

# “An Open-Source Software Framework for Adaptive Multi-Modal User Interfaces in AAL Environments”



## Project overview

The European research project GUIDE ("Gentle User Interfaces for Elderly People", [www.guide-project.eu](http://www.guide-project.eu)) develops an open source software framework and design tools to support Connected TV developers in efficiently integrating accessibility and personalisation features into their applications and services.

The GUIDE Framework integrates and manages various kinds of multi-modal user interface technologies, such as gesture interaction, voice control, virtual characters, second screens and (gyroscopic) remote controls. Based on user profiles, the Framework can adapt the legacy user interface of an (HTML5) application to specific preferences and capabilities of an individual user. Possible adaptations of the UI range from basic adjustments in the graphical user interface and input disambiguation to supportive dialogs with the user.

With its cross-platform software and adoption of HTML5 as the main web standard, the GUIDE project focusses on the emerging Connected TV platforms. Recent developments in the TV market have demonstrated that multi-modal interaction can be one possible paradigm to control a TV device in the living room, if the user is well supported and guided in interaction. TV and STB developers shall be enabled to integrate smart interaction in their devices, both supporting the developers in transparently managing complex multi-modal UI configurations, and supporting the user in handling an ensemble of input devices and interaction means.

## Benefit for stakeholders and European markets

The ageing process in the western industrialized society means a huge challenge, but also delivers new business opportunities for service providers. The GUIDE Framework directly addresses the needs e.g. of companies developing TV-based portals for elderly users, e.g. for tele-health-, home care- and assisted living service scenarios. These companies can benefit from the comfort of multi-modal access to user-relevant resources, while being served with managed interaction with the user, basically handling the multi-modality and complexity of the UI as well as the heterogeneity of the user group transparently in application development. Using the GUIDE Framework allows for more comprehensively considering individual user requirements and thereby potentially accessing new user groups and achieving growth in the customer base.

## Relations and mutual benefit of AALOA and GUIDE

The GUIDE Framework basic components (software bus, UI ontology) are based on specifications developed in the universAAL project, which is a strong AAL infrastructure partner in the AALOA community. In AALOA, GUIDE will further develop its C++ API for universAAL (currently only Java supported), and evolve the Framework as one successful exploitation scenario of the universAAL technology.

In return, GUIDE hopes to gain more visibility among the AALOA developer community, and to attract developers to use GUIDE open source software, or even join the development team.

## Description of the initial code base

The GUIDE Framework is a collection of open source software components released under Apache 2.0 licence. The source code is available in several Mercurial code repositories maintained by Fraunhofer IGD, and will be accessible (on request) through the open source portal page (by end of August 2012).

Component	Repository *	Purpose
Framework Core (C++)	GuideCore	The Framework core is the main entity in the system. It receives user input and contextual data from UI components connected through a software bus, and performs multi-modal adaptation, based on user profiles. Further, it configures output components according to user requirements.
Software Bus (C++)	GuideBaselineUiFramework (GBUIF)	The GBUIF is the basic cross-process cross-machine communication infrastructure in the GUIDE Framework. GUIDE components can connect to the bus to receive/send event data using an ontological model and universAAL communication mechanisms.
Web browser interface plugin (C++, JavaScript)	WebBrowserInterface (WBI)	The WBI is a browser plugin that represents a bridge between the Framework Core, UI components and web applications, basically abstracting the concrete HTML representation of the application to the Core. The GUIDE JavaScript API is the basic interface for applications in the browser, to synchronise application processes with UI adaptations in the core.
Remote Control UI Component (C++)	RemoteControl	An example component to demonstrate how to use GUIDE API for integrating input and output devices and interaction technologies (e.g. sending RC key data to the software bus). Latest Framework technical demonstrators also show the integration with

		speech-/gesture recognition and virtual characters. These components are not part of the open source project.
Reference applications (HTML5)	VideoConferencing, MediaAccess, HomeAutomation, Tele-Learning	The 4 GUIDE reference applications demonstrate how to use the GUIDE Framework in HTML5 web applications.

\* <https://a7media.igd.fraunhofer.de/guide/<RepositoryName>>

## Roadmap and invitation to contribute

The GUIDE project is currently preparing its open source web portal, consisting of multiple Mercurial repositories and a set of Atlassian tools for issue tracking, WiKi and community management (by end of August 2012). In the next 2 months the project will further release a first alpha version of the Framework, and plans to invite interested external stakeholders for public experimentation and testing.

When the GUIDE project has formally ended in spring 2013, and the contractual obligations with the EC are fulfilled, the repositories can be opened for contributions by the community. At that time, at least Fraunhofer IGD will continue maintenance of the open source project in the course of future funded projects. However, we are also contacting industrial organizations in the connected TV sector for testing the GUIDE Framework with the hope of attracting interest that helps to enlarge the developer community.

## Involved people

- Saied Tazari (Fraunhofer IGD, universAAL project, AALOA)
- Carlos Duarte (University of Lisbon)
- Pat Langdon (University of Cambridge)
- Christoph Jung (Fraunhofer IGD)
- Pascal Hamisu (Fraunhofer IGD)
- Angelique Toquet (Technicolor)
- Gregor Heinrich (VSONIX)

Besides the main representatives above, the GUIDE project has an active community of around 20 developers.

## Contact

Christoph Jung (GUIDE Project Coordinator)  
 Fraunhofer-Institut für Graphische Datenverarbeitung IGD  
 Fraunhoferstrasse 5  
 64283 Darmstadt  
 Germany  
 Tel.: +49 6151 155-614  
 Fax: +49 6151 155-480  
 Mail: [christoph.jung@igd.fraunhofer.de](mailto:christoph.jung@igd.fraunhofer.de)