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**Datasheet for the decision of 12 October 2022**

**Case Number:** T 2580/17 - 3.5.04

**Application Number:** 10763260.6

**Publication Number:** 2481026

**IPC:** G06T11/20, G06T17/00

**Language of the proceedings:** EN

**Title of invention:**
DRAWING GRAPHICAL OBJECTS IN A 3D SUBSURFACE ENVIRONMENT

**Applicant:**
Landmark Graphics Corporation

**Headword:**

**Relevant legal provisions:**
EPC Art. 52(1), 56, 84, 111(1)

**Keyword:**
Main request and main request beta - Inventive step (no)
First auxiliary request, first auxiliary request beta, second auxiliary request, second auxiliary request beta - Clarity (no)
Remittal to the first-instance department (no)



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**Decisions cited:**

**Catchword:**


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**Case Number: T 2580/17 - 3.5.04**

# D E C I S I O N
# of Technical Board of Appeal 3.5.04
# of 12 October 2022

| | |
|---|---|
| **Appellant:** (Applicant) | Landmark Graphics Corporation<br>2107 City West Blvd., Bldg. 2<br>Houston, Texas 77042-3051 (US) |
| **Representative:** | Hoffmann Eitle<br>Patent- und Rechtsanwälte PartmbB<br>Arabellastraße 30<br>81925 München (DE) |
| **Decision under appeal:** | **Decision of the Examining Division of the European Patent Office posted on 21 September 2017 refusing European patent application No. 10763260.6 pursuant to Article 97(2) EPC.** |

**Composition of the Board:**

| | |
|---|---|
| **Chair** | B. Willems |
| **Members:** | B. Le Guen |
| | B. Müller |

## Summary of Facts and Submissions

I. The appeal is against the decision of the examining division dated 21 September 2017 to refuse European patent application No. 10 763 260.6. The decision, which was a decision according to the state of the file, referred for its grounds to the communication dated 7 June **2016**. It is undisputed that the communication that was actually meant in the decision was the examining division's communication dated 7 June **2017**.

II. The prior-art documents cited in the examining division's communication dated 7 June 2017 included the following:

D3: US 2008/0079723 A1
D8: US 6,256,039 B1

III. In that communication, the examining division found, *inter alia*, that the subject-matter of the independent claims of the then main request did not involve an inventive step (Article 56 EPC) and that the amended claims of the then first and second auxiliary requests did not comply with the requirements of Rule 137(5) EPC.

IV. The applicant (appellant) filed notice of appeal, with which it re-filed the claims of the three requests that had formed the basis of the decision under appeal. The appellant requested that the decision under appeal be set aside and that a European patent be granted on the basis of the claims of one of these requests. In a

statement setting out the grounds of appeal annexed to the notice of appeal, the appellant challenged the examining division's findings.

V. The board issued a summons to oral proceedings and a communication under Article 15(1) RPBA 2020. In this communication, the board gave, *inter alia*, the following preliminary opinion.

- The subject-matter of claim 1 of the main request did not involve an inventive step (Article 56 EPC) in view of the disclosure of document D3 combined with the common general knowledge of the person skilled in the art.

- The examining division was not correct in applying Rule 137(5) EPC.

- Claim 1 of the first and second auxiliary requests did not meet the requirements of Article 84 EPC, because the expression "property value consistent with the second facies" was not clear.

VI. With its reply dated 9 September 2022, the appellant filed amended claims of three new requests labelled "Main Request Beta", "First Auxiliary Request Beta" and "Second Auxiliary Request Beta". These requests were said to address new issues raised by the board in its preliminary opinion and were to be dealt with in such an order that the "beta version" of each request followed the existing (non-beta) version of that request. The appellant provided arguments as to why the subject-matter of claim 1 of the main request involved an inventive step in view of the disclosures of documents D3 and D8 and why the phrase "consistent

with" in claim 1 of the first and second auxiliary requests was clear.

VII. In a communication dated 23 September 2022, the board further explained why it considered that the expression "property value consistent with the second facies" in claim 1 of the first and second auxiliary requests and the beta versions thereof was not clear.

VIII. In a letter of reply dated 11 October 2022, the appellant provided arguments as to why claim 1 of the first and second auxiliary requests and their beta versions was clear.

IX. Oral proceedings were held on 12 October 2022.

The appellant's final requests were that the decision under appeal be set aside and a European patent be granted on the basis of the claims of the main request filed with the statement of grounds of appeal or the request labelled "Main Request Beta" filed by letter dated 9 September 2022. Alternatively, the appellant requested that the decision under appeal be set aside and the case be remitted to the examining division for further prosecution on the basis of the claims of the first auxiliary request, the "First Auxiliary Request Beta", the second auxiliary request or the "Second Auxiliary Request Beta", the first and second auxiliary requests filed with the statement of grounds of appeal, the beta versions of these requests filed by letter dated 9 September 2022.

At the end of the oral proceedings, the chair announced the board's decision to dismiss the appeal.

X. Claim 1 of the main request reads as follows:

"A computer-readable memory medium that has program instructions stored thereon, wherein the program instructions are executable by a computer system to implement a method comprising:

displaying a first image in a first window using a display system, wherein the first image corresponds to a first view of a graphical object set that includes one or more graphical objects in a three-dimensional (3D) space, wherein the first view is the view of a virtual camera situated in the 3D space, wherein each of the one or more graphical objects represents a corresponding sub-surface geological structure;

displaying a second window using the display system;

generating a polygon in the 3D space, wherein said generating includes:

receiving user input defining a closed planar polyline in the second window, wherein said user input is supplied by a user drawing the planar polyline in the second window and includes a first set of drawing inputs to the second window, wherein the closed planar polyline includes three or more 2D vertices in the second window; and

mapping each of the three or more 2D vertices to a respective 3D point in the 3D space, thereby obtaining three or more 3D points that define 3D vertices for the polygon;

rendering the polygon with respect to the first view to generate an update for the first image; and

displaying the updated first image in the first window, wherein the updated first image depicts at least a portion of the polygon and at least a portion of a first of the graphical objects of the graphical object set,

wherein the state of the polygon in the 3D space dynamically follows the instantaneous state of the planar polyline as the user creates or modifies the planar polyline in the second window, such that the drawing input supplied in the second window is used to dynamically update the state of the drawing object, so that the changes become immediately visible in the first window."

XI. Claim 1 of the beta version of the main request is identical to claim 1 of the main request except for the replacement of the feature "used to dynamically update the state of the *drawing object*" with the feature "used to dynamically update the state of the *polygon*".

XII. Claim 1 of the first auxiliary request and its beta version reads as follows (features added to and deleted from claim 1 of the main request are underlined or crossed out as appropriate):

"A computer-readable memory medium that has program instructions stored thereon, wherein the program instructions are executable by a computer system to implement a method comprising:

displaying a first image in a first window using a display system, wherein the first image corresponds to a first view of a graphical object set that includes one or more graphical objects in a three-dimensional (3D) space, wherein the first view is the view of a

virtual camera situated in the 3D space, wherein each of the one or more graphical objects represents a corresponding sub-surface geological structure;

displaying a second window using the display system;

generating a polygon in the 3D space, wherein said generating includes:

receiving user input defining a closed planar polyline in the second window, wherein said user input is supplied by a user drawing the planar polyline in the second window and includes a first set of drawing inputs to the second window, wherein the closed planar polyline includes three or more 2D vertices in the second window; and

mapping each of the three or more 2D vertices to a respective 3D point in the 3D space, thereby obtaining three or more 3D points that define 3D vertices for the polygon;

rendering the polygon with respect to the first view to generate an update for the first image; and

displaying the updated first image in the first window, wherein the updated first image depicts at least a portion of the polygon and at least a portion of a first of the graphical objects of the graphical object set,

~~wherein the state of the polygon in the 3D space dynamically follows the instantaneous state of the planar polyline as the user creates or modifies the planar polyline in the second window, such that the drawing input supplied in the second window is used to~~

~~dynamically update the state of the drawing object, so that the changes become immediately visible in the first window~~

–

wherein the first graphical object includes a mesh that covers a surface in the 3D space, wherein the three or more 3D points reside on said surface, wherein the method further comprises:

receiving user input indicating that a boundary of the polygon represents an unconformity between a first facies and a second facies;

–

generating a new mesh for the surface, wherein the new mesh includes a first submesh and a second submesh that interface along the polygon boundary, wherein the first submesh corresponds to the exterior of the polygon, wherein the second submesh corresponds to the interior of the polygon, wherein at least a portion of the first submesh is assigned to the first facies, wherein the second submesh is assigned to the second facies; and

–

assigning a property value consistent with the second facies to grid points of the second submesh."

XIII. Claim 1 of the second auxiliary request reads as follows (features added to and deleted from claim 1 of the main request are underlined or crossed out):

"A computer-readable memory medium that has program instructions stored thereon, wherein the program instructions are executable by a computer system to implement a method comprising:

displaying a first image in a first window using a display system, wherein the first image corresponds to

a first view of a graphical object set that includes one or more graphical objects in a three-dimensional (3D) space, wherein the first view is the view of a virtual camera situated in the 3D space, wherein each of the one or more graphical objects represents a corresponding sub-surface geological structure;

displaying a second window using the display system;

generating a polygon in the 3D space, wherein said generating includes:

receiving user input defining a closed planar polyline in the second window, wherein said user input is supplied by a user drawing the planar polyline in the second window and includes a first set of drawing inputs to the second window, wherein the closed planar polyline includes three or more 2D vertices in the second window; and

mapping each of the three or more 2D vertices to a respective 3D point in the 3D space, thereby obtaining three or more 3D points that define 3D vertices for the polygon;

rendering the polygon with respect to the first view to generate an update for the first image; and

displaying the updated first image in the first window, wherein the updated first image depicts at least a portion of the polygon and at least a portion of a first of the graphical objects of the graphical object set,

wherein the state of the polygon in the 3D space dynamically follows the instantaneous state of the

planar polyline as the user creates or modifies the planar polyline in the second window, such that the drawing input supplied in the second window is used to dynamically update the state of the drawing object, so that the changes become immediately visible in the first window, and

– wherein the first graphical object includes a mesh that covers a surface in the 3D space, wherein the three or more 3D points reside on said surface, wherein the method further comprises:

receiving user input indicating that a boundary of the polygon represents an unconformity between a first facies and a second facies;

– generating a new mesh for the surface, wherein the new mesh includes a first submesh and a second submesh that interface along the polygon boundary, wherein the first submesh corresponds to the exterior of the polygon, wherein the second submesh corresponds to the interior of the polygon, wherein at least a portion of the first submesh is assigned to the first facies, wherein the second submesh is assigned to the second facies; and

– assigning a property value consistent with the second facies to grid points of the second submesh."

XIV. Claim 1 of the beta version of the second auxiliary request is identical to claim 1 of the second auxiliary request except for the replacement of the feature "used to dynamically update the state of the *drawing object*" with the feature "used to dynamically update the state of the *polygon*".

XV. The appellant's arguments in support of its view that the subject-matter of claim 1 of the main request and its beta version involves an inventive step when starting from the disclosure of document D3 as the "closest prior art", as far as relevant for the present decision, can be summarised as follows.

(a) There was doubt about whether the graphical object displayed in the first and second views of the GUI shown in figure 27A of document D3 represented a sub-surface geological structure, as required by the wording of claim 1.

(b) The novel features of claim 1 achieved an enhanced definition of user-defined features in images for investigating the properties of sub-surface geological structures represented by 3D objects rendered using computer graphics. They had the synergistic effect of enhancing the ability of the user to interact with a graphical object.

(c) Document D3 solely related to the identification of linear features such as metal pipes. Therefore, the person skilled in the art would have been discouraged from trying to solve the problem of assisting the user in creating a 3D "non-linear" object.

(d) A person skilled in the art faced with the task of identifying non-linear sub-terranean formations would not have used EMI sensor data, because extracting boundary extents from such data was not obvious. The EMI inversion process described in paragraph [0153] of document D3 was specifically designed for extracting linear 2D targets such as metal pipes embedded in a dielectric medium. It

would not have been obvious to extrapolate it to the problem of extracting "non-linear" features. Better solutions existed for that purpose.

(e) Paragraph [0099] disclosed that "non-linear" features such as regions of interest were automatically extracted by SPADE. In the process described in paragraphs [0152] and [0153] the user specified linear features. Therefore, paragraph [0099] taught away from using that process for identifying "non-linear" features.

(f) Although the wish for a system to output its results dynamically and immediately is generally obvious, the users of the GUI shown in figure 27A of document D3 would not have expressed the specific wish for each drawing input in the 2D view corresponding to the creation or modification of a polyline to be immediately reflected in a corresponding change to a polygon in a 3D view. Firstly, the process described in paragraphs [0152] and [0153] of document D3 did not lend itself to being converted into a process satisfying this wish. Whilst computers were powerful enough to return the results of an EMI inversion immediately, this process required a step-wise selection of endpoints and numbers of profiles per segment. Secondly, the user of the GUI described in document D3 did not need to manipulate the segments of the polyline once they had been specified. Hence, the person skilled in the art would not have arrived at a method in which the state of the polygon in the 3D space dynamically followed the state of the planar polyline as the user modified it.

XVI. The appellant's arguments in support of its view that the expression "property value consistent with the second facies" in claim 1 of the first and second auxiliary requests and their beta versions is clear can be summarised as follows.

The step of "receiving user input indicating that a boundary of the polygon represents an unconformity between a first facies and a second facies" implied an identification of the type of the first and second facies (for example, "sand" and "rock"). Thus, the claim comprised all the essential features that allowed the program instructions to assign a property value consistent with the second facies to the grid points of the second mesh. In any case, the invention did not lie in the determination of property values consistent with facies. Moreover, the expression "consistent with" covered not only the case in which the property value was determined by the program but also the case in which this value was input by a user.

## Reasons for the Decision

1. The appeal is admissible.

2. **Main request - Inventive step**

2.1 An invention is to be considered as involving an inventive step if, having regard to the state of the art, it is not obvious to a person skilled in the art (Article 56 EPC).

2.2 *Document D3's disclosure*

2.2.1 Document D3 discloses a computer-readable memory medium storing a software called SPADE (see paragraph [0102]: "*SPADE 112 may be implemented using Matlab (e.g., Matlab version 7), as in the embodiment described hereinbelow, or in other platforms, such at VTK, C++, Java or other platforms*").

In an embodiment (see figure 27A), a graphical user interface (GUI) generated by SPADE is presented to the user. A view of a map of an area determined by an electromagnetic imaging (EMI) sensor is displayed in a 3D space in a first window (see the top view in figure 27A and the reference to "*the 3D view of the EMI data within SPADE*" in paragraph [0153]). The rendering of that graphical object implies the definition of a centre of projection and viewing parameters which, together, can be considered representative of a virtual camera situated in the 3D space. The GUI shown in figure 27A also comprises a second window (see bottom-left view) displaying the map of the area in two dimensions.

Paragraphs [0152] and [0153], together with figures 25, 26A and 26B, describe an EMI inversion process, in which (i) a user picks 2D points ("endpoints") defining a linear feature on the map of the area, (ii) the user selects a number of profiles per segment constituting the linear feature, (iii) SPADE computes a depth for each profile of each segment of the linear feature (i.e. it maps each 2D point to a respective point in the 3D space) and (iv) as each depth is computed, it is plotted (i.e. rendered) in the 3D view to allow the user to have a view of the 3D configuration of the target, thus generating an update of the view of the map of the area.

Paragraph [0153] and figures 25, 26A and 26B disclose an embodiment in which a feature has two segments, which means that three 2D points were picked by the user. It is also shown in figures 25, 26A and 26B that the 2D points are joined to form a planar polyline at depth 0.

2.2.2 The board does not share the appellant's doubts about whether the graphical object displayed in the first and second views of the GUI represents a sub-surface geological structure, as required by the wording of claim 1 (see point XV.(a) above, first sentence). An EMI sensor measures the electrical conductivity of sub-surface materials to deduce their properties. The map of the area shown to the user in the two views must necessarily provide information about what is beneath the surface (i.e. sub-surface geological structures), otherwise the map would be pointless for the purpose of selecting underground linear features for which depths are to be calculated in the EMI inversion process.

2.3 *Distinguishing features*

2.3.1 The subject-matter of claim 1 of the main request differs from document D3's disclosure in that it comprises the following sets of features.

**Set 1** The 2D points are selected in the second window.

**Set 2** The polyline is a closed polyline. A polygon is generated in the 3D space on the basis of the polyline. The polygon is rendered.

**Set 3** The state of the polygon in the 3D space dynamically follows the instantaneous state of the planar polyline as the user creates or modifies the latter in the second window, such that the drawing input supplied in the second window is used to dynamically update the state of the drawing object, so that the change becomes immediately visible in the first window.

2.3.2 In the context of the claim, the term "dynamically" means that any user interaction before the updating of the first view on the basis of the selected 2D points is excluded (see appellant's letter dated 9 September 2022, page 8, penultimate paragraph, last two sentences).

2.4 *Technical effects*

2.4.1 It is established case law that, if the features or sets of features of a claim are a mere aggregation of these features or sets of features which are not functionally interdependent, i.e. do not mutually influence each other to achieve a technical success over and above the sum of their respective individual effects, it is to be established whether each feature or each set of features is separately obvious in the light of the state of the art (see Case Law of the Boards of Appeal of the European Patent Office, 10th edition, 2022 ("Case Law"), I.D.9.3.2).

2.4.2 There is no evident correlation between the second set of distinguishing features identified under point 2.3 above and the ability of the user to interact with the graphical object in any way, as claimed by the appellant. The appellant did not provide any argument

in support of its view that the alleged enhancement (see point XV.(b) above) was achieved by means of this second set of features. In any case, the appellant did not substantiate why the alleged overall enhancement achieved by means of the combination of the three sets of distinguishing features identified under point 2.3 above was over and above the sum of their individual effects.

2.4.3 In the board's view the sets of distinguishing features identified under point 2.3 above have the following technical effects.

**Set 1** An appropriate view for selecting the 2D points is set.

**Set 2** The user can specify the outline of a planar object which is then represented by at least one polygon in the 3D space and rendered.

**Set 3** The user sees the polygon being drawn in the first view as 2D points are picked, i.e the conversion of the 2D points is fully automated and there is no delay until the user can view the selection of 2D points inducing a change in the 3D plot.

2.4.4 The board cannot identify any effect achieved by the combination of these three sets of distinguishing features that is over and above the sum of each of their individual effects. Thus, it is to be established whether each set of features is separately obvious in the light of the state of the art.

2.5 *Partial objective technical problems*

2.5.1 It is established case law that the correct procedure for formulating the objective technical problem is to choose a problem based on the technical effect of exactly those features distinguishing the claim from the prior art that is as specific as possible without containing elements or pointers to the solution (see Case Law, I.D.4.2.1).

2.5.2 The partial objective technical problem with respect to the first set of distinguishing features identified under point 2.3 above may be formulated as that of choosing an appropriate view for selecting the 2D points.

2.5.3 The partial objective technical problem with respect to the second set of distinguishing features identified under point 2.3 above can be formulated as that of assisting the user in the creation of a 3D planar object.

In the board's view, the examining division was correct in identifying that the person skilled in the art to be considered for the present application could be an expert in computer graphics who obtains a requirement specification from the geologist (see point 1.2.5 of the examining division's communication dated 7 June 2017). In a realistic situation, the geologist would have asked the computer graphics expert to realise their wish to be able to specify and simulate specific objects. Thus, it is not relevant whether or not document D3 discloses the identification of non-linear features (see appellant's argument under point XV.(c) above). Neither the expression of the user's wish to specify and simulate specific objects, nor the

realisation that specific objects are planar, requires any technical skills. These aspects belong to the motivation phase that precedes the invention. Thus, an objective technical problem that includes these aspects as a requirement to be met by the person skilled in the art does not include pointers to the solution.

2.5.4 The partial objective technical problem with respect to the third set of features identified under point 2.3 above can be formulated broadly as that of improving the system disclosed in document D3.

2.6 *Obviousness - Set 1*

The board notes that there are only two relevant views to choose from in the GUI of figure 27A to identify linear features. The board is not convinced that choosing either of these views can represent an inventive contribution to the state of the art.

In any case, common ground was established at the oral proceedings before the board that the map of the EMI data imported to the GUI in the embodiment of paragraphs [0152] and [0153] was a planar object. The person skilled in the art would have recognised that the cognitive content of a planar object is more easily discernible in a view showing this object as a 2D image than in a view showing a perspective projection of that object placed in a 3D space. Thus, they would have considered allowing the user to select the 2D points in the bottom-left view of the GUI shown in figure 27A, i.e. the second view within the meaning of claim 1.

The appellant did not challenge the formulation of the first partial objective technical problem and did not submit any arguments as to why, on the basis of that

formulation, the first set of distinguishing features identified under point 2.3 above involved an inventive step.

In view of the above, the board reaches the conclusion that these distinguishing features would have been obvious to the person skilled in the art.

2.7 *Obviousness - Set 2*

2.7.1 Polygons are standard 3D representations of planar objects. Thus, in view of the second partial objective technical problem, assisting the user in creating a 3D polygon would have been obvious for the person skilled in the art of computer graphics. Moreover, the person skilled in the art would have derived from document D3 the general teaching of determining 3D vertices on the basis of 2D points of a polyline drawn by the user. Thus, determining the 3D vertices of a polygon on the basis of 2D points selected by the user would have been obvious. It is self-evident for the board that specifying a planar object by drawing a closed polyline cannot be considered to involve an inventive step.

For these reasons alone, the board finds that the second set of distinguishing features identified under point 2.3 above would have been obvious to the person skilled in the art.

2.7.2 The appellant's argument that it would not have been obvious to extrapolate the EMI inversion process described in paragraph [0153] to extract "non-linear" features (see point XV.(d) above) is not convincing, for two reasons. Firstly, claim 1 does not specify how a 2D vertex is mapped to a 3D point in the 3D space. The mapping step covers assigning an arbitrary depth to

the coordinates of the specified 2D vertices. Hence, in the board's view, the general teaching of determining 3D vertices on the basis of 2D points selected by the user would already have anticipated this step. Secondly, if EMI inversion is capable of extracting the linear profile of metal *pipes*, the board fails to see why it would not be suitable for extracting the linear contours of simple planar objects.

2.7.3 The board disagrees with the appellant's view that paragraph [0099] of document D3 teaches away from any user interaction in the process of identifying "non-linear" features (see point XV.(e) above). The last sentence of this paragraph indicates that a user may also participate actively in the production of a processed image. The board understands this sentence as meaning that a user may actively participate in the identification of any of the features mentioned in paragraph [0098] including "*any item that give[s] rise to a geophysical signature that is of interest to the survey, client or interpreter*". One way of participating in such a process is disclosed in paragraphs [0152] and [0153] and requires the user to draw the linear features of the target.

2.7.4 The board attributes no weight to the appellant's argument that better solutions than EMI inversion existed for the purpose of extracting underground "non-linear" features (see point XV.(d) above), since this alleged fact has not been supported by any evidence.

2.7.5 In view of the above, the board reaches the conclusion that the second set of distinguishing features identified under point 2.3 above would have been obvious to the person skilled in the art.

2.8 *Obviousness - Set 3*

2.8.1 The appellant could not convince the board that the wish to see drawing inputs in the 2D view corresponding to the creation or modification of the polyline being dynamically and immediately reflected in a corresponding change to a polygon in a 3D view was not obvious. It is established case law that the mere automation of functions previously performed by human operators cannot be considered inventive since this is in line with the general trend in technology (see Case Law, I.D.9.21.6). Thus, the mere idea of automating the selection of the number of profiles per segment mentioned in paragraph [0153] of document D3 cannot be considered inventive. The board finds that the mere idea of obtaining results of certain computations without delay is also in line with the general trend in technology and, as such, cannot be considered to represent an inventive contribution to the state of the art.

2.8.2 The implementation of the obvious ideas of automation and immediacy would not have posed any technical difficulties to the person skilled in the art. For example, the person skilled in the art would have arrived at a process in which the changes made in the second view are "dynamically" reflected in the first view merely by setting a default number of profiles per segment. Moreover, the appellant itself submitted that sufficiently powerful computers existed in 2008 to return the result of an EMI inversion immediately (see point XV.(f) above). Therefore, by combining the two obvious concepts of automation and immediacy the person skilled in the art would have arrived at a method in which each creation of a new segment immediately induced a change in the 3D plot.

2.8.3 The appellant's argument that the user of the GUI described in document D3 does not need to manipulate (update) the segments of the polyline once they have been specified (see point XV.(f) above) is not persuasive, because this is not required by claim 1. The claim does not specify what it means for a (closed) planar polyline to be created or modified. An object representing a (closed) planar polyline can be considered "created" as soon as three 2D points have been selected and "modified" for each subsequent selection of an additional 2D point. Therefore, by combining the two obvious concepts of automation and immediacy the person skilled in the art would have arrived at a method in which the state of the polygon in the 3D space dynamically follows the instantaneous state of the planar polyline as it is created or modified by the user.

2.8.4 In view of the above, the board reaches the conclusion that the third set of distinguishing features identified under point 2.3 above would have been obvious to the person skilled in the art.

2.9 Since the board found that all the distinguishing features identified under point 2.3 above would have been obvious to the person skilled in the art, it comes to the conclusion that the examining division was correct in its finding that the subject-matter of claim 1 of the main request does not involve an inventive step within the meaning of Article 56 EPC.

3. **Main request beta - Inventive step**

It is common ground that the amendment made to claim 1 according to the beta version of the main request does

not address the issue of lack of inventive step raised with respect to claim 1 of the main request (see minutes of the oral proceedings held on 12 October 2022). Therefore, the board comes to the conclusion that the subject-matter of claim 1 of "Main Request Beta" does not involve an inventive step within the meaning of Article 56 EPC.

4. **First and second auxiliary requests and their beta versions - Clarity**

4.1 Article 84 EPC provides that the claims must be clear.

It is established case law that the independent claims must specify all the essential features of the invention (see Case Law, II.A.3.2).

4.2 Claim 1 of the first and second auxiliary requests and their beta versions is directed to a computer-readable memory medium having program instructions executable by a computer system to implement steps of a specified method. The last feature reads as follows:

*assigning a property value consistent with the second facies to grid points of the second submesh*

4.3 The determination of the property values consistent with the second facies is an absolute precondition for the assignment of these values to grid points of the second submesh and for the simulation that is intended to be executed on the basis of these grid points and their properties (see paragraph [0114] of the description of the application in hand). Therefore, the board is of the view that this determination represents an integral part of the invention, unlike what was suggested by the appellant (see point XVI. above).

4.4 It is undisputed that the feature identified under point 4.2 above covers the determination, by the program instructions of the computer-readable memory medium, of the property values consistent with the second facies. However, the claim does not specify any feature allowing program instructions to determine property values consistent with a facies. In particular, the claim does not specify any feature guaranteeing that the properties of the facies are known to the system. Claim 1 specifies a step of "*receiving user input indicating that a boundary of the polygon represents an unconformity between a first facies and a second facies*". Contrary to the appellant's statement (see point XVI. above), it cannot be deduced from this wording that, as a result of the user input, the types of the first and second facies - and the properties thereof - are known to the system. Indicating that there is an unconformity between a first facies and a second facies may simply trigger the generation of the new mesh for the surface on the basis of the polygon. Claim 1 further specifies that "*at least a portion of the first submesh is assigned to the first facies, wherein the second submesh is assigned to the second facies*". It can also not be deduced from this wording that, as a result of the assignment of the portions of the submeshes to facies, the system knows the properties of the first facies and the second facies. The step may simply mean that graphical objects created to represent the first and second facies are associated with the relevant portions of the first and second submeshes. Therefore, the claim does not specify all the essential features of the invention.

4.5 The board agrees with the appellant that the expression "consistent with" covers not only the case in which the

property value is determined by the program but also the case in which this value is input by a user (see point XVI. above). However, if both cases had been explicitly specified in the claim, there is no doubt that the claim would not have specified all the essential features for the first case. The board cannot see why a different conclusion should be reached simply because these two cases are implicitly covered by an umbrella term.

4.6 In view of the above, the board finds that claim 1 of the first and second auxiliary requests and their beta versions is not clear and, therefore, that these requests do not meet the requirements of Article 84 EPC.

5. **Request for remittal of the case to the first-instance department**

Since the board has decided on the allowability of all claim requests on file, remitting the case to the department of first instance for further prosecution under Article 111(1), second sentence, EPC would serve no purpose. Therefore, this request is refused.

6. **Conclusion**

Since none of the requests on file is allowable, the appeal must be dismissed.

**Order**

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

The appeal is dismissed.

The Registrar: The Chair:

K. Boelicke B. Willems

Decision electronically authenticated