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The ARAKNES project: the future gold standard for minimally invasive surgery

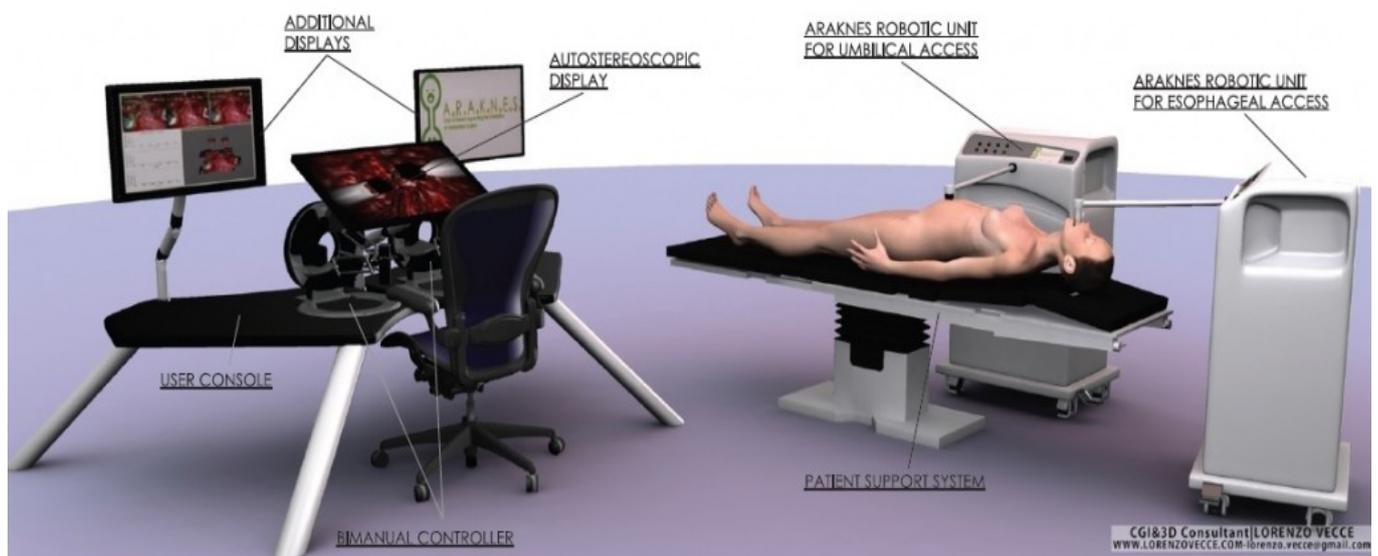
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The ultimate goal of ARAKNES is to integrate the advantages of traditional open surgery, laparoscopic surgery and robotics surgery.

--- Posted by the Scuola Superiore Sant'Anna team, coordinator of FP7 ARAKNES project [ARAKNES](#) [1] is currently running the last months of the project, with the final aim to validate and demonstrate system capabilities and potentialities. In the spirit of Minimally Invasive Surgery, the ARAKNES project stems from the innovative idea to transfer the technologies of bimanual laparoscopic surgery to the endoluminal surgical approach, thus further reducing operative trauma and enhancing therapeutic outcome of minimally invasive procedures for most abdominal procedures. In this framework, the ultimate goal of ARAKNES is to integrate the advantages of traditional open surgery, laparoscopic surgery, and robotics surgery into a deeply innovative system for bi-manual, ambulatory, tethered, visible scar-less surgery, based on an array of smart microrobotic instrumentation.



[2] The essential components of the ARAKNES system include:

1. flexible oro-pharyngo-esophageal access port and an umbilical access port;
2. assistive and operative micro-robots allowing a bi-manual operation;

3. imaging system consisting of an endoscopic camera for global vision and a stereoscopic camera for visualizing the operative area;
4. biosensors for tissue analysis normally not available during laparoscopy; and
5. an operating console incorporating the image of the operative field.



[3] In details, the ARAKNES SPRINT (Single-Port laparoscopic bimanual robot) robot is a novel master-slave robotic platform designed to completely pass through a single umbilical incision and to be deployed into the abdomen, thus avoiding additional access ports and exploiting a pre-existing scar. The SPRINT robot consists of two high dexterity anthropomorphic manipulators, a stereoscopic camera and a master console for the robot control by the surgeon. The two robotic arms are inserted into the abdomen of the patient through a 34 mm cylindrical introducer, maintaining dexterity and visual capabilities typical of the open surgery. Objectives and impact of ARAKNES are very broad and ambitious: the concept of a total miniature robot for advanced endoluminal surgery is entirely new in the research community, but we are confident that ARAKNES is providing a solid technological basis for contributing to reinforce the European competitiveness in endoluminal robotic surgical fields. Moreover, ARAKNES has the ambition to improve the quality of life of a large number of citizens, with a relevant impact on the healthcare systems, in terms of hospitalization time and costs, and general health management. Thanks to the impressive network and leading position of the different members of the Consortium, a pretty large community of researchers, expert surgeons, medical doctors and leading companies has grown around the ARAKNES group, strengthened the impact of the project.

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[1] <http://www.araknes.org/>

[2] <https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/digital-agenda/files/2012/09/ARAKNES-scenario1.jpg>

[3] <https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/digital-agenda/files/2012/09/SPRINT-robot1.jpg>