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**Datasheet for the decision
of 3 February 2021**

Case Number: T 1272/16 - 3.5.05

Application Number: 07835703.5

Publication Number: 1999737

IPC: G08G5/04, G01S13/93

Language of the proceedings: EN

Title of invention:

AIRCRAFT COLLISION SENSE AND AVOIDANCE SYSTEM AND METHOD

Patent Proprietor:

The Boeing Company

Opponent:

Airbus Defence and Space GmbH

Headword:

Minimum safe distance/BOEING

Relevant legal provisions:

EPC Art. 83, 123(2), 54(1), 54(2)

RPBA 2020 Art. 13(1)

RPBA Art. 12(4)

Keyword:

Sufficiency of disclosure - (yes)
Amendments - added subject-matter (no)
Novelty - (yes)
Amendment to appeal case - (not admitted)

Decisions cited:

G 0001/95



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Case Number: T 1272/16 - 3.5.05

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 3 February 2021

Appellant: Airbus Defence and Space GmbH
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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
29 March 2016 concerning maintenance of the
European Patent No. 1999737 in amended form.**

Composition of the Board:

Chair A. Ritzka
Members: E. Konak
E. Mille

Summary of Facts and Submissions

- I. The appeal was filed by the opponent (hereinafter "the appellant") against the interlocutory decision of the opposition division to maintain the patent in suit in amended form.
- II. The opposition division decided that the subject-matter of the claims as amended during the opposition proceedings met the requirements of Articles 83, 123(2), 54 and 56 EPC.
- III. In its statement setting out the grounds of appeal, the appellant requested that the decision be set aside and that the patent be revoked in its entirety. It indicated reasons for setting aside the contested decision in view of the requirements of Articles 83, 123(2) and 54 EPC.

In its reply to the appellant's statement setting out the grounds of appeal, the patent proprietor (hereinafter "the respondent") requested that the appeal be held inadmissible or be dismissed.
- IV. The appellant filed further submissions at a later date, indicating reasons for setting aside the contested decision in view of the requirements of, *inter alia*, Article 56 EPC. The respondent requested that this late-filed inventive-step attack not be admitted into the appeal proceedings.
- V. Oral proceedings were held before the board.

Several auxiliary requests were filed by the respondent over the course of the appeal proceedings which were

withdrawn at these oral proceedings. The respondent also withdrew its request that the appeal be held inadmissible.

The appellant's final request was that the decision under appeal be set aside and that the patent be revoked.

The respondent's final request was that the appeal be dismissed.

VI. Claim 1 of the patent in suit as maintained by the opposition division reads as follows:

"A host aircraft (100) comprising an image interrogator (112) identifying and avoiding potential collision threats, said image interrogator comprising:

 a clutter suppression and target detection unit (118) detecting moving targets from local images;

 a Line Of Sight (LOS), multi-target tracking unit (120) tracking said detected targets;

 a target track history storage, said LOS, multi-target tracking unit supplying target track data for each tracked target to said target track history storage;

 a threat assessment unit (124) determining whether any tracked target poses a collision threat; and

 an avoidance maneuver unit (126) determining a maneuver to avoid any identified said collision threat, wherein said threat assessment unit determines whether each said tracked target poses a collision threat based on a respective track history and said threat assessment unit categorizes each said tracked target as either not on a collision course or on a possible collision course, said threat assessment unit

determining a target trajectory for each said tracked target, said target trajectory being a three dimensional (3D) trajectory with respect to the host aircraft (100) comprising the image interrogator, the 3D trajectory determined by determining a line of sight (LOS) trajectory for said tracked target relative to the host aircraft (100) and correlating the LOS trajectory with an apparent range change between said tracked target and said host aircraft (100), the apparent range change determined from said target's apparent change in size and/or intensity, and determining whether said target trajectory passes said host aircraft (100) by more than a selected minimum safe distance,

wherein the host aircraft (100) is an unmanned aerial vehicle."

VII. In the present decision, reference is made to the following prior art:

D1: DE 100 650 180 A1

Reasons for the Decision

1. Sufficiency of disclosure (Article 83 EPC)

1.1 The invention according to claim 1 determines a collision threat based on whether a 3D trajectory passes the host aircraft by more than a selected minimum safe distance. The respondent explained that this 3D trajectory should be understood not as a trajectory in Euclidean space provided by a time series of real-world coordinates of latitude, longitude and altitude but as a trajectory in state space which is a

time series of line-of-sight (LOS) coordinates and apparent range change (see e.g. the respondent's reply to the statement setting out the grounds of appeal, point 5.5). The LOS coordinates could be provided by the position of the target object in images taken, whereas the apparent range change could be provided in binary fashion by whether the target is getting bigger, i.e. waxing, or smaller, i.e. waning (see *ibid.*, point 5.9). The respondent emphasised that the patent in suit suggests in no way that the depth ambiguity problem has been overcome (see *ibid.*, point 4.2). Rather, it identifies, based only on the change in apparent range, if there is a possibility that an impact could occur, without needing to know when and where the impact will occur (see *ibid.*, points 4.3 and 4.6).

1.2 The appellant argued (see the letter of 27 November 2017, page 6, third paragraph to page 8, first paragraph) that at least "a selected minimum safe distance" in feature (F3) of claim 1 (see 3.1 below for the feature numbering) had to be a Euclidean distance. Paragraph [0024] of the patent also referred to a safety zone around the host aircraft. As the patent in suit did not disclose how to determine whether a 3D trajectory in state space passes within a Euclidean distance of the host aircraft, as required by this feature, the patent in suit did not meet the requirements of Article 83 EPC. Indeed, it was not possible to directly compare a property of state space to a property of Euclidean space.

1.3 However, the board agrees with the respondent that paragraph [0024] is related to Figure 4, which shows the development of avoidance manoeuvres after determining that a target represents a collision threat and not to feature (F3). The passages of the

description relevant for feature (F3) are rather paragraphs [0020] and [0021]. The respondent convincingly argued that, as taught consistently in the rest of the patent in suit, these passages also stated that the calculation of a true range was not necessary and cited, *inter alia*, the text "regardless of the true size and range of the target" in paragraph [0021]. Accordingly, "a selected minimum safe distance" in feature (F3) was not a Euclidean distance. Paragraph [0021] gave the example of "one mean target diameter" for this distance. Therefore, the board was convinced that the skilled person could have carried out this feature based on the information disclosed in the patent.

1.4 The appellant also argued (see the appellant's letter of 27 November 2017, page 2, third paragraph, to page 6, second paragraph) through an example with two parallel trajectories of target objects that the method underlying claim 1 could not reliably distinguish between objects that pose a collision risk and those that do not. However, the board agrees with the respondent that the fact that a particular collision detection method might give false negatives or positives is not relevant for assessing the sufficiency of disclosure.

1.5 The appellant further argued at the oral proceedings that the apparent size of a target object was given by the arctangent of true size divided by true distance. The arctangent described a non-linear relation. Hence, it was not possible to derive reliable information on the true distance of a target object in the absence of information on its true size. However, the method underlying claim 1 does not require the true distance of a possible collision threat to be calculated but

merely an assessment on whether it could be on a possible collision course. Therefore, the board is also not convinced by this argument.

1.6 Consequently, the patent in suit meets the requirements of Article 83 EPC.

2. Added subject-matter (Article 123(2) EPC)

2.1 In its preliminary opinion issued in preparation for the oral proceedings, the board informed the appellant that it was convinced by the respondent's arguments that the subject-matter referred to in the objection discussed under points 3.1 to 3.4 of the contested decision was disclosed explicitly in box 1248 of Figure 3 and hence met the provisions of Article 123(2) EPC. The appellant did not comment on the board's preliminary opinion, either in writing or during the oral proceedings. Under these circumstances, the board sees no reason to deviate from this preliminary opinion.

2.2 In its preliminary opinion, the board also informed the appellant that, as far as the objection discussed under point 3.5 of the contested decision was concerned, the board was minded not to admit a line of attack based on this objection as the appellant did not deal with the reasons given in the contested decision but merely referred to "the reasons as presented in first instance" (see the statement setting out the grounds of appeal, page 10, second paragraph). The appellant did not comment on this either. Therefore, the board does not admit this line of attack (Article 12(4) RPBA 2007).

3. Novelty (Article 54 EPC)

3.1 The contested decision and the parties' submissions dealt with the following features of claim 1 for the assessment of novelty:

- (F1): the 3D trajectory determined by determining a line-of-sight (LOS) trajectory for the tracked target relative to the host aircraft (100) and correlating the LOS trajectory with an apparent range change between the tracked target and the host aircraft (100)
- (F2): the apparent range change determined from the target's apparent change in size and/or intensity
- (F3): determining whether the target trajectory passes the host aircraft (100) by more than a selected minimum safe distance

3.2 Although the appellant considers D1 to be prejudicial to the novelty of claim 1, this document does not disclose feature (F3). The contested decision came to the same conclusion although on the basis of a different interpretation of the disclosure of D1. The contested decision interpreted D1 such that its method involves the calculation of two different 3D trajectories for two different purposes. The board rather follows the appellant's interpretation that D1, paragraphs [0016] *et seq.*, is not related to the calculation of a second trajectory but to a more detailed description of the same 3D trajectory mentioned in paragraph [0015], despite the inconsistent terminology. Accordingly, the "*zeitlicher Verlauf des Sichtlinienwinkels und der Ausdehnung*" (column 2, lines 41 to 42) and the "*dreidimensionale Bahn des Schwerpunkts*" (column 2, line 44), mentioned in paragraph [0015], both appear to be the same 3D

trajectory as the "*Band*" mentioned in paragraphs [0016] and [0017]. Paragraph [0018] (column 3, lines 22-23) refers to this 3D trajectory as "*die dreidimensionale Trajektorie oder das Band [jedes erfassten Fahrzeugs]*". The board agrees with the appellant that features (F1) and (F2) of claim 1 can be identified in the characteristics of this 3D trajectory.

3.3 However, for issuing a collision warning, D1 assesses whether this 3D trajectory intersects the vector of movement of the host aircraft and whether the detected target is approaching this intersection point (paragraph [0017], "*wenn der Vektor der Eigenbewegung des Luftfahrzeugs dieses Band schneidet und das beobachtete Objekt auf diesen Punkt hinstrebt*"). The appellant argued that the wording "*wenn [...] das beobachtete Objekt auf diesen Punkt hinstrebt*" disclosed passing the host aircraft by more than a minimum safe distance, as required by feature (F3). Irrespective of the fact that the cited passage does not mention any minimum safe distance, this statement is not disclosed in paragraph [0017] in isolation but rather in combination with the prerequisite condition that the 3D trajectory intersects the vector of movement of the host aircraft. Consequently, the criteria applied in D1 for issuing a collision warning is different from the one required by feature (F3).

3.4 Therefore, the subject-matter of claim 1 is new (Article 54(1) and (2) EPC).

4. Admissibility of the inventive-step attack (Article 13(1) RPBA 2020)

4.1 In its statement setting out the grounds of appeal, the appellant did not make any submissions with regard to

inventive step apart from mentioning the number of the relevant article ("Art. 54 and **56** EPC") in the concluding paragraph. However, as the contested decision was also based on Article 56 EPC (see points 6 and 7 of the contested decision), any submission in this regard could and should have been filed in the statement setting out the grounds of appeal which should contain the appellant's complete case (Article 12(3) RPBA 2020).

4.2 In a subsequent letter (dated 27 November 2017), the appellant supplemented its appeal case with submissions regarding inventive step. As the respondent rightly argued, this inventive-step attack is an amendment to the appellant's appeal case within the meaning of Article 13(1) RPBA 2020 that is subject to the appellant's justification for its late-filing and admissible only at the board's discretion. Accordingly, the respondent requested that this late-filed attack not be admitted.

4.3 The appellant relied in its defence on a blanket statement on page 1 of its statement setting out the grounds of appeal that reads "the submissions presented in the first instance opposition procedure are incorporated". However, such a statement bears no legal effect (see also "Case Law of the Boards of Appeal of the European Patent Office", Ninth Edition, July 2019, V.A.2.6.4.a).

4.4 To justify the late-filing of its inventive-step attack, the appellant argued at the oral proceedings that it had seen no need to make submissions with regard to inventive step in its statement setting out the grounds of appeal since it already considered claim 1 not to be new. However, although objections under

Articles 54 and 56 EPC are related to each other, the appellant should have been aware that they are essentially different objections with different legal bases and thus different lines of attack (see G 1/95, points 4.2 to 4.4 of the reasons).

4.5 In conclusion, the board does not admit the appellant's late-filed inventive-step attack (Article 13(1) RPBA 2020).

5. Since none of the admissible attacks against the maintenance of the patent in amended form is successful, the appeal has to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chair:



K. Götz-Wein

A. Ritzka

Decision electronically authenticated