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[Continued on next page]

(54) Title: METHODS AND SYSTEMS FOR BLOOD FLOW MEASUREMENT USING DOPPLER OPTICAL COHERENCE TOMOGRAPHY

(57) Abstract: This invention provides methods for non-invasive, real-time measuring and/or monitoring of local blood flow in a subject. Methods of the invention generally include the steps of obtaining Doppler shift images of at least two planes intersecting blood vessels at the scanned location; determining Doppler angles using the Doppler shift images; and then using the Doppler angles thus determined together with the Doppler shift signals to arrive at a measure of the volumetric blood flow. Also provided are systems and software for performing the methods.

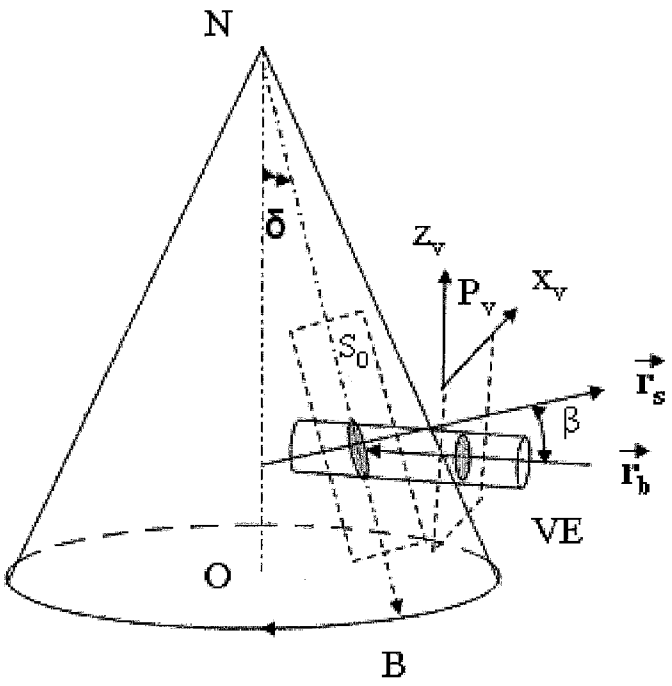

Figure 3

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European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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PCT/US 08/59954

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - A61B 8/00 (2008.04)
USPC - 600/455
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 8/00 (2008.04)
USPC : 600/455

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC : 600/452, 453, 454, 468, 465, 504 (text search)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PubWEST(USPT,PGPB,EPAB,JPAB); DialogPRO(Engineering); Google Scholar; Google
Search Terms: Optical coherence tomography, Doppler, Fourier domain, spectral, scan, two, multiple, plane, angle, Doppler shift, blood flow rate, volumetric, circle, cardiac cycle, cross, blood vessels (Continued on search history)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2006/0187462 A1 (SRINIVASAN, et al.) 24 August 2006 (24.08.2006), para [0009], [0023], [0075], [0083]-[0084], [0110], [0116]-[0117], [0136], [0140], [0146], [0161], [0189]; Figs. 3, 15 B; claim 26	1-32
Y	PEDERSEN, et al. Measurement of Absolute Flow Velocity Vector Using Dual-Angle, Delay-Encoded Doppler Optical Coherence Tomography, Optics Letters, March 2007, Vol. 32(5), page 506 to 508	1-32
Y	US 2004/0088123 A1 (JI) 06 May 2004 (06.05.2004), para [0045]-[0049]	1-16, 21, 24-26, 29-32
Y	WHITE, et al. In Vivo Dynamic Human Retinal Blood Flow Imaging using Ultra-High-Speed Spectral Domain Optical Doppler Tomography, Optical Express, December 2003, Vol. 11(25), page 3490 to 3497	6, 23
Y	YANG, et al. High Speed, Wide Velocity Dynamic Range Doppler Optical Coherence Tomography (Part I): System Design, Signal Processing, and Performance, Optical Express, April 2003, Vol. 11(7), page 794-809	12
Y	US 5,830,147 A (FEKE, et al.) 03 November 1998 (03.11.1998), col 1, ln 35-48	15

☐ 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
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"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
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Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

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