Project Results

Software support improves modern surgery

Improved decision making, imaging and communications improves operating theatre performance

Information technology has a key role in the operating theatre to support the trend to minimally invasive surgery. The ITEA 2 EDAFMIS project has enabled equipment interoperability, improved real-time imaging technology, simplified communications with external colleagues and speeded access to expert information. As a result, surgeons can work faster, allowing patients to go home earlier and get back to work sooner, as well as helping avoid medical errors.

Minimal invasive surgery

Modern operating theatres involve many stand-alone instruments for imaging, measuring vital signs, administering drugs and anaesthetics, and manipulating surgical instruments, as well as providing access to a patient's records. Part of the personnel is there just to operate equipment and exchange information. Each has to follow a strict protocol and some – such as anaesthetists – are only needed briefly, often working on several operations at the same time.

EDAFMIS has developed a new generation of medical operation support systems that enables easy interoperability and user interaction. It provides a minimal operation cockpit which supports automation and navigation in the operating theatre. A 3D multi-modal user interface allows interaction both with systems incorporating medical know-how and with the systems acquiring and processing patient data.

REPLACING OPEN SURGERY
The current trend to minimally invasive techniques requires equipment to work well together – requiring automation support. Equipment is also needed to support navigation of catheters and devices through the patient's body.

EDAFMIS focused particularly on decision support during planning of the treatment and during the operation itself. The latter involved two different elements:
1. Decision support by measuring all kinds of signals from the patient's body and relating them to already-published knowledge.; and
2. Support for navigation of all types of instrument within the body with the focus on minimally invasive surgery where the surgeon needs to ensure instruments are in the right spot in the body.
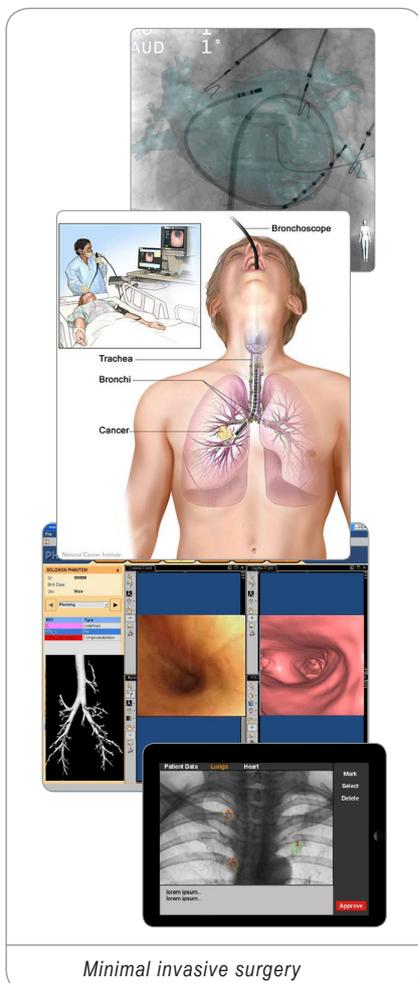
EDAFMIS
(ITEA 2 ~ 07011)

■ **Partners**
CeTIM
Mobilera
Philips Healthcare
Sopheon
VU University Medical Center
ZorgGemak

■ **Countries involved**
The Netherlands
Turkey

■ **Project start**
January 2009

■ **Project end**
December 2011

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Project Results

RANGE OF INNOVATIONS
Other innovations included:

- Advanced imaging – mapping 3D images on 2D images, using different colours to aid navigation. Work focused on improving visualisation of soft tissues based on combining images made before the treatment and during the operation, presenting them in real time to enable the surgeon to work with them;
- Developing decision-support systems for use during the operation. These connect to worldwide databases with evidence-based medicine so that relevant rules can be applied during treatment. The rules still need to be selected in the planning stage because there are so many but it can help apply the right ones in practice;
- Improving collaboration during operations from outside the operating theatre using wireless networking and an iPad tablet computer to see what is happening in the operating theatre and to exchange annotations and words in real time; and
- Validation of this real-time connection and collaboration with personnel outside the operating theatre.

ENSURING FAST EXPLOITATION
Results are already being exploited with products on the way to commercialisation.

Philips is launching an advanced system for navigation in heart operations, offering electrophysiology procedures for treating electrical problems in the heart. Three customers are already lined: universities in Berlin, Germany and in Boston and Chicago, USA. And a Philips internal start-up is developing its first application for oncology-directed products.

Software and systems company Sopheon is keen to use the decision-support tool developed for use during either in the same type of requirement or in other non-healthcare areas. Mobile services specialist Mobilera has developed an iPad application in collaboration with hospitals in Turkey. And electronic health record company ZorgGemak is enhancing record handling for real-time data in the operating theatre while offering the connection between the operating theatre and the external world on iPad and other systems.

TAKING A GLOBAL LEAD
The major outcome is a marked improvement in quality and speed of treatment in operating theatres. First time right avoids medical errors – some €80 billion is spent annually on new operations to correct such errors. Moreover, Europe is in the global lead both in navigation for minimally-invasive surgery and in offering a validated iPad application for these types of use.

Major project outcomes

DISSEMINATION
- 4 conference papers
- 1 congress event where we showed Edafmis
- 1 presentation to OpenEHR community at HL7 conference
- Healthcare workshop at ITEA2/Artemis co-summit Helsinki
- Healthcare project leaders meeting in Best, November 2011

EXPLOITATION
- 2 new products in 2012: Philips - interventional system for heart surgery, Mobilera - Interactive DICOM app
- 1 new service: Sopheon - Rules Engine for decision support
- 1 new system: ZorgGemak - Semantic interoperable electronic patient record with workflow management & decision support
- 2 new markets: Sopheon, Mobilera - both expanding to Healthcare area

STANDARDISATION
- Contributions to CEN-13606 - openEHR approach

SPIN-OFFS
- 1 new internal Philips start-up company on minimal invasive oncology

- ITEA 2 – Information Technology for European Advancement – is Europe's premier co-operative R&D programme driving pre-competitive research on embedded and distributed software-intensive systems and services. As a EUREKA strategic Cluster, we support co-ordinated national funding submissions and provide the link between those who provide finance, technology and software engineering. Our aim is to mobilise a total of 20,000 person-years over the full eight-year period of our programme from 2006 to 2013.

- ITEA 2-labelled projects are industry-driven initiatives building vital middleware and preparing standards to lay the foundations for the next generation of products, systems, appliances and services. Our programme results in real product innovation that boosts European competitiveness in a wide range of industries. Specifically, we play a key role in crucial application domains where software dominates, such as aerospace, automotive, consumer electronics, healthcare/medical systems and telecommunications.

- ITEA 2 projects involve complementary R&D from at least two companies in two countries. We issue annual Calls for Projects, evaluate projects and help bring research partners together. Our projects are open to partners from large industrial companies and small and medium-sized enterprises (SMEs) as well as public research institutes and universities.

EUREKA

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