Sensing, imaging and mechatronic technologies for active milling and drilling devices are sought to be integrated in a robot for spinal surgeries

Summary

Profile type	Company's country	POD reference
Technology request	**Spain**	**TRES20240828012**
Profile status	**Type of partnership**	**Targeted countries**
PUBLISHED	**Commercial agreement with technical assistance** **Investment agreement** **Research and development cooperation agreement**	• **World**
Contact Person	**Term of validity**	**Last update**
Alice MOROSINI	**28 Aug 2024** **28 Aug 2025**	**28 Aug 2024**

General Information

Short summary

A Basque SME which has developed a robot to assist surgeons in spinal fusion operations is looking for technology providers for its next-generation developments in the robotic assisted surgical field. The current system has undergone preclinical and clinical trials and is planned to reach certification under the MDR European regulation on December 2024. The company wills to establish a commercial agreement with technical assistance.

Full description

The SME was created in 2017 as a spinoff project of an industrial corporation specialized in the precision manufacturing of mechanical components/assemblies for aerospace applications. It was born as a result of various R&D projects which concluded that a precise mechanical guiding system could optimize resource utilization and avoid the risks of free-hand medical interventions aiding doctors in performing bone cuts and prothesis placement in spinal procedures.

The aid of different gadgets or devices is becoming more common in the sanitary industry, in both diagnosis and treatment. In light of this trend, the SME has developed a robotic assistant to aid surgeons in spinal procedures, in particular spinal fusion surgery. Spinal fusion is a surgical technique in which one or more of the vertebrae of the spine are joined together (fused) to stop them from moving against each other. Spinal fusion can be used to treat

various pathologies such as scoliosis, vertebral fractures, spinal stenosis or kyphosis. The solution developed by the company includes a novel patent-protected electro-mechanical tracking system guiding the surgeon with submilimetric accuracy in the critical phase of the spinal fusion procedure: the insertion of the pedicle screws to fuse two or more vertebrae. This is a unique tracking system in the surgical field, which avoid the usage of optical tracking systems that are usually employed by other market competitors.

The current system has undergone to preclinical and clinical trials, and is planned to reach the certification under the MDR European regulation on December 2024. Moreover, the SME filed two international patents in 2017, which was renewed for Europe and other 13 countries in 2019. Several other patents have been filed between 2020 and 2024.

The company is currently working on next generation products and functionalities, focusing on the development of active technologies for bone removal operation. A natural step forward is to assist the surgeon not only during the insertion of screws, but also during decompressions and similar procedures which require the cutting of bone structures.

The latter requires the implementation of novel active modules to be integrated into the surgical assistant, requiring research and development steps in mechatronics, robotic control, medical imaging and software development. The company main aim is to include redundant safety features to guarantee and optimize the outcome o the surgery, preventing any damage to the patient. The resulting technology should provide to the surgeon new features that enhances his/her capabilities, assisting him/her during complex procedures, reducing risks and execution time. Thus, the company is looking for partners in the development of such technologies, as well as clinics and hospitals that want to be involved in the development and preclinical validation of such tools. The company vision is to start the commercialization as soon as possible, while fostering a culture of continuous improvements and development towards disruptive functionalities in the robotic surgical domain.

Advantages and innovations

Unlike competing robotic solutions for spinal surgery which are based on optical tracking systems, this assistant robot's tracking system is mechanical. And so, it drastically reduces set-up time, fourfold accuracy, reduces the footprint in the operating room, and reduces operation costs. The less use of camaras also provides a better ergonomic. Complementary to such technology, the new modules will be integrated in the robotic platform, providing assistance during procedures such as laminectomies, through the usage of active cutting tools, robotic technologies and advanced control systems. At the time, there is no robotic platform offering this type of assistance.

Technical specification or expertise sought

With the aim to reach TRL7 for the new modules, the company seeks a technological partner capable of developing the described tools, providing sensing and/or mechatronic solutions for active milling/drilling devices to be integrated in the robotic platform. On the other side, different procedures in the spine domain could be tackled, requiring the involvement of clinicians in the definition of the clinical steps required, control modes and validation of the whole robotic-assisted procedure. moreover, the partner should also publish scientific articles in terms of the validation process and the results obtained.

Stage of development

Available for demonstration

Sustainable Development goals

- **Goal 3: Good Health and Well-being**
- **Goal 9: Industry, Innovation and Infrastructure**

IPR Status

IPR granted

IPR Notes

Partner Sought

Expected role of the partner

The company is exploring a range of options to support the development, validation, and later industrialization and commercialization of the technology. The SME is also seeking investors to fund the commercialization of the current system, while supporting the development of the next generation platform. Potential investors should be trustworthy companies with experience in transnational commercial activities. Companies in the medical sector, seeking for a scalable robotic solution, would be preferable in order to ease the commercialization of the current certified product and its installation in several hospitals withing Europe

Type of partnership

Commercial agreement with technical assistance

Investment agreement

Research and development cooperation agreement

Type and size of the partner

- **SME 11-49**
- **SME 50 - 249**
- **R&D Institution**
- **Big company**

Dissemination

Technology keywords

- **01003012 - Imaging, Image Processing, Pattern Recognition**
- **01003020 - Building Automation Software**
- **01001001 - Automation, Robotics Control Systems**

Market keywords

- **05004006 - Surgical instrumentation and equipment**
- **05003003 - Surgical implants**

Targeted countries

- **World**

Sector groups involved

- **Health**

Media

Images

Picture SpinalRobot.jpg