

## Project Profile

# Enhancing user interface design

## Model-based approach ensures greater versatility in multiple contexts

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# μ7

Multi-device  
Multi-user  
Multi-linguality  
Multi-organisation  
Multi-context  
Multi-modality  
Multi-platform

μ7 concepts

**The UsiXML project is developing an innovative model-driven language to simplify and improve user interface design for the benefit of both consumer and industrial end-users. It will provide particular benefits for industry in term of productivity, usability and accessibility by supporting the 'μ7' concept of multiple device, user, culture/language, organisation, context, modality and platform applications.**

While the EU offers a huge market for European companies, the many different languages and cultures, multiple organisations and numerous contexts remain strong constraints to the wide distribution of nationally developed products.

This is a particular problem in software-based and software-intensive systems.

Here the key challenge for human-system interaction is the design of simple and natural multimodal user interfaces – such as voice command, text to speech and gesture recognition – with enough features for users of different levels of expertise and capabilities.

### MORE EFFICIENT MODEL-BASED APPROACH

New ways are needed to design such user interfaces efficiently to cope with increased complexity and the evolution of operational use – including robustness to organisational changes, devices and modalities. To achieve this objective, a more efficient model-driven approach is needed.

A large proportion of today's infrastructure tools, software tools and interactive applications are implemented on top of XML platforms. This ITEA 2 project therefore proposes to enhance the XML-based user interface extensible mark-up language (UsiXML) by adding versatile context-driven capabilities that will take it far beyond the state of the art and lead to its standardisation.

UsiXML will define, validate, and standardise an open user interface description language (UIDL), increasing productivity and reusability, and improving usability and accessibility of industrial interactive applications using the μ7 concept.

The seven μ7 dimensions offer a powerful new approach to cope with technological advances and environmental variations such as: new input/output devices; users evolving over time and new user profiles appearing constantly; applications submitted to internationalisation with new languages, markets and cultures; applications that need to be extended to multiple organisations; and new contexts and constraints imposed to use various modalities depending on context and platform.

## UsiXML

(ITEA 2 ~ 08026)

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### ■ Partners

Aérodrones  
Baum Engineering  
CSB Hanse  
Company for Software and Development  
DAI-Labor  
DefiMedia  
ErgoSign  
Gostai  
Informatics and Telematics Institute  
Institut Télécom  
Institutul National de Cercetare-Dezvoltare in Informatica  
LIP6  
Namahn  
OutSystems  
ProDevelop  
See & Touch  
SIV AG  
Telefónica I+D  
Thales  
Universidad de Castilla-La Mancha  
Universidade da Madeira  
Universidad de Valencia  
Université Joseph Fourier  
Université Catholique de Louvain  
Université de Namur  
University of Paderborn  
University of Rostock  
VRSense

### ■ Countries involved

Belgium  
France  
Germany  
Greece  
Portugal  
Romania  
Spain

### ■ Project start

October 2009

### ■ Project end

September 2012

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This is a major breakthrough as it will no longer be necessary to develop individual unique interface solutions for each application.

### HELPING ADDRESS THE WHOLE EUROPEAN MARKET

Development of a standard language and a universal engineering framework will provide benefits in terms of time-to-market, productivity, reuse, propagation-of-change and usability/accessibility guarantees. UsiXML will help industries address the European market as a whole, instead of remaining in local niche markets. The results will improve the competitiveness of European industries and enable the needs of European citizen to be better satisfied.

The market relevance also relates to the strong increase in demand for new types of user interface, driven by sectors such as the home, healthcare and mobility – and device heterogeneity. The complexity of user-interface design and the associated costs are increasing. Thus, a dramatic improvement in design efficiency is required, particularly to meet tough US competition.

### ADDING VERSATILE CONTEXT-DRIVEN CAPABILITIES

The expected outcome of the UsiXML project will reduce total application costs and development time by enhancing the UsiXML interface modelling language through the addition of versatile context-driven capabilities.

UsiXML is an XML-compliant mark-up language that describes a user interface for multiple contexts such as character, graphical, auditory or multimodal interfaces. Thanks to UsiXML, non-developers can shape the user interface of any new interactive application by specifying it in UsiXML, without requiring the programming skills usually found in mark-up and programming languages.

This project offers a practical application of model-driven architecture (MDA) and

engineering (MDE) that will show immediate benefits in day-to-day software engineering. The impact of UsiXML on European technological and commercial advancement will be mainly found in:

- Advancement of European state-of-the-art in modelling and model transformation techniques for human-computer interaction;
- Technological transfer from the academic partners to large and small industries;
- Stronger positioning in the standardisation bodies; and
- The very high performance/price ratio of the UsiXML solution as no hardware investment will be needed – giving the companies marketing it a strong edge.

### DEMONSTRATING REAL BENEFITS IN USE

Innovations in UsiXML will help European software vendors and industrial systems makers to increase productivity in software development and reduce development costs. The three major outcomes will be:

1. A development methodology for multi-target user interfaces integrating the whole  $\mu 7$  concept;
2. A software environment for developers guaranteeing the quality and usability of the resulting user interfaces; and
3. A UsiXML language release under standardisation and XML compliant.

These results will reduce time to market, speed-up productivity, improve factorisation, speed change propagation and better assess usability and accessibility.

While one of the main goals is standardisation, companies need to be shown that there is a real benefit for them, in their domain and with the constraints they face in their everyday business. The ITEA 2 project will validate the UsiXML UIDL and framework in a wide range of applications offering a broad spectrum of characteristics. This will encourage the build up of the momentum required for the adoption of UsiXML as a general-purpose user-interface definition language throughout Europe.

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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.



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