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**Datasheet for the decision  
of 23 January 2014**

**Case Number:** T 0845/10 - 3.4.02

**Application Number:** 06756178.7

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**Title of invention:**  
COMBINED HEAD UP DISPLAY

**Applicant:**  
ELBIT SYSTEMS LTD.

**Relevant legal provisions:**  
EPC 1973 Art. 84, 56

**Keyword:**  
Clarity (yes - amended claims)  
Inventive step (yes - amended claims)



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Case Number: T 0845/10 - 3.4.02

**D E C I S I O N**  
**of Technical Board of Appeal 3.4.02**  
**of 23 January 2014**

**Appellant:** ELBIT SYSTEMS LTD.  
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**Decision under appeal:** **Decision of the Examining Division of the European Patent Office posted on 10 December 2009 refusing European patent application No. 06756178.7 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chairman:** A. G. Klein  
**Members:** F. J. Narganes-Quijano  
B. Müller

## **Summary of Facts and Submissions**

I. The appellant (applicant) lodged an appeal against the decision of the examining division refusing European patent application No. 06756178.7 based on the International application No. PCT/IL2006/000624 (published with the International publication No. WO 2006/129307).

In its decision the examining division held with regard to the set of claims then on file that the claimed subject-matter was not clear and that it did not involve an inventive step in view of the disclosure of documents

D1: JP-A-05142982 together with the corresponding English language abstract published in "Patent abstracts of Japan"  
D7: US-A-4634384  
D8: US-A-6042238.

II. With the statement setting out the grounds of appeal the appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of an amended set of claims.

III. In reply to a telephone consultation with the rapporteur of the Board, with letter dated 23 December 2013 the appellant filed an amended set of claims 1 to 9 and an amended description (pages 1 to 18) replacing the corresponding application documents on file.

IV. The set of claims amended according to the present request of the appellant includes independent claims 1 and 8 and dependent claims 2 to 7 and 9 referring back

to independent claims 1 and 8, respectively.  
Independent claims 1 and 8 read as follows:

"1. System for simulating, to an audience including a plurality of viewers (118A, 118B, 118C, 118D, 118E), a view from a cockpit of an aircraft, the cockpit including a head-up display, the system comprising:

a concave panoramic projection screen (102) positioned at a distance of at least 10 meters from the audience;

a plurality of panoramic projectors (104A, 104B, 104C) for projecting on respective sections ( $S_A$ ,  $S_B$ ,  $S_C$ ) of said panoramic projection screen (102) at least one respective portion of a panoramic image (150), said panoramic image (150) simulating a view of outside scenery as seen by a pilot from said cockpit, said panoramic image being viewed by said audience;

a single beam combiner (106), having a respective length and width of at least between 1 meter and 2 meters, said single beam combiner (106) being located between said concave panoramic projection screen (102) and said audience;

an auxiliary projector (110) for projecting an auxiliary image (158, 160, 162, 164) toward said beam combiner (106) for simulating the display on said head-up display, said beam combiner (106) producing a combined image of said panoramic image (150) and said auxiliary image (158, 160, 162, 164), to be viewed by said audience through said beam combiner (106) from respective positions of said viewers (118A, 118B, 118C, 118D, 118E), by transmitting at least part of said panoramic image (150) toward said audience (118A, 118B, 118C, 118D, 118E), and reflecting said auxiliary image (158, 160, 162, 164) toward said audience (118A, 118B, 118C, 118D, 118E), such that said auxiliary image (158, 160, 162, 164) is focused as being located on an image

plane (120) located at a distance of between 2 meters and 4 meters from said viewers so that said auxiliary image (158, 160, 162, 164) appears closer to said audience (118A, 118B, 118C, 118D, 118E) than said panoramic image (150);

a database (114) for storing panoramic image data respective of said panoramic image (150), and auxiliary image data respective of said auxiliary image (158, 160, 162, 164);

a user interface (116) for displaying said auxiliary image (158, 160, 162, 164) to a user operator (118F) among said audience (118A, 118B, 118C, 118D, 118E), said user interface (116) being situated remotely from said beam combiner (106), said user interface (116) producing an output according to an input from said user operator (118F), respective of one of a plurality of options (168, 170, 172) included in said auxiliary image (158, 160, 162, 164); and

a processor (112) coupled with said panoramic projectors (104A, 104B, 104C), said auxiliary projector (110), said database (114), and with said user interface (116), said processor (112) retrieving said panoramic image data from said database (114) according to said output, said processor (112) retrieving said auxiliary image data according to said output, said processor (112) directing said panoramic projectors (104A, 104B, 104C) to project said panoramic image (150) on said panoramic projection screen (102) according to said panoramic image data, said processor (112) directing said auxiliary projector (110) to project said auxiliary image (158, 160, 162, 164) on said beam combiner (106) according to said auxiliary image data, wherein said panoramic image (150) and said auxiliary image (158, 160, 162, 164) are temporally and spatially projected in synchrony."

"8. Method for simulating, to an audience including a plurality of viewers (118A, 118B, 118C, 118D, 118E), a view from a cockpit of an aircraft, the cockpit including a head-up display, the method characterized by the steps of:

producing an output, according to an option selected by a user operator (118F) among a plurality of options (168, 170, 172) on a user interface (116);

retrieving panoramic image data and auxiliary image data from a database (114) according to said output;

directing a plurality of panoramic projectors (104A, 104B, 104C) to project at least one respective portion of a panoramic image (150) on respective sections of a concave panoramic projection screen (102) positioned at a distance of at least 10 meters from the audience, according to said panoramic image data;

directing an auxiliary projector (110) to project an auxiliary image (158, 160, 162, 164) toward a single beam combiner (106) according to said auxiliary image data, said beam combiner (106) having a respective length and width of between 1 meter and 2 meters, said beam combiner (106) being located between said concave panoramic projection screen (102) and said audience (118A, 118B, 118C, 118D, 118E), said beam combiner (106) situated remotely from said user interface (116); and

producing a combined image of said panoramic image (150) and said auxiliary image (158, 160, 162, 164), to be viewed by said audience (118A, 118B, 118C, 118D, 118E) through said beam combiner (106) from respective positions of said viewers (118A, 118B, 118C, 118D, 118E), by transmitting at least part of said panoramic image (150) toward said audience (118A, 118B, 118C, 118D, 118E), by said beam combiner (106), and reflecting said auxiliary image (158, 160, 162, 164) toward said audience (118A, 118B, 118C, 118D, 118E), by

said beam combiner (106), such that said auxiliary image (158, 160, 162, 164) is focused as being located on an image plane (120) located at a distance of between 2 meters and 4 meters from said viewers so that said auxiliary image (158, 160, 162, 164) appears closer to said audience (118A, 118B, 118C, 118D, 118E) than said panoramic image (150), wherein said panoramic image (150) and said auxiliary image (158, 160, 162, 164) are temporally and spatially projected in synchrony."

## **Reasons for the Decision**

1. The appeal is admissible.
2. *Amendments*

The Board is satisfied that the application documents amended according to the present request of the appellant comply with the formal requirements of the EPC, and in particular with the requirements of Article 123(2) EPC. More particularly,

- claim 1 is based on claims 1, 2 and 6 as originally filed, together with the passages on page 7, lines 8 to 11, page 8, lines 15 to 18, page 9, lines 5 to 7 and 21 to 24, page 10, lines 24 to 30, and page 11, lines 27 to 29 of the description of the application as originally filed,

- independent claim 8 is based on independent claim 10 as originally filed and the same amendments made to present claim 1 and mentioned in the former subparagraph, and

- dependent claims 2 to 7 and 9 are respectively based on dependent claims 3 to 5, 7 to 9 and 16 as originally filed, together with the passage on page 9, lines 7 to 10 of the description of the application as originally filed.

The description has been amended in order to comply with the requirements of the EPC, and in particular with those set forth in Article 84, second sentence and Rules 27(1) and 35(12) EPC 1973.

3. *Clarity*

In its decision the examining division held that the subject-matter of claim 1 then on file was not clear (Article 84 EPC 1973). This claim required that the concave panoramic projection screen was positioned "relatively distant from the audience, such as 10 m away" and that the single beam combiner had "a respective length and width such as of between 1 meter and 2 meters", and the examining division held that these features were vague and non-limiting, and therefore unclear, in view of the expressions "relatively distant" and "such as".

Present claim 1 has been amended so that the two features mentioned above now read "at a distance of at least 10 meters from the audience" and "a respective length and width of at least between 1 meter and 2 meters", respectively. These amendments omit the expressions "relatively distant" and "such as" objected to by the examining division and therefore the amendments to the claim overcome the examining division's objections of lack of clarity.



In addition, the Board is satisfied that the remaining wording of the set of claims as presently amended is clear within the meaning of Article 84 EPC 1973.

4. *Inventive step*

4.1 The examining division considered in its decision that document D1 represented the closest state of the art and held that the subject-matter of claim 1 then on file did not involve an inventive step over the disclosure of document D1.

4.1.1 Document D1 discloses a system for simulating to each of a plurality of viewers a view from a cockpit of an aircraft, the cockpit including a head-up display (English abstract together with Figures 1 to 11). The system comprises

- a concave panoramic projection screen and a panoramic projector for projecting on the screen a panoramic image simulating a view of outside scenery as seen by a pilot from the cockpit (Figures 3, 10 and 11);

- a plurality of desks each comprising a seat for a respective one of the plurality of viewers (Figure 3), each of the desks comprising a beam combiner and an auxiliary projector for projecting towards the beam combiner an auxiliary image simulating the display on the head-up display (Figures 1, 2, 4 and 5), so that each of the viewers views through the respective beam combiner a combined image constituted by the superposition of the panoramic image viewable through the beam combiner and the auxiliary image reflected by the beam combiner (abstract and Figures 1 to 5 and 7 to 11); and

- a database for storing image data relating to the panoramic and the auxiliary images (Figures 6 and 8), a

user interface in each of the desks enabling the corresponding viewer to control the auxiliary image displayed in the respective beam combiner (abstract), and a processor for retrieving image data of the auxiliary image in accordance with the output from the corresponding user interface and image data of the panoramic image common to all the desks, and for directing the panoramic projector and the corresponding auxiliary projector to project the respective images (abstract and Figures 6 to 11).

Present claim 1 is also directed to a system for simulating to an audience a view from a cockpit of an aircraft including a head-up display and, when compared with the system disclosed in document D1, the claim requires the following features:

a) the system comprises a single beam combiner having a respective length and width of at least between 1 and 2 m and through which the audience views the combined image of the panoramic image and the auxiliary image projected on the beam combiner, the panoramic projection screen is positioned at a distance of at least 10 m from the audience, and the auxiliary image is focused as being located on an image plane at a distance of between 2 and 4 m from the audience, so that the auxiliary image appears closer to the audience than the panoramic image;

b) the user interface is positioned remotely from the beam combiner and produces an output according to an input by an operator corresponding to one of a plurality of options displayed in the auxiliary image, the processor retrieves image data not only of the auxiliary image but also of the panoramic image in accordance with the output from the user interface, and the panoramic and the auxiliary images are then temporally and spatially projected in synchrony; and

c) the panoramic projector is constituted by a plurality of projectors each projecting on a respective section of the panoramic projection screen a corresponding portion of the panoramic image.

4.1.2 According to the set of distinguishing features a) identified above, while the system of document D1 has been designed to accommodate each of the members of the audience in a respective one of a plurality of desks and requires a separate beam combiner in each desk for viewing a different auxiliary image while sharing a common panoramic image, the system defined in claim 1 allows for all the members of the audience to view from their respective positions a common combined image of the panoramic and the auxiliary images through one single beam combiner located between the panoramic projection screen and the audience.

In the decision under appeal the examining division noted that in similar simulation systems two viewers (and in particular a trainee and an instructor as is the case in document D7, see Figure 1 and the corresponding description, in particular column 3, lines 56 to 63) can share a common place behind a simulation cockpit and held with regard to the then claimed subject-matter that it was possible in the system disclosed in document D1 for two or more members of an audience to share seats behind a single one of the desks. The examining division concluded that the corresponding features of the then valid claim 1 were obvious since they merely expressed the wish that a plurality of viewers use a predetermined one of the plurality of desks and view the combined image through the beam combiner associated with the desk.

This view of the examining division was based on the fact that some of the set of features a) now required by the claimed subject-matter were formulated in the then valid claim 1 in terms that were vague or only optional (cf. point 3 above). However, present claim 1 has been amended so as to require that

- the combination of the panoramic and the auxiliary image is viewable by all the members of the audience through a single beam combiner having a respective length and width of at least between 1 and 2 m and therefore having bigger dimensions than each of the beam combiners of document D1,

- the auxiliary image is focused as being located on an image plane at a distance between 2 and 4 m from the members of the audience, and

- the panoramic projection screen is positioned at a distance of at least 10 m from the audience.

These amendments result in additional distinguishing features of the claimed system over the disclosure of document D1, with the consequence that even if one of the desks of the system disclosed in document D1 were occupied by more than one viewer, the set of distinguishing features a) identified above would not be satisfied by the system of document D1.

Thus, contrary to document D1, the set of features a) allows the members of an audience to view through a relatively large beam combiner the same combined image simulating a cockpit including a head-up display.

In addition, the set of features b) identified above has the technical effect of simultaneously updating the panoramic and the auxiliary images in accordance with one of the options displayed in the auxiliary image and selected by an operator via the user interface, and of displaying the superposed updated images in synchrony.

None of the documents on file discloses or suggests the sets of features a) and b) and the technical effects achieved therewith. In particular, documents D7 and D8 considered by the examining division in its decision disclose the projection of an image on a projection screen by means of a plurality of projectors each projecting a section of the image on a respective portion of the screen (document D7, Figure 1, together with column 3, lines 6 to 28, and document D8, Figures 2, 4, 5, 8 and 11 and the abstract) and these documents would, at the most, render obvious the set of features c) identified above - as held by the examining division in its decision -, but not the sets of features a) and b) listed above because these two documents are silent as to the problem of simulating to a whole audience the operation of a head-up display in a cockpit. The remaining documents on file are less pertinent for the issues under consideration.

- 4.1.3 The Board concludes that the subject-matter of claim 1 involves an inventive step over the available prior art.
- 4.2 Independent claim 8 is directed to a method of simulating a view from a cockpit of an aircraft to an audience including a plurality of viewers, and the steps of the claimed method are essentially in one-to-one correspondence with the functional and structural features of the different means of the simulation system defined in claim 1. Accordingly, the assessment of inventive step of the system defined in claim 1 carried out in point 4.1 above is readily applicable to the method of independent claim 8.

- 4.3 The Board concludes that the subject-matter of amended independent claims 1 and 8 as well as that of dependent claims 2 to 7 and 9 is new and involves an inventive step over the available prior art (Article 52(1) EPC together with Articles 54(1) and 56 EPC 1973).
5. The Board is also satisfied that the application documents amended according to the present request and the invention to which they relate meet the remaining requirements of the EPC within the meaning of Article 97(1) EPC. The Board therefore concludes that the decision under appeal is to be set aside and a patent to be granted on the basis of the application documents amended according to the present request of the appellant.

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance with the order to grant a patent on the basis of the following application documents:
  - claims: claims 1 to 9 filed with the letter dated 23 December 2013;
  - description: pages 1 to 18 filed with the letter dated 23 December 2013; and
  - drawings: sheets 1/9 to 9/9 as originally filed.

The Registrar:

The Chairman:



M. Kiehl

A. G. Klein

Decision electronically authenticated