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(71) Applicant *(for all designated States except US)*: **VERAN MEDICAL TECHNOLOGIES, INC.** [US/US]; 2942 Primrose Circle, Nashville, TN 37212 (US).

(72) Inventor; and

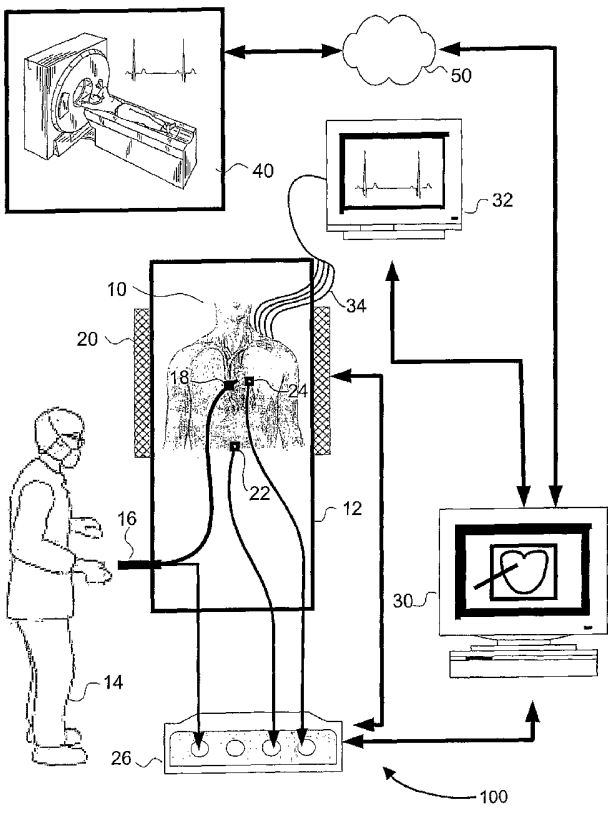
(75) Inventor/Applicant *(for US only)*: **EDWARD, Jerome, R.** [US/US]; 2657 Blakemore Avenue, Nashville, TN 37212 (US).

(74) Agent: **GARRETT, Mark, T.**; Fulbright & Jaworski, L.L.P., 600 Congress Avenue, Suite 2400, Austin, TX 78701 (US).

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[Continued on next page]

(54) Title: METHODS, APPARATUSES, AND SYSTEMS USEFUL IN CONDUCTING IMAGE GUIDED MEDICAL INTERVENTIONS



(57) Abstract: Methods, apparatuses, and systems relating to image guided interventions on dynamic tissue. One embodiment is a method that includes creating a dataset that includes images, one of the images depicting a non-tissue internal reference marker (24), being linked to non-tissue internal reference marker positional information, and being at least 2-dimensional. Another embodiment is a method that includes receiving a position of an instrument reference marker (18) coupled to an instrument; transforming the position into image space using a position of a non-tissue internal reference marker implanted in a patient; and superimposing a representation of the instrument on an image in which the non-tissue internal reference marker appears. Computer readable media that include machine readable instructions for carrying out the steps of the disclosed methods. Apparatuses, such as integrated circuits, configured to carry out the steps of the disclosed methods. Systems that include devices configured to carry out steps of the disclosed methods.

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PT, RO, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW.

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/026001

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61B19/00

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)
IPC 7 A61B

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 practical, 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 A	US 2003/125622 A1 (SCHWEIKARD ACHIM ET AL) 3 July 2003 (2003-07-03) paragraph [0006] - paragraph [0041] -----	1-25 26-54, 60-78
A	US 2002/044631 A1 (MITSCHKE MATTHIAS ET AL) 18 April 2002 (2002-04-18) paragraph [0006] -----	1-54, 60-78
A	US 6 347 240 B1 (BUCHOLZ RICHARD D ET AL) 12 February 2002 (2002-02-12) abstract -----	1-54, 60-78
X	US 6 473 635 B1 (RASCHE VOLKER) 29 October 2002 (2002-10-29) the whole document -----	1-25
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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in 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 document 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

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"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	Date of mailing of the international search report
21 December 2004	29. 04. 2005

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Held, G

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/026001

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 285 902 B1 (LEA JON T ET AL) 4 September 2001 (2001-09-04) column 7, line 57 - column 23, line 34 -----	1-7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2004/026001

Box 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 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 fee, this Authority did not invite payment of any additional fee.

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.:

see annex

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ 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: 1-54,60-78

Method and system for creating a dataset of images, computing said images and using said images for guiding an instrument. The problem solved is to precisely guide an instrument within "dynamic anatomy".

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2. claims: 55-59

Marker used for a tracking system.
The specific problem posed is a non-ferrous marker fixable to tissue.

INTERNATIONAL SEARCH REPORT

formation on patent family members

International Application No
PCT/US2004/026001

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Information on patent family members

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