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Datasheet for the decision of 28 January 2025

Case Number: T 1985/22 - 3.5.04

Application Number: 17811115.9

Publication Number: 3329466

IPC: G06T19/00, G06T17/00, G06T15/10, G06F3/01

Language of the proceedings: EN

Title of invention:
MIXED-REALITY ARCHITECTURAL DESIGN ENVIRONMENT

Applicant:
DIRTT Environmental Solutions, Ltd.

Headword:

Relevant legal provisions:
EPC Art. 84
RPBA 2020 Art. 12(4), 12(6), 13(1), 13(2)

Keyword:
Auxiliary requests 1, 2, 3A - admittance (no)
Remaining requests - clarity (no)

Decisions cited:

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Catchword:

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Case Number: T 1985/22 - 3.5.04

D E C I S I O N
of Technical Board of Appeal 3.5.04
of 28 January 2025

Appellant: (Applicant)	DIRTT Environmental Solutions, Ltd. 7303 30th Street SE Calgary, Alberta T2C 1N6 (CA)
Representative:	Schröer, Gernot H. Meissner Bolte Patentanwälte Rechtsanwälte Partnerschaft mbB Bankgasse 3 90402 Nürnberg (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 14 March 2022 refusing European patent application No. 17811115.9 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 examining division's decision to refuse European patent application No. 17 811 115.9.

II. The decision was based on the ground that claim 1 of the main request and of the first to sixth auxiliary requests then on file was not clear (Article 84 EPC).

III. The applicant (appellant) filed notice of appeal. With the statement of grounds of appeal, it filed claims of a main request and of auxiliary requests 1 to 7. The appellant indicated that these requests underlay the decision under appeal, with the exception of auxiliary request 1, which was a new request on appeal. The appellant also submitted arguments to support its view that the independent claims of all the requests were clear.

IV. The appellant was summoned to oral proceedings. In a communication under Article 15(1) RPBA, the board gave its preliminary opinion that claim 1 of the main request and of auxiliary requests 3 to 7 was not clear and not supported by the description (Article 84 EPC). The board noted that auxiliary request 2 was also a new request on appeal. It was minded to exercise its discretion under Article 12 RPBA by not admitting auxiliary requests 1 and 2 into the appeal proceedings.

V. By letter dated 23 December 2024, the appellant filed auxiliary request 3A. It submitted arguments to support its view that this request should be admitted into the appeal proceedings and that claim 1 of auxiliary requests 3 and 3A was clear.

VI. The oral proceedings before the board were held on 28 January 2025.

The appellant's final requests were that the decision under appeal be set aside and that a European patent be granted on the basis of the claims of the main request filed with the statement of grounds of appeal or, alternatively, that the case be remitted to the first instance department for examination of novelty and inventive step on the basis of the claims of the main request filed with the statement of grounds of appeal or one of auxiliary requests 1 to 3 filed with the statement of grounds of appeal, or auxiliary request 3A filed by letter dated 23 December 2024, or one of auxiliary requests 4 to 7 filed with the statement of grounds of appeal.

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

VII. Claim 1 of the appellant's requests reads as follows:

Main request

"A computer system for managing multiple distinct perspectives within a mixed-reality design environment, comprising:

multiple different mixed-reality viewing devices configured to implement a mixed reality environment, wherein mixed reality comprises any usage of computer-generated elements that incorporate a virtual object within a user's real-world space;

one or more processors (110); and

one or more computer-readable media (130) having stored thereon executable instructions that when

executed by the one or more processors (110) configure the computer system to perform at least the following:

load (610) a three-dimensional architectural model into memory, wherein:

the three-dimensional architectural model is associated with a virtual coordinate system, and

the three-dimensional architectural model comprises at least one virtual object (220,230,240) that is associated with an independently executable software object that comprises independent variables and functions that are specific to a particular architectural element that is represented by the at least one virtual object (220,230,240), the independently executable software object comprising a set of computer-executable instructions used in object-oriented program code, and which relate to a particular physical component or feature;

associate (620) the virtual coordinate system with a physical coordinate system within a real-world environment;

transmit (630) to each device of the multiple different mixed-reality viewing devices (150a,150b, 150c;410) rendering information, wherein the rendering information comprises:

three-dimensional image data comprising rendering instructions for the at least one virtual object (220,230,240) within least a portion of the three-dimensional architectural model, the three-dimensional image data further comprising only geometries and textures of the at least one virtual object, the rendering information configured to render a mixed-reality environment, and

coordinate information that maps the virtual coordinate system to the physical coordinate system;

receive from a particular device of the multiple different mixed-reality viewing devices (150a, 150b, 150c; 410) a ray (430) that extends from a particular portion (300) of a user's perspective towards a rendered portion of the three-dimensional architectural model;

determine that the ray (430) intersects with the at least one virtual object (220, 230, 240) that is associated with the independently executable software object;

identify one or more functions associated with the independently executable software object that is associated with the at least one virtual object (220, 230, 240); and

generate a command interface (320) that depicts one or more commands related to the one or more functions, wherein the command interface is generated within the three-dimensional architectural model rendered by the particular device."

Auxiliary request 1

As in the main request, wherein claim 1 has the following amendments (added features are underlined; deleted features are ~~struck-through~~):

" [...]

the three-dimensional architectural model is ~~associated with~~mapped to a virtual coordinate system, and

the three-dimensional architectural model comprises ~~at least one virtual object (220,230,240) that is associated with an independently executable~~a software object that comprises ~~independent~~ variables and functions that are

specific to a particular architectural element that is represented by ~~the~~ at least one virtual object (220,230,240)~~, the independently executable software object comprising a set of computer-executable instructions used in object-oriented program code, and which relate to a particular physical component or feature~~;

[...]

determine that the ray (430) intersects with the at least one virtual object (220, 230, 240) that is associated with the~~ independently executable~~ software object;

identify one or more functions associated with the~~ independently executable~~ software object that is associated with the at least one virtual object (220, 230, 240); and

[...] ."

Auxiliary request 2

As in the main request, wherein the clean version of claim 1 of auxiliary request 2 has the following amendments:

"[...]

one or more computer-readable media (130) having stored thereon executable instructions that when executed by the one or more processors (110) ~~configure~~ cause the computer system to~~ perform at least the following:~~

description [0007]

load (610) a three-dimensional architectural model into memory, wherein:

the three-dimensional architectural model is associated with a virtual coordinate system, and

the three-dimensional architectural model comprises at least one virtual object (220,230,240) that is associated with an independently executable software object that comprises independent variables and functions that are specific to a particular architectural element that is represented by the at least one virtual object (220,230,240), wherein the independently executable software object is functional within the architectural design software application (100) and provides context and functionality specific to the particular architectural element with which the independently executable software object is associated,

the independently executable software object comprising a set of computer-executable instructions used in object-oriented program code, and which relate to a particular physical component or feature;

[...]

generate a command interface (320) that depicts one or more commands related to the one or more functions, wherein the command interface is only generated within the three-dimensional architectural model rendered by the particular device."

Auxiliary request 3

As in the main request, wherein the following text is added at the end:

", wherein the command interface (320) is only generated within the three-dimensional architectural model that is rendered by the particular device"

Auxiliary request 3A

As in auxiliary request 3, wherein claim 1 has the following amendments:

"[...]
multiple different mixed-reality viewing devices being head-mounted displays (410) configured to implement [...]
the three-dimensional architectural model comprises ~~at least one~~a plurality of virtual objects (220,230,240), wherein each of the virtual objects (220,230,240) ~~that~~ is associated with an independently executable software object that comprises independent variables and functions that are specific to a particular architectural element that is represented by the ~~at least one~~ virtual object (220,230,240) that is associated with the independently executable software object, the independently executable software object comprising a set of the ~~computer-~~executable instructions used in object-oriented program code, and which relate to a particular physical component or feature;
wherein, before a virtual object (220, 230, 240) is displayed to a user, the user must point their head-mounted display (410) at a target (210) within a real-world environment and wherein the location of the target (210) is known to the one or more processors (110), so that the one or more processors (110) can generate the virtual coordinate system and
[...]

three-dimensional image data comprising rendering instructions for the ~~at least one~~ virtual objects (220,230,240) within ~~least a portion of~~ the three-dimensional architectural model, the three-dimensional image data further comprising only geometries and textures of the ~~at least one~~ virtual objects (220,230,240), ~~the rendering information configured to render a mixed-reality environment~~, and

[...]

receive from a particular device of the multiple different mixed-reality viewing devices (150a, 150b, 150c; 410) a ray (430) that extends from a particular portion (300) of a user's ~~perspective~~field of view towards a rendered portion of the three-dimensional architectural model;

determine that the ray (430) intersects with ~~the at least~~ one of the virtual objects (220, 230, 240) that is associated with the independently executable software object;

identify ~~one or more~~ functions ~~associated with~~ comprised by the independently executable software object that is associated with the ~~at least~~ one virtual objects (220, 230, 240); and

generate a command interface (320) that depicts one or more commands related to the ~~one or more~~ functions, wherein [...]."

Auxiliary request 4

As in auxiliary request 3, wherein claim 1 has the following amendments:

"[...]

determine that the ray (430) intersects with the at least one virtual object (220, 230, 240) that is

associated with the independently executable software object, wherein determining that the ray (430) intersects with a rendered representation of the at least one virtual object (220,230,240), comprises:

extending the ray (430) within the three-dimensional architectural model until it intersects the at least one virtual object (220,230,240);

[...]"

Auxiliary request 5

As in auxiliary request 3, wherein claim 1 has the following amendments:

"[...]

receive from a particular device of the multiple different mixed-reality viewing devices (150a, 150b, 150c; 410) a selection of an area (250) by a user that depicts a particular portion of the mixed-reality environment that the user desires to interact with, wherein, upon the selection by the user, the particular device calculates a ray (430) that extends from ~~a~~the particular portion ~~(300)~~ of a user's perspective towards ~~a rendered portion~~the area (250) of the three-dimensional architectural model;

[...]"

Auxiliary request 6

As in auxiliary request 5, wherein claim 1 has the following amendments:

"[...]

determine that the ray (430) intersects with the at least one virtual object (220, 230, 240) that is associated with the independently executable software object by extending the ray (430) within the three-dimensional architectural model until it intersects the at least one virtual object (220,230,240);

[...]"

Auxiliary request 7

As in auxiliary request 6, wherein claim 1 has the following amendments:

"[...]

multiple different mixed-reality viewing devices including at least one head-mounted display (410) configured to [...]

receive from ~~a particular device of the multiple different mixed-reality viewing devices~~the head-mounted display (~~150a, 150b, 150c;~~ 410) a selection of an area (250) by a user making a pinching motion with his hand (310) that depicts a particular portion of the mixed-reality environment that the user desires to interact with, wherein, upon the selection by the user, the ~~particular device~~head-mounted display (410) calculates a ray (430) that extends from the particular portion of a user's perspective towards the area (250) of the three-dimensional architectural model;

[...]

generate a command interface (320) that depicts one or more commands related to the one or more functions, wherein the command interface is generated within the three-dimensional architectural model rendered by the ~~particular~~

~~device~~head-mounted display (410), wherein the command interface (320) is only generated within the three-dimensional architectural model that is rendered by the ~~particular device~~head-mounted display (410)."

Reasons for the Decision

1. The appeal is admissible.

Summary of the invention

2. The application in hand relates to a computer system comprising an architectural design software application in communication with mixed-reality devices (such as head-mounted displays or mobile phones) (see Figure 1). It enables architects or interior designers to visualise and interact with virtual three-dimensional objects (such as cubicles, desks or light fixtures) in the real space for which they have been designed (see Figure 2). Each user can interact with a virtual object by selecting it (see Figures 3 and 4). The user's mixed-reality device then calculates a ray that points to the selected virtual object and transmits that ray to the software application. The software application determines the selected virtual object based on the ray and generates the rendering information necessary for the mixed-reality device to generate a command interface specific to that object in the mixed-reality environment (see Figure 3: 320).

Main request and auxiliary requests 3 and 4 to 7 - clarity

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

A claim lacks clarity if, *inter alia*, the exact distinctions which delimit the scope of protection cannot be derived from it. The independent claims must specify all the essential features of the invention, the meaning of which should be clear for the skilled person from the wording of the claim alone (see Case Law of the Boards of Appeal of the European Patent Office, 10th edition, 2022, II.A.3.1 and II.A.3.2).

4. Claim 1 of the main request and of auxiliary requests 3 and 4 specifies that the computer system is configured to receive from a particular device of the multiple different mixed-reality viewing devices a ray that extends from "*a particular portion (3003) of a user's perspective*" towards a rendered portion of the three-dimensional architectural model.

5. One of the definitions of "perspective" given by the Merriam Webster (https://www.merriam-webster.com/dictionary/perspective) is "*the appearance to the eye of objects in respect to their relative distance and positions*". In its letter of 23 December 2024, the appellant submitted that this definition was a perfect description of the user's perspective that was enabled and delimited by the specific mixed-reality device that was worn by the user. However, the appellant did not explain how the definition was to be delimited by the specific mixed-reality device. Moreover, the board understands this definition as referring to the mental processing of the images projected on the retinas of the eyes. To consider a particular portion of this processing as the origin of a three-dimensional ray does not make technical sense.

6. Another definition of "perspective" given by the Merriam Webster is "*a picture in perspective*". However,

it is evident that the "user's perspective" is not to be equated with a "user's picture in perspective" in the context of the invention.

7. In view of the previous two points, the board can only speculate about whether "a particular portion of a user's perspective" is meant to refer to a portion of the real and virtual objects positioned in the real space (the "objects" referred to in the first definition given above) or a portion of the virtual objects as they are rendered on the display of the mixed-reality device (each rendering of a virtual object may be considered a "picture in perspective" and thus a "perspective" according to the second definition).

8. The appellant submitted that the feature identified in point 4. above was clear to the skilled person. It relied on paragraphs [0037] to [0039] as well as Figures 3 and 4 of the application as filed and argued that (i) the user's perspective was understood to correspond to the "user's view" mentioned in paragraph [0037], (ii) the origin of the ray (i.e. the particular portion of a user's perspective) was understood to be on the display of the mixed-reality device, for example at its centre, as shown in Figure 4, and (iii) the ray was calculated on the basis of a line that was perpendicular to the display, as also shown in Figure 4.

9. The appellant's arguments cannot be accepted. The origin of the ray is not shown on the surface of the head-mounted display in Figure 4, but at an unspecified location in front of it. Paragraphs [0037] and [0038] of the application as filed do not specify this location either. Paragraph [0037] describes that the

mixed-reality device calculates a ray that extends from a particular portion of the "user's perspective" towards an area selected by the user within the "user's view". There is no indication that the same meaning should be given to "user's perspective" and "user's view" or that "user's view" refers to the surface of the display of the mixed-reality device.
Paragraph [0038] of the description as filed specifies that the centre of the user's field of view can be the "particular portion". However, in this paragraph the centre of the user's field of view is not presented as the origin of the ray but as a reference on the basis of which an angle indicating the direction of the ray is calculated. Paragraph [0039] further specifies that the coordinates on the basis of which the angle is calculated could be associated with a location other than the centre of the user's field of view. No mention is made of the origin of the ray in this paragraph either. Furthermore, it cannot be derived from Figure 4 that the line which appears to extend to the user's thumb is perpendicular to the head-mounted display.

10. The board further notes that the origin of the ray in Figure 4 does not seem to be related to the objects viewed by the user, contrary to what the two definitions discussed in points 5. and 6. above - i.e. the wording of the claim alone - might have suggested.

11. In view of the above, the appellant's arguments do not convince the board that the origin of the ray, i.e. the "particular portion of the user's perspective", is clear in the light of the description, let alone from the wording of claim 1 of the main request or of auxiliary requests 3 or 4 alone.

12. Claim 1 of auxiliary requests 5 and 6 specifies that the computer system is configured to receive from a particular device of the multiple different mixed-reality viewing devices a selection of an area by a user that depicts a particular portion of the mixed-reality environment that the user desires to interact with, wherein, upon the selection by the user, the particular device calculates a ray that extends from the particular portion of a user's perspective towards the area of the three-dimensional architectural model.

Claim 1 of auxiliary request 7 further specifies that the particular device is a head-mounted display and that the selection of the area is carried out by the user making a pinching motion with their hand.

13. The "particular portion of a user's perspective" is not to be equated with the "particular portion of the mixed-reality environment that the user desires to interact with" since the former represents the origin of the ray and the latter the area towards which the ray extends. Thus the amendments made to claim 1 in accordance with auxiliary requests 5 to 7 do not clarify the origin of the ray.

14. In view of the above, the board concludes that claim 1 of the main request and of auxiliary requests 3 and 4 to 7 does not meet the requirements of Article 84 EPC.

Auxiliary request 1 - admittance

15. The amendments made to claim 1 in accordance with auxiliary request 1 are shown in point VII. above. These amendments are intended to address clarity objections raised in the decision under appeal (see point C.6 of the statement of grounds of appeal).

16. Since auxiliary request 1 did not form the basis of the decision under appeal, it represents an amendment pursuant to Article 12(4) RPBA.

17. According to Article 12(4) RPBA, "[t]*he party shall ... provide reasons for submitting* [each amendment] *in the appeal proceedings*" and "*[t]he Board shall exercise its discretion in view of,* inter alia*, the complexity of the amendment, the suitability of the amendment to address the issues which led to the decision under appeal, and the need for procedural economy*".

Additionally, Article 12(6) RPBA stipulates that "[t]*he Board shall not admit requests ... which should have been submitted ... in the proceedings leading to the decision under appeal, unless the circumstances of the appeal case justify their admittance.*"

18. The appellant has not provided reasons for not submitting auxiliary request 1 until the appeal proceedings. Moreover, paragraphs [0027] to [0030] of the application as filed, referred to by the appellant in point C.6 of its statement of grounds of appeal as a basis for the amendments, clearly use the terms "*associated with*", "*independently executable software object*" and "*independent variables and function*". Hence the amendments *prima facie* give rise to objections under Article 123(2) EPC.

19. Additionally, the examining division consistently raised clarity objections with respect to the terms "*associated with*" and "*independently executable software object*" during the first-instance proceedings (see point 2 of the communication dated 7 January 2020, point 1 of the communications dated 10 August 2020 and

9 April 2021, and point 2 of the minutes of the oral proceedings). Therefore, if the appellant was of the view that auxiliary request 1 overcame these objections, it should have submitted it during the examination proceedings. Furthermore, the board cannot identify any circumstances of the appeal case justifying its admittance.

20. At the oral proceedings, the appellant referred to its written submissions.

21. In view of the above, the board exercised its discretion under Article 12(4) and (6) RPBA by not admitting auxiliary request 1 into the appeal proceedings.

Auxiliary request 2 - admittance

22. Contrary to what is suggested by section B of the statement of grounds of appeal, auxiliary request 2 is also a new request on appeal. The claims of auxiliary request 2 differ from those of the first auxiliary request underlying the decision under appeal in that the terms "*the architectural design software application (100)*" in claims 1 and 5 have been amended as follows: "*an~~the~~ architectural design software application (100)*".

23. Paragraph [0027] of the application as filed, referred to by the appellant as a basis for the amendment (see marked-up version of auxiliary request 2), clearly refers to "*application 100*", which comprises elements 110 to 140 according to Figure 1, not a more generic architectural design software application. Therefore auxiliary request 2 *prima facie* gives rise to a new objection under Article 123(2) EPC.

24. At the oral proceedings, the appellant referred to its written submissions. However, it did not provide written arguments as to why auxiliary request 2 should be admitted into the proceedings.

25. In view of this, the board exercised its discretion under Article 12(4) RPBA by not admitting auxiliary request 2 into the appeal proceedings.

Auxiliary request 3A - admittance

26. Auxiliary request 3A was filed after notification of the board's communication under Article 15(1) RPBA.

27. According to Article 13(2) RPBA, "[a]*ny amendment to a party's appeal case made* [...] *after notification of a communication under Article 15, paragraph 1, shall, in principle, not be taken into account unless there are exceptional circumstances, which have been justified with cogent reasons by the party concerned.*"

28. As argued by the appellant in point 1 of its reply of 23 December 2024, auxiliary request 3A represents a direct reaction addressing objections raised for the first time in the board's communication under Article 15(1) RPBA. Thus there are exceptional circumstances which have been justified with cogent reasons by the party concerned.

29. However, when exercising its discretion under Article 13(2) RPBA, the board may also rely on criteria set out in Article 13(1) RPBA (see Supplementary publication 2, OJ EPO 2020, Explanatory remarks on Article 13(2), fourth paragraph).

In the case of an amendment to a patent application, one of the criteria set out in Article 13(1) RPBA is "*whether the party has demonstrated that any such amendment*, prima facie, *overcomes the issues raised ... by the Board and does not give rise to new objections*".

30. Claim 1 of auxiliary request 3A differs from claim 1 of auxiliary request 3 in that, *inter alia*, the expression "a user's perspective" has been replaced with "a user's field of view". In point 3.2 of its letter dated 23 December 2024, the appellant indicated paragraph [0038] of the application as filed as a basis for this amendment.

31. As indicated in point 9. above and in point 16 of the board's communication, the centre of the user's field of view is not presented as the origin of the ray in paragraph [0038] of the application as filed but as a reference on the basis of which an angle indicating the direction of the ray is calculated.

32. At the oral proceedings, the appellant referred to its written submissions.

33. In view of the above, the appellant did not demonstrate that the amendment, *prima facie*, did not give rise to a new objection of added matter pursuant to Article 123(2) EPC.

34. Therefore the board exercised its discretion relying on the criteria set out in Article 13(1) RPBA and decided not to admit auxiliary request 3A into the appeal proceedings.

Conclusion

35. Since auxiliary requests 1, 2 and 3A were not admitted into the appeal proceedings and the remaining requests are not 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