

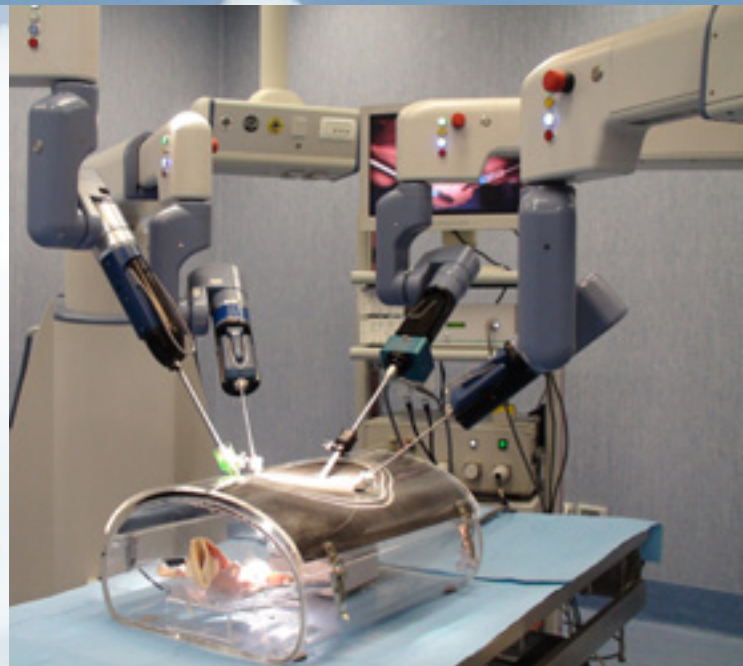
## **Nuclear safety tools help revolutionise minimally invasive surgery**

Telelap ALF-X is a new, advanced telesurgical system being piloted in hospitals that allows surgeons to better feel the consistency of soft tissues and the force exerted by their surgical instruments when performing operations using remotely operated machinery. The technology was first pioneered in the laboratories of the European Commission's in-house science service, the Joint Research Centre (JRC). Scientists successfully devised robotic software making it safer to remotely handle and store spent nuclear fuel elements. A partnership with a pharmaceutical company then successfully transferred its applications from the nuclear to the health field.



**Joint Research Centre (JRC)**  
– the European Commission's in-house science service

The essential breakthrough is that from now on surgeons can, in addition to visual information, feel the consistency of soft tissues and the forces exerted by surgical instruments through their sense of touch (so-called haptic feedback). Previously, surgeons using remotely operated equipment relied mostly on their eyes. With the new Telelap ALF-X system, the sensed forces can be amplified, if necessary, so that surgeons can receive even more information from their fingers than when they perform open surgery. This gives them greater security and confidence when manipulating tissues and tying knots. The previous generation of telesurgery systems ran a greater risk of, for example, pulling too hard and causing unnecessary bleeding. A further advance is that the system helps avoid shaking and can be set to limit the force used. The system is equally equipped with an eye tracking system. This allows surgeons to zoom in and out or activate instruments just by looking at the respective icons on the screen.



### **Background**

In 2004, the Italian pharmaceutical company, SOFAR, first approached the Joint Research Centre. SOFAR's research and development team wanted to explore how the JRC's expertise in nuclear safeguard operations that had led to the development of unique software might be applied to the field of robotically assisted surgery. Four years of cooperation between JRC and SOFAR engineers led to the development of the first prototype of the Telelap ALF-X system. In parallel, the JRC filed three patent proposals and created innovative software pieces. These intellectual property assets were licensed to SOFAR for further developments in 2009.

### **Did you know?**

The JRC produces the reference materials that set the global standards for the millions of blood tests taken daily. These measure serum proteins against which doctors establish where a patient's blood analysis for all kinds of conditions falls within a given range. Global manufacturers of high-tech medical equipment also use JRC reference materials to calibrate their machines.

**The JRC – SOFAR partnership illustrates how innovation today cuts across scientific sectors and ideally brings the best of public and private research actors together. It is a story about technological foresight, in getting a good idea to market and bridging the gap between discovery and delivery.**