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**Datasheet for the decision  
of 23 April 2009**

**Case Number:** T 0887/07 - 3.2.05

**Application Number:** 99302710.1

**Publication Number:** 1050396

**IPC:** B29C 70/54

**Language of the proceedings:** EN

**Title of invention:**

Knowledge driven composite design optimization process and system therefor

**Patentee:**

McDONNELL DOUGLAS CORPORATION

**Opponent:**

Airbus SAS

**Headword:**

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**Relevant legal provisions:**

EPC Art. 52(2), 52(3), 83, 84, 54, 56, 123(2)  
RPBA Art. 13(1)(3)

**Relevant legal provisions (EPC 1973):**

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**Keyword:**

"Admissibility of late filed request (yes)"  
"Amendments (allowable)"  
"Clarity (yes)"  
"Sufficiency of disclosure (yes)"  
"Industrial applicability (yes)"  
"Novelty (yes)"  
"Inventive step (yes)"

**Decisions cited:**

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**Catchword:**

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Case Number: T 0887/07 - 3.2.05

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.05  
of 23 April 2009

**Appellant:** McDONNELL DOUGLAS CORPORATION  
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**Respondent:** Airbus SAS  
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**Representative:** Quantin, Bruno Marie Henri  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 19 April 2007  
revoking European patent No. 1050396 pursuant  
to Article 102(1) EPC 1973.

**Composition of the Board:**

**Chairman:** W. Zellhuber  
**Members:** P. Michel  
E. Lachacinski

## Summary of Facts and Submissions

- I. The appellant (patent proprietor) lodged an appeal against the decision of the Opposition Division revoking European Patent No. 1 050 396.
  
- II. The patent in suit was revoked by the Opposition Division on the grounds that a main request, first and second auxiliary requests did not satisfy the requirements of Article 123(2) EPC, claim 1 of a third auxiliary request lacked novelty, and claims 1 and 8 of a fourth auxiliary request lacked an inventive step.
  
- III. Oral proceedings were held before the Board of Appeal on 23 April 2009.
  
- IV. The appellant requested that the decision under appeal be set aside and that the patent in suit be maintained on the basis of the set of claims 1 to 7 filed as auxiliary request 9 during oral proceedings.

The respondent (opponent) requested that the appeal be dismissed.

- V. The following documents are referred to in the present decision:

CG1: "CAD based optimisation of composite structures",  
Morelle et al,

CG2: WO-A-96/06776

VI. Claim 1 of the sole request of the appellant reads as follows:

"1. A knowledge driven composite design optimization system used in designing a laminate part comprising a plurality of regions, each region of the laminate part including a plurality of plies, the system comprising:

means for generating a globally optimized 3-D ply definition for the laminate part (11, 12, 13) including each region of the laminate part, wherein said means for generating the global 3-D ply definition comprises means for determining connectivity (112, 113, 119) between the plurality of regions defining the laminate part in accordance with predefined transition rules; and

means for modifying the 3-D ply definition (14, 15, 16, 17) to include local features which modify the global 3-D ply definition of the laminate part,

wherein said means for generating and said means for modifying are parametrically linked to one another such that the global 3-D ply definition is modified based upon local features of the laminate part."

VII. The appellant argued substantially as follows in the written and oral procedure:

The request filed during oral proceedings merely involves the deletion of claims 1 to 7 of the previous main request and the renumbering of previous claims 8 to 14. The request should therefore be admitted into the proceedings.

The features of claim 1 are disclosed in the application as filed and the requirements of Article 123(2) EPC are satisfied.

The term "knowledge driven" indicates that the system uses knowledge in the field of composite design. The person skilled in the art understands the references in claim 1 to a "knowledge driven composite design optimization system" and a "globally optimized 3-D ply definition". Claim 1 is thus clear.

The disclosure of the patent in suit is sufficient to enable the person skilled in the art to put the invention into practice. In particular, connectivity and the use of transition rules are described in paragraphs [0034], [0057] and [0058]. Step 13 of Figure 7B and step 116 of Figure 8D merely represent opportunities for the user to modify the parameters; optimization has already been performed.

Claim 1 relates to a system and as such is not excluded from patentability.

Neither of documents CG1 and CG2 discloses or suggests that the optimized global ply definition, once generated, is subsequently modified to include local features. The subject-matter of claim 1 according to the main request is thus new.

There is no suggestion in the prior art to modify the system disclosed in document CG1 so as to enable the design of a composite part to be modified in respect of local features without starting the design process from the beginning. The subject-matter of claim 1 according

to the main request thus also involves an inventive step.

VIII. The respondent argued substantially as follows in the written and oral procedure:

The request of the appellant filed during oral proceedings is late filed and should not be admitted into the proceedings.

The application as filed does not disclose "means for generating a globally optimized 3-D ply definition for the laminate part" as specified in claim 1. Claim 6 is directed to a feature which is only disclosed in the application as filed in combination with other features. The requirements of Article 123(2) EPC are thus not fulfilled.

Claim 1 has been modified as compared with the granted claims by the introduction of the terms "knowledge driven", "optimization process" and "globally optimized". These terms are not clear in the context of the patent in suit and thus render the claim unclear. It is noted that the terms were removed during prosecution of the application as being unclear and were only reintroduced in order to satisfy the requirements of Article 123 EPC. It is further noted that the translations of the title of the patent in suit have differing meanings.

The disclosure of the patent in suit is not sufficient to enable the person skilled in the art to carry out the invention. Claim 1 is directed to a system which can design a laminate part without human intervention.

Such a system is not, however, disclosed. Human intervention is required, for example in the optimisation steps 13 in Figure 7B and 116 in Figure 8D. In addition, the feature that the generating and modifying steps are "parametrically linked" is not disclosed in a sufficient manner.

The subject-matter of claim 1 lacks a technical character, so that the requirements of Article 52(2) EPC are not satisfied. In particular, the corresponding method can be carried out using a paper and pencil, so that the fact that the claim is directed to a system rather than a method is merely an artificial distinction.

The features specified in claim 1 are largely non-technical and therefore cannot distinguish the claim from the prior art. The only physical difference from the prior art is the presence of a computer.

Document CG1 discloses in section 3.2 a system as claimed in claim 1. The starting point of "every layer everywhere" represents a global 3-D ply definition for the laminate part including each region of the laminate part as required by claim 1. The reference to the definition being optimized is a purely mental step which cannot distinguish the subject-matter of the claim from the prior art. It is further disclosed in section 4 of document CG1 that the parameter is updated.

The subject-matter of claim 1 of the main request is thus not new having regard to the disclosure of document CG1.



Even if the subject-matter of claim 1 were to be regarded as being distinguished from the disclosure of document CG1, it would nevertheless not involve an inventive step.

Document CG1 represents the closest prior art.

If a laminate part to be designed comprises more than one region, such as the spar shown in Figure 5 of document CG2, the designer would inevitably use transition rules for determining connectivity between the regions so as to avoid weak zones. Since the spar must be mounted on a hub, it will be necessary to modify the ply definition so as to include the necessary local feature.

## **Reasons for the Decision**

### **1. Main Request**

#### **1.1 Admissibility**

The request was filed during the course of the oral proceedings before the board. The request includes a set of claims numbered 1 to 7, which correspond to claims 8 to 14 of the claims of the main request previously on file. The amendment thus merely involves the deletion of some of the claims of an existing request. In addition, the amendment is intended to overcome an objection of lack of patentable subject-matter raised against the deleted claims.

Moreover, the request did not raise any issues with which the board and respondent could not reasonably be expected to deal without adjournment of the oral proceedings.

The board thus considers it to be appropriate to exercise their discretion under Article 13(1) and (3) RPBA so as to admit the request.

#### 1.2 Article 123(2) EPC

Claim 1 is based on claim 14 of the application as filed, which specifies the presence of "means for generating a globally optimized 3-D ply definition for the laminate part".

The fact that the subject-matter of claim 6 is disclosed in paragraph [0022] of the application as filed (published version) as being one of three optional features of "PACKS" (parametric composite knowledge system) does not indicate that this feature is only disclosed in combination with the other two features.

The requirements of Article 123(2) EPC are thus satisfied.

#### 1.3 Clarity

As compared with claim 8 as granted, claim 1 has been amended by the inclusion of the term "knowledge driven" and the references to optimization.

The term "knowledge driven" is comprehensible to the person skilled in the art as referring to a design procedure in which expert knowledge is applied. Optimization is similarly a familiar concept in the design of components (see document CG1).

The prosecution history of the application leading to the patent in suit is not relevant to the issue of clarity.

Claim 1 is thus clear and the requirements of Article 84 EPC are satisfied.

#### 1.4 Sufficiency of Disclosure

The means for generating a globally optimized 3-D ply definition comprising means for determining connectivity by the use of transition rules is described in the patent in suit in paragraphs [0034], [0057] and [0058].

As shown in Figure 7B and described at paragraphs [0065] to [0067] of the patent in suit, the global ply definition defined at step 12 is a result of optimization procedures carried out in steps 9 to 11. Step 13, at which it is decided whether or not to use the definition, is an additional step which occurs between the generation of the optimized ply definition and the modification of the definition to include local features, which occurs in steps 14 to 17. It is thus not the case that the means for optimization required by claim 1 is that carried out by a user at step 13. It would be possible to supply the global ply definition of step 12 directly to the procedure of step 14 without

allowing the possibility of altering the properties or parameters at step 18.

The person skilled in the art of composite design systems would thus be capable of providing an optimization system as specified in claim 1 in the light of the description and drawings of the patent in suit. It is noted that claim 1 does not specify that the system is completely automatic and does not exclude the presence of further steps. The requirements of Article 83 EPC are thus satisfied.

#### 1.5 Article 52(2) EPC

Claim 1 is directed to a system for designing a laminate part.

Article 52(2) EPC excludes methods for performing mental acts from patentability. This exclusion does not, however, extend to a system such as that claimed in claim 1, which represents a technical means for implementing a design optimization method. This is made clear by Article 52(3) EPC, which states that the exclusions of Article 52(2) EPC relate only to the specified activities as such.

The subject-matter of the claim is thus susceptible of industrial application.

#### 1.6 Novelty

Claim 1 of the patent in suit relates to a system comprising means for generating a globally optimized 3-D ply definition, including means for determining

connectivity between the plurality of regions defining the laminate part in accordance with predefined transition rules, and means for subsequently modifying the globally optimized 3-D ply definition to include local features of the laminate.

This is not the case in the procedure outlined in paragraph 3.2 of document CG1. This passage proposes a procedure in which the starting point is a laminate with "every layer everywhere", which is modified by an optimization procedure involving successive removal of layers. Such a starting point cannot be regarded as being in any respect optimized, so that the procedure disclosed in this paragraph could only be regarded as constituting the step of generating a globally optimized 3-D ply definition. There is no suggestion of a system comprising means for modifying the resulting optimized laminate definition to include local features, or means for determining connectivity between a plurality of regions of the laminate part in accordance with predefined transition rules.

Document CG2 is concerned with the location and arrangement of the plies of a composite spar. There is no suggestion of a system for carrying out a two stage design process.

The subject-matter of claim 1 is thus new.

#### 1.7 Inventive step

Document CG1 is regarded as representing the closest prior art. The subject-matter of claim 1 is distinguished from the disclosure of this document in

that, the system comprises means for generating a globally optimized 3-D ply definition in accordance with predefined transition rules, and means for modifying the globally optimized 3-D ply definition to include local features, the means for generating the globally optimized 3-D ply definition and the means for modifying it being parametrically linked to one another, that is, they utilize the same parameters.

Such a system enables local features of the laminate component to be modified without necessitating the generation of a new globally optimized 3-D ply definition.

The cited prior art does not suggest such a system. In particular, document CG2 merely proposes a set of rules for the design of a composite spar. It was suggested on behalf of the respondent that the spar would subsequently have to be modified to enable it to be mounted on a hub. There is, however, no indication in document CG2 that any features of the spar would not be taken into account from the beginning of the design process.

The subject-matter of claim 1 thus involves an inventive step. Claims 2 to 7 are directly or indirectly dependant from claim 1 and relate to preferred embodiments of the system of claim 1. The subject-matter of these claims thus similarly involves an inventive step.

**Order**

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

1. The decision under appeal is set aside.
  
2. The case is remitted to the first instance with the order to maintain the patent on the basis of claims 1 to 7 filed as auxiliary request 9 during oral proceedings, and the description and drawings to be adapted.

The Registrar:

The Chairman:

D. Meyfarth

W. Zellhuber