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(71) Applicant: **KONINKLIJKE PHILIPS N.V.** [NL/NL]; High Tech Campus 5, NL-5656 AE Eindhoven (NL).

(72) Inventors: **HUMMEL, Erik**; c/o High Tech Campus 5, NL-5656 AE Eindhoven (NL). **HOMAN, Robert Johannes Frederik**; c/o High Tech Campus 5, NL-5656 AE Eindhoven (NL). **BABIC, Drazenko**; c/o High Tech Campus 5, NL-5656 AE Eindhoven (NL). **BALGUID, Angélique**; c/o High Tech Campus 5, NL-5656 AE Eindhoven (NL).

(74) Agents: **STEFFEN, Thomas** et al.; High Tech Campus Building 5, NL-5656 AE Eindhoven (NL).

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[Continued on next page]

(54) Title: AUGMENTED REALITY IMAGING SYSTEM FOR SURGICAL INSTRUMENT GUIDANCE

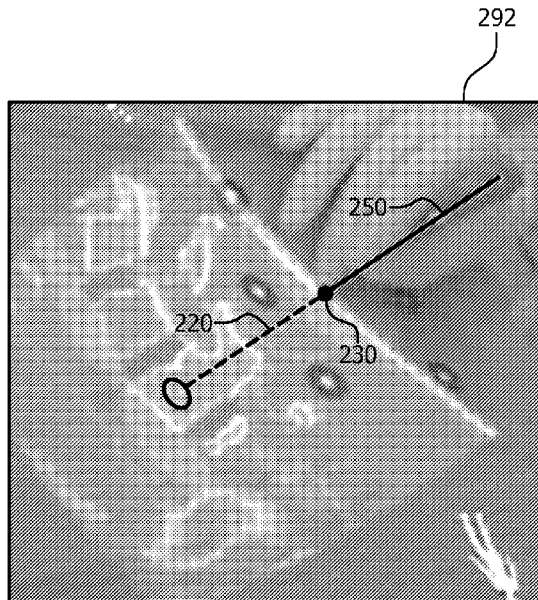


FIG. 3b

(57) Abstract: Imaging system (100) for enabling instrument guidance in an interventional procedure, comprising: -an input (130) for obtaining an interventional path (220) for use in the interventional procedure, the interventional path being planned based on 3D image data (200) of a patient's interior, and the interventional path being indicative of an entry point (230) on the patient's exterior; -a camera (124-127) for obtaining a camera image (270) of the patient's exterior during the interventional procedure; -a processor (140) for i) establishing a spatial correspondence between the camera image and the 3D image data, ii) based on the spatial correspondence, calculating a view (280) of the interventional path that corresponds with the camera image, and iii) combining the view of the interventional path with the camera image to obtain a composite image (290); and -a display output (150) for displaying the composite image on a display (162).



Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

- *with international search report (Art. 21(3))*

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10 July 2014

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2013/055697

A. CLASSIFICATION OF SUBJECT MATTER
 INV. A61B19/00 G06T19/00
 ADD. A61B6/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
 Minimum documentation searched (classification system followed by classification symbols)
 A61B G06T

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/251030 A1 (AZAR FRED S [US] ET AL) 10 November 2005 (2005-11-10)	1,6, 8-10, 12-15
Y	paragraphs [0002], [0006], [0011], [0017], [0020] - [0028] figures 1-4	1-5,9
Y	----- WO 2010/067281 A1 (KONINKL PHILIPS ELECTRONICS NV [NL]; HENDRIKS BERNARDUS H W [NL]; DESJ) 17 June 2010 (2010-06-17) cited in the application figures 1,3,5 page 2, lines 4-17 page 4, lines 4-5 page 9, lines 29-31 page 10, line 34 - page 11, line 2 -----	1-5,9

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search
 20 December 2013

Date of mailing of the international search report
 13/03/2014

Name and mailing address of the ISA/
 European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040,
 Fax: (+31-70) 340-3016

Authorized officer
 Erbel, Stephan

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2005251030	A1	CN 1689518 A	02-11-2005
		US 2005251030 A1	10-11-2005

WO 2010067281	A1	CN 102245106 A	16-11-2011
		EP 2375988 A1	19-10-2011
		JP 2012511381 A	24-05-2012
		RU 2011128330 A	20-01-2013
		US 2012008741 A1	12-01-2012
		WO 2010067281 A1	17-06-2010

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2013/055697

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-6, 8-10, 12-15

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-6, 8-10, 12-15

An imaging system for interventional instrument guidance, directed at the system comprising a C-arm to which a camera is affixed.

2. claim: 7

An imaging system for interventional instrument guidance, directed at the system comprising more than two cameras between which the user may select.

3. claim: 11

An imaging system for interventional instrument guidance, directed at the system being arranged for registering the camera image with 3D image data, based on analysis of the camera image.
