

FI-PPP Position statement : **Large Scale Experimentation in the domain of Ambient Assisted Living**

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1 Introduction

This position statement argues the case for using the domain of Ambient Assisted Living for requirements gathering for, and large scale experimentation of, the Future Internet Core Platform. We propose to utilize emergent results from the FP7 IP universAAL (<http://www.universaal.org>) to reach a critical mass of highly relevant use cases, future internet AAL developer communities and future internet AAL users.

In this position statement we outline:

- The use case of ambient assisted living and utilizing the universAAL project.
- What innovative future internet functionality and technologies that is important to succeed in the domain of ambient assisted living.
- Functionalities expected from the core platform with regard to AAL
- What kind of experimentation environment we consider necessary for broad large scale testing of the platform to be developed in your use area.
- The role of SINTEF

2 The Use Case of Ambient Assisted Living utilizing the UniversAAL Project.

Ambient Assisted Living (known as **AAL**) includes methods, concepts, (electronic) systems, devices as well as services that are providing unobtrusive support for daily life based on context and the situation of the assisted person. The technologies applied for AAL are user-centric and must be adaptable towards the needs and capabilities of the users. They are also integrated with the internet of things constituting the immediate environment of the user (anywhere she is). The technology is adapting to the user rather than the other way around, something that needs future internet services and the support of the future internet core platform. In order to share relevant information between systems and services, technologies for AAL should be based on modular and interoperable mash-ups of services, contents and things. Enabled with semantic analysis and reasoning technology this will enable the needed virtual intelligence in the AAL environment.

The universAAL project

universAAL produces Europe's open platform for AAL that provides a standardised approach making it technically feasible and economically



<http://www.universaal.org>

viable to develop future internet savvy AAL solutions.

The platform will be produced by a mixture of new development and consolidation of state-of-the-art results from existing AAL initiatives (see existing initiatives in the project in figure below).

Pertinent to a future internet AAL scenario is that universAAL drives the work of establishing an open and sustainable community of AAL research and technology providers that will design, develop, evaluate and standardize the common European service platform for AAL.

The platform is complimentary to European and international standards and will work with other open associations to maximize impact, as shown in the figure below.



Figur 1 – Complimentary approach to existing standardisation bodies

3 Future Internet Requirements from the Ambient Assisted Living Use Case

As defined by the AAL Roadmap from the AALIANCE¹, from a technological point of view, organisations that develop AAL services suffer from a lack of standards based future internet platform functionality and architectures for conceiving, designing and deploying cost efficient AAL systems:

- Need for domain models that are concepts, functions and qualities for eHealth/eInclusion systems to make explicit the demands and contributions.
- Need for open-reference architecture that facilitate efficient integration of diverse assistance devices (internet of things) and services (internet of services) into personalized, trusted and manageable assistance solutions.
- Standardized solutions for unobtrusive, affordable sensing of context (location, activity, vital data).

¹ <http://www.aaliance.eu/public/documents/aaliance-roadmap/>

- Advanced user-interfaces that can be adapted to the changing needs and context of the user.
- Guidelines and solutions for privacy and security of data management in the internet of services.
- Guidelines and solutions for system management and interoperability of heterogeneous things, contents, and services.

The AAL domain and market has some characteristics that make it an ideal candidate for the forming requirements and exploring the capabilities of a future internet core platform. These include the following application functionalities:

- Security & safety (alarm, monitoring): Fall detection, identification, access control to buildings, proactive environment sensors, certainty that carers will come if need be.
- Entertainment and education: To live independently people need physical, social and mental stimulation. Fusion is needed between local media, local activities, employment/occupation, and voluntary work.
- Social life: Seamless and ubiquitous contact with friends and family, including giving and getting reassurance.
- Wellbeing: Tele-health sensors, motivation to exercise and be active. Get medical services wherever you are.
- Device management: Monitoring of meals through the internet of things, dietary help, automated internet shopping from the refrigerator.
- Ambience: Services must be non-intrusive and highly user friendly, and end user adaptable.
- Energy efficiency: Sensors for energy efficiency can be used to make sure that the living environment is pleasant.
- Tracking: In order to be secure, some people benefit from being watched over (particularly people with cognitive decline, such as dementia). This can give people more freedom of movement otherwise impossible.

4 Functionalities Expected from the Future Internet core Technology Platform in Support of AAL

Federated Open Trusted Platforms (FOTs): Cost effective design, development and deployment of AAL solutions requires FOTs to emerge, so that platforms developed for AAL (such as universAAL) can inter-connect, inter-operate and inter-work with platforms for other verticals. Deploying an AAL solution does not happen in isolation, but happens in a service and platform infrastructure where connecting to other services through common and open APIs is necessary.

Internet of Services: As seen from the requirement list in section 3 above, we see that several services from different verticals need to seamlessly inter-connect and inter-work in order to provide a suitable AAL service. Flexibility, adaptability and configurability of services are important to ensure adaptation to individual needs. The concept of Software as Services (SaaS) is also central to AAL, as costs and flexibility is crucial for sustainable deployment strategies. Services in the domain of AAL, especially safety and security services rely on an infrastructure provided by a core platform that is dependable, reliable, and secure.

Internet of Things: AAL solutions need standardised mechanisms for manageable sensors & actuators (such as robots), sensor & actuator networks, sensor data storage and sensor fusion in order to provide the necessary quality of service. Availability through a core platform

would ensure deployment in highly fragmented domains and environment, in a secure and stable manner.

Internet of Networks: AAL solutions would need to follow the user wherever she goes, and provide the necessary assistance at the time of need. This requires networks with sufficient capacity and stability available everywhere.

Internet of Media: Smart and context aware media is needed to ensure adaptability to a highly divergent user group.

5 Experimentation Environment

Different kinds of experimentation environments would be needed for different kinds of stakeholders in the AAL domain. The main idea of the AAL use case is to work through the universAAL community in order to reach relevant ICT industry, service providers and users. To reach the ICT industry and developers of AAL services we foresee to utilise the concept of AAL competitions (similar to IHE Connectathon) where core platform functionalities would be used and experimented with. Furthermore, using the same community, we would connect with projects in the ICT PSP programme that do large scale trials in real life settings. Finally, we will liaison with projects in AAL Joint Programme and evaluate the platform in living labs (members of the European Network of Living Labs - ENoLL).

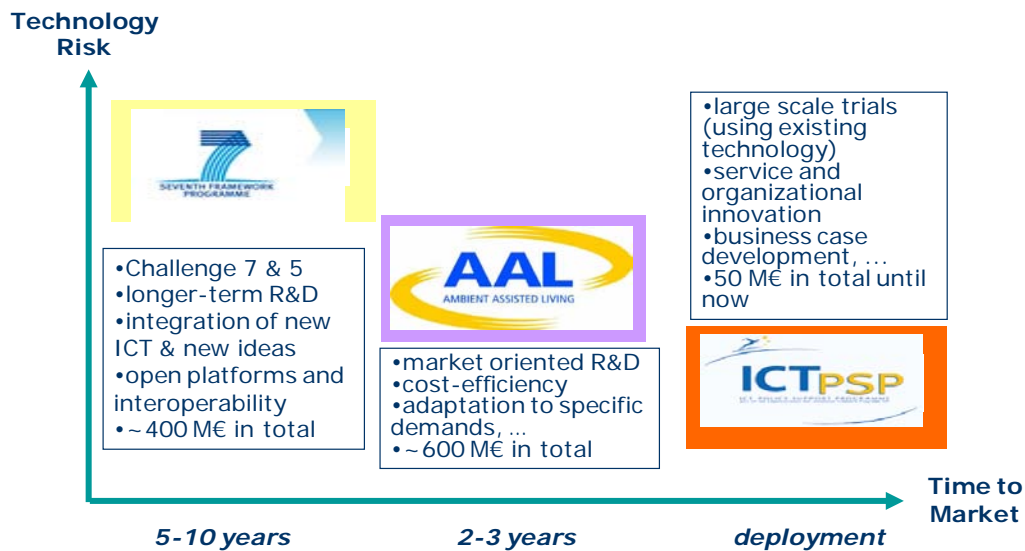


Figure 2 -Existing AAL/eInclusion research in EU

6 The Role of SINTEF

The SINTEF Group is the largest independent research organisation in Scandinavia. Every year, SINTEF supports the development of 2000 or so Norwegian and overseas companies

via our research and development activity. SINTEF has approximately 2000 employees, 1300 of which are located in Trondheim and 450 in Oslo. We have offices in Bergen, Stavanger and Ålesund, in addition to offices in Houston, Texas (USA), Skopje (the former Yugoslav Republic of Macedonia), Rio de Janeiro (Brasil) and a laboratory in Hirtshals (Denmark). SINTEF's head office is in Trondheim.

Infrastructure and partnerships SINTEF ICT can bring into an AAL Use Case:

- Coordinating and participating in several European eHealth/eInclusion projects.
- Coordinating work on establishing one common European platform for Ambient Assisted Living (universAAL).
- Established cooperation with leading industry in the domain.
- Established cooperation with public authorities, regions and clinical expertise for real life tests and evaluations of AAL technology.
- Established cooperation with end user organizations and domain experts.
- Participation in relevant standardization activities (OMG, Continua).
- Established cooperation with Living Labs in the European Network of Living Labs (ENoLL) focusing on AAL evaluations.

What we specifically can offer of results that is of value for a Use Case scenario:

- Knowledge base of end user and developer needs and requirements in an AAL setting.
- Knowledge base of the use of standards (OMG, HL7, IEEE11073/Continua) and contributing to the same.
- Open source and standards based service platform for the development of AAL services.
- Experience from developing AAL services and running long-term field evaluations.
- Results from empirically evaluating use of technology platforms on developers and methodology for doing such research.