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Datasheet for the decision
of 27 September 2024

Case Number:	T 1491/21 - 3.5.04
Application Number:	15746050.2
Publication Number:	3102908
IPC:	G06T7/521, G06T7/593, G01B11/245
Language of the proceedings:	EN

Title of invention:
STRUCTURED LIGHT MATCHING OF A SET OF CURVES FROM TWO CAMERAS

Patent Proprietor:
Creaform Inc.

Opponents:
Hangzhou Sikan Technology Co., Ltd.
Carl Zeiss Industrielle Messtechnik GmbH

Headword:

Relevant legal provisions:
EPC Art. 100(b), 100(c), 111(1), 108
RPBA 2020 Art. 11
EPC R. 99(2)

Keyword:

Granted patent - sufficiency of disclosure - yes
Granted patent - added subject-matter - no
Remittal - yes

Decisions cited:

T 1404/05, G 0010/91

Catchword:

Beschwerdekammern

Boards of Appeal

Chambres de recours

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Case Number: T 1491/21 - 3.5.04

D E C I S I O N
of Technical Board of Appeal 3.5.04
of 27 September 2024

Appellant: (Patent Proprietor)	Creaform Inc. 4700 de la Pascaline Street Lévis, QC G6W 0L9 (CA)
Representative:	Dehns St. Bride's House 10 Salisbury Square London EC4Y 8JD (GB)
Respondent: (Opponent 1)	Hangzhou Sikan Technology Co., Ltd. No. 12 South Building, No. 998 West Wen Yi Road Hangzhou Zhejiang (CN)
Representative:	Lang, Johannes Bardehle Pagenberg Partnerschaft mbB Patentanwälte, Rechtsanwälte Prinzregentenplatz 7 81675 München (DE)
Respondent: (Opponent 2)	Carl Zeiss Industrielle Messtechnik GmbH Carl Zeiss Strasse 22 73447 Oberkochen (DE)
Representative:	Behr, Wolfgang Lorenz Seidler Gossel Rechtsanwälte Patentanwälte Partnerschaft mbB Widenmayerstraße 23 80538 München (DE)
Decision under appeal:	Decision of the Opposition Division of the European Patent Office posted on 22 June 2021 revoking European patent No. 3102908 pursuant to Article 101(3)(b) EPC.

Composition of the Board:

Chair	B. Willems
Members:	F. Sanahuja
	G. Decker

Summary of Facts and Submissions

I.   The appeal is against the opposition division's
        decision dated 22 June 2021 revoking European patent
        No. 3 102 908.

II.   In the opposition proceedings, the grounds for
        opposition under Article 100(a), together with
        Articles 54 and 56 EPC, Article 100(b) and
        Article 100(c) EPC were raised.

III.   The opposition division revoked the European patent for
        the following reasons.

        (a) The ground for opposition under Article 100(b) EPC
            prejudiced the maintenance of the patent as
            granted, and the invention as defined in the claims
            of auxiliary requests 2 to 7 did not meet the
            requirements of Article 83 EPC.

        (b) The subject-matter of claims 1 and 6 of auxiliary
            request 1 extended beyond the disclosure of the
            application as filed (Article 123(2) EPC).

        (c) New auxiliary request 4, filed by the patent
            proprietor during the oral proceedings before the
            opposition division, was not admitted into the
            proceedings because it did not satisfy the
            requirements of Article 83 EPC.

IV.   The patent proprietor (appellant) filed notice of
        appeal. With the statement of grounds of appeal, it
        contested each of the opposition division's conclusions
        mentioned in point III. above. The appellant stated
        that the claims of the main request filed with the

statement of grounds of appeal corresponded to the
claims of the patent as granted. It further submitted
auxiliary requests 1 to 9.

V.   Opponent O1 (respondent O1) and opponent O2
        (respondent O2) filed respective replies to the appeal.

VI.   The board issued summons to oral proceedings and a
        communication under Article 15(1) RPBA. In this
        communication, the board set out its interpretation of
        claim 1 of the patent as granted and gave, *inter alia*,
        the following preliminary opinion.

        (a) The statement of grounds of appeal complied with
            the requirements of Article 108, third sentence,
            EPC, and therefore the appeal should be deemed
            admissible.

        (b) The ground for opposition under Article 100(c) EPC
            did not appear to prejudice the maintenance of the
            patent as granted.

        (c) The ground for opposition under Article 100(b) EPC
            did not appear to prejudice the maintenance of the
            patent as granted.

        (d) If the claimed invention was found to be
            sufficiently disclosed on the basis of the board's
            interpretation, the case should be remitted to the
            opposition division for novelty and inventive step
            to be assessed on the basis of that interpretation.

VII.   In its letter of reply dated 27 August 2024,
        respondent O2 rebutted the board's interpretation of
        claim 1 of the patent as granted and reiterated why in
        its opinion the grounds for opposition under

Article 100(b) and Article 100(c) EPC prejudiced the maintenance of the patent as granted. It further presented arguments why the case should not be remitted to the opposition division if the claimed invention was found to be sufficiently disclosed.

VIII.   During the oral proceedings before the board, respondent O2 requested that, rather than the case being remitted to the opposition division, the oral proceedings be adjourned to a later date to discuss the outstanding issues.

IX.   The appellant's final requests were that the opposition division's decision be set aside (main request), that "*compliance of the claims of the main request with Articles* [sic] *83 EPC be confirmed*" and that the case be remitted to the opposition division for the issues not discussed during the first-instance proceedings. The appellant further requested that compliance of any of auxiliary requests 1 to 9 with Article 83 EPC be recognised and that the case be remitted to the opposition division. If the board was not willing to remit the case, the appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the main request or one of the auxiliary requests filed with the statement of grounds of appeal.

Respondent O1's final requests were that the appeal be dismissed and that the patent be revoked in its entirety, that the new auxiliary requests of the patent proprietor not be admitted into the proceedings and that the appellant's request to remit the case to the opposition division be dismissed.

Respondent O2's final requests were that the appeal be dismissed and that the patent be revoked in its entirety. It further requested that the oral proceedings be adjourned.

X.   At the end of the oral proceedings, the chair announced the board's decision.

XI.   Claim 1 of the **patent as granted**, including the numbering of the claimed features adopted in the decision under appeal, reads as follows.

(1) "*A computer-implemented method performed by at least one computer processor for matching points between two images of a scene, the method including:*"

(1.1) "*retrieving two images acquired by a sensor (100), said two images forming a frame captured at a single relative position between the scene and the sensor (100), said images each containing a reflection of a projected pattern (300) on said scene;*"

(1.2) "*extracting blobs from said reflection in said images and individually labelling said blobs with a unique identifier;*"

(1.3) "*selecting a selected epipolar plane (430) from a set of epipolar planes and defining a conjugate epipolar line (550) on each of said images;*"

(1.4) "*identifying plausible combinations, said plausible combinations including a light sheet label of said projected pattern (300) and the respective unique identifier for two plausible blobs where each plausible blob is selected from said blobs in each of said images*"

respectively, said plausible blobs crossing the conjugate epipolar line (550) of the respective image;"

(1.5) *"calculating a matching error (700, 702) for each of the plausible combinations;"*

(1.6) *"repeating said steps of selecting, identifying and calculating for each epipolar plane (430) of said set of epipolar planes;"*

(1.7) *"determining a most probable combination by computing a figure of merit for said plausible combinations using said matching error (700, 702) for each epipolar plane (430) of said set of epipolar planes;"*

(1.8) *"identifying matching points in said frame from said most probable combination;"*

(1.9) *"generating an output identifying said matching points in said frame."*

Reasons for the Decision

1. *Admissibility of the appeal (Article 108 EPC)*

1.1 In the statement of grounds of appeal, the appellant should indicate the reasons for setting aside the decision under appeal, or the extent to which it is to be amended, and the facts and evidence on which the appeal is based (Article 108, third sentence, EPC and Rule 99(2) EPC).

1.2 Respondent O1 submitted that the appellant's reference to earlier submissions at first instance in its *"ANNEX 1 – Submissions in the event of non-remittal"*

could not be considered sufficient for the purposes of
Article 108, third sentence, EPC (see the last
paragraph on page 3 of respondent O1's reply of
22 March 2022).

1.3   The decision under appeal is limited to the issues of
        added subject-matter and sufficiency of disclosure.
        Respondent O1 has not contested that the appellant has
        indicated the reasons for setting aside the decision
        under appeal by addressing these issues in its
        statement of grounds of appeal.

1.4   The appellant's annex (starting on page 13 of its
        statement of grounds of appeal) relates to issues which
        the opposition division had not decided upon. It refers
        to documents submitted in the first-instance
        proceedings before the opposition division. From a
        formal point of view, this approach does not contravene
        the requirements of Article 12(3)(a) RPBA, under which
        documents referred to in the statement of grounds of
        appeal do not need to be annexed if they were filed in
        the course of the opposition proceedings. On the
        substance of the submissions, the appellant cannot be
        required to modify or supplement its submissions on a
        matter which has not been decided on by the opposition
        division in order for its appeal to be admissible.

1.5   In view of the above, the statement of grounds of
        appeal complies with the requirements of Article 108,
        third sentence, EPC, and therefore the appeal is
        admissible.

2.   *Patent as granted – added subject-matter*
          (Article 100(c) EPC)

2.1   The ground for opposition under Article 100(c) EPC
          prejudices the maintenance of the European patent as
          granted if its content extends beyond that of the
          application as filed.

          A patent application or patent can only be amended
          within the limits of what a skilled person would derive
          directly and unambiguously, using common general
          knowledge, and seen objectively and relative to the
          date of filing, from the whole disclosure of the
          description, claims and drawings of the application as
          filed. This is often referred to as the "gold
          standard". After the amendment the skilled person may
          not be presented with new technical information (see
          Case Law of the Boards of Appeal of the European Patent
          Office, 10th edition, 2022, "Case Law", II.E.1.1).

2.2   In points 9.1 and 9.4 of the decision under appeal, the
          opposition division concluded that the amendments made
          to feature 1.4 satisfied the requirements of
          Article 123(2) EPC because they were directly and
          unambiguously derivable from the wording of the
          corresponding feature in the application as filed.

2.3   Feature 1.4 of claim 1 as granted specifies the
          following:

          "*identifying plausible combinations, said plausible
          combinations including a light sheet label of said
          projected pattern and the respective unique identifier
          for two plausible blobs where each plausible blob is
          selected from said blobs in each of said images*

*respectively, said plausible blobs crossing the
conjugate epipolar line of the respective image;"*

2.4   The corresponding feature 1.4 in claim 1 as filed reads
        as follows:

        *"identifying plausible combinations, said plausible
        combinations including a light sheet label of said
        projected pattern and said unique identifier for a
        plausible blob selected from said blobs in each of said
        images, said plausible blob crossing the conjugate
        epipolar line;"*

2.5   Respondent O1 argued that the corresponding feature as
        filed disclosed two items in the plausible combinations
        and could not provide a basis for the amendment to
        feature 1.4 of claim 1 as granted. The opposition
        division had relied on the disclosure of paragraphs
        [0046] and [0050] of the application as published (see
        section III. of respondent O1's reply of
        22 March 2022). However, paragraph [0050] disclosed
        that the triplets, i.e. the combinations, used curves
        instead of blobs. Contrary to what was argued by the
        opposition division, blobs and curves could not be used
        interchangeably since paragraph [0046] distinguished
        between them. Moreover, paragraph [0046] did not
        disclose a plausible combination comprising two blobs
        and a light sheet label.

        Furthermore, the expression "in each of said images"
        could not refer to the identifiers of the blobs because
        they were not in the images. The expression had to be
        interpreted as referring to the blobs in the images.

        In addition, if a feature of a claim as filed required
        interpretation, it could not provide a direct and

unambiguous disclosure for an amendment. Interpreting
the features of a claim as filed to determine its
disclosure was not reconcilable with the principles of
the gold standard.

2.6   Respondent O2 submitted that claim 1 as originally
        filed defined a duet composed of a plausible blob
        selected from the blobs of the two images and one light
        sheet label (see section II. of its reply of
        21 March 2022). This was a technically sensible
        interpretation, in particular in view of paragraphs
        [0003] and [0004] of the application as filed. The
        amendments to claim 1, specifying that the combination
        included (two) blobs, redefining the plausible
        combination and stating that each of the plausible
        blobs in each of the respective images crossed the
        conjugate epipolar line of the respective image, were
        not derivable from claim 1 as originally filed.

        According to respondent O2, paragraph [0050] of the
        application as filed did not provide a basis for
        feature 1.4 of claim 1 of the patent as granted. This
        paragraph did not mention blobs and disclosed that a
        reduced number of combinations were determined by
        selecting plausible combinations on the basis of a
        matching error (while claim 1 used the matching error
        after the selection) and comparing the matching error
        of each of the possible combinations with a threshold.
        Therefore, paragraph [0050] disclosed a different
        embodiment. Moreover, this paragraph required a light
        projector unit projecting the pattern and two cameras
        of the sensor to be calibrated in the same coordinate
        system. Extracting an isolated feature from the
        specific embodiment disclosed in paragraph [0050]
        amounted to an intermediate generalisation.

2.7   The appellant concurred with the opposition division.
        It also submitted that selecting two plausible blobs
        was unambiguously clear from originally filed claim 1
        as such. This was confirmed when reading the claim in
        combination with the description as filed, in
        particular paragraph [0050] (see also section 2.1 of
        the statement of grounds of appeal). Since the basis
        for feature 1.4 of claim 1 as granted was claim 1 as
        originally filed, there was no intermediate
        generalisation resulting from omitting features
        disclosed in paragraph [0050].

        Paragraph [0004] of the application as filed disclosed
        using points of a single image but was part of the
        description of the background art and should not be
        used to interpret the claims. The only technically
        sensible interpretation of feature 1.4 as filed in the
        context of claim 1, which specified "*matching points
        between two images of a scene*", was that a plausible
        combination included an identifier of a light sheet and
        two blobs, one in each of the two images.

2.8   The board agrees with the appellant.

2.9   Claim 1 as filed specifies plausible combinations
        including "*said unique identifier ... in each of said
        images*". In the board's view, this phrase, in the
        context of the application, directly and unambiguously
        defines a unique identifier in each of the two images
        specified in claim 1, and the plausible combinations
        thus include two of said unique identifiers, one in
        each of the images.

2.9.1   The board is of the view that to determine the
        disclosure of a claim, its subject-matter must first be
        determined by interpreting the claim (i.e. establishing

the meaning of the claimed features) from the
perspective of the person skilled in the art. The
meaning of claimed features is determined by what the
person skilled in the art would understand when reading
the claim, using common general knowledge, and seen
objectively and relative to the date of filing, in the
context of the application as filed.

2.9.2   The board is not convinced by the arguments of
        respondents O1 and O2 that the person skilled in the
        art would infer from the wording "*said unique
        identifier for a plausible blob selected from said
        blobs in each of said images*" that only one unique
        identifier was included. The board agrees with the
        appellant that it follows from the natural reading of
        the wording that there are as many identifiers as there
        are images.

2.9.3   The board accepts that, under certain conditions, a
        point in one image and a light ray may suffice for
        calculating the coordinates of a point in
        three-dimensional space. This is disclosed in paragraph
        [0004] of the application as filed as a prior-art
        technique which exploits a known orientation of a
        projected ray and its reflection on a single image. It
        is not apparent, though, how the single image of the
        prior art could serve the claimed purpose of "matching
        points between two images".

2.9.4   However, the board is not convinced that a claim should
        be interpreted according to a specific disclosure of
        the background art. The application as a whole
        consistently teaches matching points between two images
        using triplets (i.e. a light sheet label and two
        identifiers for two blobs, one in each of the two
        images) and matching errors of the triplets (see e.g.

paragraphs [0050] to [0054] of the description as
filed). It is also apparent that the identifiers
(indexes, labels) for blobs and curves in paragraphs
[0046] and [0050] and feature 1.4 of claim 1 as filed
refer to the same entities.

2.9.5   Therefore, the board considers that the person skilled
         in the art would construe the plausible combinations of
         feature 1.4 of claim 1 as filed solely to mean
         triplets, this also being the only technically sensible
         interpretation in the context of the claim. Therefore,
         claim 1 of the application as filed directly and
         unambiguously disclosed combinations of triplets.

2.9.6   The argument that the amendment represents an
         intermediate generalisation is not persuasive either.
         The board agrees with the appellant that since the
         basis for the amendment to feature 1.4 of claim 1 as
         granted is claim 1 as filed, the context of the
         disclosure of triplets in paragraph [0050] is
         inconsequential for assessing whether the
         subject-matter of claim 1 as granted extends beyond the
         content of the application as filed.

2.9.7   The amendments to claim 1 as granted specify that the
         conjugate epipolar line crossed by a plausible blob is
         that "of the [blob's] respective image".

         Claim 1 as filed defines extracting blobs from two
         images and "a conjugate epipolar line on each of said
         images". The plausible blobs cross the conjugate
         epipolar line. Since the blobs and epipolar lines are
         confined to a particular image, the wording of claim 1
         as filed implies that a plausible blob crosses a

conjugate epipolar line on the image from which it has been extracted.

2.10   In view of the above, the subject-matter of claim 1 as granted does not extend beyond the content of the application as filed. Thus, the ground for opposition under Article 100(c) EPC does not prejudice the maintenance of the patent as granted.

3.   *Patent as granted – interpretation of claim 1*

3.1   In the case in hand, the board deems it necessary to interpret claim 1 as a precursor to the assessment of sufficiency of disclosure.

3.2   The boards of appeal have laid down and applied the principle whereby the description and drawings are used to interpret the claims and identify their subject-matter if the claim language is ambiguous (see Case Law, II.A.6.3.1 and II.A.6.3.3).

3.3   **The interpretation of the phrase "plausible combinations" in feature 1.4**

3.4   The appellant submitted that the composition of the combinations and the requirement that the blobs crossed epipolar lines specified in feature 1.4 provided a clear definition of the phrase "plausible combinations". Feature 1.4 was thus clear in itself and there was no need to interpret it in light of the description. However, if the description was to be considered, paragraph [0033] of the patent specification identified which blobs were considered for the combinations, and paragraph [0036] disclosed that plausible combinations already existed before the

number of them was optionally reduced using error measurements.

3.5   Respondent O2 argued that the person skilled in the art would not have seriously considered the plausible combinations to be those whose blobs crossed the conjugate epipolar lines (see section III.1 of respondent O2's reply of 21 March 2022). The description did not allow for any such interpretation; only the claims did. Paragraph [0033] of the patent specification disclosed blobs crossing the epipolar line but did not define what "plausible combinations" meant.

        Therefore, according to respondent O2, there were two possible interpretations of the phrase "plausible combinations":

        (a) It included the additional requirement to calculate matching errors for all possible combinations before identifying "plausible combinations"; this interpretation was consistent with the teaching of paragraph [0035] of the patent specification.

        (b) It was the definition submitted by the appellant.

3.6   The board is of the view that feature 1.4 of claim 1 as granted provides a clear, unambiguous and technically sensible definition of the plausible combinations.

        According to feature 1.4, plausible combinations include an identifier for a plausible blob in each of two images. Feature 1.4 defines a plausible blob as a blob which crosses the conjugate epipolar line of the respective image. The plausible combinations include these specific blobs, not just any blob. Hence, on a

normal reading of the claim, the person skilled in the art would have understood that the plausible combinations include those blobs which cross the conjugate epipolar line of the respective images.

3.7   Moreover, since the definition of the phrase "plausible combinations" leaves no doubt as to what is meant, the issue of whether the description provides a corresponding disclosure may be disregarded when interpreting feature 1.4. Respondent O2's line of argument that the "plausible combinations" included additional requirements not claimed (see point 3.5(a) above) appears rather to amount to an objection of lack of support under Article 84 EPC. However, the requirements of Article 84 EPC are not applicable to the claims of the patent as granted (see G 3/14, OJ EPO 2015, A102, point 55 of the Reasons).

3.8   In view of points 3.4 to 3.7 above, the board considers that the person skilled in the art would construe the phrase "plausible combinations" to mean those combinations having the characteristics specified in feature 1.4 of the claim.

3.9   **The interpretation of feature 1.7**

3.10   During the oral proceedings, respondent O2 argued that feature 1.7 was linguistically unclear and gave rise to multiple technically sensible interpretations.

3.10.1 If the phrase "for each epipolar plane" referred to the figure of merit, then a figure of merit would be computed for each epipolar plane. If it referred to the matching errors, then a figure of merit would be computed across the epipolar planes. If it instead referred to the most probable combination, then there

would be a separate most probable combination for each of the epipolar planes.

3.10.2   The wording of feature 1.7 cast doubt on whether a separate figure of merit was calculated for each of the plausible combinations.

3.10.3   In summary, from a purely linguistic view the ambiguities in the claims allowed for two possible interpretations:

(a) A separate most probable combination was determined for each epipolar plane by computing a single figure of merit using the matching errors of the plausible combinations in the corresponding epipolar plane or by equating each figure of merit for each plausible combination with the matching error of the corresponding plausible combination.

(b) A most probable combination was determined by computing a figure of merit using matching errors for all epipolar planes.

3.10.4   The description and figures of the patent did not support the interpretation that a figure of merit was computed using matching errors for all epipolar planes. In particular, Figure 8 did not support this interpretation as it showed that the figure of merit was determined across some epipolar planes but not over all epipolar planes as specified in claim 1. Instead, Figure 9 explicitly showed that a separate figure of merit was calculated for each epipolar plane and implicitly disclosed calculating a matching error.

3.10.5   In addition, interpreting feature 1.7 as specifying that a single most probable combination was determined

was technically nonsensical. It followed from basic
physical considerations that the same number of most
probable combinations as light sheets had to be
determined, one for each of the light sheets. However,
paragraph [0038] of the patent specification disclosed
rejecting matches if more than one triplet presented a
low average error. Therefore, the description did not
support an interpretation according to which the same
number of most probable combinations as light sheets
were generated.

3.11   The appellant argued that feature 1.7 should be
        interpreted in the context of claim 1, which defined a
        loop over epipolar planes to generate one matching
        error per plausible combination and epipolar plane.
        These errors were then taken into account to determine
        a figure of merit and a most probable combination.
        Paragraph [0038] of the patent specification disclosed
        that for each plausible combination a figure of merit
        was computed using the corresponding matching errors
        which had been calculated for all epipolar planes.
        Figure 8 plotted the matching error against the
        epipolar index, and a figure of merit was determined
        for each of the curves in the graph.

        The person skilled in the art would not consider an
        interpretation in which the figure of merit used a
        matching error for a single epipolar plane. This would
        render determining the matching error redundant because
        it would be the same as the figure of merit.

        Similarly, the person skilled in the art would reject
        an interpretation in which only one overall figure of
        merit was computed using matching errors from all
        plausible combinations. In that case, it would not be

possible to distinguish between the plausible
combinations and find a most probable combination.

The person skilled in the art would readily realise
that a matching error might not be available for all
epipolar planes. The description of the patent in suit
acknowledged that not all blobs crossed an epipolar
line, meaning that the calculation of the figure of
merit could not take into account epipolar planes for
which a matching error had not been calculated.
Moreover, feature 1.7 referred to the matching error
computed for plausible combinations, i.e. those whose
blobs crossed the epipolar line.

Figure 9 and paragraph [0040] of the patent
specification could not be regarded as a basis for
interpreting feature 1.7 because they did not disclose
calculating the matching errors specified in claim 1.

3.12   The board finds that the only contextually correct and
        technically sensible interpretation of feature 1.7 is
        that a most probable combination is determined by
        computing a respective figure of merit for each of the
        plausible combinations, each figure of merit being
        computed using the corresponding matching errors for
        all epipolar planes. The reasons are the following.

3.12.1 The diverging interpretations put forward by the
        parties partly result from uncertainty a priori as to
        whether the phrase "for each epipolar plane" refers to
        "a figure of merit", "a most probable combination" or
        "said matching error".

3.12.2 However, features 1.3 to 1.6 of claim 1 specify a loop
        in which, for each epipolar plane, a plurality of
        matching errors are calculated. Thus, the expression

"said matching error" does not have a defined
antecedent and must be read together with "for each
epipolar plane". It follows that interpretations in
which the figure of merit is computed for each epipolar
plane are contextually incorrect. A similar conclusion
would apply if the phrase referred to a most probable
combination.

3.12.3   When reading feature 1.7 in isolation, it may be
linguistically correct to interpret the feature as
specifying that a single figure of merit is commonly
computed for all plausible combinations.

However, terms and features in a claim must be
interpreted in context. The context to be considered
for interpreting a feature in a claim not only includes
the other features in that claim but also the other
claims, the description and the drawings (see Case Law,
II.A.6.3.2).

The board concurs with the appellant that computing a
single figure of merit for the group of plausible
combinations prevents the most probable combination
from being determined since the information of the
individual combinations is lost. Given that the aim is
to determine an individual combination as a most
probable combination, this interpretation does not make
technical sense.

Moreover, paragraph [0038] of the patent specification
supports the interpretation in which a figure of merit
is computed for each plausible combination. It
discloses computing a figure of merit for a triplet,
for example, as an average of the matching errors for
the triplet over the epipolar planes. A triplet is
composed of the index of a curve in the first image,

the index of a candidate corresponding curve in the second image and the index of a light sheet in the projector (see paragraph [0035]); that is, a plausible combination as specified in feature 1.4 of claim 1.

Paragraph [0038] also discloses that since the number of matching errors for a plausible combination over the epipolar planes depends on the visibility of the reflected curve in the two images, the curves of matching errors for plausible combinations shown in Figure 8 may have different lengths. Hence, the person skilled in the art does not interpret this passage to mean that a figure of merit is determined over only some of the epipolar planes, as submitted by respondent O2, but that it is determined over all epipolar planes, given that, due to the geometry of the objects to be scanned, not all plausible combinations in all epipolar planes would have a matching error.

3.12.4 The argument that Figure 9 supports a different interpretation of claim 1 is not convincing.

Figure 9 of the patent specification shows selecting an epipolar plane (920), identifying plausible triplet combinations along the selected epipolar plane (930) and calculating a figure of merit for each of the triplet combinations (940) within a loop. At the end of the loop, each image blob is associated with the most plausible triplet (950).

Claim 1 defines a loop over a set of epipolar planes including the steps of selecting an epipolar plane (feature 1.3), identifying plausible combinations (feature 1.4) and calculating a matching error for each of the plausible combinations (feature 1.5). Subsequently, a most probable combination is determined

by computing a figure of merit for the plausible
combinations (feature 1.7).

Hence, Figure 9 does not show calculating a matching
error as defined by claim 1.

It appears to the board that the opposition division,
in stating that "*the disclosure in figure 9 falls
within the scope of feature 1.7*" (see point 10.2.5 of
the decision under appeal), disregarded the context of
feature 1.7 in claim 1, in particular the requirement
that a matching error be calculated. Neither Figure 9
nor the related description in paragraph [0040]
mentions the step of calculating a matching error. The
board is not convinced by respondent O2's argument that
calculating a matching error is implicitly disclosed
because it is not apparent where in the context of
Figure 9 this calculation would be performed. Thus, the
cited passage and Figure 9 are not a proper basis for
interpreting the features of claim 1.

3.12.5   The board is not persuaded by the argument that the
          same number of most probable combinations as light
          sheets should be identified in claim 1.

          The wording of feature 1.7 does not specify determining
          more than one most probable combination. It is clear
          from the reference to the most probable combination in
          feature 1.8 that only one most probable combination is
          determined and nothing more is required to identify
          matching points from the most probable combination. The
          board notes that identifying a most probable
          combination for each light sheet would maximise the
          number of points in the images that could be matched.

However, the claimed wording is not directed to this aspect.

3.12.6   Therefore, taking into account the context of the claim and the description, the person skilled in the art would adopt the interpretation identified in point 3.12 as the sole interpretation for feature 1.7.

3.13   **The interpretation of feature 1.8**

3.14   If a term used in a claim has a clear technical meaning, as a rule, the description cannot be used to interpret such a term in a different way (see Case Law, II.A.6.3.1).

3.15   Respondent O2 argued that, in view of the problem set out in paragraphs [0008] and [0011] and the aim of the invention to determine a three-dimensional surface, feature 1.8 could only be understood to mean identifying all the points on the light sheets of the projected pattern. This interpretation was supported by paragraph [0039], which disclosed determining points for the whole frame from the observations for each triplet.

3.16   The appellant submitted that paragraphs [0008] to [0011] of the patent specification disclosed the background art, that the claimed invention aimed at identifying matching points between two images and that feature 1.8 specified this matching. Once a most probable combination was identified, all points of the blobs in that combination were matched.

3.17   It is not apparent to the board why the clear formulation "*identifying matching points ... from said most probable combination*" should be interpreted in a

completely different manner to include all points on
the light sheets of the projected pattern, i.e.
matching points on light sheets from other
combinations. This is simply not claimed.

Feature 1.8 does not define matching points using a
combination other than the most probable combination
identified in feature 1.7. Nor does it consider light
sheets or blob identifiers from other combinations to
identify the matching points. Instead, feature 1.8
conveys the unambiguous teaching that matching points
are calculated from the most probable combination. In
these circumstances, the board is of the view that
general statements in the description regarding
problems in the state of the art cannot be used to
alter the clear technical teaching of this feature.

4.   *Patent as granted – sufficiency of disclosure*
          (Article 100(b) EPC)

4.1   The ground for opposition under Article 100(b) EPC
          prejudices the maintenance of the European patent as
          granted if the patent does not disclose the invention
          in a manner sufficiently clear and complete for it to
          be carried out by a person skilled in the art.

          Under the case law of the boards of appeal, the skilled
          person may use their common general knowledge to
          supplement the information contained in the
          application. However, it must be possible to reproduce
          a claimed step using the original application documents
          without any inventive effort over and above the
          ordinary skills of a practitioner (see Case Law,
          sections II.C.4.1 and II.C.5.1).

4.2   To assess whether the invention in a European patent is
           sufficiently disclosed, the claimed subject-matter must
           first be determined by interpreting the claim (i.e.
           establishing the meaning of the claimed features) from
           the perspective of the person skilled in the art. The
           board carried out this exercise in section 3. above.

           In a second step, it must be assessed whether the
           invention defined by that subject-matter is disclosed
           in a manner sufficiently clear and complete for it to
           be carried out by a person skilled in the art.

4.3   In the decision under appeal (see point 10.2.2), the
           opposition division concluded that **feature 1.4** of
           claim 1 of the patent as granted provided a definition
           of plausible combinations. Hence, the opposition
           division found that feature 1.4 did not prejudice the
           maintenance of the patent under Article 100(b) EPC.

4.3.1   Respondent O2 submitted that, for disclosure, the whole
           application needed to be considered. Paragraphs [0035]
           and [0036] of the patent specification disclosed
           reducing the number of possible combinations on the
           basis of a matching error metric to arrive at "probable
           matches". However, claim 1 used this metric only after
           "plausible combinations" had already been determined.
           Hence, the patent did not disclose how to arrive at the
           plausible combinations of feature 1.4 independently of
           calculating the matching error (see section III.1 of
           respondent O2's reply of 21 March 2022).

4.3.2   The appellant concurred with the opposition division's
           findings. The plausible combinations were those whose
           blobs crossed the epipolar line, as defined in
           feature 1.4 (see section 2.2.1 of the statement of
           grounds of appeal). According to paragraphs [0035] and

[0036] of the patent, the error could be used not only to limit the number of combinations to a number of plausible combinations but also to reduce the number of plausible combinations. Hence, these paragraphs did not disclose that the matching errors must be taken into account to determine the plausible combinations, and feature 1.4 of the invention was sufficiently disclosed. Moreover, the opponents' submissions supporting different meanings of the phrase "plausible combinations" amounted to an objection of lack of clarity rather than one of insufficiency of disclosure.

4.3.3   As set out in point 3.3 above with respect to feature 1.4, the phrase "plausible combinations" is to be interpreted as those combinations whose blobs cross the conjugate epipolar lines.

Using this interpretation, the patent specification, and in particular feature 1.4 of claim 1 as granted, discloses how to identify plausible combinations in a manner sufficiently clear and complete for this to be carried out by a person skilled in the art.

The board further notes that paragraphs [0035] and [0036] do not make it compulsory to take account of the matching errors for determining the plausible combinations.

4.4   Respondent O2 submitted that **feature 1.6** provided for a different plausible combination to be identified for each epipolar plane and for a matching error to be calculated for each of the plausible combinations. Since matching errors were not calculated for all epipolar planes, it was impossible to associate plausible combinations across several epipolar planes. According to paragraph [0037] of the patent

specification, the combinations were for all the planes
(see section III.2 of its reply of 21 March 2022).

4.4.1 The board agrees with respondent O2 that different
plausible combinations may be determined for each
epipolar plane; only blobs that cross the conjugate
epipolar line of the respective epipolar plane form
plausible combinations for that epipolar plane (see
feature 1.4). Thus, not all plausible combinations
identified for an epipolar plane may have a matching
error in all epipolar planes.

4.4.2 However, this would not be a bar to associating
plausible combinations across multiple epipolar planes.
The blobs are indexed with a label (see paragraph
[0031] of the patent specification). The combinations
include a respective unique identifier (index) for a
blob from each of the two images and a light sheet
label (see feature 1.4 and paragraph [0035] of the
patent specification). For each epipolar plane, the
subset of combinations for which blob indices cross the
respective conjugate epipolar line are identified as
plausible combinations. Thus, it is straightforward to
associate corresponding (plausible) combinations across
multiple epipolar planes by matching their two blob
indices and the light sheet label. A figure of merit,
such as an average matching error (see feature 1.7 and
paragraph [0038] of the patent specification), can be
computed over corresponding combinations without any
difficulties.

4.5 With respect to **feature 1.7**, the opposition division
noted that "*the disclosure of the patent application
should be enabling over the entire range of the claim*".
It argued that the disclosure in Figure 9 fell "*within
the scope of feature 1.7*" of claim 1, finding that the

contradicting disclosures of Figures 8 and 9 and corresponding paragraphs [0038] and [0040] of the patent specification "[led] *to difficulties in discerning how the method would be implemented*" (see point 10.2.5 of the decision under appeal).

4.5.1 The appellant submitted that paragraph [0038] disclosed how to compute a figure of merit and a most probable combination in a manner sufficiently clear and complete for this to be carried out by a person skilled in the art. It reiterated that claim 1 required only one most probable combination to be determined, asserting that the person skilled in the art would know how to identify most probable combinations for other light sheets using the disclosure of the application and common general knowledge.

4.5.2 According to respondent O2, if the claim could be interpreted in two different ways and the patent did not allow one interpretation to be excluded, then both interpretations had to meet the requirements of the EPC. This was explicitly stated in the Case Law concerning added matter (see II.E.1.3.9 c) and II.E.1.3.9 e)) and should apply to Article 83 EPC as well. Respondent O2 also referred to T 1404/05, submitting that if a claim was open to two interpretations, both had to be sufficiently disclosed. The mere fact that the description made it clear that one interpretation was the one intended did not mean that the claim could be treated as being confined to that interpretation.

Furthermore, when feature 1.7 was construed according to the interpretation set out in point 3.12, it was not clearly and sufficiently disclosed how to select a most probable combination from all plausible combinations

using a figure of merit since neither paragraph [0038] nor Figure 8 of the patent specification showed this aspect (see the paragraph bridging pages 19 and 20 and the last paragraph on page 25 of respondent O2's reply of 21 March 2022). More specifically, paragraph [0008] stated that increasing the number of light sheets introduced ambiguities that could not be resolved. This was the case disclosed in paragraph [0038]. There had to be as many most probable combinations with a low figure of merit as there were light sheets. However, to resolve resulting ambiguities in that case, paragraph [0038] taught rejecting combinations. Consequently, the person skilled in the art did not know how to select a most probable combination.

4.5.3   Since the board finds that claim 1 allows for only one interpretation of feature 1.7 (see point 3.12 above), respondent O2's arguments based on two different interpretations are inconsequential.

The board concurs with respondent O2 that paragraph [0038] describes determining a figure of merit for each of the plausible combinations (see the paragraph bridging pages 21 and 22 of respondent O2's reply of 21 March 2022). This paragraph also identifies the triplet whose error is depicted at curve 806 as producing the best figure of merit – calculated as an average error for a given triplet – even if another curve reaches a lower local minimum error. The person skilled in the art would readily identify the goal of determining the combination (triplet) with the best figure of merit as finding the combination with the lowest average error. Hence, the patent discloses feature 1.7, and in particular how to determine a most probable combination, in a manner sufficiently clear

and complete for it to be carried out by a person skilled in the art.

The invention defined in claim 1 does not specify determining the same number of most probable combinations as light sheets. Therefore, whether the patent as granted discloses how to determine the remaining combinations in a manner sufficiently clear and complete is not relevant for the assessment of the sufficiency of disclosure of the claimed invention.

4.6   With respect to **feature 1.8,** the opposition division found that the patent did not disclose how to determine a plurality of matching points when only one most probable combination was determined, as specified in feature 1.7 of claim 1 (see point 10.2.5 of the decision under appeal).

4.6.1   The board agrees with the appellant that only one combination is needed to identify a plurality of matching points. When construing feature 1.7 according to the interpretation set out in point 3.12 above, the step of determining a most probable combination provides a correspondence between a light sheet and respective blobs in each of the images, each blob being composed of a plurality of points (see paragraph [0031]), and the step of identifying matching points identifies the correspondence between coordinates of the points on the line of light of the light sheet and the points on the blobs (see the paragraph bridging pages 3 and 4 and the first full paragraph on page 4 of the statement of grounds of appeal).

4.6.2   In this context, respondent O2 contested that the patent disclosed that the matching points to be identified in feature 1.8 were points on the two blobs

of the most probable combination and requested that the appellant's argument in this regard not be admitted into the proceedings for being late-filed.

The appellant submitted that the opposition division's reasoning in this respect was not clear from the discussion at the oral proceedings before the opposition division (see section 2.2.2 of the statement of grounds of appeal).

Indeed, it is not apparent from the minutes of the oral proceedings that the question of determining a plurality of matching points from a single most probable combination was discussed at all. Hence, the board admits the appellant's argument under Article 12(4) RPBA as it addresses a ground on which the decision was based and is not prejudicial to procedural economy. Moreover, the appellant's argument merely reflects the teaching of paragraph [0039] of the patent specification.

4.6.3   Therefore, the patent specification discloses the step of identifying matching points from the most probable combination in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

4.7   In view of points 4.3 to 4.6 above, the board considers that the ground for opposition under Article 100(b) EPC does not prejudice the maintenance of the European patent as granted.

5.   *Remittal for further prosecution (Article 111 EPC)*

5.1   The appellant requested that the board remit the case to the opposition division in view of the volume and

complexity of the undecided issues and in view of
Article 12(2) RPBA (see section 1.3 of the statement of
grounds of appeal).

Respondents O1 and O2 argued that the undecided issues,
in particular admittance of the requests, novelty and
inventive step, should be dealt with before the board
because all parties had presented their case on these
issues. Remitting the case to the opposition division
would be detrimental to procedural economy and would
lead to a ping-pong effect between the board and the
opposition division. The lengthy proceedings were a
burden on the respondents.

Respondent O2 requested that the oral proceedings be
adjourned so that the remaining issues on which the
parties had presented their case could be discussed on
a new date.

5.2   Under Article 111(1), second sentence, EPC the board
         may either exercise any power within the competence of
         the department which was responsible for the decision
         appealed or remit the case to that department for
         further prosecution.

         Since the main purpose of the appeal proceedings is to
         give the losing party a chance to challenge the
         opposition division's decision on its merits (see
         G 10/91, OJ EPO 1993, 420, point 18 of the Reasons),
         the boards have normally considered remittal in
         accordance with Article 111(1) EPC to be appropriate in
         cases where the opposition division issues a decision
         on particular issues (e.g. added subject-matter and
         sufficiency of disclosure) but leaves other substantive
         issues (e.g. admissibility of claim requests and
         submissions, validity of the priority claim, novelty

and inventive step) undecided. This existing practice fulfils the primary object of appeal proceedings to review the decision under appeal in a judicial manner, as expressed in Article 12(2) RPBA.

Although the EPC does not grant parties an absolute right to have all the issues in a case considered at two instances and a remittal would delay the proceedings, it is well recognised that any party may be given the opportunity to have two readings of the important elements of a case.

In the case in hand, the board disagrees with the opposition division's finding that claim 1 of the patent as granted could be interpreted in more than one way and finds that the invention as defined in claim 1 meets the requirements of Articles 83 and 123(2) EPC.

5.3   In the board's view, all these elements, and in particular the interpretation of claim 1 established by the board, constitute special reasons that justify remitting the case to the opposition division in accordance with Article 11 RPBA for an assessment of novelty and inventive step on the basis of that interpretation. Therefore, the board concludes that the case should be remitted to the opposition division for further prosecution. The request for adjournment of the oral proceedings then becomes moot.

6.   *Conclusion*

6.1   Since the grounds for opposition under Article 100(b) and Article 100(c) EPC do not prejudice the maintenance of the European patent as granted, the decision under

appeal is to be set aside. The case is to be remitted
to the opposition division for further prosecution.

Order

For these reasons it is decided that:

1.   The decision under appeal is set aside.

2.   The case is remitted to the opposition division for
        further prosecution.

The Registrar: The Chair:

K. Boelicke   B. Willems

Decision electronically authenticated