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**Datasheet for the decision  
of 8 April 2022**

**Case Number:** T 2656/19 - 3.5.05

**Application Number:** 13703872.5

**Publication Number:** 2809565

**IPC:** B61L15/00, B61L1/16, B61L1/14

**Language of the proceedings:** EN

**Title of invention:**  
DETECTING TRAIN SEPARATION

**Patent Proprietor:**  
OptaSense Holdings Limited

**Opponent:**  
Siemens Aktiengesellschaft

**Headword:**  
Train separation detection/OPTASENSE

**Relevant legal provisions:**  
EPC Art. 108, 56  
RPBA Art. 12(4)

**Keyword:**

Admissibility of appeal - appeal sufficiently substantiated  
(yes)

Late-filed evidence - admitted (no)

Inventive step - (yes)



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Case Number: T 2656/19 - 3.5.05

**D E C I S I O N**  
**of Technical Board of Appeal 3.5.05**  
**of 8 April 2022**

**Appellant:** Siemens Aktiengesellschaft  
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**Respondent:** OptaSense Holdings Limited  
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**Representative:** Abel & Imray LLP  
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**Decision under appeal:** **Interlocutory decision of the Opposition  
Division of the European Patent Office posted on  
22 July 2019 concerning maintenance of the  
European Patent No. 2809565 in amended form.**

**Composition of the Board:**

**Chair** A. Ritzka  
**Members:** P. Cretaine  
F. Blumer

## **Summary of Facts and Submissions**

I. This appeal is against the opposition division's interlocutory decision, issued on 22 July 2019, to maintain European patent No. 2 809 565 in amended form according to claims 1 to 15 of auxiliary request 2 filed during the oral proceedings before the opposition division.

The opposition was based on the grounds of Article 100(a) EPC. In the impugned interlocutory decision, the opposition division found that claim 1 as granted did not meet the requirements of Article 56 EPC over the disclosure of:

E1: WO 2011/027166 in combination with

E6: DE 10 2004 057 545

Furthermore, the opposition division found that claim 1 according to an auxiliary request 1 filed by letter of 18 April 2019 did not meet the requirements of Article 123(2) EPC and that claim 14 of this request did not meet the requirements of Article 56 EPC having regard to E1 in combination with E6.

Finally, the opposition division found that the claims of auxiliary request 2 met the requirements of Article 123(2) EPC and that their subject-matter involved an inventive step (Article 56 EPC) with regard to the disclosure of E1 in combination with E6.

The following documents were also cited in the decision:

E7: DE 10 2009 060 727

Q10: R. M. Measures, "Structural Monitoring with Fiber Optic Technology", 1st edn., Academic Press, 2001, 595

II. The opponent's notice of appeal was received on 19 September 2019, and the appeal fee was paid on the same day. The statement setting out the grounds of appeal was received on 19 November 2019. The opponent (appellant) requested to set aside the decision and to revoke the patent in its entirety for lack of inventive step. In support of its arguments, the appellant filed the following documents E10 to E14 and requested to admit them into the appeal proceedings:

E10: US 2008/0277568

E11: US 5 194 847

E12: WO 2011/039501

E13: US 2011/0069302

E14: WO 2011/058314

Oral proceedings were also requested on an auxiliary basis.

III. By letter of 30 March 2020, the proprietor responded to the statement setting out the opponent's grounds of appeal. The proprietor (respondent) requested to dismiss the appeal as inadmissible and unallowable. The respondent also requested not to admit documents E10 to E14 into the appeal proceedings. Furthermore, the respondent filed auxiliary requests 1 to 11. Oral

proceedings were requested in case the board were not able to dismiss the appeal.

- IV. A summons to oral proceedings was issued on 8 July 2021.
- V. In a communication pursuant to Article 15(1) RPBA sent on 21 February 2022, the board indicated the points which would be discussed during the oral proceedings. It also expressed its preliminary opinion that the appeal was admissible and that documents E10 to E14 should not be admitted into the appeal proceedings. With respect to inventive step, the board mentioned that it considered the appellant's lines of argument to be unconvincing.
- VI. By letter dated 22 March 2022, the appellant provided comments on the respondent's auxiliary requests 1 to 11.
- VII. By letter dated 25 March 2022, the respondent provided arguments on the admissibility and allowability of auxiliary requests 1 to 11.
- VIII. Oral proceedings were held before the board on 8 April 2022.

The appellant (opponent) requested that the decision under appeal be set aside and that European patent No. 2 809 565 be revoked.

The respondent (patent proprietor) requested that the appeal be rejected as inadmissible or refused as unallowable or that the patent be maintained on the basis of one of auxiliary requests 1 to 11 filed with the letter of 30 March 2020.

At the end of the proceedings, the board's decision was pronounced.

IX. Claim 1 of the main request (claims as maintained in the interlocutory decision) reads as follows:

"A method of detecting that a portion of a train has become separated from the rest of the train comprising: performing distributed acoustic sensing on at least one optical fibre (104a, 104b) deployed along the length of a railway (201) by interrogating the optical fibre with electromagnetic radiation and detecting, using a photodetector, the radiation Rayleigh backscattered from intrinsic scattering sites within the fibre so as to provide a plurality of longitudinal acoustic sensor portions along the railway; analysing the acoustic response from said acoustic sensor portions to detect a signature indicative of a train (202) having separated, characterised in that said detecting said signature comprises detecting a first acoustic event associated with a first part of a first train and a second acoustic event associated with a second different part of the first train and detecting that the separation between the first acoustic event and second acoustic event is beyond a threshold."

The main request further comprises an independent claim (claim 13) directed to a corresponding computer program and an independent claim (claim 14) directed to a corresponding system.

Due to the outcome of the appeal proceedings, there is no need to detail the claims of the auxiliary requests.

## **Reasons for the Decision**

### 1. Admissibility of the appeal

The respondent requested that the appeal should be rejected as inadmissible. The respondent argued in substance that the appellant's statement setting out the grounds of appeal did not address the key issues of the decision, namely why the subject-matter of claim 1 as maintained was not inventive over a combination of E1 with E6, contrary to what was decided by the opposition division. According to the respondent, the appellant merely asserted that the claims as maintained were not inventive over a combination of E1 with E6 and newly cited documents.

However, the board notes that the appellant raised in its statement setting out the grounds of appeal an inventive-step objection against the claims as maintained, based on first and second partial problems. The appellant came to the conclusions on pages 6 to 8 of this statement that the skilled person would solve, starting from E1 and without the exercise of inventive step, the first partial problem based on their own technical knowledge and the second partial problem based on the teaching of E6. Therefore, an inventive-step objection based on a combination of E1 with E6 and taking into account the common general knowledge is present in the statement setting out the grounds of appeal, thus directly addressing the findings of the decision in point 21 on auxiliary request 2.

Thus, the board holds that the respondent's request to reject the appeal as inadmissible is not founded.



2. Admission of documents E10 to E14

These documents were filed by the appellant with the statement setting out the grounds of appeal. The appellant argued that the late filing was justified by the amendments made to the claims according to the then auxiliary request 2 during the oral proceedings before the opposition division.

However, the board agrees with the respondent that the amendments to the claims merely clarified the construction of the distributed acoustic sensing (DAS), based on the description (see paragraphs [0010] and [0047]) and an interpretation which the respondent has relied upon from the beginning of the opposition proceedings (see page 1 of the letter of reply to the opposition dated 19 July 2018). Moreover, the board notes that the respondent filed in advance of the oral proceedings before the opposition division documents on the principles of DAS in support of its argument that DAS used the detection of Rayleigh backscattered radiations, as mentioned in the description and defined by the claims as maintained. Thus, the board holds that the appellant could have filed documents dealing with technical implementations of DAS, such as E10 to E14, in advance of the oral proceedings before the opposition division.

Furthermore, the board agrees with the respondent that documents E10 to E14 are not more relevant than the prior-art documents on file since none of them relates to train separation detection using DAS. E10 does not relate to a system using DAS but rather to a system measuring the Rayleigh backscattered radiations in an optical fibre subject to strain, for instance due to a vehicle weight, at certain locations. E11 relates to an

intrusion detection system based on DAS and not to trackside railway monitoring. E12 relates to improvements of the distributed sensing and not to railway monitoring. E13 relates to a seismic sensing system based on DAS and not to trackside railway monitoring. E14 relates to improvements to optical fibres used for DAS and not to trackside railway monitoring.

For these reasons, the board decided in oral proceedings not to admit documents E10 to E14 into the appeal proceedings (Article 12(4) RPBA 2007).

3. Inventive step

3.1 The following labelling of features of claim 1 as maintained (main request) was used in appeal proceedings:

M1 A method of detecting that a portion of a train has become separated from the rest of the train comprising:

M1.1 performing distributed acoustic sensing on at least one optical fibre deployed along the length of a railway by interrogating the optical fibre with electromagnetic radiation and detecting using a photodetector the radiation Rayleigh backscattered from intrinsic scattering sites within the fibre so as to provide a plurality of longitudinal acoustic sensor portions along the railway;

M1.2 analysing the acoustic response from said acoustic sensor portions to detect a signature indicative of a train having separated,

M1.3 wherein said detecting said signature comprises detecting a first acoustic event associated with a first part of a first train and a second acoustic event

associated with a second different part of the first train and

M1.4 detecting that the separation between the first acoustic event and second acoustic event is beyond a threshold.

### 3.2 Closest prior art

It was common ground in oral proceedings that E1 represented the closest prior art since it related to train separation detection and thus disclosed feature M1 on page 10, lines 13 and 14.

The appellant argued that E1 was not only related to the use of fibre optic hydrophony for detecting train separation but also disclosed using DAS. The appellant relied on the passages on page 1, lines 12 to 13, page 2, lines 2 to 9 and 15 to 23, and page 3, lines 11 to 13 which, according to it, disclose using fibre optic hydrophony or DAS indifferently.

However, the board agrees with the respondent that the passage on page 2, lines 3 to 9 clearly discloses that fibre optic hydrophony is used since the fibre optic cable is described as being turned into a series of microphones, i.e. sounds receivers are created at locations along the fibre, whereas DAS creates sensors with longitudinal portions of the fibre. Furthermore, no detection of Rayleigh backscattered radiations is mentioned in this passage. As to the passage on page 2, lines 15 to 24, the board considers that the disclosure of using dark fibres, i.e. fibres not used in normal operation of the railway, as acoustic transducers is not a disclosure of the use of DAS since the detection of Rayleigh backscattered radiations is not mentioned in this passage.

Moreover, E1 refers in numerous passages to fibre optic hydrophony (see page 1, line 14; page 2, lines 23 to 24; page 4, line 16; page 5, lines 23 to 30; page 8, lines 3 to 5, 25 to 27 and 31 to 32; page 10, lines 6 to 8; page 11, lines 15 to 17) whereas DAS is not referred to. The only alternative to fibre optic hydrophony that the description mentions is the use of microphones (see page 11, lines 15 to 17).

For these reasons, the board holds that E1 does not disclose using DAS for train separation detection.

- 3.3 Since feature M1.1 clearly defines that the technology used to measure the effect of acoustic waves on the optical fibre is DAS and not fibre optic hydrophony as in E1, this feature is not disclosed in E1.

As a consequence, features M1.2, M1.3 and M1.4 are also not disclosed in E1 since they build on a different acoustic response than in E1. Thus, the board agrees with the respondent that the signature detected using fibre optic hydrophony in E1 is fundamentally different from the signature detected using DAS in claim 1. The use of the DAS technology enables building acoustic sensor portions of a certain length along the fibre after the optical fibre has been installed along the railway and that the acoustic response from a sensor portion when a train is passing along this portion represents a signature of acoustic amplitude against the length of the fibre, as shown in Figure 3 of the patent. By contrast, the acoustic sensors in the optical fibre of E1 are created before the optical fibre is installed along the railway, and the acoustic response of each sensor of the fibre when a train is passing through its position on the fibre represents a

signature of acoustic amplitude versus time, as shown in Figure 1 of E1, which is used for axle counting.

- 3.4 The differences between the subject-matter of claim 1 and the disclosure of E1 are thus features M1.1 to M1.4.

The board agrees with the respondent that these features, due to the usage of DAS using detection of Rayleigh backscattered radiations, allows sensing from several longitudinal portions of the optical fibre. This enables the measurement of train length at each portion and thus a more rapid detection of train separation based on the comparison of the train length with a threshold.

The objective technical problem can thus be formulated as how to achieve a more rapid detection of a train separation.

- 3.5 The appellant further relied during the oral proceeding on documents E7, Q10 and E6.

E7 discloses a system for measuring train length and train separation (see paragraph [0010]). It teaches the use of trackside radars to determine the distance between the front and rear ends of a train (see paragraph [0005]), the radars being used to replace existing trackside sensors (see paragraph [0008]). Starting from E1 and faced with the objective technical problem, the skilled person could thus have considered E7. However, as argued by the respondent, the teaching of E7 would only lead the skilled person to replace the fibre optic hydrophony system of E1 with the radar system of E7, without arriving at the subject-matter of claim 1, which is based on the use of DAS.

The skilled person would not have found in Q10 any relevant teaching since this document does not relate to acoustic sensing but rather to strain sensing using an optical fibre.

E6 discloses a system for detecting a train separation event by knowing the exact locations of the front and rear of the train and determining the distance between them (see paragraph [0006]). These locations are measured using GPS receivers at the front and rear ends of the train (see paragraphs [0009] and [0016] and claim 3). Starting from E1 and faced with the objective technical problem, the skilled person could thus have considered E6. However, as argued by the respondent, the teaching of E6 would only lead the skilled person to replace the fibre optic hydrophony system of E1 with the GPS-based system of E6, without arriving at the subject-matter of claim 1, which is based on the use of DAS.

- 3.6 For these reasons, the board holds that the subject-matter of claim 1 involves an inventive step (Article 56 EPC) having regard to E1, either alone or in combination with E7, Q10 or E6. Independent claims 13 and 14 contain the same features as method claim 1 but expressed in terms of a computer program and a system, respectively. Therefore, independent claims 13 and 14 also meet the requirements of Article 56 EPC. Claims 2 to 12 and 15 are dependent claims and, as such, also meet the requirements of Article 56 EPC.

4. Conclusion

The grounds for opposition under Article 100(a) EPC do not prejudice the maintenance of the patent as amended during the opposition proceedings (main request).

**Order**

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

The appeal is dismissed.

The Registrar:

The Chair:



K. Götz-Wein

A. Ritzka

Decision electronically authenticated