ITEA 2

INFORMATION TECHNOLOGY FOR EUROPEAN ADVANCEMENT

Project Results

MEDIATE
Patient-friendly medical intervention

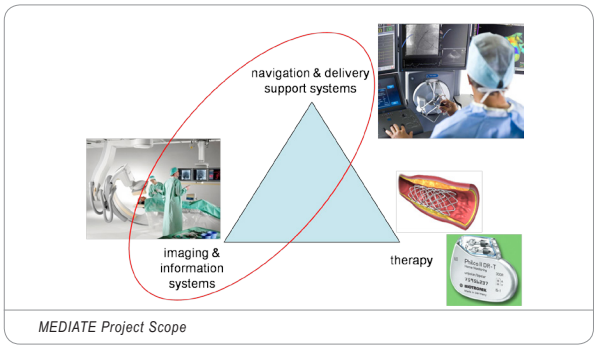
The costs of sustaining healthcare for the world's ageing population are rising constantly and have become a significant component of global GDP. A growing number of patients require complicated surgical interventions, which are more and more replaced by image guided minimally invasive procedures as these have shown to improve patient outcome and reduce costs. The aim of the MEDIATE ITEA 2 project was to improve these minimally invasive procedures by fully integrating all medical imaging sources and therapeutic devices into the interventional workflow including optimised UI's and decision support.

SMOOTH AND SEAMLESS INTEGRATION

The project focused on minimally invasive procedures for three key medical fields – cardiology, oncology and orthopaedics – according to a pre-programmed workflow procedure, namely medical imaging to aid diagnosis, intervention planning, the intervention itself using image-guided navigation of therapeutic devices (like needles, catheters, artificial heart valves or endoscopic instruments) and finally evaluation and follow up. MEDIATE geared its efforts to developing a system architecture that enables the integration of multi-modal imaging systems, real-time image distribution (local and remote) and therapeutic devices. The platform-independent solutions were based on open, stable standards such as XML Web Services, Dicom and DVI to support multi-vendor interoperability, Image presentation and UI's were optimised for the specific clinical task and devices were provided with haptic feedback for accurate manipulation.

LARGE AND GROWING MARKET

The diagnostic and interventional medical imaging market is worth almost €20 billion globally, with the USA taking about half and Europe a quarter. The market is growing steadily at an average compound annual growth rate (CAGR) about 4%. For some segments, projected growth rates are even higher. The European market for 3D imaging has a CAGR of 14% from 2004 to 2014, and the global clinical decision support system market almost doubled from €159 million in 2006 to €289 million by 2012.



MEDIATE Project Scope

The consortium combined strengths from a number of European countries and had the benefit of participation by major companies in the medical equipment industry, SMEs that focused on one particular equipment area and research institutes specialised in the design, implementation and deployment of service-oriented IT systems. The consortium also included leading academic hospitals with expertise in deploying innovative technology for the benefit of their patients and society at large. Members of the consortium were already active in several medical-imaging software segments, such as 3D medical imaging software, clinical decision support systems, navigation software and user interfaces.

REAPING THE RESULTS

The technical innovations that emerged during the course of the project have been shown in demonstrators for all three clinical domains. A nice example is the demo from a collaboration of 7 partners at the Final review of the completely aligned view of pre- and intra-interventional images from several sources for treatment of an obstruction in a cardiac artery: see picture below. It also included other aspects like real time remote image distribution and adaptive screen lay out.

Among the results being exploited in a range of healthcare IT products are:

- High-speed, high-resolution image-acquisition and processing technologies;
- Multi-modality registration and motion compensation algorithms;
- Decision-/navigation-support, image analysis and reconstruction software tools;
- User-interaction models; and
- Enhanced surgical tools.

MEDIATE
(ITEA 2 - 09039)

Partners

Alma IT Systems
ATOS S.A.E. Origin
Barco N.V.
CEA LIST
Cedrat Technologies
Demcon
Digisens
EndoControl
Erasmus MC
HAPTION
iMinds
Institut Mines-Télécom Bretagne
Institute of Applied Computing with Community Code (IAC3)
Leiden University Medical Center
Nucletron Operations BV
Philips Healthcare
Philips Medisys
Philips Research
Prodrive
SurgiQual Institute
Technolution
Therenva
Université de Rennes 1 – LTSI
University of Amsterdam Academic Medical Center
University of Girona
Utrecht University Medical Center (UMC)
Vicomtech Foundation

Countries involved

Belgium
France
Netherlands
Spain

Project start

September 2010

Project end

December 2013

Contact

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http://mediate-project.com/

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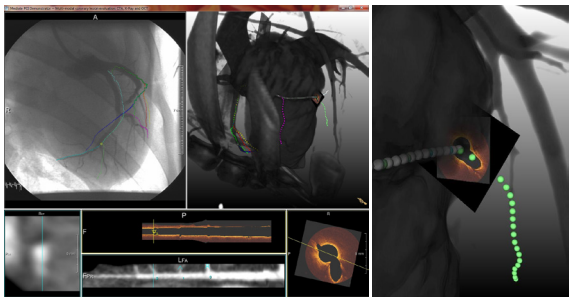


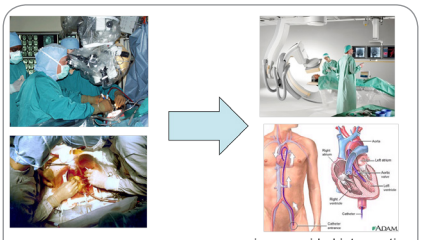
Multi-Modal Coronary Lesion Evaluation: CTA, X-Ray And OCT

Philips, the leading player in the MEDIATE consortium, is expected to release new features in 2014 on motion compensation and metal artefact correction as well as enter the Image Guided Intervention and Therapy solutions market. This strategy and these improvements are likely to add a significant sales volume over the next five years. Another key consortium member, Barco, has more than 250 installations of its image distribution solution Nexxis to its name and some 30 people working on Nexxis. Other beneficiaries of the project results are Nucletron, with its integrated and real time Brachytherapy treatment system, and the Surgiqual Institute, which integrated a Web SDK into a set of collaborative clinical applications and whose work in MEDIATE will contribute to half its revenue by 2016.

In respect of dissemination, there have been more than 30 scientific publications and over 50 presentations at scientific and commercial conferences. In addition, ten patents have been filed and at least ten more are in the preparation phase. The project has also made important contributions to standards such as Dicom and IEC60601-2-33.

A FUTURE OF OPPORTUNITY

The future healthcare challenges being faced by society create, of course, opportunities for the kinds of innovations being generated in projects like MEDIATE, and they are not restricted only to the healthcare imaging market. Some of the techniques that have been developed in MEDIATE can be used in other domains like traffic and microscopy. Interestingly, with a mechatronics company involved in the healthcare field, using its specific expertise to develop a robotics application for precise needle placement, it is clear that there is plenty of opportunity for exploitation from other domains and in other domains.



surgery:
invasive, open

image guided intervention:
minimal invasive, closed

Patient friendly medical diagnosis & treatment

Major project outcomes

DISSEMINATION

- 30 publications in leading journals like IEEE Transactions on Medical Imaging, Medical Image Analysis and Internat. Journal of Cardiovascular Imaging.
- 50 presentations at conferences, such as RSNA, Medica, SPIE Medical Imaging, MICCAI and The International Society for Magnetic Resonance in Medicine.

EXPLOITATION (SO FAR)

- new products: new reconstruction software for the X-ray tomography market, image grabber and compositor for integrated display of multiple sources on a single screen, new release of brachytherapy afterloader platform
- new services: a web based collaborative clinical decision tool
- new systems: image distribution solution for the Operating Room, MR system with new coil/receiver concepts

STANDARDISATION

- contributions to standardisation bodies: IEC60601-2-33 on MR imaging with MR conditional implants and devices, DICOM WG 24 on surgical planning and navigation and the Internat. WG for intravascular OCT Standardization and Validation

PATENTS

- 10 patent applications filed, a.o. on image registration, an integrated hybrid imaging system and a needle positioning device.
- 10 patent application in preparation

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■ 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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