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(71) Applicant: **COVIDIEN LP** [US/US]; 15 Hampshire Street, Mansfield, Massachusetts 02048 (US).

(72) Inventors: **PEINE, William**; 24 Holly Lane, Ashland, Massachusetts 01721 (US). **LIVIANU, Mathew**; 72 Hawthorne Street, Malden, Massachusetts 02148 (US). **YILMAZ, Burak**; 58 East St, Upton, Massachusetts 01568 (US).

(74) Agent: **HUGHES, Thomas et al.**; Medtronic, 60 Middletown Avenue, c/o Legal Mailstop MS 54, North Haven, Connecticut 06473 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available):

AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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(54) Title: BOUNDARY SCALING OF SURGICAL ROBOTS

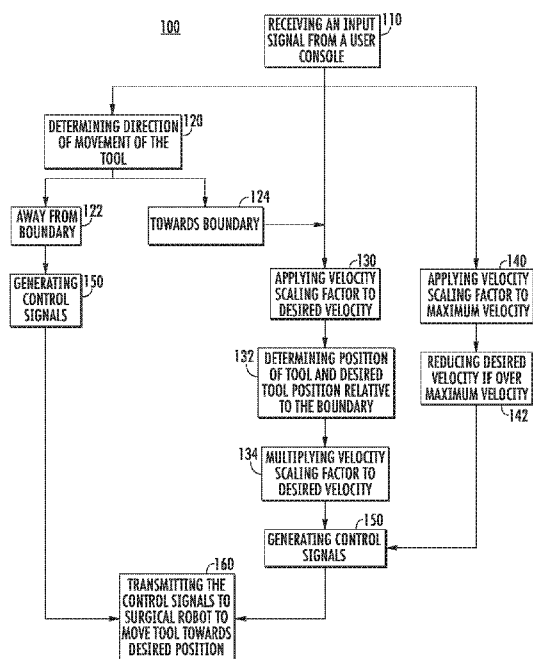


FIG. 5

(57) Abstract: A method of scaling a desired velocity of a tool of a surgical robot with a processing unit includes receiving an input signal, determining a position of the tool relative to a boundary of a surgical site, and scaling a desired velocity of movement of the tool when the tool is within a predetermined distance of the boundary of the surgical site. The input signal includes the desired velocity of movement of the tool.



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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))*

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2018/049440

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.: 5,7-10,12
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:
As claims 5, 7-10 and 12 are referring to a nonexistent claim, no meaningful international search can be carried out for claims 5, 7-10 and 12.

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:

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 any 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.:

- 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.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2018/049440**A. CLASSIFICATION OF SUBJECT MATTER****A61B 34/00(2016.01)i, A61B 34/35(2016.01)i, A61B 34/20(2016.01)i**

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 34/00; A61B 19/00; A61B 34/30; B25J 13/02; B25J 13/08; G05B 19/427; G06F 3/01; A61B 34/35; A61B 34/20

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

Korean utility models and applications for utility models
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: scale, scaling factor, boundary, predetermined distance, surgical robot

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2017-0224428 A1 (COVIDIEN LP) 10 August 2017 See claim 1.	1-4, 6, 11, 13
A	KR 10-2013-0015437 A (EATON, CO. INC.) 14 February 2013 See claims 1, 13-15, 21, 22; paragraphs [0038]-[0077]; fig. 1, 2.	1-4, 6, 11, 13
A	KR 10-2015-0007020 A (SAMSUNG ELECTRONICS CO., LTD.) 20 January 2015 See the whole document.	1-4, 6, 11, 13
A	KR 10-2012-0068597 A (EATON, CO. INC.) 27 June 2012 See the whole document.	1-4, 6, 11, 13
A	US 9582079 B2 (ABB GOMTEC GMBH) 28 February 2017 See the whole document.	1-4, 6, 11, 13

 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

02 April 2019 (02.04.2019)

Date of mailing of the international search report

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Name and mailing address of the ISA/KR

International Application Division
Korean Intellectual Property Office
189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea

Facsimile No. +82-42-481-8578

Authorized officer

HAN, Inho

Telephone No. +82-42-481-3362



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2018/049440

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