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D E C I S I O N
of 14 February 2006

Case Number: T 1199/03 - 3.2.01

Application Number: 96305338.4

Publication Number: 0754625

IPC: B64G 1/44

Language of the proceedings: EN

Title of invention:
Hybrid solar panel array

Patentee:
Space Systems/Loral, Inc.

Opponent:
Astrium GmbH EADS Deutschland GmbH

Headword:

-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (no)"

Decisions cited:

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Catchword:

-



Case Number: T 1199/03 - 3.2.01

D E C I S I O N
of the Technical Board of Appeal 3.2.01
of 14 February 2006

Appellant: Astrium GmbH EADS Deutschland GmbH
(Opponent) Postfach
D-81663 Münchens (DE)

Representative: -

Respondent: Space Systems / Loral, Inc.
(Proprietor of the patent) 3825 Fabian Way
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Representative: Ertl, Nicholas Justin
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 12 November 2003
rejecting the opposition filed against European
patent No. 0754625 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: J. Osborne
Members: Y. Lemblé
C. Heath

Summary of Facts and Submissions

- I. The appeal is directed against the decision of the Opposition Division posted 12 November 2003 to reject the opposition against European patent No. 0 754 625. The patent had been opposed on the grounds that its subject-matter lacked novelty and did not involve an inventive step (Article 100(a) EPC).
- II. On 22 November 2003 the appellant (opponent) lodged an appeal against that decision and paid the required appeal fee. In the statement of grounds filed on 10 February 2004 the appellant submitted that the subject-matter of the patent did not involve an inventive step having regard *inter alia* to the following prior art documents:
- D6: Twenty First IEEE Photovoltaic Specialists Conference, Vol. 22, 21-25 May 1990, Fl, USA, pages 1369-1373, XP 000480387, Ralph et al., "RETRACTABLE PLANAR SPACE PHOTOVOLTAIC ARRAY"
- D8: DE-B-1 801 777
- III. The respondent (patent proprietor) took no part in the written procedure.
- IV. In oral proceedings held on 14 February 2006 the appellant requested that the decision to reject the opposition be set aside and the patent be revoked. The respondent did not appear, despite having been duly summoned.

V. Independent claim 1 as granted reads as follows:

"1. A hybrid solar panel array mounted on a satellite sidewall for movement between a stowed position proximate the satellite sidewall and a deployed position extending away from the satellite sidewall, said solar panel array comprising, a yoke pivotally mounted on the satellite sidewall, a first rigid solar panel pivotally mounted to said yoke, a second rigid solar panel pivotally mounted to said first rigid solar panel along an axis distant from said yoke, a third non-rigid solar panel assembly joined to said first and second rigid solar panels, and drive means for moving said solar panel array between the stowed position and the deployed position, wherein the non-rigid solar panel assembly is sandwiched between the two rigid panels in the stowed position."

VI. The appellant submitted *inter alia* the following argumentation:

The subject-matter of claim 1 resulted in an obvious manner essentially from the embodiment of figures 9 to 11 of document D8. This embodiment showed a solar panel array comprising a plurality of rigid solar panels 31 which were pivotally connected to one another by hinges 33 and a non-rigid solar panel assembly 36 joined to the rigid solar panels. In the deployed position, the panels extended away from the satellite side wall. In the stowed position, the folded non-rigid solar panel assembly 36 was sandwiched between rigid solar panels 31 and formed a pack similar to a rolling shutter. In such a pack, the non-rigid solar panel assembly was protected against launch stresses by the

rigid solar panels. Taking into consideration the progress made in the efficiency of the photovoltaic solar panels since the publication of D8, a solar panel array having the power requirements in the range of 10 to 20 KW mentioned in paragraph [0006] of the patent would require a number of rigid solar panels as low as two. The application of the packing principle disclosed in the embodiment of figures 9 to 11 of D8 to an array having only two rigid solar panels would lead in an obvious manner to an array having the claimed feature, i.e. having a non-rigid solar panel assembly sandwiched between the two rigid solar panels. Moreover, the presence of a yoke was a generally known feature for connecting a solar panel array to a satellite (see D6). The implementation of this connection for the array of D8 was an obvious measure for the skilled person.

Reasons for the Decision

1. The appeal meets the requirements of Articles 106 to 108 and Rule 64 EPC and is therefore admissible.
2. *Inventive step*
 - 2.1 In agreement with the appellant the Board considers that the nearest prior art is to be seen in the embodiment of figures 9 to 11 of document D8. In this embodiment, a hybrid solar panel array is mounted on a satellite sidewall for movement between a stowed position proximate the satellite sidewall and a deployed position extending away from the satellite sidewall. The solar panel array comprises a plurality of rigid solar panels 31 which are connected together

by hinges 33 and side bars 32 in a serial arrangement such as to be pivotally mounted to one another and to extend outwardly from the side wall of the satellite in the deployed position. A flexible solar panel assembly 36 is attached to said rigid solar panels whereby sections of this assembly overlap two adjacent rigid solar panels. These flexible sections are unfolded from one side of the rigid solar panels for their deployment (see figure 10). Drive means 37 are provided for moving said solar panel array between the stowed position and the deployed position.

2.2 The subject-matter of claim 1 is distinguished from this prior art in that

- (a) the array comprises two rigid solar panels which sandwich (all of) the non-rigid solar panel assembly in the stowed position, and in that
- (b) the solar panel array is pivotally mounted to a yoke which is itself pivotally mounted on the satellite sidewall.

2.3 The primary object of D8 was to provide an array which offered a large surface for the solar cells in the deployed position from a very compact arrangement in the stowed position. The hybrid array disclosed in D8 is not specifically adapted for providing cost effective power in the 10 to 20 KW intermediate range. The problem to be solved by the differentiating feature (a) can therefore be formulated as follows: to design an array that can provide cost effective power for the 10 to 20 KW range, is lightweight but nevertheless withstand loads arising during launch.

D8 is silent regarding the means of connection of the rigid solar panels to the wall of the satellite and the differentiating feature (b) supplements the teaching for practical implementation and especially for partial deployment in transfer orbit.

Since the differentiating features (a) and (b) have no functional relationship they are to be considered separately for assessment of inventive step.

- 2.4 The Board notes that D8 proposes in various embodiments a series of different solutions (see D8: column 3, lines 41 to 60) to the problem mentioned in the paragraphs [0005] and [0014] of the patent, which is to protect the flexible panel assembly during the launch and the transfer orbit phases of the satellite, the flexible panels being normally not designed to sustain such loads.

In the embodiment of D8 figures 7 and 8, all the flexible panels 22 are protected against displacement and friction damage due to the acceleration during launch by packing them between the satellite wall and the rigid solar panels (column 6, lines 11 to 20).

In the embodiment of figures 9 to 11, the rigid panels 31 envelop between them all of the folded flexible panel assembly 36 in overlapping side by side relationship. The folded flexible solar panel assembly 36 is attached to one face of the rigid solar panels 31 whereby sections of the flexible panel assembly overlap two adjacent rigid solar panels. The rigid panels with the flexible sections attached on their inner face are

rolled up together to form a pack having squared edges. It is important to note that the two last innermost rigid solar panels of the pack are disposed by 180° relative to one another (see D8, column 6, lines 40 to 44) and sandwich between them a section of the flexible panel assembly.

The technical teaching of this latter embodiment is not limited to any particular number of rigid solar panels. In view of the progress made in the efficiency of the photovoltaic solar panels between the publication of D8 (1971) and the priority date of the present patent (1995), and for a relatively low power requirement from the solar array in the range of 10 to 20 KW, a set of two rigid solar panels may suffice. It would be evident for the skilled person that the teaching of the third embodiment of D8 is equally applicable to an array comprising only two rigid solar panels. Such an array would comprise feature (a), namely a flexible solar panel assembly sandwiched between two rigid solar panels disposed at 180° relative to one another, as mentioned above.

- 2.5 The provision of a yoke between the satellite sidewall and the solar panels of the array is a generally known feature (see e.g. D6) for keeping the array at a distance from the payload which is located on the relevant side of the satellite and which may enter in function in the partially deployed position. The implementation of such a connection in the array of D8 is an obvious measure.

2.6 The Board concludes from the above that the subject-matter of independent claim 1 does not involve an inventive step (Article 56 EPC).

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:

A. Vottner

J. Osborne