Title: DYNAMIC OPTICAL TOMOGRAPHIC IMAGING DEVICES METHODS AND SYSTEMS

Abstract: The disclosed subject matter includes optical tomographic systems for acquiring and displaying dynamic data representing changes in a target tissue sample to external provocation. For example, the disclosed devices, methods and systems may be used for quantifying dynamic vascular changes caused by imposed blood pressure changes for diagnosing peripheral artery disease.

Published:

— with international search report (Art. 21(3))

— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

Date of publication of the international search report: 5 July 2012
A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - A61B 5/022 (2012.01)
USPC - 600/425

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(8) - A61B 5/022 (2012.01)
USPC - 600/425

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
IPC(8) - A61B 5/022 (2012.01)
USPC - 600/300, 407, 425, 473, 476, 480, 481, 485, 490

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PubWEST (PGPB, USPT, EPAB, JPAB); Google (Patents, Scholar, Web)
Search Terms: Optic, tomography, peripheral, arterial, vascular, disease, controller, processor, computer, generate, construct, create, light, source, detector, sensor, indicator, sequence, pattern, near, infrared, wavelength, different, simultaneous, concurrent, synchronized

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 2007/0232940 A1 (FINE et al.) 04 October 2007 (04.10.2007) Abstract; Claim 17; Fig. 1-4B; para [0061]-[0068], [0066]-[0068], [0071]-[0072], [0075]-[0080], [0093], [0096], [0099], [0101], [0104]-[0105]</td>
<td>22, 25/(22), 46, 49</td>
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<tr>
<td>Y</td>
<td>US 2010/0078756 A1 (NTZIACHRISTOS et al.) 01 April 2010 (01.04.2010) Fig. 1-2; para [0085]-[0089], [0101]-[0103], [0127], [0130], [0145], [0164]-[0166], [0181]</td>
<td>1-12, 41-44, 47-48</td>
</tr>
<tr>
<td>Y</td>
<td>US 2010/0262018 A1 (BAKKER et al.) 14 October 2010 (14.10.2010) Fig. 1; para [0029]-[0030]</td>
<td>12</td>
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</tbody>
</table>

Further documents are listed in the continuation of Box C.

* 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
  "Z" document member of the same patent family

Date of the actual completion of the international search
27 April 2012 (27.04.2012)

Date of mailing of the international search report
02 MAY 2012

Name and mailing address of the ISA/US
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### 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.: 13-21, 26-34, 38, 45
   - because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

### 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 extra 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 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.: 1-12, 22-25, 41-44, 46-49

### 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.
This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I: Claims 1-12, 22-25, 41-44, 46-49; directed to systems and methods for applying simulus.

Group II: Claims 35-37, 39, 40; directed to supports for arrays of light guides.

The inventions listed as Groups I - II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

The special technical feature of Group I is applying simulus, which is not present in Group II. The special technical feature of Group II is an array, which is not present in Group I.

The only elements of commonality between groups I and II are those of optical tomographic light guides, which is known in the prior art (ref. US 2009/0259130 A1 to Van Der Mark et al.; Title: "OPTICAL TOMOGRAPHY MEASUREMENT USING AN ADAPTED BRIM FOR THE RECEIVING VOLUME"; para [0010]-"the brim is optically coupled to at least two straight, crossing light guides"), and of an interfacing module including a plurality of light sources connected to light conduits, which is known in the prior art (ref. US 6,385,371 B1 to Li; claim 1-"An optical system comprising...a second coupler comprising at least two single fiber light guides...a second interface surface"; claim 25-"a source of focused light associated with each of said at least two single fiber light guides, each of said sources of focused light being constructed and arranged to direct light toward a focal point thereof).

Accordingly, unity of invention is lacking under PCT Rule 13.1.

Claim 15 is self-referential; it is assumed to be properly dependent upon claim 14. Claims 13-21, 26-34, 38, 45 are improper multiple dependent claims.