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(54) Ultrasound imaging catheter with registration of electro-anatomical map and pre-acquired image

(57) A system and method for imaging a target in a patient's body includes the steps of providing a pre-acquired image (100) of the target and placing a catheter (28) having a position sensor (32), an ultrasonic imaging sensor (40) and at least one electrode (46), in the patient's body. Positional information of a portion of the catheter in the patient's body is determined using the position sensor and electrical activity data-points of a surface of the target are acquired using the at least one electrode. An ultrasonic image of the target is obtained using the ultrasonic imaging sensor and positional information for the electrical activity data-points of the surface of the target is determined. An electrophysiological map (90) of the target is generated based on the electrical activity data-points and the positional information for the electrical activity data-points. Positional information for any pixel of the ultrasonic image of the target is determined and the pre-acquired image and the electrophysiological map are registered with the ultrasonic image. The registered preacquired image, electrophysiological map and ultrasonic image are displayed on a display (44).

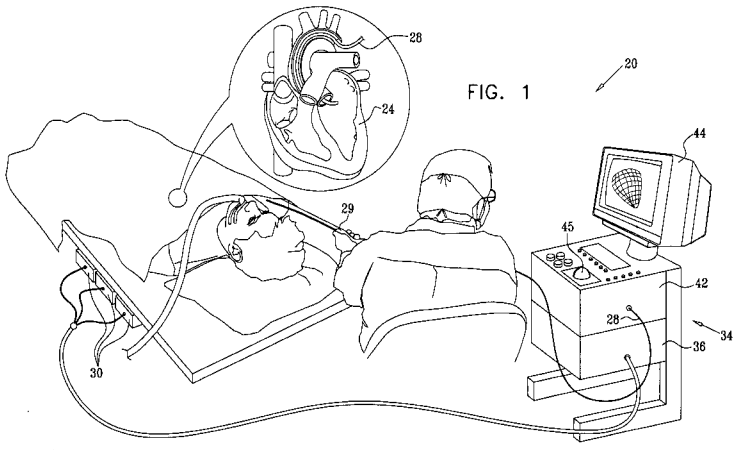
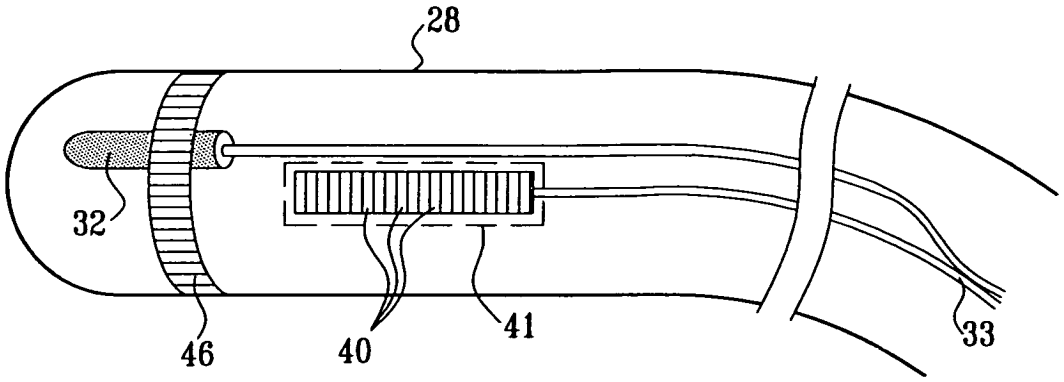


FIG. 1

EP 1 717 602 A3

(Cont. next page)

FIG. 2



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PARTIAL EUROPEAN SEARCH REPORT

which under Rule 63 of the European Patent Convention shall be considered, for the purposes of subsequent proceedings, as the European search report

Application Number EP 06 25 2222

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2003/231789 A1 (WILLIS N PARKER [US] ET AL) 18 December 2003 (2003-12-18) * the whole document * -----	1-16	INV. G01S15/89 G01S7/52 G06T17/00
X	WO 2004/086082 A (KONINKL PHILIPS ELECTRONICS NV [NL]; PESZYNSKI MICHAEL [US]; SALGO IVA) 7 October 2004 (2004-10-07) * the whole document * -----	1-3	A61B8/12 A61B5/06 ADD. A61M25/00 A61B8/06
X	WO 2004/060158 A (SCIMED LIFE SYSTEMS INC [US]) 22 July 2004 (2004-07-22) * the whole document * -----	1-13	A61B19/00 A61N7/00 A61B17/00 A61B5/04
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TECHNICAL FIELDS SEARCHED (IPC)

G01S
G06T
A61B

INCOMPLETE SEARCH

The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC to such an extent that a meaningful search into the state of the art cannot be carried out, or can only be carried out partially, for these claims.

Claims searched completely :

Claims searched incompletely :

Claims not searched :

Reason for the limitation of the search:

see sheet C

Place of search	Date of completion of the search	Examiner
Munich	14 December 2007	Anscombe, Marcel

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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INCOMPLETE SEARCH SHEET C

Application Number
EP 06 25 2222

Claim(s) searched completely:
1-16

Claim(s) not searched:
17-29

Reason for the limitation of the search (non-patentable invention(s)):

The subject-matter of claims 17-29 includes the feature of "placing a catheter .... in the patient's body" which comprises the subject-matter of insertion through a blood vessel (paragraph [0080]) of a living human. This subject-matter is a physical activity which by its nature constitutes a method step for surgery and the subjet-matter of claims 17-29 is therefore excluded from patentability under Art. 53(c) EPC and paragraphs 4-6 of the Guidelines C-IV,4.8.1.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 06 25 2222

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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14-12-2007

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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

专利名称(译)	超声成像导管，具有电解剖图和预采集图像的配准		
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申请号	EP2006252222	申请日	2006-04-25
[标]申请(专利权)人(译)	韦伯斯特生物官能公司		
申请(专利权)人(译)	生物传感韦伯斯特，INC.		
当前申请(专利权)人(译)	生物传感韦伯斯特，INC.		
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发明人	ALTMANN, ANDRES CLAUDIO GOVARI, ASSAF		
IPC分类号	G01S15/89 G01S7/52 G06T17/00 A61B8/12 A61B5/06 A61M25/00 A61B8/06 A61B19/00 A61N7/00 A61B17/00 A61B5/04 A61B5/042 A61B17/22		
CPC分类号	G06T19/00 A61B5/0035 A61B5/0037 A61B5/042 A61B5/06 A61B5/062 A61B5/7285 A61B5/743 A61B6/488 A61B6/503 A61B6/504 A61B6/5247 A61B6/541 A61B8/06 A61B8/0883 A61B8/0891 A61B8/12 A61B8/4416 A61B8/4483 A61B8/483 A61B18/1492 G06T17/00 G06T2210/41		
代理机构(译)	MERCER，CHRISTOPHER PAUL		
优先权	11/115013 2005-04-26 US 11/114801 2005-04-26 US		
其他公开文献	EP1717602B1 EP1717602A2		
外部链接	Espacenet		

摘要(译)

用于对患者体内的目标成像的系统和方法包括以下步骤：提供目标的预先获取的图像（100）并放置具有位置传感器（32）的导管（28），超声成像传感器（40）患者体内的至少一个电极（46）。使用位置传感器确定导管的一部分在患者体内的位置信息，并且使用至少一个电极获取目标表面的电活动数据点。使用超声波成像传感器获得目标的超声波图像，并确定目标表面的电活动数据点的位置信息。基于电活动数据点和电活动数据点的位置信息生成目标的电生理图（90）。确定目标的超声图像的任何像素的位置信息，并且将预先获取的图像和电生理图用超声图像配准。登记的预先获取的图像，电生理学图和超声图像显示在显示器（44）上。