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# Datasheet for the decision of 20 July 2012

**Case Number:** T 0362/09 - 3.4.01

**Application Number:** 96933969.6

**Publication Number:** 929824

**IPC:** G01S 13/90

**Language of the proceedings:** EN

**Title of invention:**
Delay compensated doppler radar altimeter

**Patentee:**
THE JOHNS HOPKINS UNIVERSITY

**Opponent:**
EUROPEAN SPACE AGENCY

**Headword:**
-

**Relevant legal provisions:**
EPC Art. 100(a), 56
EPC R. 84(1), 100(1), 103(1)(a)

**Keyword:**
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**Decisions cited:**
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**Catchword:**
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Beschwerdekammern | Boards of Appeal | Chambres de recours

**Case Number:** T 0362/09 - 3.4.01

# D E C I S I O N
**of the Technical Board of Appeal 3.4.01**
**of 20 July 2012**

**Appellant**: (Opponent)
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**Decision under appeal:**
**Decision of the Opposition Division of the European Patent Office posted 10 November 2008 rejecting the opposition filed against European patent No. 929824 pursuant to Article 101(2) 2nd sentence EPC.**

**Composition of the Board:**

**Chairman:** G. Assi
**Members:** H. Wolfrum
A. Pignatelli

## Summary of Facts and Submissions

I. The appellant (opponent) lodged an appeal against the decision of the opposition division, dispatched on 10 November 2008, rejecting the opposition against European patent No. 0 929 824. The notice of appeal was received on 31 December 2008 and the prescribed fee had been paid on 24 December 2008. On 5 March 2009 a statement setting out the grounds of appeal was filed.

II. Pursuant to Articles 100(a) and 100(b) EPC the opposition had been based on the grounds of lack of novelty and inventive step (Articles 52(1), 54(1) and (2) and 56 EPC) and insufficiency of disclosure.

III. In the appeal the appellant made reference, *inter alia*, to the following documents :

D2 : R. K. RANEY et al : "Precision SAR Processing Using Chirp Scaling", IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING, US, IEEE, NEW YORK, vol. 32, no. 4, 1 July 1994, pages 786-798;

D3 : R. K. RANEY : "A Delay/Doppler Radar Altimeter For Ice Sheet Monitoring", INTERNATIONAL GEOSCIENCE AND REMOTE SENSING SYMPOSIUM, US, NEW YORK, IEEE, 1995, pages 862-864;

D7, D7a, D7b :
"Synthetic Aperture Radar, Systems and Signal Processing" by J. C. CURLANDER and R. McDONOUGH; chapters 1 and 4; John WILEY and Sons, New York, 1991; and

D8 : D. B. CHELTON, E. J. WALSH and J. L. McARTHUR: "Pulse Compression and Sea Level Tracking in Satellite Altimetry", Journal of Atmospheric and Oceanic Technology, no. 6, pages 407-438, 1989.

The appellant requested that the decision under appeal be set aside and the European patent be revoked in its entirety. Moreover, reimbursement of the appeal fee was requested for reasons of allegedly substantial procedural violations on the part of the opposition division.

IV. The present patent lapsed in the last designated Contracting State on 30 September 2009. At that time the appeal had already been filed and was still pending.

In fact, the respondent (patent proprietor) did not make any submission in the appeal proceedings.

V. By a communication dated 15 June 2012, pursuant to Rule 84(1) EPC in conjunction with Rule 100(1) EPC, the Board informed the parties about the lapse of the patent and enquired whether the appellant wished the appeal proceedings to be continued.

Having regard to the appellant's request for reimbursement of the appeal fee, the Board expressed doubts that this request would be allowable.

VI. By letter of 26 June 2012 the appellant requested continuation of the opposition proceedings and the issue of a decision both on substantive issues and on the request of reimbursement of the appeal fee.

In this context, the appellant expressly stated that it had sufficiently exposed its case in the Grounds of Appeal and did not require oral proceedings.

VII. Independent claims 1 and 8 of the patent as granted read as follows :

*"1. A delay compensated Doppler radar altimeter for determining the elevation of successive ground scatterers ($x_n$, $x_2$, $x_3$) scanned from an above-ground moving platform (10) having when in motion an along-track direction relative to the scatterers, said altimeter comprising:*

*means (14) for providing a downwardly directed illuminating wavefront; means (14) for receiving reflected signals from the scatterers returned to the altimeter;*

*means (32) for applying a fast Fourier transform in the along-track direction to transform in a delay-Doppler domain;*

*means (34, 36) for introducing a range curvature correction in the delay-Doppler domain;*

*inverse Fast Fourier transform means (38) for converting radar range to elevation for the scatterers located within the region under illumination; and*

*means (40) for combining the ranges measured for each of the scatterers over an illumination history, characterised in that the range curvature correction means (34, 36) are adapted for multiplying, by the phase function $\Phi(f,t) = exp\{+2\pi jk_R \cdot 2/c \cdot \delta r(f)t\}$, all data in the delay-Doppler domain, where t denotes the time variable, f is the Doppler frequency, $k_R$ is the linear FM rate and $\delta r(f)$ is the delay in range relative to the minimum range at nadir.*

*8. A method in a delay-Doppler radar altimeter for determining the elevation of successive ground scatterers scanned from an aerial moving platform having when in motion an along-track extension relative to the scatterers, the method comprising the steps of:*

*a. downwardly directing from said aerial moving platform an illuminating wavefront having non-zero extension in an along-track direction for illuminating a surface;*

*b. radiating a wavefront which impinges on the scatterers on the illuminated surface, giving rise to reflected signals returned to and receiving by the delay-Doppler radar altimeter;*

*c. processing the returned signals from each of the scatterers by applying a fast Fourier transform in the along-track direction to transform in a delay-Doppler domain;*

*d. introducing a range curvature correction in the delay-Doppler domain;*

*e. converting radar range to elevation for the scatterers located within the region under illumination by performing an inverse fast Fourier transformation; and*

*f. combining the ranges measured for each of the scatterers over the entire illumination history;*

*characterised in that the range curvature correction in step d. comprises multiplying, by the phase function* $\Phi(f,t) = \exp\{+2\pi j k_R \cdot 2/c \cdot \delta r(f) t\}$*, all data in the delay-Doppler domain, where t denotes the time variable, f is the Doppler frequency,* $k_R$ *is the linear FM rate and* $\delta r(f)$ *is the delay in range relative to the minimum range at nadir."*

Claims 2 to 7 and 9 to 13 are dependent claims.

## Reasons for the Decision

1. The appeal complies with the requirements of Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.

2. Applicable law

In the light of the entry into force of the EPC 2000, reference is made to Article 7(1), 2nd sentence of the Revision Act of 29 November 2000 ("Act revising the Convention on the Grant of European Patents (European Patent Convention) of 5 October 1973, last revised on 17 December 1991") and the transitional provisions for the amended and new provisions of the EPC (Decision of the Administrative Council of 28 June 2001), from which it may be derived which Articles of the EPC 1973 are still applicable to the present application and which Articles of the EPC 2000 are to apply.

3. Novelty

The closest prior art is given by document D3 (see the whole document). D3 shows all features of the preambles of claims 1 and 8 of the patent as granted. In addition, the radar altimeter according to D3 possesses range curvature correction means which are adapted for multiplying, by a phase function, all data in the delay-Doppler domain (page 863, left hand column).

As regards the phase function to be used for the range curvature correction, document D3 makes reference to document D2, which in turn makes use of three phase functions (see equations (14), (19) and (21)), none of which is identical to the one specified in claims 1 and 8 as granted.

Therefore, the subject-matter of claims 1 and 8 as granted is novel within the meaning of Article 54(1) and (2) EPC. The opposition division reached the same conclusion in the decision under appeal.

4. Inventive step

4.1 The phase functions discussed in document D2 concern specific corrections at various stages of a complex multi-stage process of Fourier transformations (see Figure 3). For instance, the first phase function operates on data resulting from an azimuth FFT and does not completely eliminate range curvature (Figure 4).

Thus, the reference in document D3 to document D2 would not deter the skilled person from looking for a more generic solution in this respect.

4.2 In this context, the appellant has convincingly demonstrated (see Part 1, paragraph III of the statement setting out the grounds of appeal) that the skilled person would have educed the claimed phase function from basic mathematics and common general knowledge (such as evidenced by documents D7 and D8).

4.3 Contrary to the opposition division's view, the Board does not see any element of hindsight in the

appellant's reasoning. Moreover, when it comes to the use of common general knowledge, it does not matter in which specific context this may be documented. Thus, the Board is not convinced by the opposition division's argument that the skilled person would not have combined the "teachings" of documents D3 and D8 because document D8 was concerned with radar altimetry of the non-coherent kind.

4.4 Consequently, the subject-matter of claims 1 and 8 of the patent as granted lacks an inventive step within the meaning of Article 56 EPC.

5. It follows that the ground for opposition under Article 100(a) EPC prejudices the maintenance of the patent as granted (Article 101(2) first sentence EPC), which therefore has to be revoked. In view of this, there is no need for an assessment of the other ground invoked under Article 100(b) EPC.

6. Request for reimbursement of the appeal fee

6.1 According to the appellant, the opposition division did not give appropriate consideration in its decision to the arguments which had been raised against novelty and inventive step (see "Part 3 - Substantial procedural violation" of the statement setting out the grounds of appeal"). Thus, the decision under appeal was not sufficiently motivated. Moreover, having ignored the opponent's arguments instead of giving them appropriate consideration, the opposition division had violated the right of the opponent to be heard. This constituted a substantial procedural violation which justified the reimbursement of the appeal fee. The appellant referred

in particular to the circumstance that the decision considered only a combination of document D3 with D8 but completely ignored document D7a/D7b. Although documents D7a/D7b and D8 were mentioned, their content was not discussed. Moreover, without apparent reason, document D8 was not considered as representing the general knowledge of the skilled person.

In its letter of 26 June 2012, the appellant reiterated that the opposition division had not even dismissed in its decision the arguments filed by the opponent but instead dealt with objections which were never raised during the opposition proceedings. This amounted to a lack of motivation and justified the reimbursement of the appeal fee.

6.2 The decision under appeal deals in its reasons with all of the grounds of opposition that had been raised in opposition. In this context, the opposition division explains why it considers, on the basis of the documents cited, the claimed subject-matter to be novel and inventive.

More specifically, the opposition division discusses the issue of inventive step on the basis of the teaching of document D3, D8, their combination or of D3 in combination with the skilled person's knowledge. As regards the latter combination, reference is made to the disclosures of documents D7a and D7b (see point 4. in combination with point 4.3 of the reasons). Moreover, a brief consideration is given to a combination of document D8 with any of the other cited prior art documents.

6.3 The Board concurs with the appellant that the contested decision could have been more detailed and specific, for instance as regards the presentation of the content of documents D7a/D7b and D8. Moreover, instead of implicitly dealing with the opponent's arguments, the decision could have been more explicit as well.

Nevertheless, the decision under appeal addresses all of the grounds raised and facts presented by the opponent and thus can be regarded as being sufficiently reasoned. For example, in point 4.3 of the reasons of the decision under appeal the opposition division dismisses a combination of D3 with the skilled person's knowledge on the ground that the latter (which according to point 4. of the reasons was considered to be represented by document D7a/D7b) did not indicate a phase function as claimed in claims 1 and 8 of the patent in suit.

That there remain discrepancies between the evaluation of the facts provided by the decision on the one hand and the opponent's argumentation on the other hand rather constitutes a matter of divergence in judgement, perhaps fuelled by misunderstandings and misconceptions of the arguments raised (such as for instance the nature and relevance of document D8), than a procedural, let alone a substantial procedural deficiency.

Moreover, a distinction has to be made between a violation of the right to be heard (for instance when a party is not given full opportunity of presenting its case) and divergences or possibly even errors in judgement in the evaluation of the facts and arguments.

Therefore, the Board sees no substantial procedural deficiency in the manner in which the opposition division has decided about the opposition.

The requests for reimbursement of the appeal fee is therefore not equitable by reason of a substantial procedural violation (Rule 103(1)(a) EPC).

## Order

## For these reasons it is decided that :

1. The decision under appeal is set aside.

2. The patent is revoked.

3. The request for reimbursement of the appeal fee is refused.

The Registrar The Chairman

R. Schumacher G. Assi