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Partnering Opportunity

Profile status : Published

Research Development Request

H2020-FETOPEN-01-2018-2019-2020: Development of an innovative resectoscope for trans urethral resection of the bladder

Summary

An italian research team is looking for partners to complete a Consortium for a FET-Open proposal. The aim is developing an innovative resectoscope for trans urethral resection of the bladder (TURB). The Partners (P) sought should be experts: (P1) in novel resectoscope loops development, and/or in bioelectrical properties of tissues; (P2) in medical device optics and their physical interface with an operator; (P3) in AI-based image recognition and analysis, augmented reality.

Creation Date	16 January 2020
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Expiration Date	17 February 2020
Reference	RDIT20200116001
Public Link	https://een.ec.europa.eu/tools/services/PRO/Profile/Detail/4742459a-d01a-48e7-9186-1158c58122ad

Details

Description

An Italian research team is studiyng the development of an innovative, AI-driven resectoscope for Trans Urethral Resection of the Bladder (TURB).
TURB is the removal of dysplastic/neoplastic tissues (polyps, tumours) from the bladder. Currently, it is considered the gold standard for tissue retrieval (biopsies) and treatment of nonmuscle invasive bladder cancer (NMIBC), but has several limitations: NMIBC recurrence rate at 3 months is up to 17%; it is highly error prone: bleeding, bladder

perforation, infections and urethral orifice injuries are the most common complications. This, because TURB depends on surgeon manual ability and the status/size of the lesion. The Italian team plans to build a novel device which will overcome TURB existing limits and introduce a breakthrough in urological surgery. The proposal's aim is to equip a standard resectoscope with a series of highly technological tools that will change it into an innovative and smart instrument. The consortium will place on the cutting wire a sensor that will use electrical tissue properties to discern healthy vs non-healthy and muscle vs non-muscle tissues, and will stop the electricity inside the wire in presence of healthy tissues. The team will connect it to a newly developed 3D camera allowing the surgeon to see the depth of the organ and the lesion. Finally, the team will connect the camera to an AI, developed for this specific task, which will help discriminating the lesion borders in real time. This AI-based information will be sent to special glasses (or similar optical device), worn by the surgeon, in which the operator will see, in real time, the bladder cavity and a signal delimiting the dysplastic/neoplastic tissue, overlapping the bladder view through augmented reality.
• H2020-FETOPEN-01-2018-2019-2020 - Programme Framework conditions are listed in the General Annexes https://ec.europa.eu/research/participants/data/ref/h2020/other/wp/2018-2020/annexes/h2020-wp1820-annex-ga_en.pdf
and include list of eligible countries, admissibility and eligibility conditions.
• Expression of interest deadline: 17 Feb 2020; Call deadline: 13 May 2020; Estimated project duration: 3 years.
• Type and role of the partner (P):
- P1 (hardware) is expected to build a resectoscope equipped with a new sensor, or to modify an existing one. Expertise in resectoscope or resectoscope loops manufacturing is mandatory. Knowledge of the bioelectrical properties of human tissues is highly recommended. Previous expertise in developing innovative medical devices, especially in urology, is advisable. A detailed knowledge on a specific resectoscope model/brand as a selection point will be evaluated on a case-by-case basis if appropriately motivated.
- P2 (hardware) is expected to build a 3D-vision device that will be coupled with a new resectoscope camera and that will substitute the standard optical device. Expertise on medical device optics is mandatory. Expertise on manufacturing other 3D visual devices (e.g., those used in medical robotics) is recommended. Previous expertise in developing innovative medical devices, especially in urology, is advisable. P2 is supposed to closely collaborate with P3 (see below) and, to a lesser extent, with P1. If P2 has renowned expertise also in P3 specific fields (AI and augmented reality), the possibility to assign both parts of the project to the same partner will be evaluated.
-P3 (software) is expected to create the digital interface between the modified resectoscope (P1 + P2) and the surgeon. Images taken with the device developed by P2 will be analyzed and sent in real time to the operator, who will see both the 3D image registered by the machine and a superimposed indication (in augmented reality of the borders of the borders of the tissue to be removed.These borders will be identified by an AI (developed by P3 as well) that will be instructed through the images collected and provided by the coordinator group.

Advantages and innovations

The novel device will overcome TURB existing limits and introduce a breakthrough in urological surgery.
TURB is the removal of dysplastic/neoplastic tissues (polyps, tumours) from the bladder, or the retrieval of a tissue sample for analysis (biopsy). Usually, and particularly with tumours, the borders of the mass to be removed are irregular in both extension and depth and, in its peripheral region, hard to distinguish from the closely surrounding, healthy tissue. To date, the instrument used to remove the mass is the resectoscope, that cuts the tissue using an electrified wire. This instrument is guided by the surgeon without no other help than his hands, eyes, and experience. Thus, the surgeon’s risk is either to damage the healthy bladder wall (perforation, excessive resection) or to incompletely remove the mass, thus potentially increasing the chance of tumour relapse. The proposed modifications to the resectoscope will allow overcoming most of these problems. Despite several technological improvements in the field of robotics and other related, minimally invasive surgical approaches, cystoscopes in general (and the resectoscope in particular) is still, essentially, a manual instrument and did not significantly change in the last decades. In addition, this smart resectoscope will likely substitute other robotic-assisted approaches, with the advantage to make the surgery easier and faster, as well as less expensive. Despite the several innovations proposed, the basic form of the instrument and its handling will remain largely untouched, thus the adoption of this new instrument by surgeons will have a very smooth learning

curve.
The device will significantly drop the frequency of bladder damage and tumour relapse, as well as the duration of surgery, through the lowering of the procedure error rate and the increased speed/precision of the intervention, thus greatly improving patient's recovery and surgery success.

Stage of development

Concept stage

Comments Regarding Stage of Development

All scientific bases are described in the literature, and several parts of the planned technology already exist, although not directly applied to a resectoscope. Thus, the feasibility of the project is high. The italian research team plan to have a working prototype in 12-18 months, that will be tested, optimized and miniaturized in the next 18-24 months.

IPR Status

Other

Comment Regarding IPR status

A preliminary search for anteriority has been performed in 2018, indicating that there is the possibility to patent some of the solutions adopted for this project. IPR issues will be discussed in advance and will be an integral part of the consortium agreement.

Keywords

Technology

06001003	Cytology, Cancerology, Oncology
06001012	Medical Research
06001013	Medical Technology / Biomedical Engineering
06001017	Surgery
06005002	Sensors & Wireless products

Market

02007012	Medical/health software
05003002	Surgical instrumentation and equipment
05004001	Electromedical and medical equipment
05005014	Oncology
05007006	Computer-aided diagnosis and therapy

NACE

Q.86.1.0	Hospital activities

Q.86.2.2 Specialist medical practice activities

Network Contact

Issuing Partner

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Open for EOI: Yes

Dissemination

Relevant sector groups

Healthcare

Client

Type and Size of Organisation Behind the Profile

R&D Institution

Year Established

1923

Already Engaged in Trans-National Cooperation

No

Languages Spoken

English
Italian

Client Country

Italy

Partner Sought

Type and Role of Partner Sought

The Partners sought could be SMEs or research Institutions/universities. The roles are specified below:
Partner 1: expertise in surgical device modification and/or creation (resectoscope)
Partner 2: expertise in medical optical device modification and/or creation (3D visualization of human organs)
Partner 3: expertise in computer/human interface; artificial intelligence; augmented reality tailored for the modified resectoscope (Partners 1 and 2)

Type and Size of Partner Sought

SME 11-50,University,R&D Institution,SME <10,SME 51-250

Type of Partnership Considered

Research cooperation agreement

Program - Call

Framework Program

H2020

Call title and identifier

FET Open – Novel ideas for radically new technologies
Call ID: H2020-FETOPEN-01-2018-2019-2020

Submission and evaluation scheme

Single-stage submission scheme.
More information are available in the Work Programme 2018-20202/Future and Emerging Technologies
https://ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/main/h2020-wp1820-fet_en.pdf

Coordinator required

No

Acronym

Development of an innovative, AI-driven resectoscope for Trans Urethral Resection of the Bladder (TURB) Acronym: TURSe (Trans Urethral Resectoscope Sensor)

Duration

156 days

Deadline for EOI

17 Feb 2020

Deadline of the Call

13 May 2020

Weblink to the call

https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/fetopen-01-2018-2019-2020

Attachments