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**Datasheet for the decision  
of 26 March 2014**

**Case Number:** T 0085/11 - 3.2.01

**Application Number:** 02075572.4

**Publication Number:** 1231137

**IPC:** B64C3/50, B64C9/22, B64C21/02

**Language of the proceedings:** EN

**Title of invention:**  
Tailored wing assembly for an aircraft moveable slat system

**Patent Proprietor:**  
The Boeing Company

**Opponent:**  
Airbus Operations GmbH/Airbus Operations SAS (FR) /  
Airbus Operations Limited (GB) /  
Airbus Operations S.L. (ES)/Airbus SAS (FR)

**Headword:**

**Relevant legal provisions:**  
EPC Art. 54(1), 56, 83, 123(2)

**Keyword:**  
Extended subject-matter (no)  
Sufficiency of disclosure (yes)  
Novelty (yes)  
Inventive step (yes)

**Decisions cited:**

**Catchword:**



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Case Number: T 0085/11 - 3.2.01

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.01**  
**of 26 March 2014**

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**Decision under appeal:** **Interlocutory decision of the Opposition  
Division of the European Patent Office posted on  
22 November 2010 concerning maintenance of the  
European Patent No. 1231137 in amended form.**

**Composition of the Board:**

**Chairman:** G. Pricolo  
**Members:** C. Narcisi  
D. T. Keeling

## Summary of Facts and Submissions

I. European patent No. 1 231 137 was maintained in amended form by the decision of the Opposition Division posted on 22 November 2010. An appeal was lodged by the Opponent against this decision on 5 January 2011 and the appeal fee was paid at the same time. The statement of grounds of appeal was filed on 16 March 2011.

II. Oral proceedings were held on 26 March 2014. The Appellant (Opponent) requested that the decision under appeal be set aside and that the European patent be revoked. The request for reimbursement of the appeal fee was withdrawn. The Respondent (Patentee) requested that the decision under appeal be set aside and that the patent be maintained in accordance with the main request filed during the oral proceedings. All other requests were withdrawn.

Claim 1 of the main request reads as follows:

"A wing assembly (24, 38) for an aircraft movable slat system (20), the wing assembly comprising:  
a fixed structure (40) having an exterior surface defining an external contour and an interior surface defining a cavity (50), the fixed structure (40) having one or more edges defining a cutout (26), wherein the cavity permits stowage of an actuation mechanism for coupling to the slat,  
characterized in that said actuation mechanism extends in said cavity and through said cutout and in that a contoured surface (42, 44) is coupled to one or more of the edges of the cutout and extends into the cavity, said contoured surface being defined so as to promote airflow from the cavity through said cutout to the external contour".

III. The Appellant's arguments may be summarized as follows:

The subject-matter of claim 1 (main request) extends beyond the content of the application as filed (Article 123 (2) EPC). The feature implying that (i) "said actuation mechanism extends in said cavity" is not disclosed in the application as filed. Specifically, the application as filed (see published patent application, hereinafter designated as EP-A) merely discloses that "the actuation mechanism extends through a tailored cutout of the wing assembly" (see EP-A, claim 9) and that "the cavity permits stowage of the actuation mechanism" (see EP-A, claim 11). Moreover, the wording "extends in" (see feature (i)) is unclear since it does not disclose whether said actuation mechanism is entirely or only partially located within said cavity, which latter interpretation would more appropriately correspond to the wording "extending into".

The invention as defined by claim 1 in conjunction with the description of the patent specification (hereinafter designated as EP-B) is not sufficiently clearly and completely disclosed for the skilled person to put it into effect (Article 83 EPC). In particular, the feature stating (ii) "said contoured surface (422, 44) being defined so as to promote airflow from the cavity through said cutout (26) to the external contour" is very broad and vague. Dependent Claims 2 and 3 either do not include technical information which is apt to precisely determine the geometrical configuration of the "contoured surface". Indeed, these claims, as well as the description of EP-B, do not specify how the mentioned radius of curvature of the surface is determined, given that through any point of

a surface an infinite number of radii of curvature may be defined by the intersection with a corresponding normal plane. Consequently, the location of the centre of said radius curvature is likewise not disclosed in EP-B. Moreover, the features of claim 3 specifying (iii) "the variable radius shape decreasing in radius from the upper centerline location to the side edge locations" are unclear and cannot be put into effect by the skilled person. Indeed, difficulties result again from the fact that it is not indicated how the radius of curvature is to be determined, for generally an infinite number of radii of curvature exist at any point of the surface (see above).

The subject-matter of claim 1 is not new over prior art documents D1 (US-A-1 887 148) and D2 (EP-B2-100 775). D1 discloses a wing assembly 20 for a movable slat system 21, a fixed structure 20 having an external contour and an interior surface defining a cavity 23 (figure 6), said fixed structure having one or more edges (see figure 6) defining a cutout. An actuation mechanism for coupling to the slat is stowed in the cavity (see figure 6, axis 24; page 2, lines 89-92), the actuation mechanism extending in said cavity 23 and through said cutout. Finally, a contoured surface (side walls of cavity 23) is coupled to the edges of the cutout and extends into the cavity, the contoured surface being defined so as to promote airflow from the cavity to the external contour. The Opposition Division erroneously considered that constructional element 21 does not constitute a slat, a slat being defined in the view of the Opposition Division as "an aerodynamic profile presenting a section roughly similar to a wing, capable of translational movement starting from the leading edge of a wing, from a position where it conforms to said wing shape, to an extended position in

front of it". This definition is unnecessarily and unduly narrow since a slat is commonly known in the art as being a movable component of the wing positioned at the leading edge of the wing and causing an increase in the wing's lift.

D2 analogously discloses in the embodiment of figures 8, 9 a wing assembly with a movable slat system 21. The fixed structure 20 comprises an interior surface with edges defining a cutout, the interior surface forming a cavity permitting stowage of an actuation mechanism 24, 23A, which extends in said cavity through said cutout. The cavity is defined by a contoured surface extending within said fixed structure 20. The contoured surface is designed to promote airflow from the cavity through said cutout to the external contour (D2, column 9, lines 48-56). Therefore the subject-matter of claim 1 lacks novelty.

The subject-matter of claim 1, even if it were regarded as being new, does not involve an inventive step. In effect, even if it were considered that the contoured surface shown in figure 9 of D2 does not promote airflow from the cavity through said cutout to the external contour, nonetheless such a feature would be obvious for the skilled person. Indeed, as shown in the drawing submitted by the Appellant during the oral proceedings before the Board, the skilled person would install in the wing assembly of figure 9 a spoiler or flap located at the edge defining the cutout of the fixed structure 20, which spoiler or flap is apt to promote airflow from the cavity to the external contour. Thereby the skilled person would arrive in an obvious manner at the subject-matter of claim 1.

IV. The Respondent's arguments may be summarized as follows:

Claim 1 does not contravene the requirements of Article 123 (2) EPC, for feature (i) was disclosed, though not literally, in the application as filed and in this respect reference is made to paragraphs [0007], [0008] and [0014] of EP-A. Further, the wording "extends in said cavity" is equivalent within the context of claim 1 to the wording "extends into said cavity", for a different interpretation would make no technical sense, given that the actuation mechanism is provided for "coupling to the slat" (see claim 1).

The invention complies with the requirements of Article 83 EPC. The features according to claims 1, 2 and 3 in conjunction with the description of the patent specification (EP-B) provide sufficiently clear and complete information to allow the skilled person to carry out the invention. Specifically, paragraph [0029] and figures 4, 5 of EP-B illustrate that the radius of curvature around the side edges of the contoured surface varies "from the (upper) centerline value to zero at the side edge locations 48" and this is in agreement with the corresponding features of claims 1, 2 and particularly 3. Accordingly, the skilled person would deduce in a completely unambiguous way that the radius of curvature is determined by the illustrated curves running in the direction of airflow (see curves directed towards the upper part of the fixed structure 40, 24 in figures 4, 5) around the lip formed by said side edges of the contoured surface.

The subject-matter of claim 1 is new over D1 and D2. As to D1 it is doubtful whether the the nose 21 (figure 6) can be regarded as being a slat, for it does not



perform any significant translational or rotational movement according to the disclosure of D1. At all events claim 1 is clearly distinguished from D1 in that the feature implying that "a contoured surface is coupled to one or more of the edges of the cutout and extends into the cavity" is not disclosed in D1. Secondly, no "contoured surface being defined so as to promote airflow from the cavity through said cutout to the external contour" is shown by the wing arrangement of D1. D2 also does not take away the novelty of the claimed subject-matter since it does similarly not disclose the aforesaid two features.

The subject-matter of claim 1 is inventive over D2. The skilled person would not have any incentive nor any reason to introduce into the wing assembly of D2 the modifications suggested by the Appellant. In effect, it is not even clear which technical meaning these modifications would have, given that in use no airflow passes through the cavity enclosed by the fixed structure 20 in figures 8, 9 of D2.

### **Reasons for the Decision**

1. The appeal is admissible.
2. The set of claims under consideration differs from the set of claims allowed by the Opposition Division only in that method claims 10 to 12 have been deleted. The Appellant did not object to the filing of this set of claims during the oral proceedings before the Board. The Board saw no reason to raise objections in this respect.
3. The subject-matter of claim 1 does not infringe Article 123 (2) EPC. Admittedly, the feature implying that (i)

"said actuation mechanism extends in said cavity" is not literally disclosed in the application as filed. Nonetheless it is a direct consequence of the following features, included in the application as filed (EP-A): "the actuation mechanism extends through a tailored cutout of the wing assembly" (see EP-A, claim 9), "the cavity permits stowage of the actuation mechanism" (see EP-A, claim 11) and "a contoured surface coupled to one or more of the edges of the cutout and extending into the cavity" (EP-A, claim 1). The third feature implies that the cutout constitutes the access to the cavity and the first feature thus entails that the actuation mechanism extends into the cavity. The second feature confirms this, given that the actuation mechanism is stowed into the cavity and is coupled to the slat (see EP-A, claim 9). As remarked by the Respondent, in the present context the wording "extends into" is equivalent to "extends in", since it is obvious that the actuation mechanism necessarily extends also outside the cavity for coupling to the slat.

4. The invention is disclosed in a manner sufficiently clear and complete for it to be carried out by the skilled person. The Appellant is certainly correct in that the description and the drawings of EP-B give no explicit indications relating to specific curves located on said contoured surface and passing through points lying e.g. on said upper centerline 46 (see claim 3), along which curves the radius of curvature of the surface is to be defined at said points. Two mutually orthogonal, intersecting families of curves situated on said contoured surface are shown in figures 4 and 5, however without any reference being made thereto in the description. Nevertheless the Board considers that from the description (paragraph [0029]) of EP-B and from claims 2 and 3 it can be deduced that

the wording "around the side edges" (see "the radius around the side edges of the contour ...") can only be reasonably construed as representing the curve running from the interior of the cavity (defined and enclosed by constructional parts 42 in figures 4, 5), along e.g. upper centerline 46, to the exterior of the cavity, along e.g. a curve belonging to one of the aforesaid two orthogonal families of curves (shown in figures 4, 5) which point in the direction of the upper part of the wing (see reference signs 38, 24). The radius of curvature defined along these curves, at points situated at the edges of said cavity, correctly varies as described in the description "from the centerline value to zero at the side edge locations 48" (see EP-B, [0029]) and in accord with claim 3. It is noted that the radius of curvature could not possibly be defined by a curve encircling the opening of said cavity (see figures 4 and 5) and belonging to the other one of the aforesaid two orthogonal families of curves, for then the radius of curvature would increase (not decrease) from the upper centerline to the side edge locations, contrary to the features stated in claim 3 and in paragraph [0029] of EP-B. In conclusion, it appears that the requirements of Article 83 EPC are met.

5. The subject-matter of claim 1 is new over D1 and D2. D1 in particular does not disclose the feature implying that "the cavity permits stowage of an actuation mechanism for coupling to the slat". The wing assembly of D1 (see figure 6) shows that the axis 24, the vertical strap 25 and the constructional part (no reference sign in figure 6) pivoting around the axis 24 for coupling to and actuating the slat are not stowed within the cavity 23. Moreover, the internal surface of said cavity 23 does not comprise "a contoured surface" which is "coupled to one or more of the edges of the

cutout and" which "extends into the cavity". Indeed, according to the invention it is absolutely clear that said contoured surface is tailored to meet specific aerodynamic requirements and coupled to the fixed structure, for instance by welding (see EP-B: paragraphs [0007], [0009], [0016], [0017], [0022]). Hence it does not form an integral part of the fixed structure. Such a disclosure of a contoured surface is lacking in D1.

On the other hand D2 does not disclose the features implying that "a contoured surface is coupled to one or more of the edges of the cutout and extends into the cavity" and that "said contoured surface being defined so as to promote airflow from the cavity through said cutout to the external contour". As to the first feature it is noted that the panels 22, 42 (see figures 8, 9) cannot possibly be identified with said contoured surface because they do not extend into the cavity (located inside fixed structure 20). Concerning the second feature an airflow from the mentioned cavity directed towards the external contour is not derivable from the disclosure of D2. In effect, said cavity is located within the fixed structure 20 of the wing and there is no explicit or implicit indication in D2 that any inlet is provided to introduce air into said cavity and to promote airflow from the cavity and through the cavity's opening (cutout) to the external contour. Consequently, irrespective of the configuration of the cavity's internal surface, said second feature is not known from D2. Accordingly, neither D1 nor D2 take away the novelty of the subject-matter of claim 1.

6. The subject-matter of claim 1 is inventive over the cited prior art. Starting from D2 the skilled person would not arrive in an obvious manner at the subject-

matter of claim 1. As previously noted (see point 4), according to the known wing assembly of D2 no airflow is generated in use from said cavity (formed in the fixed structure of the wing) to the external contour and therefore the skilled person would not have any incentive or any reason to modify the known configuration of the cavity as suggested by the Appellant, i.e. such as to meet specific aerodynamic requirements. For this same reason the skilled person would not even consider or envisage to design a contoured surface extending into the cavity and tailored to meet specific aerodynamic requirements, and thereafter coupling it to the wing's fixed structure.

For the sake of completeness the arguments of the Appellant based on D1 which were presented in writing (see statement of grounds of appeal) are also briefly discussed, even though these were not reiterated during the oral proceedings. The Appellant's argument substantially was that even if the nose-piece 21 were not regarded as being a slat, the technical teaching of D1 (see particularly figure 6 and related parts of the description discussed under point 4) would nevertheless still lead to the claimed subject-matter if considered in combination with a known conventional slat. This opinion is however not shared by the Board since, as was explained in detail above (see point 4), essential features of claim 1 are missing in D1 and neither are these features suggested by other documents or by the common general knowledge of the skilled person. In view of the reasons set out above the requirements of Article 56 EPC are complied with.

7. Therefore, claim 1 with dependent claims 2 to 9 and the description, adapted to reflect that the method claims

have been deleted, form a suitable basis for the maintenance of the patent in amended form.

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the Opposition Division with instructions to maintain the patent on the basis of the following documents:
  - Description, columns 1 to 7 as filed during the oral proceedings;
  - Claims 1 to 9 as filed during the oral proceedings;
  - Drawings 1 to 10 as granted.

The Registrar:

The Chairman:



A. Vottner

G. Pricolo

Decision electronically authenticated