PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

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PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2018/049327	04.09.2018	26.09.2017

International Patent Classification (IPC) or both national classification and IPC
INV. G06F17/50

Applicant
SIEMENS PRODUCT LIFECYCLE MANAGEMENT SOFTWARE INC.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notifed the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA:	Date of completion of this opinion	Authorized Officer
European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Fax: +49 89 2399 - 4465	see form PCT/ISA/210	Alexe, Mihai Telephone No. +49 89 2399-0

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed.

   ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:

   a. ☐ forming part of the international application as filed:

      ☐ in the form of an Annex C/ST.25 text file.

      ☐ on paper or in the form of an image file.

   b. ☐ furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.

   c. ☐ furnished subsequent to the international filing date for the purposes of international search only:

      ☐ in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).

      ☐ on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	
	No:	Claims	1-15
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-15
Industrial applicability (IA)	Yes:	Claims	1-15
	No:	Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1 Reference is made to the following documents:

D1 WO 2017/009128 A1 (JETCAM INT SARL [MC]) 19 January 2017

D2 CAUDELL T P ET AL: "*Augmented reality: an application of heads-up display technology to manual manufacturing processes*", 7 January 1992, p. 659-669, DOI: 10.1109/HICSS.1992.183317

Lack of novelty (Art. 33(2) PCT)

2 The present application does not meet the criteria of Art. 33(1) PCT because the subject-matter of **claims 1, 7** and **13** is not new (Art. 33(2) PCT).

2.1 **D1** discloses, in the words of **claim 1** (references to **D1** in brackets):

A system [**claim 1**: the headset comprising a processor and an optical device]

comprising:

an augmented reality (AR) headset [**claim 1**: "a *headset* configured to *augment a wearer of the headset's view of fabric shapes (...) comprising (...) an optical device*"; **abstract**; **Fig. 3a**]

configured to drive an AR view that digitally visualizes ply placement data [**p. 1**, **par. 1-3**: "The present invention relates to the (...) manufacture of *composite products*. A composite product may be formed by arranging a plurality of *fabric shapes* into a *mould* (...) Those skilled in the art may refer to the stacks as kits, and the fabric shapes as *plies*"]

on a composite part layup tool [**Fig. 3a**: the *moulds* in which fabric shapes are stacked]

physically visible through the AR headset; [**Fig. 3b-3d**; **claim 17**: "*wearer's field of view*"; **Fig. 5** and **p. 17, l. 1-2**: "The headset 20 *recognises that the stack 75 and the mould 80 are within its field of view 40*"]

and

an AR ply layup engine [**claim 1**: the processor] configured to:

analyze a view of the AR headset to identify the composite part layup tool; [**p. 17, l. 1-2**, with references to **Fig. 5**: "The headset 20 *recognises that the stack 75 and the mould 80 are within its field of view 40*, by the processor PRC analyzing video from the camera CAM"]

match a computer-aided design (CAD) generated ply placement position of a given ply to layup via the composite part layup tool; [flow diagram of **Fig. 2**, steps 101-102, and **p. 12, l. 11-18**: *design* nest of fabric shapes, send nest data to AR headset, "the designed nest of fabric shapes includes *data specifying which product (mould) each fabric shape is intended for, and whereabouts the fabric shape should be placed relative to the other fabric shapes for the same mould*"]

and provide the CAD generated ply placement position of the given ply to the AR headset [**Fig. 2**, step 102: nest data to headset] as the ply placement data to digitally overlay on the composite part layup tool physically visible through the AR headset. [**claim 1**: "optical device configured to *overlay graphics in the wearer's field of view according to instructions from the processor*"; **claim 16**: "the processor is configured to instruct the optical device to highlight a (...) fabric shape to be picked up from the stacks of fabric shapes, and to *highlight one of a plurality of moulds* into which the (...)fabric shape should be added"; **claim 17**: "the processor is configured to instruct the optical device to *highlight the mould by overlaying an image of the fabric shape on top of the mould in the wearer's field of view*, the image showing the wearer *whereabouts to place the fabric shape within the mould*"; **p. 9, l. 6-8**: "the *size, shape, and position of the overlaid image is the same as the size, shape, and position of the fabric shape when it is in its place within the mould*"]

2.2 For completeness, we note that **D1** teaches both individual "*aspects*" of the invention and their *combination* (see **p. 10, l. 6-7** and the claims).

2.3 With regard to **claims 7** and **13**, we note that **D1** teaches a corresponding method [**D1**, **claim 25**] and a computer-readable storage device comprising code for configuring the headset [**D1**, **claim 23**].

2.4 Further to **claim 13**, **D1** teaches incremental placement paths (i.e. ply placement sequences), see **p. 8, l. 10-18** and **p. 9, l. 10-19**:

> "the processor is configured to instruct the optical device to overlay an *image of a **next** one of the fabric shapes to be placed in the mould* (...) and shows the wearer whereabouts to place the next fabric shape within the mould."

2.5 **Claims 2 - 6**, **8 - 12** and **14 - 15** are also not novel over **D1** (references below are to **D1**):

(i) Claims 2 and **8**: see **p. 8, l. 10-18** and **p. 9, l. 10-19**.

(ii) Claims 3, 9 and **14**: **p. 9, l. 6-19**.

(iii) Claims 4 and **10**: **p. 13, l. 10-11** and **p. 19, l. 23-25**.

(iv) Claims 5 and **11**: **Fig. 3c** and **p. 13, l. 27-32**.

(v) Claims 6, 12 and **15**: **p. 3, l. 32 - p. 4, l. 2**.

Re Item VII

Certain defects in the international application

2.6 The independent claims are not in the two-part form in view of **D1** (Rule 6.3(b) PCT).

2.7 The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

2.8 The relevant background art disclosed in **D1** and **D2** is not mentioned in the description, nor are these documents identified therein (Rule 5.1(a)(ii) PCT).

Re Item VIII

Certain observations on the international application

Lack of clarity (Art. 6 PCT)

3 **Claims 2, 3, 8, 9, 13** and **14** are not clear, for the following reasons:

3.1 **Claims 2**, **8** and **13**: The meaning of "*incremental placement path*" is not clear to the skilled person. This unclear expression has been interpreted as "*a sequence to layup a particular ply*" (description, par. [**0036**]).

3.2 **Claims 3**, **9** and **14**: The expressions "*surface complexities*" and "*effectiveness of a ply layup*" do not have a well-defined technical meaning and are considered unclear. Said expressions have been read in view of description, see par. [**0034**], [**0040**], [**0050**]. However, their technical meaning should have been clear to the skilled person *from the wording of the claim alone*.

3.3 Further to **claim 3**: The reference to the "*layup simulation tool*" being provided to the AR headset is unclear. The corresponding claim feature has been taken to mean:

"provide the *layup simulation* to the AR headset" (cf. **claims 9** and **14**).

3.4 **Claims 6**, **12**, and **15**: The claim wording "*real-time feedback resulting for the analysis*" appears incorrect and should have read "*real-time feedback resulting from the analysis*".