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**Datasheet for the decision
of 30 November 2021**

Case Number: T 0582/18 - 3.2.05

Application Number: 13175585.2

Publication Number: 2685150

IPC: F16P3/14, G01S17/02, G05B19/18

Language of the proceedings: EN

Title of invention:
Monitoring system and method

Patent Proprietor:
Wide Automation S.r.l.

Opponent:
SICK AG

Relevant legal provisions:
RPBA Art. 12(4)
RPBA 2020 Art. 13(2)
EPC Art. 54(2), 100(a), 107 sentence 2

Keyword:
Late-filed evidence - admitted (yes)
Novelty - document made available to the public (yes)
Novelty - main request (no)
Prohibition of reformatio in peius - auxiliary request 1 (yes)

Decisions cited:

G 0004/93, T 0151/99, T 0538/09

Catchword:

Public availability of a master's thesis, see point 3.1 of the reasons.



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Case Number: T 0582/18 - 3.2.05

D E C I S I O N
of Technical Board of Appeal 3.2.05
of 30 November 2021

Appellant: Wide Automation S.r.l.
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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
13 December 2017 concerning maintenance of the
European Patent No. 2685150 in amended form.**

Composition of the Board:

Chairman P. Lanz
Members: M. Holz
T. Karamanli

Summary of Facts and Submissions

- I. The patent proprietor and the opponent lodged respective appeals against the interlocutory decision of the opposition division finding that European patent No. 2 685 150 (hereinafter: the "patent"), as amended according to auxiliary request 2, and the invention to which it related met the requirements of the European Patent Convention (EPC).
- II. A summons to oral proceedings before the board was issued on 27 January 2021.
- III. In a communication pursuant to Article 15(1) RPBA 2020 issued on 20 September 2021, the board expressed its preliminary opinion on the case.
- IV. Oral proceedings before the board were held on 30 November 2021 via videoconference.

During the oral proceedings, the opponent withdrew its appeal.

V. Requests

The appellant (patent proprietor) requested that the decision under appeal be set aside and that the patent be maintained as granted (main request) or, as an auxiliary measure, that the decision under appeal be set aside and that the patent be maintained as amended on the basis of the claims according to auxiliary request 1 filed as auxiliary request 2 with its statement of grounds of appeal dated 23 April 2018.

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

VI. Of the documents cited during the opposition proceedings, the following are relevant for this decision:

D2: "Intelligent Monitoring of Assembly Operations",
Master Thesis by Peter Anderson-Sprecher, The
Robotics Institute, Carnegie Mellon University,
Pittsburgh, Pennsylvania, June 2011

D12: screenshot of dblp webpage listing publications of
Peter Anderson-Sprecher

The following documents were cited during the appeal proceedings:

D2a1: screenshot of webpage entitled "Publications",
The Robotics Institute, Carnegie Mellon University,
printed on 15 February 2018

D2a2: screenshot of webpage entitled "Intelligent
Monitoring of Assembly Operations", The Robotics
Institute, Carnegie Mellon University, printed on
15 February 2018

D2a3: "Voxel-Based Motion Bounding and Workspace
Estimation for Robotic Manipulators" by Peter
Anderson-Sprecher and Reid Simmons

D2a4: screenshot of webpage of IEEE.org, "Voxel-based
motion bounding and workspace estimation for
robotic manipulators", "Abstract", printed on
16 February 2018

D2a5: screenshot of webpage of IEEE.org, "Voxel-based
motion bounding and workspace estimation for
robotic manipulators", "References", printed on
15 February 2018

D15: screenshot of webpage of Technische Universität München, "Hochschulschriften"

VII. Claim 1 as granted reads as follows (the feature references used by the board are indicated in square brackets):

"1. **[1.1]** A system for monitoring an area (A) close to a processing machine (M), **[1.2]** with the machine (M) having at least one movable operating head (2) in the area (A) or close to it, comprising **[1.3]** a first pair (C1) of video cameras (T1, T2) positioned, in use, in a predetermined reciprocal position for acquiring 3-dimensional images of the area (A), characterised in that, the system further comprises, in combination: **[1.4]** a second pair (C2) of video cameras (T3, T4), positioned, in use, in a predetermined reciprocal position for taking 3-dimensional images of the area (A) from a different angle relative to the first pair (C1) of video cameras (T2, T3); **[1.5]** processing means (3), connected to the video cameras (T1, T2, T3, T4) of the first and second pair for receiving the images and configured for: **[1.6]** a) analysing, in combination, the images of the video cameras (T1, T2) of the first pair and analysing, in combination, the images of the video cameras (T3, T4) of the second pair for identifying the presence of an object in the area (A); **[1.7]** b) acquiring a position of the operating head (2) in the area (A); **[1.8]** c) providing a signal (SA) for stopping the machine (M) as a function of the relative position of the operating head (2) with respect to the object detected in the area (A)."

The patent as granted further contains an independent claim directed to a method for monitoring an area (A) close to a processing machine (M).

VIII. The parties' arguments, in so far as they are relevant for this decision, may be summarised as follows:

(a) Claim interpretation

The parties took different views on how the term "area" used in claim 1 would be construed by the skilled person.

(i) Opponent

In view of the stereoscopic, 3-dimensional detection principle and the explicit reference to 3-dimensional images in features 1.3 and 1.4, the term "area" described a spatial region. Therefore, there would be no need to consult the description of the patent. The skilled person would furthermore not have used the original Italian text as a basis for interpreting the claims. According to Article 70(2) EPC, the original Italian text represented the authentic text of the application as filed. However, the binding version of the text of the patent was that in the language of the proceedings, which was English. In addition, the fourth definition indicated in the Merriam Webster dictionary for the term "area" began with "*a particular extent of space or surface*" and thus explicitly mentioned the term "space". The English terms "extension" and "perimeter" did not provide any incentive to attribute a different meaning to the term "area", since a spatial region also had an extension and a boundary.

Moreover, even if it could be shown that the term "area" may also be understood as a 2-dimensional region, as suggested by the patent proprietor, there was no indication that this was the only correct claim interpretation.

(ii) Patent proprietor

An area was a 2-dimensional flat portion of a surface. From the wording of granted claim 1, it was clear that the system defined therein should be used for the monitoring of a flat area and not for monitoring a space. According to settled case law, terms used in a patent document should be given their normal meaning in the relevant art, unless the description gives the terms a special meaning. The application on which the patent was based had originally been filed in Italian. Therefore, by virtue of Article 70(2) EPC, the Italian text had to be considered the authentic text. Hence, even if the language of the proceedings was English, the Italian text was the authentic text to be used for the understanding and interpretation of the disclosure of the originally filed application text. Consequently, for the claim interpretation, the normal meaning of the Italian term "area" used in the originally filed application was relevant. As was apparent from an Italian dictionary, the skilled person would understand the Italian term "area" as a (2-dimensional) surface region. According to the Merriam Webster dictionary, in English too an "area" was primarily defined as "*the surface included within a set of lines*".

Moreover, paragraph [0014] of the patent read: "*It should be noted that the area A has, preferably, a predetermined extension.*" The term "extension" corresponded to the Italian term "estensione", which,

according to an Italian dictionary, was defined as a "*dimensione in lunghezza e in larghezza*", which translated to English as "*dimension seen in length and width*". Since a 3-dimensional space was not only defined by its length and width, but in particular also by its height, the cited passage confirmed the understanding of the term "area" as being a "*predetermined portion of a surface*" having a predefined length and width.

Reference was also made to paragraph [0054] of the patent which reads:

"The initial calibration step comprises applying 'markers' on the perimeter of the area and taking images of the markers so that the system can analyse the images and identify the area A to be monitored."

If the term "area" was to be understood as a 3-dimensional space, the markers would have to define not only the predetermined base of the space, but also its height. In the patent, however, there was no indication that the markers defined a specific, predetermined height. Moreover, according to paragraph [0054], the markers were arranged at the "*perimeter of the area*". This term was a direct translation of the relevant Italian expression "*perimetro dell'area*", which, according to an Italian dictionary, was defined as "*il contorno di una superficie piana, e la misura di esso*", which was in English "*the outline of a flat surface, and the extent of it*". By definition, a perimeter was a path that surrounded a 2-dimensional shape (see <https://en.wikipedia.org/wiki/Perimeter>).

Moreover, the claim feature "*acquiring 3-dimensional images of the area (A)*" did not predefine the term "area" as being a 3-dimensional space. Instead, the skilled person would understand this feature as "*acquiring a 3-dimensional image of the space above the flat area A together with a view of the flat area A*". There was furthermore not a single mention of an example of generating a 3-dimensional model or volume of the objects or the operating head given in the patent. Instead, features 1.6 and 1.7 of claim 1 would be interpreted by the skilled person as a projection of the position of the objects captured in the 3-dimensional images into the flat predetermined area A.

(b) Claim 1 as granted: novelty over document D2

The parties were of different opinions on whether document D2 belonged to the state of the art under Article 54(2) EPC and whether the subject-matter of granted claim 1 was new over document D2.

(i) Opponent

Document D2 as state of the art

Document D2 belonged to the state of the art under Article 54(2) EPC.

The publication date of document D2 had been contested for the first time during the oral proceedings before the opposition division, which had been too late. This should therefore not have been admitted.

The screenshot D2a1 showed that publications of the Robotics Institute of Carnegie Mellon University were

made available on the website www.ri.cmu.edu/pubs/. Since the webpage shown in document D2a1 allowed the filter option "Master's Thesis", this necessarily implied that master's theses were envisaged for publication. The website further included a webpage (see screenshot D2a2) relating to document D2. The statement "*This material is presented to ensure timely dissemination of scholarly and technical work*", included in the section "copyright notice" of document D2a2, negated a policy of confidentiality. While the screenshot D2a2 was taken in 2018, it was an indication that the described practice was also in place in the year 2011, particularly since the master's thesis of 2011 was cited in the screenshot.

While documents D2a1 and D2a2 stated the number CMU-RI-TR-12-03, which was different from the number CMU-RI-TR-02-03 stated on the first page of document D2, it was likely that this was a mistake in documents D2a1 and D2a2. By following the links provided on the webpages shown in documents D2a1 and D2a2, document D2 was obtained. Moreover, it was unlikely that the same author Peter Anderson-Sprecher expressly mentioned in documents D2a1 and D2a2 had written two master's theses with the same title and carrying the same date of June 2011, but having different numbers. Therefore, it was beyond doubt that documents D2a1 and D2a2 referred to document D2.

While the screenshots D2a1 and D2a2 were taken in the year 2018, i.e. after the priority date of the patent, the indication of the publication year 2011 for the master's thesis of Peter Anderson-Sprecher in these screenshots showed that document D2 had been made publicly available in the year 2011. Generally, one could assume that a master's student would be eager to

share his or her thesis as soon as possible and would not wait several years before uploading it. Although there was thus still a theoretical possibility that document D2 was not available in 2011, the balance of probabilities spoke against this possibility.

In a further aspect, the first catchword of decision T 151/99 mentioned that it would appear highly plausible that a master's thesis was not confidential. Except for the mere assertion of a theoretical possibility, nothing had been provided to contradict this assumption.

In addition, again according to the catchword of decision T 151/99, the high probability become a virtual certainty if the paper was referred to in a document published before the priority date of the patent in suit. This finding also applied to document D2, since document D2a3 cited document D2 as a reference (see reference [3]). The fact that document D2a3 was published before the priority date of the patent was shown by documents D2a4 and D2a5. It would furthermore have been against well-established citation rules to cite, in a conference paper such as document D2a3, a document (here: document D2) that was not publicly available. Citing a non-public document would not have been useful to the reader of document D2a3 and would furthermore have been counterproductive if confidentiality of the cited document (here: document D2) was intended. Therefore, the fact that document D2 was cited in document D2a3 demonstrated that document D2 was publicly available at the time at which document D2a3 was published.

The term "novel" in the abstract of document D2a3 was furthermore only used as a catchword to attract

attention. It was not to be understood as implying that the described method was not included in the reference [3] cited in document D2a3. Rather, it seemed that the conference at which document D2a3 was presented was the first opportunity for the author of document D2 to present the results of his research to a wider audience.

Document D15, in contrast, only referred to the practice at Technische Universität München and thus did not allow any conclusions to be drawn regarding the practice at Carnegie Mellon University, at which institution the master's thesis D2 was submitted. Moreover, document D15 indicated that master's theses, even if often not published, could be found in institute libraries. In the present case, it was furthermore not disputed that document D2 was publicly available.

Moreover, T 538/09 held, in point 8 of the reasons, that library services may be considered a reliable source of information about publications. This finding also applied to document D2a2, which included information on the publication of document D2. According to point 9.1 of the reasons of T 538/09, a later pre-published paper was discussed during a symposium that cited the master's thesis and was written by the same author. In this constellation, the board in T 538/09 came to the conclusion that it was highly likely that interested readers of the paper had access to the master's thesis.

Hence, it could be concluded that document D2 had been made available to the public before the priority date of the patent and thus forms part of the state of the art.

Novelty over document D2

Document D2 disclosed all features of granted claim 1. The environment described in document D2 in which the robot operated corresponded to an area in the sense of feature 1.1. Regarding feature 1.6, document D2 described object detection based on image data (see page 6).

Document D2 explicitly referred to two Tyzx G3 EVS stereo cameras (see the first paragraph of section 1.3 on page 4). It was implicit that a stereo camera included two video cameras and electronics to evaluate the data from the two video cameras. Document D2 furthermore described (see the last sentence of the first paragraph of section 3.4 on page 17) that all sensors were oriented towards the centre of the environment. This implied that the two stereo cameras monitored the same area.

Feature 1.7 furthermore only required that the position of the operating head was acquired, but was not limited as to the way in which the position was acquired and furthermore did not require a projection. From Figure 1.2 on page 2 and from section 1.1 on page 1 of document D2, it was evident that the positions of the robots and the persons were acquired. In this regard, the "position" mentioned in feature 1.7 could also be a future position of the operating head. Even if this might not be the case in embodiments described in the patent (see e.g. paragraph [0029]), limitations indicated only in the description should not be read into the claim.

Furthermore, feature 1.8 did not require that the positions of the operating head and the object were determined based on the 3-dimensional images. A safety measure taken in accordance with the relative position of the robot and a person was unambiguously derivable from Figure 1.2 of document D2.

Hence, the subject-matter of granted claim 1 was not new over document D2.

(ii) Patent proprietor

Document D2 as state of the art

There was no basis for the assumption that document D2, being a master's thesis, was published before the priority date of the patent. Document D2 mentioned on its front page a single date, namely June 2011, which was obviously the finishing date of the master's thesis. Contrary to the world-wide obligation to publish a doctoral thesis, there was no obligation to publish a master's thesis, as was also demonstrated by document D15. As stated in document D15, master's theses are often not published.

Documents D2a1 to D2a5 should not be admitted into the appeal proceedings. These documents were late-filed, since they had not been filed by the opponent in the opposition proceedings in due time in order to support its position. Document D2 had been filed at the beginning of the opposition proceedings and documents D2a1 to D2a5 could thus have been filed at an earlier stage. Since document D2 was not a patent publication or a scientific article, the opponent had had the burden of proof from the outset of the

opposition proceedings that document D2 was publicly available prior art.

According to the principles of equitability and fairness, if documents D2a1 to D2a5 were to be admitted in the proceedings, document D12 should be too. Document D12 showed a list of publications by the author of document D2, Peter Andersen-Sprecher, in the years 2011 and 2012. Document D2 was not mentioned as a publication, although one could assume that the master's thesis should at least be mentioned in such a list.

Moreover, the master's thesis of Peter Andersen-Sprecher could be downloaded from the Carnegie Mellon University's homepage as a pdf file. However, the creation date of that pdf file was 23 February 2012, which was later than the date indicated on the first page of document D2, namely June 2011.

Furthermore, document D2a3 did not carry any publication date and also made no reference to Peter Anderson-Sprecher's master's thesis (document D2), but rather referred, in the reference list under item [3], to a technical report by Peter Anderson-Sprecher having the same title. This reference, however, mentioned a document having the number CMU-RI-TR-02-03, while Peter Anderson-Sprecher's master's thesis carried the number CMU-RI-TR-12-03, as was shown e.g. by document D2a1.

It was furthermore not true that, if reference was made to a document in another document, it could be assumed that the document to which reference was made was available to the public without any confidentiality restrictions. In addition, the findings in decision T 151/99 cited by the opponent were not applicable to

document D2. In document D2a3, the author, Peter Anderson-Sprecher, referred to his own document. In contrast, the scientific document D3 in case T 151/99 referred to a master's thesis D1 by a different author, so that the author of document D3 could only have become aware of the contents of document D1 if document D1 had been accessible to him without any non-disclosure obligation. The circumstances of document D2a3, in which Peter Anderson-Sprecher cited himself, were therefore different from the factual circumstances in T 151/99.

In the abstract of document D2a3, it was furthermore stressed that a "novel" method for creating a reachability grid was proposed in that document. This would not have been true if this method had already been made publicly available beforehand. Hence, the assumption that document D2 was publicly available before document D2a3 would be in contradiction to this statement in document D2a3.

Moreover, the copyright notice shown in the screenshot D2a1 did not imply that the same practice was already followed in 2011, since the screenshot was only taken in the year 2018.

In a written submission dated 29 October 2021, the patent proprietor further argued that when the link at which a copy of document D2 could be downloaded (<https://www.ri.cmu.edu/publications/intelligent-monitoring-of-assembly-operations/>) was entered on Google, the Google date was 13 September 2017, which was later than June 2011 and later than the priority date of the patent in suit. Furthermore, at Carnegie Mellon University there was a "publication submission form" procedure, which indicated that Carnegie Mellon

University requested the consent of the author for publication of a work inside its webspace. These findings were a further confirmation that the date indicated on document D2, namely June 2011, could not be assumed to be the publication date. In contrast, it was not known how and when the master's thesis D2 was made available to the public without confidentiality.

Furthermore, the opponent's reference to decision T 538/09 should not be admitted into the appeal proceedings since it had been filed too late. Moreover, in T 538/09, the master's thesis was cited several times before the relevant date of the patent. The decision was thus not only based on the finding that the master's thesis was present in a library. Moreover, even if the contents of the screenshots D2a1 and D2a2 were to be found reliable in view of T 538/09, they showed the situation in the year 2018.

Novelty over document D2

Even if document D2 were to be assumed to belong to the state of the art, granted claim 1 was not anticipated by document D2.

Document D2 disclosed a monitoring system for monitoring a 3-dimensional room, but not an area as claimed in feature 1.1.

Moreover, features 1.3 and 1.4 required that there was an overlapping area that was monitored by both of the two pairs of video cameras. However, this was not the case in document D2. Rather, according to page 4 of document D2, a region was monitored by two different kinds of sensors. Hence, features 1.3 and 1.4 were not

disclosed in document D2. In addition, since there was no overlap between the regions monitored by two pairs of video cameras, document D2 did not disclose an "area" in the sense of claim 1, such that features 1.7 and 1.8 too were not disclosed in document D2 for this reason alone.

In document D2, a reachability grid was determined that described the future position of the operating machine (robot). In contrast, the skilled person would understand that feature 1.7 referred to the current position of the operating head and not to a future target position as in document D2. It was also apparent from paragraph [0029] of the patent that, in feature 1.7, the actual current position was meant. Moreover, in document D2, the reachability grid was determined based on the programmed moving paths and not on the basis of the 3-dimensional image in the working space as required by claim 1.

Furthermore, in document D2, the relative position of the operating machine (robot) with respect to the position of a person within the working space was determined by comparing the artificial "danger zone", which was based on the preprogrammed moving path, with the actual position of the person within the working space on the basis of the 3-dimensional images. Contrary to this, in claim 1, the position of the operating head as well as the position of the object were both based on the actual 3-dimensional images.

Feature 1.6 further required that the images from the first and a second pair of video cameras were analysed separately and that, in a subsequent step, the presence of an object was detected. In document D2, however, images from all sensors were taken, but no separate

analysis of the images from the first and second set of cameras took place before the resulting data were merged.

Consequently, document D2 did not disclose the combination of features 1.1, 1.3, 1.4, 1.6, 1.7 and 1.8 of granted claim 1.

(c) Auxiliary request 1

(i) Opponent

The opponent raised objections against auxiliary request 1 under the provisions of Articles 52(1), 54(2) and 56 EPC (novelty and inventive step).

(ii) Patent proprietor

The patent proprietor provided arguments as to why auxiliary request 1 fulfilled the requirements of Articles 52(1), 54(2) and 56 EPC.

Reasons for the Decision

1. Interpretation of the term "area"

The parties disagree about the interpretation of the term "area" used in the claims. The patent proprietor defines an area as a 2-dimensional flat portion of a surface while, according to the opponent, a spatial region can (at least also) be considered an area in the sense of the claims.

As also pointed out by the patent proprietor, according to established case law, terms used in a patent

document should be given their normal meaning in the relevant art unless the description gives them a special meaning (see Case Law of the Boards of Appeal, 9th Edition 2019 - hereinafter: "Case Law" -, II.A. 6.3.3). However, for the following reasons, the board does not concur with the patent proprietor's view that this implies that the English term "area" used in granted claim 1 must be interpreted in the sense of the Italian term "area" used in the application as originally filed.

The European patent application on which the patent is based was originally filed in Italian and, in accordance with Article 14(2) EPC, a translation in English, i.e. in one of the official languages of the EPO, was subsequently filed. Therefore, by virtue of Article 70(2) EPC, the originally filed Italian text is the "application as filed" within the meaning of the EPC. This means that with regard to the question as to whether the subject-matter of the European patent application or the European patent in the language of the proceedings, i.e. English, goes beyond the content of the application as filed, the originally filed version of the application in Italian is relevant.

However, the provisions of Article 70(2) EPC are not relevant to the present discussion of whether the claims of the granted patent fulfil the respective requirements of the EPC regarding novelty. Rather, Article 70(1) EPC applies in this regard, according to which the text of a European patent application or a European patent in the language of the proceedings is the authentic text in any proceedings before the EPO. Therefore, in the present case, the authentic text of the patent (including its claims) is the text of the patent in the language of the proceedings, i.e. in

English. The correct application of the above case law does not lead to a different conclusion. For the assessment of novelty regarding the subject-matter of a granted claim, the "patent document" mentioned in this case law is the granted patent, rather than the application as filed.

Therefore, the normal meaning of the terms used in the original Italian text of the application is not of importance for the case in hand.

Moreover, the pertinent point is not whether the term "area" can (also) designate a (2-dimensional) surface region, but rather whether the skilled person would, in the context of the claims, consider a (3-dimensional) spatial region to fall under the definition of the term "area". The latter question is of relevance when assessing whether a 3-dimensional spatial region disclosed in the prior art can be considered an area in the sense of claim 1.

In this regard, the opponent's observation that the fourth definition indicated in the Merriam Webster dictionary for the term "area" begins with "*a particular extent of space or surface*" is of relevance. This definition is further in line with the entry for the term "area" in the Oxford English dictionary, section I.5.a., reading "*A region or space with definite boundaries or defined extent*", or section I.10., reading "*A part or region of space, the sky, etc.*".

Consequently, the board is satisfied that the skilled person generally considers that a (3-dimensional) spatial region falls under the definition of the term "area" in granted claim 1.

Based on the following considerations, the description of the patent too does not rule out the possibility that the term "area" can designate a spatial region.

To begin with, the description does not contain an explicit definition of the term "area".

Moreover, the passages in paragraphs [0014] and [0054] cited by the patent proprietor relate to preferred embodiments. Therefore, even if these passages were found to describe additional restrictions for the area in the specific context of preferred embodiments, this would not be a sufficient reason for reading such restrictions into independent claim 1 (see also "Case Law", II.A.6.3.4).

Moreover, the cited passages of the description also do not suggest a restricted definition of the term "area" as a 2-dimensional surface region. In particular, the term "extension" used in paragraph [0014] of the patent description cited by the patent proprietor, can, according to the Oxford English Dictionary, mean, e.g., "*The amount of space throughout which anything extends; size, extent*", "*The property of being extended or of occupying space; spatial magnitude*" and "*An extended body or space*". Hence, the definition that the "area" can have an "extension" also does not exclude the possibility that a spatial region can constitute an "area".

Similarly, the expression "*perimeter of the area*", used in paragraph [0054] of the patent description, does not require the area to be 2-dimensional. According to section 1.a. of the entry for "perimeter" in the Oxford English Dictionary, this term can mean, e.g., "A

continuous line forming the boundary of a closed geometrical figure or of any area or surface; a circumference; a periphery, outline". Therefore, 3-dimensional spatial regions too, such as e.g. a sphere, can have a perimeter in the sense of a circumference or a periphery.

Hence, the description of the patent too does not exclude the possibility that an "area" in the sense of the claims can be a spatial region.

In summary, the board is satisfied that claim 1 allows an interpretation in which the term "area" designates a (3-dimensional) spatial region.

2. Admittance of late-filed submissions

Some pieces of evidence were submitted for the first time during the appeal proceedings or were filed during the oral proceedings before the opposition division but not admitted into the proceedings by the opposition division.

In the present case, the statements of grounds of appeal filed by each party were filed before 1 January 2020. Thus, in accordance with Article 25(2) of the Rules of Procedure of the Boards of Appeal of the European Patent Office as applicable from 1 January 2020 (RPBA 2020, see OJ EPO 2021, A35), Article 12(4) to (6) RPBA 2020 does not apply. Instead, Article 12(4) of the Rules of Procedure of the Boards of Appeal of the European Patent Office as amended in 2007 (RPBA 2007, see OJ EPO 2007, 536 ff) continues to apply. According to Article 12(4) RPBA 2007, the board has the power to hold inadmissible facts, evidence or requests

which could have been presented or were not admitted in the first-instance proceedings.

2.1 *Document D12*

Document D12 was submitted by the patent proprietor during the oral proceedings before the opposition division in order to support its view that document D2 had not been made available to the public before the priority date of the patent (see point 18 of the minutes of the oral proceedings before the opposition division). The opposition division decided not to admit document D12 into the proceedings "*because it was not found prima facie relevant for assessing the publication date of D2*" (see section 2 of the reasons for the decision). The patent proprietor submitted document D12 again with its statement of grounds of appeal and requested that this document be admitted into the appeal proceedings.

It is established case law (see "Case Law", V.A.3.5.1 b)) that, on appeal against a decision taken by a department of first instance in exercise of its discretion, it is not the task of the board to review all the facts and circumstances of the case as if it were in that department's place and to decide whether or not it would have exercised discretion in the same way. The board should overrule the way in which the department of first instance exercised its discretion in reaching a decision in a particular case only if the board concludes that the department of first instance did so in accordance with the wrong principles, without taking the right principles into account or in an arbitrary or unreasonable way, thereby exceeding the proper limits of its discretion.

The patent proprietor has not submitted any arguments in this regard. Moreover, the board cannot see that the opposition division, in deciding not to admit document D12 into the proceedings, exercised its discretion under Article 114(2) EPC in accordance with the wrong principles, without taking the right principles into account or in an arbitrary or unreasonable way. According to established case law, a decisive criterion for admitting late-filed documents in opposition proceedings is their *prima facie* relevance (see also "Case Law", IV.C.4.5.3), such that the opposition division reached its decision by applying the right principles. The board therefore does not see any reason to overrule the opposition division's decision not to admit document D12 into the proceedings.

However, the board furthermore has its own discretion under Article 12(4) RPBA 2007 to admit on appeal facts and evidence not admitted at first instance (see also "Case Law", V.A.3.5.3). In this regard, the board notes that document D12 was cited to show that document D2 did not form part of the state of the art under Article 54(2) EPC. The question of whether document D2 is state of the art was already raised in the opposition proceedings and is furthermore highly relevant for the assessment of whether a ground for opposition under Article 100(a) EPC prejudices the maintenance of the patent.

Document D12 is a screenshot from the website of the "dblp computer science bibliography" which allegedly shows a list of publications by Peter Anderson-Sprecher, the author of document D2, from the years 2011 and 2012. Document D2, however, is not mentioned in this list. This finding seems *prima facie* relevant

for the above-mentioned discussion as to whether document D2 forms part of the state of the art.

The board was therefore satisfied that document D12 is *prima facie* relevant for the outcome of the appeal and thus exercised its discretionary power under Article 12(4) RPBA 2007 in admitting document D12 into the appeal proceedings.

2.2 *Documents D2a1 to D2a5*

Documents D2a1 to D2a5 were submitted by the opponent for the first time with its statement of grounds of appeal to support its view that document D2 belonged to the state of the art.

The patent proprietor contested that document D2 had been made available to the public before the priority date of the patent for the first time during the oral proceedings before the opposition division (see e.g. point 18 of the minutes of the oral proceedings before the opposition division). However, the opposition division concurred with the opponent's view that document D2 represented prior art under Article 54(2) EPC (see section 26 of the minutes of the oral proceedings before the opposition division).

Therefore, the board is satisfied that there were no compelling reasons for the opponent to file, during the first-instance proceedings, any documents supporting the public availability of document D2 before the patent's priority date.

The board therefore has no discretionary power under Article 12(4) RPBA 2007 not to admit documents D2a1 to D2a5 into the appeal proceedings.

2.3 *Document D15*

Document D15 was submitted by the patent proprietor for the first time with its reply to the opponent's appeal. The patent proprietor refers to document D15 to support its view that a master's thesis is often not published, thereby disputing the finding that it would appear a *priori* highly plausible that papers submitted to obtain an academic degree are not confidential, as set out in decision T 151/99.

The board considers the filing of document D15 to be occasioned by the opponent's reference to decision T 151/99, cited for the first time in the opponent's statement of grounds of appeal (see section 3. a) thereof). The patent proprietor's reply was therefore the first opportunity to counter the opponent's line of argument in this regard.

The board therefore has no discretionary power under Article 12(4) RPBA 2007 not to admit document D15 into the appeal proceedings.

2.4 *Screenshots in patent proprietor's written submissions*

The board notes that, in several instances, the patent proprietor embedded screenshots (e.g. of webpages) in the text of its written submissions, apparently with the intention to provide additional evidence supporting its arguments.

In its statement of grounds of appeal, on pages 19 and 20, the patent proprietor provided two screenshots regarding an alleged publication of the master's thesis of Peter Anderson-Sprecher on the website of the

Robotics Institute of Carnegie Mellon University. The first screenshot (on page 19) appears to refer to the same webpage as document D2a2 provided by the opponent. The second screenshot (on page 20) was provided by the patent proprietor to show that the pdf file downloadable from the website of the Robotics Institute via the webpage shown in the first screenshot (on page 19) was created on 23 February 2012, i.e. after June 2011. These screenshots therefore relate to the question of public availability of document D2. Since this question is of high importance for the outcome of the appeal and was already discussed in the opposition proceedings, and since the answer to this question is not *prima facie* evident, the board is satisfied that these screenshots are *prima facie* relevant for the outcome of the appeal.

The board, exercising its discretion under Article 12(4) RPBA 2007, therefore admitted these screenshots into the proceedings.

In point 4 of its submission of 29 October 2021, the patent proprietor provided further screenshots to support its view that document D2 could not be considered to form part of the state of the art for the patent. For the admittance of these screenshots into the appeal proceedings, Article 13(2) RPBA 2020 applies in accordance with Article 25(1) and (3) RPBA 2020. The board notes that the preliminary assessment, given in its communication under Article 15(1) RPBA 2020, of the question as to whether document D2 formed part of the state of the art was based on the parties' submissions but also contained the board's own, more in-depth considerations. Moreover, this question is of high importance for the outcome of the appeal, and the answer to this question is *prima facie* not evident. In

addition, the opponent did not contest admittance of these screenshots into the appeal proceedings. The board is therefore satisfied that there are exceptional circumstances which have been justified with cogent reasons.

The board therefore decided to admit into the appeal proceedings the screenshots included in point 4 of the patent proprietor's submission of 29 October 2021 under the provisions of Article 13(2) RPBA 2020.

2.5 *Reference to decision T 538/09*

The patent proprietor requests that the decision T 538/09 not be considered, since it was cited by the opponent for the first time in its written submission of 18 October 2021 and was thus late-filed.

However, the board considers the opponent's reference to decision T 538/09 to be a legal argument in support of its previously held view. This reference does not introduce new facts or evidence. Submissions of a party which concern only the interpretation of the law are generally not considered to constitute an amendment of the party's appeal case within the meaning of Articles 12(4) and 13 RPBA 2020 (see OJ EPO 2020, Supplementary publication 2, explanatory remarks regarding Article 12(4) RPBA 2020, page 57).

Therefore, the board does not have any discretion when it comes to the admittance of the opponent's legal arguments based on T 538/09.

3. Lack of novelty in view of document D2 (Article 100(a) EPC together with Article 54 EPC)

3.1 *Document D2 as state of the art under Article 54(2) EPC*

The patent proprietor contests that document D2 belongs to the state of the art under Article 54(2) EPC. The opponent, however, is of the opinion that the board should not consider the patent proprietor's challenge because it was submitted for the first time during the oral proceedings before the opposition division.

The board notes that, in the decision under appeal, the opposition division concluded that document D2 was state of the art under Article 54(2) EPC (see section 3 of the reasons for the decision). The board could not find any indication that the patent proprietor's contesting of the public availability of document D2 was not considered by the opposition division. The board is therefore not in a position not to consider the patent proprietor's challenge.

The board further observes that both the patent proprietor and the opponent had equal access to the evidence concerning the question of whether document D2 belongs to the state of the art under Article 54(2) EPC, i.e. whether it was publicly available before the priority date of the patent (9 July 2012). It is established case law that, under these circumstances, the standard of proof of the balance of probabilities is applicable for the board's assessment of the contested issue (see "Case Law", III.G.4.3). To this end, and applying the principle of free evaluation of evidence (see "Case Law", III.G.4.1), the board makes the following observations.

The board notes that the first page of document D2 carries a date of June 2011. It is not stated whether this refers, e.g., to the finishing date (as alleged by the patent proprietor), the date of submission to the thesis committee, or the publication date.

Document D12 is a screenshot of the website of the "dblp computer science bibliography" which allegedly shows a list of publications by Peter Anderson-Sprecher, the author of document D2, from the years 2011 and 2012. Document D2 is not mentioned in this list. However, the patent proprietor has not convincingly shown that it could reasonably be expected that the dblp computer science bibliography generally also included master's theses or technical reports (such as document D2) that were not published in a journal, book, etc. Therefore, the lack of reference to Peter Anderson-Sprecher's master's thesis in document D12 cannot be assumed to imply that this master's thesis has not been made publicly available in some other way.

The screenshots D2a1 and D2a2 provided by the opponent carry a printing date of 15 February 2018, i.e. after the priority date of the patent. Based on this evidence, it can therefore not be assumed that the webpages of the Robotics Institute of Carnegie Mellon University depicted in these screenshots had been made available to the public before the priority date of the patent, i.e. 9 July 2012, and, if so, that they had the same content as they had at the time the screenshots D2a1 and D2a2 were taken, including any links to document D2. In addition, the screenshots provided in the patent proprietor's written submissions (see pages 19 and 20 of its statement of grounds of appeal

and page 8 of the submission of 29 October 2021) suggest that the webpages referring to the master's thesis of the author of document D2, Peter Anderson-Sprecher, may have been updated after the priority date of the patent.

These findings, however, do not exclude the possibility that document D2 had been made available on the website of the Robotics Institute before the priority date of the patent. In addition, the patent proprietor's finding that a pdf file of the master's thesis available from the website contains, in its metadata, a creation date of 23 February 2012, does not seem to allow any conclusions in this regard. In particular, the alleged creation date is still before the priority date of the patent.

Moreover, these findings do not exclude the possibility that document D2 was available to the public by other means, such as, e.g., from the institute library or the university library.

In this regard, it is noted that the board in T 151/99 took the view that it would, in general, appear highly plausible that a paper, such as a master's thesis, submitted in order to obtain an academic degree was not confidential (see the first sentence of catchword of T 151/99).

The patent proprietor argues that this general assumption is incorrect, referring to the screenshot D15 of a webpage of Technische Universität München which states that degree papers (diploma, bachelor's or master's theses) are often not published (*"Abschlussarbeiten (Diplom-, Bachelor- oder Masterarbeiten) werden häufig nicht veröffentlicht,*

[...]"). However, this statement apparently refers to the practice at Technische Universität München and therefore does not prejudice the practice at Carnegie Mellon University. Moreover, the mere fact that a master's thesis has not been published does not imply that it has not been made publicly available by other means (see also "Case Law", I.C.3.2.1 for ways of making information available to the public). In this regard, the screenshot D15 itself seems to suggest that electronic versions of degree papers may, e.g., be searched on mediaTUM or that printed copies may be found in a branch library.

The opponent also referred to the following statement in the screenshot D2a2:

Copyright notice: This material is presented to ensure timely dissemination of scholarly and technical work. Copyright and all rights therein are retained by authors or by other copyright holders. All persons copying this information are expected to adhere to the terms and constraints invoked by each author's copyright. These works may not be reposted without the explicit permission of the copyright holder.

This statement suggests that the master's thesis to which document D2a2 refers had been made public in a timely manner. While the screenshot D2a2 was taken in 2018, in the board's view, "[t]his material" (mentioned in the above citation) refers to the master's thesis of Peter Anderson-Sprecher of 2011 referenced in document D2a2. This finding suggests that this master's thesis was made publicly available shortly after it was finished.

The patent proprietor correctly observed that the number CMU-RI-TR-12-03 stated in the screenshots D2a1

and D2a2 was different from the number CMU-RI-TR-02-03 stated on the first page of document D2. However, since these screenshots refer to a master's thesis of the same author (Peter Anderson-Sprecher) of the same date (June 2011) and with the same title ("Intelligent monitoring of assembly operations") as document D2, the board is satisfied that they refer to the same master's thesis. The board therefore concurs with the opponent's view that the number stated in the screenshots D2a1 and D2a2 is erroneous.

In a further aspect, document D2a3 includes the following reference on the final page:

[3] P. Anderson-Sprecher. Intelligent monitoring of assembly operations. Technical Report CMU-RI-TR-02-03, Robotics Institute, Carnegie Mellon University, June 2011.

The board notes that this reference carries the same author's name, title, number, institution and date as document D2. While this reference does not expressly indicate that it refers to a master's thesis, these details are identical to those stated on the first page of document D2.

Moreover, although document D2a3 does not carry a publication date, it is apparent from document D2a4 that an article of the same title and by the same authors as document D2a3 was presented at a conference which took place on 14 to 18 May 2012, and that the corresponding article was added to IEEE Xplore on 28 June 2012 (see screenshot D2a4). The board is therefore convinced that document D2a3 was available to the public before the priority date of the patent.

The board further notes that document D2a3 does not include any indication that the document CMU-RI-

TI-02-03, cited therein as reference [3], was unpublished or not publicly available. This suggests that the authors of document D2a3 (among them the author of document D2 himself) considered CMU-RI-TI-02-03 to be publicly available at least at the time of publication of document D2a3, i.e. before the priority date of the patent.

The patent proprietor points out that one of the authors of document D2a3 was the author of document D2. The only other author of document D2a3 was furthermore apparently a member of the thesis committee for the master's thesis document D2 (see the first page of document D2). The board shares the patent proprietor's view that, consequently, the public availability of document D2 was not a logical prerequisite for document D2a3 to be written. However, the fact that document D2a3 refers to document CMU-RI-TI-02-03 without indicating that this document was, e.g., unpublished, confidential or not publicly available suggests that the authors of document D2a3 (among them also the author of document D2) considered document D2 to be available to the interested reader of document D2a3.

Moreover, the board does not interpret the word "novel" used in the abstract of document D2a3, cited by the patent proprietor, as referring to novelty in the sense of patent law. The board instead concurs with the opponent that this is a catchword used to attract the attention of the reader and does not imply that the described method was not described in the cited master's thesis of the first author of document D2a3.

In a similar situation, the board in T 151/99 concluded that it would not only appear highly plausible that the

paper submitted to obtain an academic degree is not confidential, but that this becomes a virtual certainty if the paper is referred to in published scientific work. If the reference is in a document published before the priority date of the patent in suit then it can be assumed that said paper was also made available to the public before said date (see catchword of T 151/99).

In T 538/09 (see point 9.1 of the reasons), a research paper published in 1991 had as its first author the author of a master's thesis and also cited this master's thesis. The research paper described the same system as that which had been developed during the research work for the master's degree, showing similar examples of interaction, modelled objects and display results. The features and functionality of the system were presented in detail in the research paper and in the corresponding symposium in 1991. The board in T 538/09 concluded that the master's thesis was most probably made available to interested readers of the research paper in 1991.

In summary, applying the balance of probabilities standard and the principle of free evaluation of evidence, the present board concludes that document D2 was comprised in the state of the art under Article 54(2) EPC.

3.2 *Novelty over document D2*

It is disputed between the parties whether document D2 discloses the combination of features 1.1, 1.3, 1.4, 1.6, 1.7 and 1.8 of granted claim 1.

Based on the above interpretation of the term "area" (see point 1.), the board is satisfied that the (3-dimensional) robotic assembly environment mentioned in the abstract of document D2 can be considered an area in the sense of granted claim 1. The same applies to the (3-dimensional) IMAO test workcell shown in Figure 1.4 on page 4. Document D2 thus shows feature 1.1 of claim 1.

Document D2 further refers to the use of two Tyzx G3 EVS stereo cameras (see the first paragraph of section 1.3 on page 4), as also pointed out by the opponent. The board also concurs with the opponent's view that it is implicit that a stereo camera includes two video cameras. Document D2 further describes (see the last sentence of the first paragraph of section 3.4 on page 17) that all sensors (i.e. including the two stereo cameras) are oriented towards the centre of the environment. Consequently, the two stereo cameras monitor the same area, namely the area surrounding and including the centre of the environment. Features 1.3 and 1.4 are thus disclosed in document D2.

Regarding feature 1.6, it is noted that each of the stereo cameras described in document D2 (see e.g. the first paragraph of section 1.3 on page 4) implicitly analyses the images taken by the two video cameras of the stereo camera to produce a 3-dimensional image, as also submitted by the opponent. The 3-dimensional images are then fused to obtain safety zones around people and other unexpected objects in the environment, as explained in detail in chapter 2 of document D2 (see also Figure 1.3). Thus, feature 1.6 is disclosed in document D2.

Moreover, feature 1.7 of claim 1 does not require a projection of 3-dimensional image data onto a 2-dimensional map. In contrast, a position of the operating head in the area can also be "acquired", e.g., by modelling the operating head's movement as described in chapter 4 of document D2.

Feature 1.7 furthermore does not expressly specify that it is a current position of the operating head that is to be acquired. Even if this was apparent from paragraph [0029] of the patent, the scope of the claim should not be restricted by implying into it features which appear only in the description (see "Case Law", II.A.6.3.4). Consequently, also a modelled future position as in document D2 can be considered a position in the sense of feature 1.7.

However, even if the term "position" were to be understood as a current position, it is further noted that reference is made in the penultimate paragraph of page 1 of document D2 to "gathering position data", which the skilled person in the context of that paragraph would understand as acquiring the current positions of the robots and any people. Hence, document D2 also discloses acquiring a current position of the robot. Feature 1.7 is therefore disclosed in document D2.

Moreover, claim 1 does not specify how the relative position of the operating head with respect to the object detected in the area, cited in feature 1.8, is determined. According, e.g., to the caption of Figure 1.2 of document D2, once the safety zone and the danger zone intersect, the system is no longer safe and the robots must be halted to prevent a possible collision. Such a course of action falls within the

scope of feature 1.8 since the intersection of the safety zone and the danger zone is dependent on the relative position of the robot and the object. Feature 1.8 is thus disclosed in document D2.

Since document D2 discloses all features of granted claim 1 in combination, the subject-matter of granted claim 1 is not new. Hence, the ground for opposition under Article 100(a) EPC together with Article 54 EPC prejudices the maintenance of the patent as granted.

4. Auxiliary request 1

The opponent raised objections against the patent proprietor's auxiliary request 1 under the provisions of Articles 52(1), 54(2) and 56 EPC (novelty and inventive step).

The board notes that the present auxiliary request 1 corresponds to the patent proprietor's former auxiliary request 2 on which the interlocutory decision under appeal maintaining the patent as amended was based.

Moreover, since the opponent withdrew its appeal, it thereby became the respondent and a party to the appeal proceedings as of right, pursuant to Article 107, second sentence, EPC and the patent proprietor is left as the sole appellant.

According to decision G 4/93, if the patent proprietor is the sole appellant against an interlocutory decision maintaining a patent in amended form, neither the board of appeal, nor the non-appealing opponent as a party to the proceedings as of right under Article 107, second sentence, EPC, may challenge the maintenance of the

patent as amended in accordance with the interlocutory decision ("prohibition of *reformatio in peius*").

Applying this principle, the board concludes that, under the present circumstances, the maintenance of the patent as amended in accordance with auxiliary request 1 may not be challenged.

5. Conclusions

Since the ground for opposition under Article 100(a) EPC together with Article 54 EPC prejudices the maintenance of the patent as granted (see point 3. above), and since the maintenance of the patent as amended in accordance with auxiliary request 1 is not to be challenged (see point 4. above), the appeal has to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



N. Schneider

P. Lanz

Decision electronically authenticated