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**Datasheet for the decision  
of 11 May 2017**

**Case Number:** T 0481/13 - 3.5.03

**Application Number:** 03078445.8

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**IPC:** G05D1/08, G05D19/02, B64C13/50,  
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**Title of invention:**  
Aircraft multi-axis modal suppression system

**Patent Proprietor:**  
The Boeing Company

**Opponent:**  
AIRBUS SAS (FR)/ AIRBUS OPÉRATIONS SAS (FR)/ AIRBUS  
OPERATIONS LTD (GB)/ AIRBUS OPERATIONS GMBH (DE)/  
AIRBUS OPERATIONS S.L. (ES)

**Headword:**  
Aircraft multi-axis modal suppression system/BOEING

**Relevant legal provisions:**  
EPC Art. 100(b), 83

**Keyword:**  
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**Decisions cited:**

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
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Case Number: T 0481/13 - 3.5.03

**D E C I S I O N**  
**of Technical Board of Appeal 3.5.03**  
**of 11 May 2017**

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**Decision under appeal:** **Interlocutory decision of the Opposition**  
**Division of the European Patent Office posted on**  
**21 December 2012 concerning maintenance of the**  
**European Patent No. 1528448 in amended form.**

**Composition of the Board:**

**Chairman** F. van der Voort  
**Members:** K. Schenkel  
S. Fernández de Córdoba

## **Summary of Facts and Submissions**

- I. This case concerns appeals filed by the opponent and the proprietor respectively against the interlocutory decision of the opposition division in opposition proceedings concerning European patent No. 1 528 448.
- II. The opposition was based on the grounds according to Article 100(a) EPC in conjunction with Articles 52(1), 54 and 56 EPC, Article 100(b) EPC in conjunction with Article 83 EPC, and Article 100(c) EPC in conjunction with Article 123(2) EPC.
- III. Of the cited grounds for opposition, only that of Article 100(b) EPC in conjunction with Article 83 EPC is relevant to the present decision.
- IV. The opposition division held, *inter alia*, that, account having been taken of the amendments made by the proprietor in accordance with a seventh auxiliary request, the patent and the invention to which it relates according to this request met the requirements of the EPC.
- V. In its statement of grounds of appeal, the appellant-proprietor requested, in this order, that the interlocutory decision be set aside and that the opposition be rejected (main request) or, in the alternative, that the decision under appeal be set aside and that the patent be maintained in amended form on the basis of the set of claims of one of auxiliary requests I, II, III, III', IV, IV', V, V', VI, and VI' as filed with the statement of grounds of appeal, or that the appeal filed by the opponent be dismissed (auxiliary request VII).

- VI. In its statement of grounds of appeal, the appellant-opponent requested that the decision under appeal be set aside and that the patent be revoked in its entirety.
- VII. With its reply to the opponent's appeal, the appellant-proprietor filed a further set of claims of further auxiliary request VIII.
- VIII. In a communication following a summons to oral proceedings, the board gave the preliminary opinion that, *inter alia*, the subject-matter of the claims of all requests had not been disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.
- IX. In response to the board's communication, the appellant-proprietor filed with a letter dated 11 April 2017 corrected auxiliary requests V', VI and VI' as well as further sets of claims of further auxiliary requests IX and X.
- X. Oral proceedings took place on 11 May 2017.

During the oral proceedings, the appellant-proprietor submitted a new auxiliary request VII replacing auxiliary request VII on file.

The appellant-proprietor requested, in this order:

- that the decision under appeal be set aside and that the opposition be rejected (main request) or, in the alternative,

- that the patent be maintained in amended form on the basis of the set of claims of one of:

- auxiliary requests I, II, III, III', IV, IV' and V as filed with the statement of grounds of appeal;
- auxiliary requests V', VI and VI' as filed with the letter dated 11 April 2017;
- auxiliary request VII as filed during oral proceedings;
- auxiliary request VIII as filed with the letter dated 12 September 2013; and
- auxiliary requests IX and X as filed with the letter dated 11 April 2017.

The appellant-opponent requested that the decision under appeal be set aside and that the patent be revoked in its entirety.

XI. Claim 1 of the main request, i.e. claim 1 as granted, reads as follows:

"Method for providing modal suppression in an aircraft (50) comprising the steps of:

- utilizing symmetric elevators to control the vertical body bending mode of the aircraft;

characterized by:

- utilizing symmetric flaperon control surface positions to control the vertical wing mode, wherein the control actions are filtered to harmonize control, comprising the steps of:

- cross-feeding the symmetric elevator command (36) to the symmetric flaperon command (35); and

- cross-feeding the symmetric flaperon command to the symmetric elevator command."

XII. The wording of claim 1 of each of auxiliary requests I, II, III, III', IV, IV', V, V', VI, VI', VII, VIII, IX and X need not be reproduced here in full. Noting that the present decision specifically concerns the following method step of claim 1 as granted:

"wherein the control actions are filtered to harmonize control, comprising the steps of:

- cross-feeding the symmetric elevator command (36) to the symmetric flaperon command (35); and
- cross-feeding the symmetric flaperon command to the symmetric elevator command",

it is sufficient to mention that, in respect of this feature, claim 1 of each of auxiliary requests I, II, III, III', IV, IV', V, V', VI, VI', IX and X includes the same wording, claim 1 of auxiliary request VII includes the following amended wording:

"wherein the control actions are cross fed and filtered to harmonize control, comprising the steps of:

- filtering and cross-feeding the symmetric elevator command (36) to the symmetric flaperon command (35); and
- filtering and cross-feeding the symmetric flaperon command to the symmetric elevator command",

and claim 1 of auxiliary request VIII includes the following amended wording:

"wherein commands are filtered to harmonize control, the method comprising the steps of:



- cross-feeding the symmetric elevator command (36) to the symmetric flaperon command (35); and
- cross-feeding the symmetric flaperon command to the symmetric elevator command".

## **Reasons for the Decision**

1. *Main request and auxiliary requests I, II, III, III', IV, IV', V, V', VI, VI', VIII, IX and X: sufficiency of disclosure (Articles 100(b) and 83 EPC)*

1.1 The method of claim 1 of each of the main request and auxiliary requests I, II, III, III', IV, IV', V, V', VI, VI', VIII, IX and X (see points XI and XII above) includes

i) the feature that the "control actions" (i.e. "commands" in claim 1 of auxiliary request VIII) "are filtered to harmonize control", and

ii) the steps of:

- "cross-feeding the symmetric elevator command (36) to the symmetric flaperon command (35)"; and
- "cross-feeding the symmetric flaperon command to the symmetric elevator command".

1.2 The expression "to harmonize control" has no generally recognized meaning in the present context. The board notes that in the patent in suit the only reference to this wording is in paragraph [0048], in which reference is made to "control harmonization" as follows:

"It is known that one control surface can be used to remove undesirable effect of another control surfaces [sic]. For example, if the rudder is used to damp the

lateral bending mode at a particular frequency, however its dedicated sensors at times could also pick up signals of other structural modes at other frequencies. As a result, the motion of the rudder may further exasperate the existing torsional body mode. In this case, anti symmetric elevator [sic] may be commended to generate at the appropriate frequency to negate the torsional effect of the rudder. Similarly, one may choose the anti-symmetric flaperon to negate the torsional effect of rudder. To provide such a cross-feed, it is understood in the art that appropriate filtering design is required. This approach is known in the art as control harmonization."

From this, the board understands that control harmonization involves cross-feeding plus appropriate filtering. This means that, in order to be able to carry out the invention, the skilled person must know which filtering design would be appropriate.

However, the patent in suit does not provide any description of appropriate filtering design in connection with cross-feeding of control actions (or commands).

The patent proprietor argued that the filtering design refers to the structure of the filter and that the setting of the parameters in the filter was known to the person skilled in the art. Further, the patent proprietor referred to Fig. 2 and the corresponding part of the description, i.e. paragraph [0033], which allegedly described an appropriate filtering design, namely by stating that a torsional body modal suppression filter 26 is "designed to provide the proper gain and phase relationship such that anti-symmetric elevator would be deployed at the right

moment with the right amplitude".

The board notes that equivalent descriptions of a vertical wing modal suppression filter 27 and a vertical body modal suppression filter 28 can be found in paragraphs [0034] and [0035], respectively.

However, Fig. 2 and the corresponding parts of the description refer to a control algorithm without cross-feeding of control actions. As shown in Fig. 2, none of the three modal suppression filters 26 to 28 is located in a signal path between different ones of the flaperon, rudder and elevator commands. The patent in suit discloses neither whether nor how these filters can be used for control actions or control commands which are cross-fed.

The board further notes that a filter according to its generally recognized meaning is a device which is capable of changing the phase and/or gain of one or more periodic signals. The above-mentioned characterisation, i.e. "to provide the proper gain and phase relationship", does not go any further in terms of specifying the filter and, hence, cannot not provide a disclosure of an appropriate filtering design.

The board concludes that the description of the modal suppression filters 26 to 28 shown in Fig. 2 does not provide a disclosure of an appropriate filtering design for cross-feeding control actions or commands.

- 1.3 Claim 1 of each of the main request and auxiliary requests I, II, III, III', IV, IV', V, V', VI, VI', VIII, IX and X refers to a symmetric elevator control and a symmetric flaperon control as the control actions or commands.

Taking into account the conclusion in point 1.2 above, namely that harmonisation of control actions or control commands comprises cross-feeding, it follows that feature i) in point 1.1 above includes cross-feeding the symmetric elevator command to the symmetric flaperon command and vice-versa. However, the steps in ii) in point 1.1 above also refer to cross-feeding. This appears to suggest that additional cross-feeding, i.e. in addition to that included in i) in point 1.1, is provided in these steps. The description, in this respect, does not provide any information on the basis of which a skilled person would be able to implement additional cross-feeding steps.

1.4 Since, for the above reasons, the person skilled in the art would not be able to implement the "appropriate filtering design" or to determine the details of the steps of "cross-feeding the symmetric elevator command to the symmetric flaperon command" and "cross-feeding the symmetric flaperon command to the symmetric elevator command", the invention as defined in claim 1 is not disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Articles 100(b) and 83 EPC).

1.5 It follows that neither the main request nor any of the auxiliary requests I, II, III, III', IV, IV', V, V', VI, VI', VIII, IX and X are allowable.

2. *Auxiliary request VII: sufficiency of disclosure (Article 83 EPC)*

2.1 Claim 1 of auxiliary request VII includes the following wording (underlining by the board):

"wherein the control actions are cross fed and filtered to harmonize control, comprising the steps of:

- filtering and cross-feeding the symmetric elevator command (36) to the symmetric flaperon command (35);  
and

- filtering and cross-feeding the symmetric flaperon command to the symmetric elevator command" (underlining indicating the additions with respect to the corresponding wording in claim 1 of the main request).

These features thus differ from the corresponding features in claim 1 of the main request in that

a) the control actions are additionally cross-fed to harmonise control, and

b) the symmetric elevator command and the symmetric flaperon command are filtered in addition to being cross-fed.

2.2 According to the conclusion in point 1.2 above, control harmonisation already includes appropriate filtering. Hence, the addition of cross-feeding in connection with control harmonization in a) does not provide further details of the step of filtering. It thus remains unclear for the skilled person how to implement the appropriate filtering. Adding the step of filtering to the steps of cross-feeding, see b), does not provide further details of an appropriate filtering design either.

Hence, the amendments to claim 1 according to auxiliary request VII do not overcome the objection in point 1.2 above.

2.3 The objection in point 1.3 above is due to the redundancy caused by the step of cross-feeding the symmetric elevator command to the symmetric flaperon command and vice-versa being included in both of the following features in claim 1 of, e.g., the main request:

i) "wherein the control actions are filtered to harmonize control"; and

ii) "comprising the steps of:

- cross-feeding the symmetric elevator command (36) to the symmetric flaperon command (35); and
- cross-feeding the symmetric flaperon command to the symmetric elevator command".

Hence, in the board's understanding, the feature in i) already includes cross-feeding and its explicit addition according to a) does not overcome the objection in point 1.3 above.

Similarly, feature b) adds to the steps of cross-feeding in ii) the steps of filtering of the respective control actions. These steps are, however, already part of i), since filtering is part of the control harmonisation (see point 1.2 above). Hence, feature b) does not remove the redundancy with respect to the cross-feeding, but rather adds a further redundancy with respect to the filtering of the control actions by being included twice in the method of claim 1 of auxiliary request VII (see point 2.1 above).

2.4 The board therefore concludes that the invention as defined in claim 1 of auxiliary request VII is not disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art

(Article 83 EPC).

- 2.5 It follows that auxiliary request VII is not allowable either.
3. As none of the appellant-proprietor's requests is allowable, it follows that the patent is to be revoked.

### **Order**

#### **For these reasons it is decided that:**

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:



G. Rauh

F. van der Voort

Decision electronically authenticated