing the appellant's expert to make oral submission the oral proceedings should be postponed and the costs of the oral proceedings should be borne by the appellant.

Considering the lack of novelty objection raised by the appellant against the subject-matter of the first auxiliary request, D2 did not disclose that the stores mounted to the wings were engine nacelles. Since the disclosure of a general feature within the prior art could not take away the novelty of a specific feature

within the generic group, the subject-matter of claim 1 was novel.

Moreover D2, concerned military aircraft as was clear from the reference to the F-4C aircraft on page 2-8, this aircraft having its engines mounted in the fuselage. The configuration analysed in D2 involved use of a Multiple Ejector Rack on the pylon which also suggested military use (see page 2-6). Therefore, even assuming that the scope of the term "stores" includes all kinds of external loads mounted to the wings of an aircraft, including engines, the skilled person was not led by the disclosures of D2 to apply its teachings to the support of engines. Also in view of the fact that the loads referred to in D2 concerned non-permanent loads, no hint could be derived from D2 in the direction of support of the engines which were not only permanent loads but quite different in size and function to the loads disclosed in D2.

Furthermore, the skilled person was reluctant to give up the essentially symmetrical arrangement of an aircraft because such a symmetrical concept not only restricted the amount of development work on the aircraft but also the number of different parts to be used and thus also the number of spare-parts to be held in stock. D2 concerned symmetrical aircraft to which non-permanent loads were asymmetrically attached and not an aircraft that was asymmetrical in its fly-away condition.

As regards the measures for improving the flutter characteristics of the aircraft disclosed in D2, this prior art document essentially considered the

instability concerning wing bending versus a wing angle of attack mode resulting primarily from pylon pitch. However, the present inventors found that the different pylon side bending flexibilities, as was now defined in claim 1 of the second auxiliary request, were of essential importance for reducing the flutter tendency. Such a teaching was neither disclosed nor hinted at in D2 so that at least the subject-matter of claim 1 of the second auxiliary request was not only novel but also involved an inventive activity within the meaning of Article 56 EPC.

Reasons for the Decision

1. The appeal is admissible.
2. *Admissibility of the opposition*
 - 2.1 The Board follows the respondent's view that admissibility of the opposition is an indispensable procedural prerequisite for considering the opposition and which has to be established by the EPO of its own motion at any stage during the proceedings, thus also at the appeal stage (see for example T 522/94 (OJ 1998, 421)).
 - 2.2 Rule 55 EPC stipulates that if the notice of opposition does not comply with the provisions of Article 99(1), Rule 1(1) and Rule 55(c) EPC, or does not provide sufficient identification of the patent against which the opposition has been filed, the opposition should be rejected as inadmissible unless these deficiencies have

been remedied before the expiry of the opposition period.

The respondent admitted during the oral proceedings that sufficient detailed facts and evidence had been put forward against the granted apparatus claim 7 but argued that for support of a request for revocation of the patent in its entirety it followed from Rule 55(c) that detailed arguments and evidence should have been supplied in respect of each of the granted claims. Therefore the respondent was of the opinion that the requirements of Rule 55(c) EPC in respect of the requested revocation of the patent in its entirety had not been fulfilled by the appellant in its notice of opposition.

- 2.3 However, no requirement can be derived from Rule 55(c) EPC or any other provision of the EPC that in case a patent is opposed in its entirety each of the claims should be the subject of a detailed and fully substantiated attack.

In accordance with its text, Rule 55(c) EPC only requires a statement of the extent to which the patent is opposed, a statement of the grounds on which the opposition is based and an indication of the facts, evidence and arguments in support of these grounds. No reference is made to the claims of the patent. It follows, however, from the established case law that a patent must be revoked in its entirety if one of its claims is objectionable under Article 100 EPC, unless this deficiency is removed (see T 114/95 and T 926/93, OJ 1997, 447).

Therefore, the provisions of Rule 55(c) EPC are satisfied if sufficient facts and evidence are provided to allow an investigation whether the patent is deficient in respect of at least one of the grounds under Article 100 EPC, concerning at least one of its claims. Under Article 100(a) EPC such deficiency may be lack of novelty or inventive step of the subject-matter of one of the granted claims.

- 2.4 In the present case the appellant filed on 30 April 1995 a notice of opposition and requested the revocation of the patent because it did not meet the requirements of Article 100(a) in respect of novelty and inventive step of its subject-matter. As regards the independent claim 7, the appellant indicated that this claim contained in its precharacterising part generally known elements of any aircraft and that the characterising features concerned nothing more than measures already known from D1 to provide different swinging frequencies of the movement of the right and left aircraft wings. For these reasons the subject-matter of claim 7 was not considered novel.

Considering the content of the notice of opposition, the Board comes to the conclusion that at least in so far as the subject-matter of claim 7 is concerned, the notice of appeal fulfills the requirements of Rule 55(c) EPC. As follows from the above considerations, an admissible attack on one independent claim is sufficient to fulfill the requirement of Rule 55(c) EPC even when revocation of the patent in its entirety is requested. Since also the other requirements of admissibility of the opposition are satisfied, which was in fact not disputed by the

respondent, the opposition is admissible.

In view of these assessments the respondent's main request must be rejected.

3. *The appellant's request to permit the expert Mr Peschel to make oral submissions during the oral proceedings*

3.1 Considering the decision G 4/95, the Board observes that in particular the following criteria cited in this decision are to be examined in the present case:

(i) The professional representative should request permission for oral submissions to be made by the expert. The request should state the name and qualifications of the person in question and should specify the subject-matter of the proposed oral submissions.

(ii) The request should be made sufficiently in advance of the oral proceedings so that all opposing parties are able properly to prepare themselves in relation to the proposed oral submissions.

3.2 As concerns these criteria, the appellant filed with facsimile dated 17 September 1999 a request for permission for oral submissions to be made by an expert on aeroelastics, either Mr Peschel or Mr Schierenbeck, on the issues raised by the Board in points 2.2 and 3.2 of its communication attached to the summons for oral proceedings.

In so far the criterion (i) is fulfilled.

3.3 During the oral proceedings the respondent's representative stated that the appellant's request for hearing of the expert Mr Peschel arrived at his office only on 30 September 1999, thus 19 days in advance of the oral proceedings. The respondent's representative was of the opinion that such short notice was insufficient to comply with the criteria as set out in the decision G 4/95 of the Enlarged Board of Appeal and that therefore the appellant's request should be rejected.

As concerns the criterion (ii), the present Board is of the opinion that a period of 19 days must be considered sufficiently long for giving the respondent proper time to prepare itself in relation to the proposed oral submissions. It is to be noted that the respondent is a world leading company in the production of aircraft and therefore must be considered to have a large competent technical staff of which at least one expert in the relevant field could be made available at short notice. Considering that the representative was informed 19 days in advance of the oral proceedings and that modern communication means allow immediate transfer of the information to the respondent's company, the Board cannot follow the representative's opinion according to which substantial delays were to be expected in informing the respondent. Furthermore, the available time period is also considered long enough to allow for sufficient time for the preparation and arrangement of the expert's journey to Europe.

3.4 Therefore the Board is of the opinion that in the present case the criteria for exercising discretion to allow the making of oral submissions by an accompanying

person in opposition appeal proceedings as mentioned in G 4/95 are fulfilled, so that no reason existed not to allow the expert Mr Peschel to make oral submissions during the oral proceedings of 19 October 1999.

Furthermore, since the respondent was in the position to prepare itself in relation to the oral submissions to be expected, there is no ground for an adjournment of the oral proceedings and ordering an apportionment of costs for this reason.

4. *The respondent's first auxiliary request*

4.1 Amendments

Claim 1 of the first auxiliary request is based on the initially filed claims 6 and 7 (see also the granted claims 7 and 8). The additional features according to which the first and second wing elements are engine nacelles suspended from the first and second wings is disclosed on page 9, lines 5 to 24 and in method claim 5 as initially filed (see also column 6, lines 27 to 48 and method claim 6 of the patent). Therefore, no objections under Article 123(2) or (3) EPC arise against the amended claim 1.

4.2 Novelty

4.2.1 There is agreement between the parties and the Board that D2, represents the closest prior art document. D2 undisputedly discloses the combination of precharacterising features of claim 1 and in particular addresses the idea of producing "built-in" asymmetry by making the left hand pylon for support of the wing

stores of different stiffness to the right-hand pylon (see first paragraph on page 2-11 of D2).

4.2.2 The appellant was of the opinion that D2 related to a general disclosure of improving flutter characteristics by providing aeroelastic stability for a wide range of additional store configurations and that this disclosure was not limited to military aircraft configurations. Since the skilled person would interpret the term "stores" to include aircraft engines mounted under the wings, D2 implicitly disclosed in addition to the precharacterising features of claim 1 of the first auxiliary request also the characterising features so that the subject-matter of claim 1 lacked novelty.

4.2.3 Although the reference made in D2 is to a military aircraft (for example the model F-4C aircraft on page 2-8 and use of Multiple Ejector Racks on page 2-6), the Board agrees with the appellant that this cannot be seen to limit the disclosure of providing flutter stability by asymmetrical stiffness of the support of the stores mounted under the wings to the use on military aircraft only. The explanations given in D2 clearly are of more general nature to include any aircraft and any type of stores mounted under the wing. In this respect attention can be drawn to the general conclusions given in the second paragraph on page 2-13 of D2: "While no symmetrical pylon configuration is stable, there is a relatively wide range of unsymmetrical configurations which provides stability", and in the last line of this paragraph: "the potential of unsymmetrically pylon stiffness should be kept in mind, especially as there is a problem area that cannot

be designed around by any other means".

However, the term "stores" includes any external load mounted under the wing and undisputedly D2 does not mention aircraft engine nacelles as an example of a "store" considered in D2. In view of the principle that a general term cannot take away the novelty of a specific feature falling within the meaning of the general term, the characterising features of claim 1 of the first auxiliary request are to be considered novel when compared to the disclosure of D2.

4.2.4 Since also D1 or the other available prior art documents do not disclose the support of aircraft engine nacelles in a manner so as to induce different oscillation frequencies of the left and right wing of an aircraft, the subject-matter of claim 1 of the first auxiliary request is novel.

4.3 Inventive step

4.3.1 Starting from the prior art disclosed in D2 the technical problem underlying the amended patent is to provide an aircraft having improved flutter characteristics in its normal clean "fly-away" condition. According to claim 1 of the first auxiliary request this is accomplished in an aircraft according to the preamble of claim 1 (the aircraft known from D2) in that the wing elements are engine nacelles which are suspended from the first and second wings.

In this manner the combination of engine and engine nacelle have different frequencies of oscillation on the right wing when compared to the left wing of the aircraft which leads to the "built-in" asymmetry improving the flutter characteristic of the aircraft.

- 4.3.2 The Board considers that in view of the teaching given in D2 concerning the provision of different pylon stiffness on the right and left wing sides for support of "stores", the selection of engine nacelles to provide for asymmetry would be arrived at in an obvious manner by the skilled person.

Firstly, there is no evidence derivable from D2 that the "stores" referred to in this document are "throw-off" loads, as was submitted by the respondent. In this respect no suggestion is given in D2 that the Multiple Ejector Rack on page 2-6 is a "throw-off" load itself. Therefore also D2 relates to aircraft in their "fly away" condition.

Furthermore, the aeroelastics engineer has no other choice than to take underwing engines and their support into account when designing the aircraft and in fact even in the patent in suit reference is made to locating "the engines and other stores" on the wing such as to favour higher flutter speeds (see column 4, lines 23 to 26).

The suggestions given in D2 on page 2-13 as referred to above in point 4.1.3 are considered pertinent for the skilled person to give him a clear indication in the direction of providing different pylon stiffness and thus different stiffness of the nacelles supporting the

engines under the wing when a problem concerning the aircraft flutter speed is encountered.

- 4.3.3 The respondent argued that the general concept of symmetry of aircraft design spoke against the use of asymmetrical engine nacelles, and that aero-engines were not addressed in D2 and in respect of weight and function of the engines were not comparable with the stores mentioned in D2 or D1.
- 4.3.4 Although generally speaking symmetry indeed plays a role in the design of an aircraft for the reasons mentioned by the respondent, for example with a view to limit the design exercise and to reduce the number of different parts for the aircraft, no disclosure is derivable from the prior art that symmetry should be maintained under all circumstances. In this respect it is to be noted that the mirror-symmetrical concept of the wings might be advantageous when designing the wings but obviously is not of great help in reducing the number of spare parts to be held in stock.

Furthermore document D2 does not teach genuine asymmetrical design of pylons. On the contrary, the asymmetry is only directed to the stiffness in a specific direction so as to achieve a specific goal and does not necessarily exclude, for example, the aerodynamic symmetry of the pylons. Therefore the teaching of these documents cannot be considered to go against normal design practice but rather indicates specific possibilities for gain in case other measures fail.

- 4.3.5 For these reasons the Board is of the opinion that the

common knowledge of the skilled person to consider external stores as involving the engines of an aircraft and the teaching derivable from D2 in respect of improved wing flutter stability when suspending stores in an asymmetrical manner would lead the skilled person in an obvious manner to the subject-matter defined in claim 1 of the respondent's first auxiliary request. Claim 1 of the first auxiliary request must therefore be rejected for lack of inventive step of its subject-matter.

5. *The respondent's second auxiliary request*

5.1 Amendments

5.1.1 In addition to the features of claim 1 of the first auxiliary request, claim 1 of the second auxiliary request includes the feature according to which the attaching means have different side bending frequencies. This feature is disclosed in combination with the other features of claim 1 in the embodiment described on page 10, lines 17 to 33 of the originally filed description (see also column 7, lines 23 to 41 of the patent description).

The dependent claims 2 to 6 are essentially based on the originally filed claims 8, 10, 9, 12 and 11, respectively (see also the granted claims 9 to 13).

In view of these assessments no objections under Article 123(2) or (3) EPC arise against the amended claims.

5.1.2 The description was amended to bring it into line with

the subject-matter now claimed and a reference to the closest prior art represented by D2 was inserted. Also these amendments do not give rise to objections under the EPC.

5.2 *Novelty*

Novelty of the subject-matter of claim 1 of the second auxiliary request follows from the fact that none of the cited documents discloses an aircraft in which the engine nacelles mounted on the right and left wing have attaching means to the wings which have different side bending frequencies with respect to each other.

Novelty of the subject-matter of claim 1 of the second auxiliary request in fact had not been in dispute.

5.3 *Inventive step*

5.3.1 Starting from the prior art disclosed in D2 the technical problem underlying the amended patent is again to provide an aircraft having improved flutter characteristics in its normal clean "fly-away" condition.

According to claim 1 of the second auxiliary request this is accomplished in an aircraft according to the preamble of claim 1 (the aircraft known from D2) in that the wing elements are engine nacelles which are suspended from the first and second wings and that the attaching means of the engine nacelles to the wing have different side bending frequencies.

Such a configuration leading to a difference in

oscillation frequencies between the port and starboard wings is considered to result in a mutual suppression of the wing flutter (see column 8, lines 32 to 35 of the patent description).

- 5.2.2 In accordance with the explanations given in column 1, lines 20 to 30, wing flutter is an aeroelastic instability produced by the coalescing and proper phasing of two or more structural vibration modes of an aircraft in flight. A flutter mode usually involves both bending and torsion types of motion of the wing in which the torsion extracts energy from the airstream and drives the bending mode to increasingly higher amplitudes.

A similar explanation is given in D2 in which it is stated that "the principal instability is essentially wing bending versus a wing angle of attack mode resulting primarily from pylon pitch". The instability mechanism is said to be "fairly straightforward except that the effective wing bending mode is altered somewhat by pylon roll, thus providing a secondary effect because of pylon roll flexibility" (see last paragraph on page 2-3 of D2). In D2 in particular the pylon pitch frequency of the stores is considered and the conclusions arrived at on page 2-12 and 2-13 are directly linked to the difference in pylon pitch frequencies on the right and left wings of the aircraft.

From these explanations can be derived that the pylon pitch movements can be actively influenced by making the left-hand pylon of different stiffness in the direction of pitch movement to the right-hand pylon

(see first paragraph on page 2-11 of D2) so as to improve the wing stability and avoid wing flutter.

D2 acknowledges that the pylon roll is of secondary influence to the wing bending but no suggestion is given that an intended difference in the pylon roll frequencies on the left and right wings could be used to actively influence the flutter stability of the aircraft so as to enhance its flutter speed.

- 5.3.3 The appellant argued that a difference in pitch stiffness of the pylons immediately and unavoidably led to a difference in roll stiffness and that therefore claim 1 of the second auxiliary request did not add any inventive features to the subject-matter of claim 1 of the first auxiliary request.

In the absence of any constructional detail of the pylon support disclosed in D2, the Board draws attention to the construction of the prior art struts for attaching an engine nacelle to an aircraft wing as shown in Figures 1 and 2 of the patent in suit. It will be clear to the skilled person that the different positions of the attachment points preclude a direct coupling of pitch and roll movements and that the attaching means shown in these drawings do not indicate any specific measure which could suggest a possibility of intended adjustment of the side bending frequencies of the engine nacelles.

Furthermore it is to be noted that claim 1 of the second auxiliary request indicates that the attaching means of the engine nacelles have different side bending frequencies, whereas the teaching of D2 rather

goes in the direction of providing the store supporting pylons themselves with different stiffnesses. Also in this respect neither D2 nor D1 suggest such a constructionally more simplified solution to the stated problem.

5.3.4 The support for the stores disclosed in D1 essentially concerns single point attachments due to the requirement of mounting to sweepable wings (see the paragraph CONCLUSION on page 19 of this document). Such single point mounting, indeed leading to direct interdependence of pitch and roll movements of the stores, is clearly unsuitable for the support of aircraft propulsion engines and therefore the skilled person could not be led by the teaching of D1 to the characterising features of claim 1.

5.3.5 The Board therefore comes to the conclusion that the subject-matter of claim 1 according to the second auxiliary request of the respondent cannot be derived in an obvious manner from the cited prior art and accordingly involves an inventive step (Article 56 EPC). This claim, together with dependent claims 2 to 6 and the amended description and drawings as granted therefore forms a suitable basis for maintenance of the patent in amended form.

6. Since the respondent's second auxiliary request is acceptable there is no need to consider its further auxiliary requests.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent on the basis of:
 - claims 1 to 6 and description columns 1 to 8 submitted at the oral proceedings,
 - drawings (Figures 1 to 9) as granted.

The Registrar:

The Chairman:

S. Fabiani

F. Gumbel