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	2014-05-02

INTERNATIONAL ELECTROTECHNICAL COMMISSION

STANDARDIZATION MANAGEMENT BOARD

SUBJECT **SMB meeting 150, agenda item 5.3, Frankfurt**

Report of SEG-3, AAL, *System Evaluation Group – Ambient Assisted Living*, following the meeting held on 2014-03-10 to 12 in Brussels, Belgium

BACKGROUND

SEG-AAL held its first meeting on 2014-03-10 to 12 in Brussels, answering the invitation of its Belgian member. The next date for the meeting of the SEG or the committee succeeding the SEG is planned in conjunction with the general meeting of the European AAL Joint Programme, on 2014-09-08 to 09, in Bucharest, Romania.

On March 10, SEG-AAL held a workshop with CENELEC in order to exchange experiences and ongoing actions in the field of AAL. Please see the workshop brochure in annex. SEG-AAL had its plenary session on March 11 and 12.

The report is in two parts:

Part A – Recommendations submitted to the SMB for formal approval: **A1 to A4**

Part B – Status of Work

Annex 1 – SEG-AAL members attending the meeting
Annex 2 – SG 5 membership list
Annex 3 – SEG-AAL / CENELEC workshop brochure
Annex 4 – SEG-AAL final report

ACTION

The SMB is invited **to decide on the recommendations** submitted in Part A, using the Technical Server, **before 2014-05-30,** and to note Part B.

Item 1: A1 Membership of SEG-AAL: Members of the former SG5-AAL
Item 2: A2 External membership of SEG-AAL: Continua Health Alliance
Item 3: A3 External membership of SEG-AAL: AALIANCE2
Item 4: A4 Transition from SEG-AAL to SYC-AAL

Secretariat note: item 4 is not the final decision on creating a SyC on AAL – that decision will be taken at the SMB meeting 150 following discussion on all the comments received, i.e. voting yes will not automatically create a SyC.

Part A Recommendations for approval

A1 Membership of SEG-AAL: Members of the former SG5-AAL

The SEG noted the approval of the SG5 report to the SMB and the SMB Decision 149/6 disbanding SG5 and creating an SEG. All the members attending the Brussels meeting approved to move into membership of SEG "AAL". See the attendance list in Annex 1.

A2 External membership of SEG-AAL: Continua Health Alliance

SG5 has experienced a fruitful collaboration with the "Continua Health Alliance" organization for more than one year. This organization was again part of the Brussels meeting, and has proposed to join SEG-AAL. This proposal is supported by the SEG Members and is submitted for approval to the SMB.

A3 External membership of SEG "AAL": AALIANCE2

SG5 has experienced a fruitful collaboration with the "AALIANCE2" organization for more than one year. This organization was again part of the Brussels meeting, and has proposed to join SEG-AAL. This proposal is supported by the SEG Members and is submitted for approval to the SMB.

A4 Transition from SEG – AAL to SYC - AAL

SEG-AAL is expecting that a System Committee on AAL will be established. The SEG-AAL members discussed a plan to manage this transition in a way to avoid stopping the activity in IEC, as external activity on AAL is moving fast and with short term expectations on the standardization side.

A4.1 The SEG-AAL requests the SMB to note the SEG´s final report (see Annex 4), disband the SEG-AAL and establish a System Committee on AAL according to the recommendations given in the SEG´s final report including a call to the stakeholders mentioned in the SEG´s report for experts, these groups not having nominated an expert so far. The suggested name for this SyC shall be System Committee on "*Active Assisted Living*" – SyC "AAL."

A4.2 The SEG-AAL recommends a joint meeting of the members of the SEG and the members of the System Committee on AAL, to handover the results of the SEG´s work and to establish the structure of the System Committee.

Part B Status of work

The March 2014 meeting was held during a transition period, as the SMB had in January 2014 approved the conversion of SG5 into an SEG, but the SEG was not yet formally recorded and structured in the IEC information system.

B1 Final report of SG5 – Ambient Assisted Living

Following SMB Decision 149/6, the Convenor of SG5 was requested to formally provide the SG5 final report to the SMB. The document SMB/5269/INF "Final report from SMB SG 5, Ambient Assisted Living" has been circulated on 17 March 2014.

B2 Final report of SEG – Ambient Assisted Living

SEG-AAL did intensive work on its final report prior to the meeting in order to have it ready for review and approval during its March 2014 meeting. The report was reviewed, each sub-group reported to SEG-AAL and the final report was completed.

Additional work was needed to finalize the report, and an action plan was set. SEG-AAL held an on line meeting on 28 April 2014 to review and approve the SEG-AAL final report.

This report is provided in Annex 4 of the present document.

B3 Workshop with CENELEC held on March 10th

The workshop objectives were:

- To exchange information between European AAL research projects and standardization activities of IEC and CENELEC and to identify standardization requirements in the field of AAL.
- To identify future needs concerning standards and certification, identify gaps where no suitable standards exist and encourage active involvement of the research community.

SEG AAL, IEC TC100 and CLC TC100x presented their activities. Then other external organizations presented their activities.

European AAL Joint Programme (AAL-JP)

This 600M€ programme is active in 19 EU member states and 3 associated non-EU countries (Norway, Israel, Switzerland). It has 50% public and 50% private funding. The programme director, Mrs. Karina Markus presented this programme.
It is structured in 6 areas:

1. Prevention and management of chronic conditions (e-health/tele-monitoring)
2. Advancement of social interaction of elderly people (prevent loneliness and isolation)
3. Advancement of older persons' independence and participation in society.
4. Advancement of older persons' mobility (orientation and navigation and assistive technology inside and outside)
5. Home Care (enable older adults to live independently, and support informal careers)
6. Supporting occupation in life of older adults (active involvement paid or voluntary)

Universities or private companies are invited to form consortia in order to submit projects in the above areas. These projects are evaluated, and funded when approved. Key criteria are that the consortia must have strong end-user involvement in any project, and must involve partners from 3 different backgrounds with at least 1 business partner, 1SME and one end-user organization.
This very important project holds a yearly general meeting with high level management meeting for EU delegates and numerous conferences open to the representatives of the consortia. The next meeting will be on 9-12 September 2014 in Bucharest.

There is an AAL-JP-newsletter communicating the outcome of the workshop, it can be found here: http://www.aal-europe.eu/standardization-meeting/

AALLIANCE2 project

Mr. Lars Rölker-Denker presented Integration Profiles and AAL Use Cases for future-proof AAL Systems.
The AAL Systems must fit into existing houses and technology must interact with local infrastructure (e.g. building automation, and local service providers). There are some approaches to complement standards e.g. conformance statement, application profiles, conformance testing, cross-vendor testing, integration profiles. The AALLIANCE2 project focuses on the specifications for interoperability of the various systems that can support ambient assisted living.

UniversAAL and ReAAL projects

Mohammad-Reza (Saied) Tazari presented the situation on these projects. UniversAAL's objective is to develop and offer to the public an open software platform and reference specification for Ambient Assisted Living. This open software library is used by the industry partners of this project. This project is now completed and is followed by the new project ReAAL.
The ReAAL project intends to test the technology using the UniversAAL open platform. This will be done by installing and using in real life AAL systems in 7000 habitations.

Other industry projects

Seven other presentations were made by representatives from the industry concerning projects including elderly oriented mobile phone interfaces, autonomous living assistance for persons with memory loss, low cost robot development platform, social robots, hospital robots, outdoor guiding robots, and an AVATAR project for AAL persons.

Workshop debriefing
There is a need to consider JTC 1 work in reference architectures, for example the sensor network reference architecture and the work on reference architecture for the internet of things.
Smart homes and smart environments are a logical basis to add applications for specific requirements related to AAL.
AAL systems require 24h/365d operation. They shall have low energy requirements (continuous operation), be independent from supply shortage (individual solar panels and energy storage), and shall have a disaster recovery strategy.

B4 SEG AAL Meeting 11th to 12th

IEEE presentation on Ethernet standards Series 802 and AAL
Mr. David Law, Chairman of IEEE 802.3 Working Group, presented the status and the future evolutions of Ethernet standards linked to potential applications for AAL.
IEEE would be a good partner for the SyC-AAL.

Continua Health Alliance presentation on the latest developments
Continua has done extensive work on profiling existing standards and based on this, developed interoperability guidelines for sensors, devices and telehealth platforms. By now, about ninety devices have been tested, certified and applied for the Continua logo programme.
Continua Health Alliance has expressed their interest in working with IEC on the standardization of their interoperability guidelines several times and IEC SEG AAL would like to progress this topic before the final set-up of the IEC System Committee for AAL.
Due to the high market relevance, e.g. Denmark is in the process of adopting the Continua Approach, and urgency of deployment of ambient assisted living and telehealth solutions in the market, IEC SEG AAL recommends establishing the liaison with the Continua Health Alliance.

Cooperation with identified TC/SC´s in and outside of IEC
IEC SEG AAL recommends that the IEC CO, IEC TC 62 and IEC TC 100 are involved in the discussions of where appropriate work should be progressed at the initial stage. Further TCs may need to be contacted depending on the review of the maturity of the interoperability guidelines submitted to IEC. After the transformation of the SEG AAL into an IEC System Committee the horizontal and interoperability approach driven by Continua needs to be reflected in the involvement of the appropriate TCs.

Working Programme
SEG-AAL did intensive work on its final report prior to the meeting in order to have it ready for final review during its March 2014 meeting. The report was reviewed, a workshop session has been organized to deal with the specific issues of the recommendations to submit for the future SYC scope, structure, and Chairman profile. In the meantime, the final version of the report has been drafted and circulated to the SEG members via the IEC collaboration tool and will be reviewed during a web meeting on the 28th of April. After this it will be submitted to SMB for approval.

Annex 1 – Participants SEG Meeting 2014-03-11 to 12

Present

Mr. T. Sentko	Convenor
Mr. P. Sebellin	Secretary

Members

Mrs. P. Cunniffe	NZ-Member
Mr. P. Coebergh van den Braak	NL - Member
Mr. W. De Kesel	BE - Member
Mrs. K. Delort	US-Member
Mrs. K. Grant	UK-Alternate
Dr. S. Hirakawa	JP-SMB
Mrs. J. Laurila-Dürsch	DE-Member
Dr. S. Lee	KR Member
Mr. D. Ma	CN-Member
Dr. H. Yamada	JP- Member

TC/SC Members

Mrs. U. Haltrich	TC100
Mr. K. Neuder	TC62

Liaison Members

Dr. R. Wichert	UniversAAL
Mr. Lars Rölker-Denker	AALIANCE2 project

Guest

Ian Haye	Continua Health Alliance

Excused

Dr. F. Furfari	UniversAAL
Mr. F. Mendes	FR- Member
Mr. J. Newbury	GB – Expert
Mrs. B. Novel	ES - Member
Dr. G. Fuchs	TC59-Expert
Mr. C. Masini	IT-Alternate
Mr. A. Siani	IT – Member
Mr. G. Ungaro	FR – Expert
Mr. E. Varela	ES – Alternate
Mr. K.P. Wegge	DE – Expert

Annex 2 – SG 5 Membership List as of 31 March 2014

Convenor

Mr. T. Sentko	Convenor

Secretary

Mr. P. Sebellin	Secretary

Members

Mr. P. Coebergh van den Braak	NL-Member
Mrs. P. Cunniffe	NZ-Member
Mr. W. de Kesel	BE Member
Mrs. K. Delort	US-Member
Mrs. J. Laurila-Dürsch	DE-Member
Dr. S. Lee	KR Member
Mr. D. Ma	CN-Member
Mr. F. Mendes	FR-Member
Mrs. B. Novel	ES-Member
Mr. A. Siani	IT-Member
Dr. H. Yamada	JP- Member

Alternates

Mrs. K. Grant	UK-Alternate
Mr C. Masini	IT-Alternate
Dr. Y. Seki	JP-Alternate
Mr. G. Ungaro	FR-Alternate
Mr. E. Varela	ES-Alternate
Mr. Z. Wu	CN-Alternate

TC/SC Members

Dr. G. Fuchs	TC59-Expert
Mrs. U. Haltrich	TC100-Expert
Dr. K. Neuder	TC62-Expert
Mr. J. Newbury	TC57-Expert
Mr. KP. Wegge	TC59-Expert

Liaison Members

Dr. R Wichert	UniversAAL
Dr. F Furfari	UniversAAL-Alternate

Annex 3 – SEG-AAL and CENELEC Workshop brochure

Pages 1 (right) and 4 (left)

Hotel and location information is available in separate documents.

10 March 2014
10:00 – 16:00 h CET
CEN/CENELEC Meeting Center
17, Avenue Marnix
Room Da Vinci
1000 Brussels

IEC CENELEC

Workshop
System Evaluation Group
Ambient Assisted Living
& CENELEC Technical Committee 100X

Pages 1 (right) and 4 (left)

IEC CENELEC

Schedule	
10.00 am	Registration
10.30 am	Opening remarks
10.30 am – 12.00 noon	Project - Presentations
12.00 – 1.00 pm	Lunch
1.00 pm – 3.00 pm	Project - Presentations
3.00 – 3.30 pm	Coffee Break
3.30 pm – 4.30 pm	Wrap up and general discussion.

IEC SEG AAL and CENELEC TC 100 X are partnering in an AAL workshop on 10 March 2014 in Brussels

What?

Our main target is the exchange of information between the European Ambient Assisted Living research projects and the standardization activities in IEC and CENELEC.

Integrating standardisation within research and development projects creates awareness in the standardisation community of innovative R&D findings with respect to AAL. We also want to highlight the competitive advantages of standardisation and how standardisation can support European R&D if considered at an early stage by the research projects.

Who?

IEC SEG AAL and CENELEC TC 100 X

The scope of CENELEC Technical Committee 100 X comprises the wide range of technology items related to audio, video and multimedia systems. Many of the cross-sectorial themes addressing current needs of the societal development also have relevance for this committee. The workshop aims to identify items potentially relevant for European standardization. Delegates may help to prepare standardization project proposals within the area of AAL. The work on AAL in TC 100 X is complementary to the activities of the IEC System Evaluation Group AAL and IEC TC 100. The objective of the SEG AAL is to manage and coordinate AAL standardization work in and outside of IEC, to establish and achieve interoperability and interconnectivity of AAL systems, and accessible design of their user interface. To this end the TC 100 X will consider how the Ambient Assisted Living will impact the AV and multimedia systems and equipment.

You!

If you are willing to present your organization's activities and challenges you are invited to give a short presentation during the meeting. Please indicate this with your registration. You are kindly requested to complete and return the attached registration form (and provide a title and summary of any presentation) by 14 February 2014 as indicated.

Thomas Sentko
IEC SEG AAL Convenor

Gerhard Henninger
CENELEC TC 100 X Secretary

Final Report

System Evaluation Group

“Ambient Assisted Living”

April 2014

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1. Forword:

Experts from the SG5 "AAL" and the SEG "AAL" developed this document. It was provided to the members of SEG "AAL" via the IEC collaboration tool for a four week commenting period, the received comments have been reviewed in a web conference at the 28th of April and the final document is provided to the IEC SMB for information..

2. What is AAL:

The SEG AAL followed the Strategic Group 5 and defined Ambient Assisted Living as followed:

> “AAL systems encompass products, services, environments and facilities used to support those whose independence, safety, wellbeing and autonomy are compromised by their physical or mental status.
>
> *Note: for the definition of Accessible Design refer to ISO/IEC Guide 71”*

AAL is highly interdisciplinary in character so that many different partners are involved from various medical, technological, social and business-related areas. This also results in a large number of specifications that already exist and are applied to the individual systems today. The SEG AAL lists these standards in an annex B of this report.
In order to establish cross-vendor interoperability of systems and components, typical AAL systems or applications should be identified and the necessary components, interfaces and data formats etc. should be standardized.
Although the term AAL is fairly well established in the community there is a need to explain the purpose of the work to people outside this community. To ease the communication the SEG suggests creating a more convenient name for committee succeeding the SEG.

3. Why AAL:

The need for AAL developments results on the one hand from demographic developments and on the other hand from increasing desires for convenience and comfort. The highly heterogeneous group of people using AAL systems results in a large number of functional and non-functional user requirements that have to be taken into consideration right from the start. More detailed information regarding social background is contained in this report.

Legal requirements are defined above all by data protection laws and Medical Devices Acts. These legal requirements differ from region to region worldwide.

Assistance systems for helping with activities and participation are used in different areas.

4. Social background

4.1. Introduction / overview on the example of Germany

Although demographic profiles differ from continent to continent, the profiles in developed countries show significant similarities. The example below of Germany holds true for these countries, and is given to provide a context for the growth of interest in AAL.

One of the key motivations for developing AAL systems is the ageing of society. Tews[i][i] sees three different aspects here:

- *Absolute increase in the number of older people*: In 1910, the German empire counted approx. 3 million people aged more than 64 years; by 2000 the number in united Germany already exceeded 13 million.
- *Relative increase in the number of older people*: The share of the population accounted for by those aged 64 years and over increased from 5 % to 16 % between 1910 and 2000. Compared to the working population aged between 18 and 64 years, the share of older people increased from 9 % to 25 %.
- *Increase in longevity*: Between 1910 and 2000, the share of very old people aged more than 80 years increased from 0.5 % to more than 3 % of the German population.

4.2. Demographic profile in Germany

The relative increase in the number of older people is closely related to the shift in the old-age dependency ratio[ii] (16 % 1950 to 27 % 2010 rising to 65 % in 2060) given a constant youth dependency ratio in future (decrease from 51 % in 1950 to 34 % in 1990 but then constant at 31 % until 2060).

This greatly increases the burden on the medium age groups (aged between 18 and 64 years) in terms of gainful employment, bringing up children and caring for elderly relatives (the number of those in need of care will increase by 70 % from 2000 to 2040 with an increase in dementia cases of just about 90 % [iii]). This trend will be further reinforced by more heterogeneous family forms, a greater focus on working and higher regional mobility in the working population[iv].

Looking after and caring for older relatives in the home environment makes great demands of the main carer who is usually female. The average period of care is currently 5,6 years.

During this time, 79 % of the main carers are working practically 24/7 to look after the person in need of care. 91 % of the main carers therefore see themselves facing a great or very great burden [v]. In 2002, 2,4 % of the total population or about 2 million people were in need of care. This refers to about 18,7 % of the 80-85 age group and about 57 % of the over-90

age group. 68 % of those in need of care are looked after in private households and 32 % in homes [vi].

The aspect of support and care leads to the need for assistance in the home environment [vii], together with the fact that once retired, "the living experience once again dominates the quality-of-life experience" [viii]. Most elderly people (> 60 years) live in their own household or in the household of relatives (97 %). Of these, 32 % live on their own and 57 % in two-person households [ix]. Generally, older people want to stay in their own homes as long as possible, because daily habits, memories and social relationships for example are closely related with the actual living environment and they are afraid that these aspects will be limited on moving to another living form or into a home.

This phenomenon of demographic change is matched by figures in the reports from Japan, China, United States and New Zealand during the meetings of SG5. Table 1 shows the prognosis of the demographic change according to the United Nations.

Table 1 – Demographic Change worldwide

		Europe	Russia	US and Canada	Asia	Africa
Population (in Mio.)	2007	591	142	335	4.010	944
	2050*	542	112	438	5.217	1937
Population Change 2007 to 2050 in %		- 8,3	-21,1	30,7	30,1	105,2
Average age	2005	38,9	37,3	36,3	27,6	19,0
	2050*	47,3	43,5	41,5	39,9	27,4
Over-65-year-olds in %	2007	16,0	14,0	12,0	6,0	3,0
	2050*	28,0	24,0	22,0	18,0	7,0

Source: United Nations (extract) *projection

4.3. AAL as a chance to face the demographic development

In 2008 the VDE states that AAL is a chance to deal with the change in the developed countries.

“Ambient Assisted Living (AAL) denotes developments and assistive systems that create an intelligent environment. Through this technical support, people are relieved from situations of exhaustion, excessive demands, and excessive complexity. The assistive systems should support the user in his or her daily activities as well as possible and almost invisibly, and take over control tasks. Technical assistance will be of particular value to older people in helping to compensate for age related limitations. From the perspective of information and communication technologies (ICT), AAL is characterised by the wide spectrum of solutions and the high level of interoperability required for a successful development of integrated

solutions. Assistive systems are often personalised and offer reminder functions, e.g. for medication intake, they suggest activities, e.g. during a rehabilitation training programme, they train cognitive capabilities for the preservation of mental capacity, or they support mobility at home and outside. The various AAL applications often interact with sensors in an intelligent environment in order to capture input data for the assistive system. AAL is based on the use of ICT in devices of daily life. Highly integrated and at the same time distributed applications with a high communication capability are needed to provide the required environmental and processing intelligence for the user. Capturing of the required data (vital parameters, environmental data) takes place via sensors either close to the human body, or integrated into the environment. The variety of ICT technologies used ranges from intelligent data processing to automated decision support. The interaction of the user with the various applications should be as intuitive as possible. The system should adapt to the user context and the physiological and cognitive conditions of the user. The user can display and, if needed, interact with the data using ergonomic user interfaces and terminal devices, whereas older people, physicians or nurses and carers might be users of the system. Therefore, AAL applications always address interfaces to other systems within an eHealth based integrated healthcare sector. AAL should offer low-cost solutions that are relatively easy to install and at the same time almost maintenance free. These advantages make AAL interesting for the complete private sector.”[x]

5. Basics on creating a system

5.1. Need for a system approach

Ambient Assisted Living covers a hybrid product:
(1) a basic technical infrastructure in the home environment (sensors, actuators, communication devices, networks, reasoning components, user interfaces) and
(2) services provided by a third party with the aim of independent living at home (concierge services, meals on wheels, mobility and autonomy support) with assistance in the following areas: Communication, Mobility, Self-sufficiency, Life at home.

During the lifetime of SG 5 it was decided to concentrate on the aspects of AAL and not to look at the standardisation of a smart home. Several activities in and outside of IEC take place to enable the smart home. As mentioned before, for AAL it is a necessity to interlink a various set of actuators, sensors and controls via a network. A home with a reliable network and an interlink to a public broadband communication network is therefore a good base to realize an AAL System.

5.2. Use Case Model

The Modelling Team in the SEG had the task of developing a use case model based on existing models in IEC including the instruction how to use such a model. This included the development of a use-case template and the collection of a selection of generic use-cases. The team collected use-cases and developed a function model to evaluate the selected use-cases. The model proved its functionality and is ready to be used by the committee succeeding the SEG. The Model is described in annex A reflecting the different areas of AAL, the technical infrastructure and the services. It proved its ability to identify relevant standards and gaps in standardisation.. The Annex also contains a list of generic use cases for AAL. A reliable network and an interlink to a public broadband communication network was always assumed as a basic in-home provision.

5.3. Reference Architecture

A reference architecture is defined by some fora and consortia outside of IEC. The task of the committee succeeding SEG will be to harmonize these architectures. The technical infrastructure is standardized in various IEC TCs. The coordination of the activities, the interface definitions and required system standards resulting from the harmonized architecture shall be executed by the committee succeeding the SEG.

5.4. AAL Stakeholder

As mentioned before, the work on an AAL System has already started in various groups in and outside of IEC.

The Status Team in the SEG had the task to collect information about standards, to identify existing standards and to identify fora and consortia. In conjunction of the SG 5 meetings workshops has been held to evaluate the market and the stakeholders.

During the workshop in **Frankfurt in March 2012** the following conclusions have been made:

The SG 5 Members made formal presentations about national activities (CN, NZ, DE, JP).TC 100 activities were also presented.

Conclusions:

- There is a global concern about the major increasing of elderly population, backed up by impressing national forecast (China: 0.44 billion over 60 by 2030)
- The status of "elderly" varies: over 60 in Europe and China, over 75 in Japan. In some countries, "elderly" includes younger people with diseases.
- The major sectors concerned by AAL are: healthcare, home appliances, multimedia, private and public buildings

- Cost efficient healthcare will require keeping elderly people at home and developing communication with hospitals, doctors and other health support organization. Data privacy is a key issue to be addressed by standardization.
- Economics of AAL is under a severe pressure to support the growing number of aged people. Thus the costs will be a key issue for acceptability of the future developments of products complying with standards
- The industry is moving now into the AAL market. To support the development of this sector, standardization shall bring:
- improved cost/performance ratio by promoting global markets with standardized products;
- product interoperability.
- Aging people is the opportunity to develop industry sectors proposing specific products (assistance robots, home appliances, multimedia)
- AAL is a transversal issue which concerns the usability of the products. AAL should be a mainstream technology rather than a sister technology.

During the workshop in **Geneva in September 2012** the following projects have been evaluated:

UniversAAL-Organization

Our guest Mr. Saied Tazari made a presentation of "UniversAAL open platform and reference Specification for Ambient Assisted Living". The roadmap and reference model developed by UniversAAL showed a major interest. SG5 will monitor the activities of UniversAAL, and will invite Mr. Tazari to provide updates on the **UniversAAL activities. (http://universaal.org)**

UK programme in Assisted Living Standards and interoperability

Our gest Mr. Graham Worsley presented the UK project of AAL experimentation in real life at the village of DALLAS-UK. An important outcome of this programme is the need for a proper regulatory environment.

During the workshop in **Geneva in December 2012** the following project has been evaluated:

Presentation of Continua Alliance Organization

Over the past 6 years Continua Alliance (www.continuaalliance.org) developed a reference architecture, use cases and interoperability profiles (called Guidelines) for the domain of telemonitoring of patients at home. This was developed to answer the market traction about these subjects. Continua is keen to work with IEC and ISO (already collaborating with ISO/TC215) in a pursuit of endorsement of these

standardization deliverables as international standards. SG5-AAL supports this collaboration, and invited Continua Alliance to contact SC 62A to establish a liaison and include SG5-AAL in the future agreement for document disclosure.

During the workshop in **Wellington in March 2013** the following issues have been evaluated:

Ambient Assisted Living Workshop

On March 25th 2013, as a prelude to the fourth meeting of IEC SG5 in Wellington, New Zealand, a workshop was held with the aim of providing some real-life examples of the complexity of the area of Ambient Assisted Living within the New Zealand context. The day was divided into three sections: Product, People and Infrastructure.

New Zealand is very active in the area of AAL, in particular within the context of Christchurch reconstruction after the earthquake of 2010. AAL integration is a part of the future town infrastructure concept.

A variety of presenters was invited, covering the following areas of experience and expertise.

- Manufacturing (mainly alarm systems)
- Regulatory requirements (electricity, telecommunications, privacy)
- Academia (robot design, product evaluation and suitability)
- Systems of equipment provision via state funding
- National and international standardization
- The user perspective
- Modelling and managing service provision
- Infrastructure management (telecommunication and internet services)

The next day, SG5 started its meeting by a debriefing in order to draw the following conclusions:

Several particular points of emphasis emerged. The first was the centrality of the user in any framework set up to develop AAL systems and products. Aspects of ergonomics, usability, and users’ needs are seen as paramount. The New Zealand legislation already agreed on considering the special needs of elderly and disabled persons in any decision and the design of public infrastructure. This part of the society is accepted as a vital part to be respected and the needs are included in every decision process. The second was that standardization at national and international levels are important. Thirdly, the complexity of the area requires co-operation at all levels of service provision. And lastly, there were some valuable experiences to be taken from the Christchurch earthquake: the loss of infrastructure combined with the

vulnerability of the target population provides a specific challenge that needs to be addressed

During the workshop in **Tokyo in October 2013** the following issues have been evaluated:

SG5 had an overview of the AAL activities in Japan and in particular of the JEITA (Japan Electronics and Information Technology Industries Association). The speakers showed information about already existing products and emphasized the importance to standardize and ensure the interoperability of the communication for these devices. IEC/TC100 gave an overview on their AAL activities and the AALIANCE2 invited the SG5 to participate in their forum.

During the IEC/CENELEC workshop in **Brussels in March 2014** the following projects have been presented and evaluated:

IEC Activities on Ambient Assisted Living: IEC TC 100 (Ms. Ulrike Haltrich)

Introduction on how IEC TC 100 has developed AAL projects in their area of work (audio, video and multimedia systems and equipment). TC 100 objectives and strategy are to enrich human life and contribute to society. TC 100 develops study sessions in AGS and this has led to the proposal for a new TA on Ambient Assisted Living, Accessibility and User Interfaces. AAL and Independent Living are both terms used for this area of work.

IEC TR 62678 was published in 2010 and considered the importance of including accessibility and usability in mainstream products. IEC TC100 published IEC 62731 in 2013 and universal framework for User Interaction in Multimedia AAL Spaces introduced as a IEC/PAS 62883. IEC TC100 identified 17 relevant AAL use cases in TR 62907. New work has been initiated on Digital television Accessibility – Functional Specification. IEC TC100 will have a workshop at the May meeting organized with CEA to explore aspects of AAL and independent living. TC100 has identified the potential role of Connected TVs not just as an entertainment device but also an “intelligent hub/home gateway”.

CENELEC Activities on Ambient Assisted Living: TC 100 X (Mr. Gerhard Henninger)

Role of the group is to monitor the adoption in CENELEC of work in IEC TC100; currently there are 2 WGs working on energy efficiency and also a focus group on AAL. Important to extend the involvement of AAL experts in the Focus Group, so far the group has led to the introduction of universAAL framework as a PAS in TC100 and the organization of the 2014 workshop.

EU AAL Joint Programme (Ms. Karina Marcus)

ICT for Ageing Well, objectives are to deliver a better quality of life for elderly citizens, and strengthen the European Industrial Base. Develop products, services for ageing well at home, in the community and at work and create critical mass of R and innovation with projects close to the market.

AAL Joint programme has 50% public and 50% private funding. Each participant funded by their own country with a top up from EU. 19 EU member states and 3 associated non-EU countries (Norway, Israel, Switzerland).

Each AAL JP call has a specific focus:

1. Prevention and management of chronic conditions (e-health/telemonitoring)
2. Advancement of social interaction of elderly people (prevent loneliness and isolation)
3. Advancement of older persons’ independence and participation in the self serve society.
4. Advancement of older persons’ mobility (orientation and navigation and assistive technology inside and outside)
5. Home Care (enable older adults to live independently, and support informal carers)
6. Supporting occupation in life of older adults (active involvement paid or voluntary)

Consortia must have strong end-user involvement in any project; partners from 3 different states at least 1 business partner, 1SME and one end-user organization. High SME participation, also research and universities, large enterprises and endusers in the projects.

For further details see www.aal-europe.eu

AAL JP Support Actions

Action 1: AAL2Business to support bringing solutions to market in 2 to 3 years

Action 2: Collaboration with Regions with workshops to raise awareness of AAL JP projects

Action 3: User involvement in AAL JP projects, guidance etc

Action 4: Standards and interoperability in AAL to raise awareness of AAL solutions interoperability too facilitate market uptake.

Action 5: AAL information Portal to get better information about existing solutions about “ICT and ageing well”. (Portal must be sustainable not just during a project)

Action 6: Market Observatory of AAL: preliminary study in AAL field to provide information to supply and demand actors

AAL Forum holds an annual conference:

Vienna 2009 / Odense 2010 / Lecco 2011 / Eindhoven 2012 / Norrkoping 2013

2014 meeting in Bucharest 9-12 September 2014

The next Meeting of the SEG AAL shall be in conjunction with this meeting.

Integration Profiles and AAL Use Cases (Mr. Lars Rölker-Denker)

Challenges for future-proof AAL Systems

Systems must fit into existing houses and technology must interact with local infrastructure (e.g. building automation, and local service providers)

Identified more than 500 standards, how can they be used?, AALLIANCE2 project developed repository, and have gaps e.g. in remote maintenance, building plans for internal localization,

There are some approaches to complement standards e.g. conformance statement, application profiles, conformance testing, cross-vendor testing, integration profiles.

AAL JP Action on Interoperability: brief overview; collected 300 Use cases and distilled in to 7 representative use cases. Looked at FP6 and 7 projects etc., cluster most popular AAL system components and selection of most important use cases for integration profiles (analyse given use case, identify systems and system components and describe interactions as transaction and select standards for each transaction)

1. Behaviour monitoring
2. Calendar service
3. Social interaction with Smart TV
4. Shopping and nutrition planner
5. Mobility assistant
6. Personal trainer
7. Environmental health monitoring and alarm

4 of the integration profiles were developed further including identification of standards.

Behaviour monitoring

- Used for dementia/cognitive impairment support and address monitoring of users location and activities and identify potential dangers
- System with home automation sensors, power sensors re device use, optical sources, sensors on body (e.g. accelerometers to detect falling) etc. (see slide 20 figure)
- May have home automation gateway and body area sensor gateway (more limited coverage).
- Classify transactions as required or optional. Provide high level processing and data flow schematic and transaction definitions (slide 29) and each transaction is

then described in greater detail. Referenced standards for each transaction identified.

- Other integration profiles e.g. Social interaction with Smart TV can reuse most of the originally identified transactions.

AAL-JP CaMeLi, NavMem, ARGUS (Mr. Markus Dubielzig)

Siemens department is “Accessibility Competence”

Working on 3 projects and considering on whether all devices are usable by end users e.g. smart phone

NavMem: Navigation Support for Older Travellers with Memory Decline

Project started in 1-10-12 and runs for 36 months, 7 partners working on a mobile companion to provide orientation and navigation support, easy to use. One mode can provide visual cues to next waypoint (chosen by user). Navigation mode enriched with photos etc., third mode is safety feedback to allow user to get help from informal carer. It can be difficult to make it really simple for the user, with standard technology/devices but need to adapt them to make simpler to use and understand. Important to know IEC on how to make accessible information.

CaMeLi, Care me for Life

2010 project to demonstrate that avatars are generally accepted even if limited to a interaction with standard remote control (yes/no). This new project will have avatar on tablet with avatar that can express emotion and is communication channel to friends/neighbours etc. Interaction with other people is important, makes people living alone more active, and developing an innovative virtual assistant -- an AVATAR.

Emotion and speech detection involve optical and acoustic aspects. Express emotion with gesture and voice. FaceReader is installed at many train stations, have fusion with voice analysis. ORBIS NL and ViVa CH are user partners, apartments for independent living and care home environment. Japanese study demonstrated that the more avatar looks like a human the less acceptable it is, need to find one agreeable for all users (may have to give users choice).

ORBIS want to install and maintain system so have major trial with large organization and project solution will continue to be available to end user after the end of the project, currently early in project working on lab tests, installation end of 2014 in end user homes.

Discussion: User Studies have been mixed male and female and have not distinguished gender difference in acceptance of avatar.

Usability implications, but what standards are needed? too early (6 month into project) to be clear, gesture interaction mainly de facto standardized and some gestures are IP protected. But user interface has to be simple.

Similar research in Japan, but avatar moves with user; it does not remain in the house.

Issues of privacy have to be addressed, particularly if not limited to the home, but with one tablet need not be networked.

Is MPEG-V appropriate? And CEN has social chain alarm standard under development (CEN TC 431).

Guide 71 revision (Klaus Wegge)

A short introduction to the status of Guide 71 revision was made. This guide is addressing accessibility in standards. Not clear if this is a direct replacement for existing Guide 71 (KW thinks not).

New standardization mandate 473 “Design for All” in relevant standardisation initiatives” in Europe.

Mandate 376 closed end of February with the publication of EN 301549 (accessibility ICT for public procurement)

In EU new public procurement directive published, has to be implemented in 2 years. Standard procurement must be for accessibility support.

Easy Reach Project, Interfaces for Elderly (Mr. Stefano Pinardi)

SpinNet Lab works on sensors and applications such as healthcare for the elderly.

Industrial area of Milan has a lot of elderly,

Ambient sensors (temperature, humidity, light, distance, presence)

Wearable sensors (accelerometers, gyroscopes, compass, heart rate, oxygen saturation)

3 case studies, intelligent monitoring and AAL JP projects.

Independent Living for the Elderly: by 2030 in Italy more elderly than young

Need to help caregivers to monitor and manage emergency situation and intervene as necessary. Need pervasive sensors, vertical integration of data, horizontal integration of technology and intelligent analysis of data for caregivers. For example use case to prevent falls.

Project to investigate the use of mobiles by the elderly, with an appropriate interface design which is both simple to use and simple to understand; by using touch screen with photos to send message, audio or video messages rather than use the keyboard. The other service will be geo-location of people and service, again relies on interaction with a touchscreen. Additionally there is a requirement to connect the young and the elderly, the young use social networks while the elderly do more one-to-one communication.

Case 3 is social application for home-based people using the Smart TV, use android embedded sensors, airpointer for gesture recognition. Elderly people may have less

accurate gestures because of impairments. In phase 3 create pilot home TV interface driven by gesture interface and integrate with mobile interface.

Undertake software usability measurement inventory to collect user feedback.

More pervasive use of sensors, more opportunity for user communication and in the medium term the challenge is integrated services and applications with intelligent homes and local services. In long term smart society should deliver solutions. Easy to use solution for the elderly will be easy to use technology for everyone.

Robot Platform Development and System Integration for the projects (Mr. Paulo Alvito)

ID Mind develops Entertainment, remote inspection and services application robots

Low cost platform to put laptop on, and control robot with Skype. Also transfer to Goggle because Skype now MS and developer support stopped

Remote operated vehicle with sensors and clients develop software

Service robotics 2010 bank installation assisting location finder and need to work without human intervention, swarm of 5 manage which charging, and flow of information. If not receive update from motor then do reset.

Note: IEC are now studying robot service applications,

Critical issues are meeting user needs, robustness (dependability), autonomy of operation, and safety, and a reasonable price.

SocialRobot

Develop integrated mobile care platform, to navigate indoors with unstructured environment, with reminder services, and also social community network.

2 wheel differential robot platform, use serial communication protocol (I2C) for low level boards. And robots also have USB and low level sensors on platform eg temperature, humidity (user content) and device sensors (battery, motor and driver temperature. Additionally higher level sensors e.g. odometry, laser ranger, infra-red markers, Kinect type camera, camera and microphone, touch screen, speakers, LEDs for robot to show basic status.

Aim to deliver for less than 8000euro; designing shell to go over base electronics

Software integration using ROS robot operating system, no longer supported product but almost all robot community work with this OS and it is an open source activity (MIT model).

MOnarCH - Multi-Robot Cognitive Systems Operating in Hospitals

Feb 2013-Jan 2016, to provide swarm of robots in hospital environment to do activities with children who are long stay, e.g. in oncology centre in Portugal and core target is 6-7 years with robot to be smaller than typical child of this age. First stage the 4 wheel omni-directional platform is complete and now designing shell.

Low level communication architecture and each micro-control loop is monitored for diagnosis and safety by sending information to high level computer systems. Navigation computer runs in Linux, and interaction computer (tablet) runs windows for user interaction.

Safety is very important, use soft materials and have bump detection with detection switches. Can control velocity and acceleration, in places can go faster, but if need to stop must have smooth movement. Use sonar obstacle detection. All boards must be in normal operation state for the motor drivers to be enabled.

FROG - Fun Robotic Outdoor Guide

Guide robot to engage tourists with fun exploration of outdoor attractions,

System with sensors, robot, vision model, navigation model and augmented reality model and can display this over real images on the screen e.g. in zoo. Or in tourist attraction can see images of site in earlier times. Final design was a 4 wheel platform base and soft foam bumper with 12 sensors that immediately cut motors on contact, had to reduce weight by battery choice, additional cooling because of use environment, some additional emergency stop override. Engaging shell designed people should not touch sensors so have green shells, and weights circa 100kg.

Discussion:

ISO 13482 2014 safety requirements for social care robots (TC184 SC2)

IEC have SG 7 with China and Germany to explore robot applications

Also IEC TC59 doing work on mobile robot platform etc. IEC 62849 Ed. 1.0

Performance evaluation method of intelligent mobile robot platform for household and similar applications

Specific group looking at safety issues with robots in public places. Have standards for industrial robots

UniversAAL and ReAAL (Mohammad-Reza (Saied) Tazari)

UniversAAL “Ecosystems around common open platforms to achieve de facto interoperability standards.”

AAL is a multi-vendor market, therefore interoperability is a major challenge. Individuals need to be able to pick applications and services to match their needs. System must be able to evolve and add new functionality as required.

Lecce declaration signed by more than 200 organisations from more than 44 AAL projects with 9 measures identified to help achieve a common open platform. Had been parallel projects working on AAL platforms e.g. Amigo, GENESIS, MPOWER, OASIS, PERSONA SOPRANO.

Need to put technology enablers under real life stress test in the project REAAL.

UniversAAL tried to establish common understanding of AAL, in reference model, and common approach to software development in the reference architecture and a specific software solution in a concrete architecture for AAL. UniversAAL based on market support through uStore, development support through AAL studio (developer depot), operational support through AAL Space. However market envisages AAL service provider rather than user individually choosing a specific product. Or would have to install run time environment and then add desired service (may not be something a typical AAL user can manage). Context Bus, Service Bus and UI (User Interaction) bus akin to 3 buses of UPnP systems.

Have 352 active UniversAAL accounts, 4 living labs, at OneM2M meeting in Berlin (April) UniversAAL will present specification for semantic interoperability.

AALOA Manifesto see www.aaloa.org/manifesto

ReAAL

Promote standards, guidelines and open platforms for interoperable solutions ion the domain of AAL and active and independent living.

Will evaluate the role of a common open platform

Measure related socio-economic impact e.g. vendor lock in, missing AAL ecosystem, lack of best practices and lessons learned and lack of information on return on investment.

Technical barriers include that scope of AAL is too open and diverse, no clear technology trends, lack of interoperability guidelines based on open solutions, lack of commonly adopted platform, maturity, usability and reliability of candidate platforms not proven.

Analyse effectiveness of pilot’s value chain and derive replication guidelines.

Deploy several applications in several pilot sites 7000 people and 7 countries)

Shape a business model and ensure sustainability of different UniversAAL entities.

Need to find evidence, costs for adoption, evidence that costs pay off for different stakeholders etc.

Advisory board has DKE, AAL JP, ETSI, DALLAS etc.

Example pilot site, each has a number of users and specific applications. Each pilot has a technical partner providing services to pilots.

- 60 users in 22 apartments in intelligent home environment, day centre etc. in Germany; fall detection by CapFloor.
- 300 users in Norway, mobile safety, safety at home, electronic locks, tracking for dementia patients

See http://cip-reaal.eu

Picture 1 shows the invitation for the Brussels-Workshop of SG 5.

Picture 1 – Flyer Workshop Brussels

During the SEG AAL meeting in **Brussels in March 2014** the following projects have been presented and evaluated:

IEEE presentation on Ethernet standards Series 802 and AAL

Mr. David Law, Chairman of IEEE 802.3 Working Group, presented the status and the future evolutions of Ethernet standards linked to potential applications for AAL.

IEEE would be a good partner for the SyC-AAL.

Continua Health Alliance presentation on the latest developments

Continua has done extensive work on profiling existing standards and based on this, developed interoperability guidelines for sensors, devices and telehealth platforms. By now, about ninety devices have been tested, certified and applied for the Continua logo programme.

Continua Health Alliance has expressed their interest in working with IEC on the standardization of their interoperability guidelines several times and IEC SEG AAL would like to progress on this topic before the final set-up of the IEC System Committee for AAL.

Due to the high market relevance, e.g. Denmark is in the process of adopting the Continua Approach, and urgency of deployment of ambient assisted living and telehealth solutions in the market, IEC SEG AAL recommends to establishing the liaison with the Continua Health Alliance.

Cooperation with identified TC/SC´s in and outside of IEC

IEC SEG AAL recommends that the IEC CO, IEC TC 62 and IEC TC 100 are involved in the discussions of where appropriate work should be progressed at the initial stage. Further TCs may need to be contacted depending on the review of the maturity of the interoperability guidelines submitted to IEC. After the transformation of the SEG AAL into an IEC System Committee the horizontal and interoperability approach driven by Continua needs to be reflected in the involvement of the appropriate TCs.

Conclusion:

The team created a list of standards, noted a number of TCs related to the AAL-market as well as a list of funded projects and existing fora and consortia in relation to AAL.

The basic research work is mainly done by a number of funded projects in the European Union. In March 2014 several leaders of projects have been invited to a workshop in conjunction with the SEG AAL meeting. A list is provided in Annex C.

During the lifetime of SG 5 AAL a number of fora and consortia have been reviewed. A list of those is contained in Annex B together with the list of standardisation committees working in the area of AAL.

In the area of smart home the situation regarding standardisation is similar. There are several fora and consortia working on this issue. Some IEC TC work is going on at a component level and at a system level. The SEG states that much more effort shall be undertaken to enable this home networking to fulfil the needs of an AAL system.

5.5. Regulation

The AAL system closely relates to the collection, storage and handling of personal and medical data. The Security Team in the SEG reviewed several different approaches to this aspect.

Due to the worldwide different approach, the SEG proposed, that a special group in SMB be formed to provide privacy guidance for IEC in general.

The committee succeeding the SEG shall reflect the different regulations in the regions worldwide to handle the issue of privacy when dealing with personal data.

The Security Team also reviewed the safety and environmental aspects of AAL. These aspects do not differ from the usual IEC work and therefore the team advises the committee succeeding the SEG to follow the existing guides related to these aspects.

6. System Committee

The following chapter deals with the future system committee to be established. The content has been compiled during the March meeting of the SEG AAL in Brussels.

6.1. Scope

The System Committee shall:

- Create a vision of Active Assisted Living that takes account of the evolution of the market
- Enable accessibility of AAL Systems and user interfaces
- Enable cross-vendor interoperability of AAL systems, products and components
- Communicate the work of the SyC to IEC and the market to foster a strong community of stakeholders

6.2. Tasks

Therefore the System Committee shall:

- Coordinate the work of existing and future committees related to AAL
- Liaise with the following relevant organizations:
    - fora and consortia and SDOs
    - e.g. Continua Health Alliance,
      European innovation partnership on active and healthy aging, W3C, etc.
    - Relevant ISO, IEC and ITU technical bodies
    - key regional and national research initiatives in AAL
    - national and regional regulators
    - relevant end user associations
- Define common terms and definitions
- Maintain the inventory of existing standards and standardization projects in progress
- Develop reference architectures and models for AAL systems
- Foster the development of conformity assessment tools and methods (aligned with CAB)
- Be aware of current and emerging commercial and market needs
- Collect user requirements and generic use cases
- Provide guidance on risk management and contingency planning
- Provide guidance on the implementation of Guide 71 in standards relevant to AAL
- Identify gaps in standardisation based on use cases evaluation and make recommendations to address these
- Develop interoperability profiles
- Organize and participate in workshops, conferences, etc.

Note: for a definition of AAL refer to Chapter 1 of this report.

6.3. Name

There has been a discussion during the meeting in march in Brussels. The following suggestions has been discussed:

1. SyC on Smart Living
2. SyC on Independent Assisted Living
3. SyC on Independent Living and Health Monitoring
4. SyC on Active Assisted Living
5. SyC on Active Assisted Aging
6. SyC on Social Inclusion
7. SyC on Active and Healthy Aging

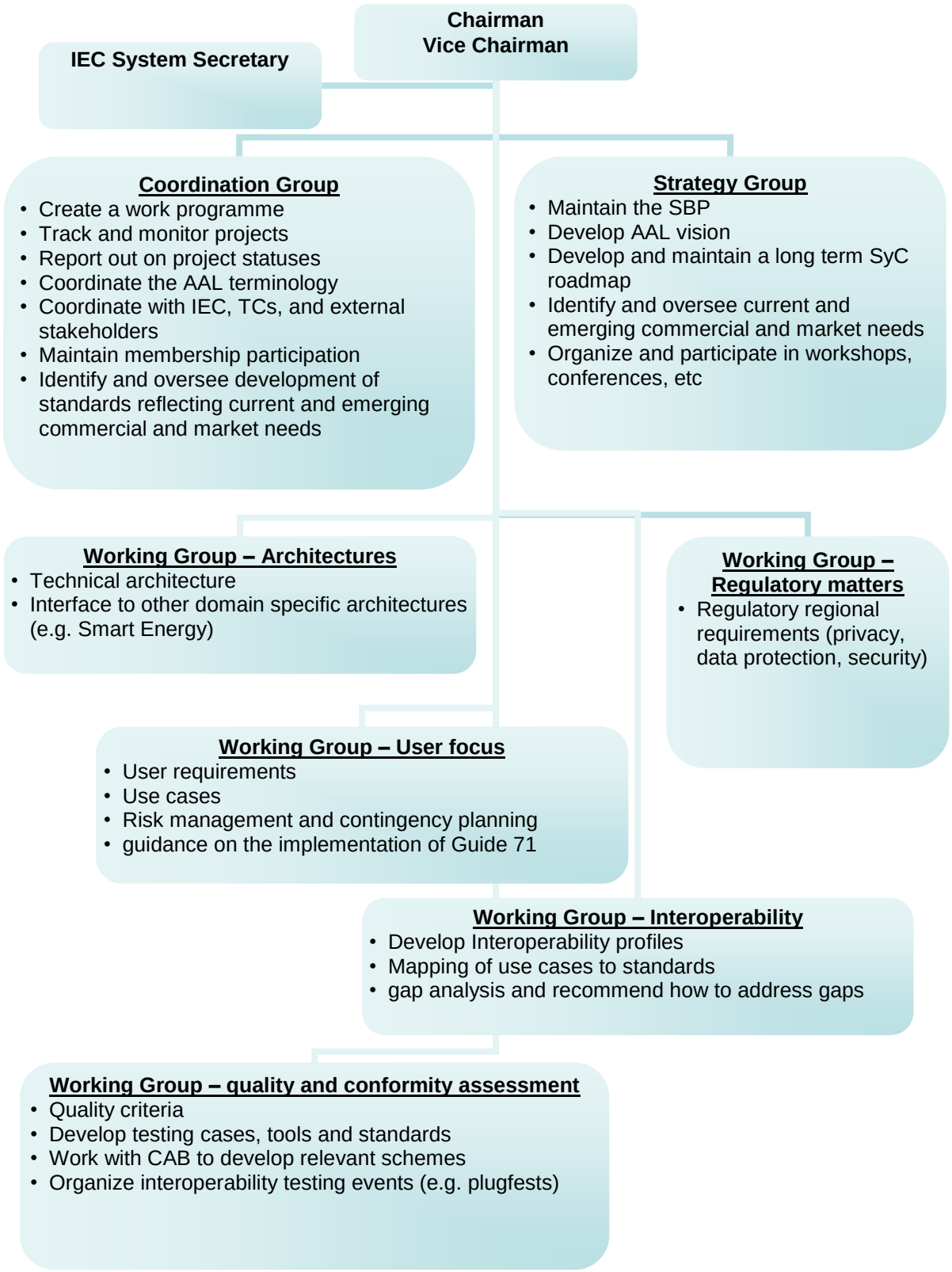
SEG-AAL agreed on #4.

Determined that the other options implied and/or referenced environments that
1) really meant something other than AAL,
2) did not encompass all of AAL or
3) encompassed more than AAL.

SEG-AAL recommends the name “System Committee on Active Assisted Living”

6.4. Structure

The following organisation is suggested by the SEG:



6.5. Constituency

The SEG suggests the following initial partial list shown in table 2. The list of participants shall be adjusted as necessary during the lifetime of the SYC.

Table 2 –Constituency

Function	Name	Organisation
Chairmen:		
Chairman		
Vice Chairman		
ISO/IEC Representatives:		
TC 3		
TC 23		
TC 59		
TC 61		
TC 62		
TC 72		
TC 79		
TC 100		
TC 116		
ISO/IEC JTC 1 SWG Management		
ISO TC 159		
ISO TC 173		
ISO TC 223		
NC Delegates		
Belgium		
China		
France		
Germany		
Italy		
Japan		
Korea		
Netherlands		
New Zealand		
Spain		
UK		
USA		

Table 2 – Constituency (cont.)

Function	Name	Organisation
SDO & Fora and Consortia & Research and Development		
Continua Health alliance (PCHA)		
Successor of AALIANCE 2		
AAL Joint Programme		
AALOA		
IEEE-SA		
ETSI		
OFFIS		
Alliance for Smart Energy Solutions		
OASIS		
Fraunhofer - Allianz AAL		
UL		
ITU-T SG 16		
DLNA		
VDE		
Age-Platform		
IEC		
System Secretary		

6.6. Chairman of the System Technical Committee AAL

The roles and responsibilities of the SyC Chairman should be the same as those for the IEC TC Chairman

Qualifications:

- Experience in an Active Assisted Living (AAL), health monitoring, well-being or similar environments
- Experience with IEC, other stakeholders and industry
- Should have a global perspective / outreach
- Technical expertise is helpful, but not required

Candidates for a Chairman should be collected through IEC by a call for nominations.
The Position shall be mutually agreed on by the P-members of the SyC and the nominee shall be approved by the SMB.

Annex A

Description of the AAL use case model

A 1. General

The objective of the use case model is to structure a use case example according to different planes. Hereby the SGAM model established by SG 3 was taken into consideration and adapted to the requirements of an AAL system. The model analyzes the use cases with respect to functionality and interoperability of the components in different planes which are highlighted in the detailed description of the model (see the following paragraph). It analyses the various use cases and provides an insight in needed standards and specifications. It also supports the fact that a TC/SC is required to realize and build up an AAL system.

This use case model should not define any model of a reference architecture. It cannot give any statement on a reference architecture and its application. The use case model was developed by the expert team of SG 5. The feasibility of the model and also template was tested by applying the use cases provided by IEC TC 100 and DKE. The results of the SG 5 activities are already reflected in the ongoing work of IEC TC 100 where a stage 0 project was established to develop a technical report of AAL use cases.

The technical report has been already published as the document IEC/TR 62907/ Ed.1.

A 2. Description of the Use Case Model

A 2.1. Definition of the Layers

The use case model encompasses different layers. These layers are the following (“Bottom up”, see Figure A.1 Layer Model):

- the Component Layer,
- the Communication Layer,
- the Information Layer and
- the Semantic Layer.

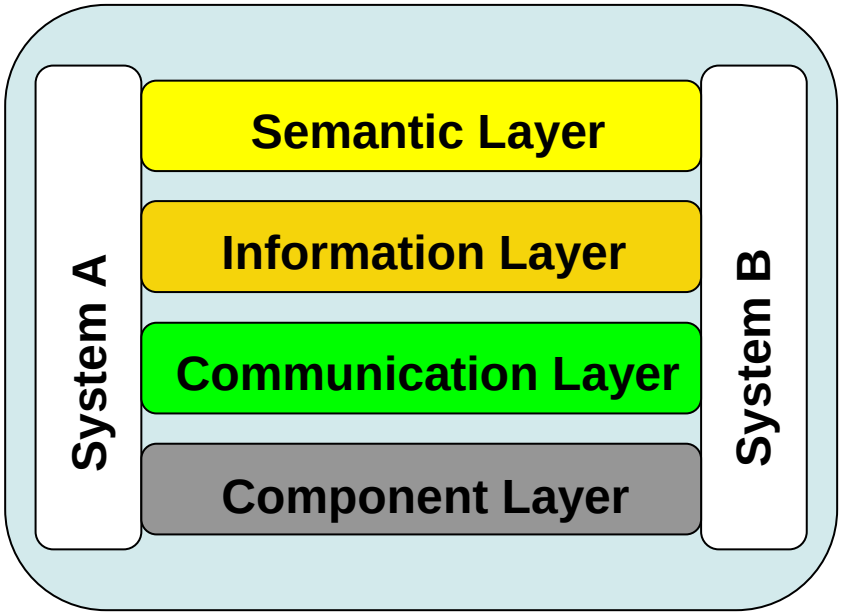


Figure A.1 Layer Model

The Component Layer describes all components which are needed in a Use Case. In this layer the connectivity, for example the plugs and sockets, that is to say, the physical interfaces and devices are described.
The Communication Layer describes the network and the connections as well as the protocols used in an AAL system, comparable to the OSI-layer 1-7 stack.
The Information Layer describes the information model, data model and the data structure.
The Semantic Layer describes functions and services based on the data of the information layer.

A 2.2. Definition of the Planes

The Plane presents the relation between the Domains and the Enablers. One plane consists of the Domain axis and the Enabler axis (see also Figure A.2 The Plane).
The Domain axis describes the single domains of a AAL-system. The Enabler axis denotes the functions which are the basis of any AAL-system.

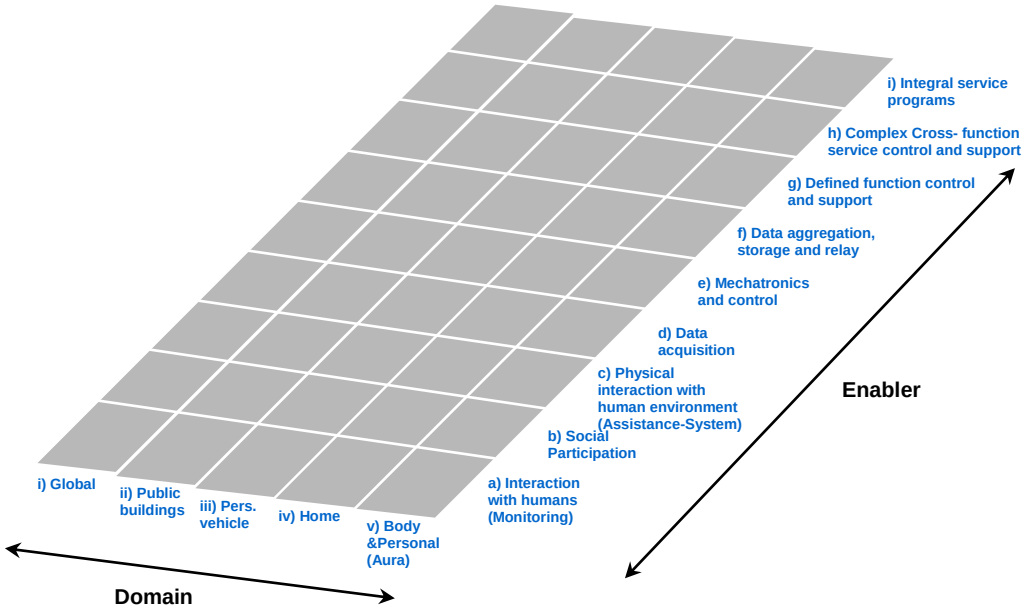


Figure A.2 The Plane

The following Domains are identified as single domains in the AAL environment (the Domain axis from left to right):

2.2.1. Global

Denotes all space outside populated areas as well as all outdoor and on the move spaces in a populated area, including public transport;

Example: in a train, at the country side, on a ship, in a park, on the street.

2.2.2. Public buildings

Denotes all other relevant in-door environments (so “public” refers to access, not to ownership here); these are not customizable but instead will be equipped for generic support of the common denominator of user groups; and would thus include generic infrastructure aimed to support a large variety of individuals typically visiting any particular place;

Example: At an airport, in a shopping centre, in the city hall, in a metro station.

2.2.3. Personal vehicle

Denotes all personal vehicles.

Example: cars, motor cycles, cycles or vehicles designed for elderly people, whether hand-operated (stability aids) or engine powered (electrical bicycles and scooters).

2.2.4. Home

Denotes the private, hence highly customizable indoor area where the AAL service user lives, alone or with friends, relatives or room-mate(s) and would thus include dedicated infrastructure aimed to support those individuals;

Example: Includes infrastructure and devices (including mainstream solutions) such as home wireless networks, routers, gateways and concentrators, audio-video aids (microphones, cameras, screens, speakers, head sets, headphones, etc.), in-house only vehicles and walking / moving aids, in-house only appliances and robots, connected TVs, monitoring and security means, medical aids (e.g. blood pressure devices).

2.2.5. Body and Personal (Aura)

Denotes the immediate area around the body.

Example: tablet, smartphone, step counter, blood pressure sensor, personal alarm button.

The Following Enablers are identified as single domains in the AAL environment (the Enabler axis, bottom-up):

2.2.6. Interaction with humans (Monitoring)

Denotes all direct **interaction of** or through **AAL system elements with humans**

Example:

1) **measurements** in or on the body (vital signs, position, movement and acceleration, …);

2) **control operations by a human** (pressing alarm button, viewing and operating all sorts of human interfaces, …) and so on.

2.2.7. Social Participation

1) **audio-visual interaction** (both artificially generated or with other humans, or even animals, through the AAL system);

2) **personal care** (e.g. hair combing, shaving, feeding support, …).

2.2.8. Physical interaction with human environment (Assistance Systems)

Denotes all direct **physical interaction of** or through **AAL system elements with the human environment** and thus includes tele-operated or autonomously operating appliances. (Interaction within systems or machines).

Example: Thus includes

1) **Machineries** like Vacuum cleaner, robot making the bed, cooking aids,

2) door and light **switches**, etc. but excludes digital / virtual interactions (data acquisition, steering actuators digitally, …).

2.2.9. Data acquisition

Denotes all **data acquisition** through sensors (gathering the data), but also the interaction between data entry in the human interface (which is Interaction with humans) and the further processing (which is any one of the items below).

Example: To get the physical state of the parameter measured.

2.2.10. Mechatronics and control

Denotes “local” control loops including mechatronics.

Example:

1) To **automatically** steer a robot arm or moving aid to a certain position,

2) to **balance** a 2-wheel vehicle or manoeuvre a wheel chair up the stairs, and so on.

2.2.11. Data aggregation and storage

Denotes all **content-agnostic data handling**.

Example:

1) **Storage**,

2) **communicating**,

3) **aggregation**, etc. of data.

2.2.12. Defined function control and support

Denotes all **digital** and **physical activity** in **immediate support** of any given **single AAL function.**

Example:

1) **Sending a reminder** that the medication has not been fully taken today yet,

2) **dispatching a task** for a house robot to vacuum the living,

3) **turning on the lights** upon detection it is getting dark, etc.

2.2.13. Complex Cross- function service control and support

Denotes all **tactical level coordination** necessary **to perform composed, more complex functions** in a meaningful manner.

Example:

1) The (guided, semi-automated or fully autonomous) **verification** of fridge content,

2) followed by **assembling** a shopping list followed by dispatching tele-shopping orders and

3) **printing** a shopping list for human shopping by the assisted person or an assistant, and so on.

2.2.14. Integral service programs

Denotes all **overall level coordination** necessary **to perform composed groups of services** over longer time spans in a meaningful manner:

Example: The assessment what services an AAL service user need, the customization of the to-be-provided services from an available “menu” over a future period, alignment with the individual and with any relatives or friends about this program, planning and arranging for digital and / or physical aids or infrastructure to be delivered and installed, etc; or at public building or higher domain levels the planning for those groups that need to be served (as opposed to individuals).

The complete Use Case model has the following design (see Figure A.3 The Use Case Model):

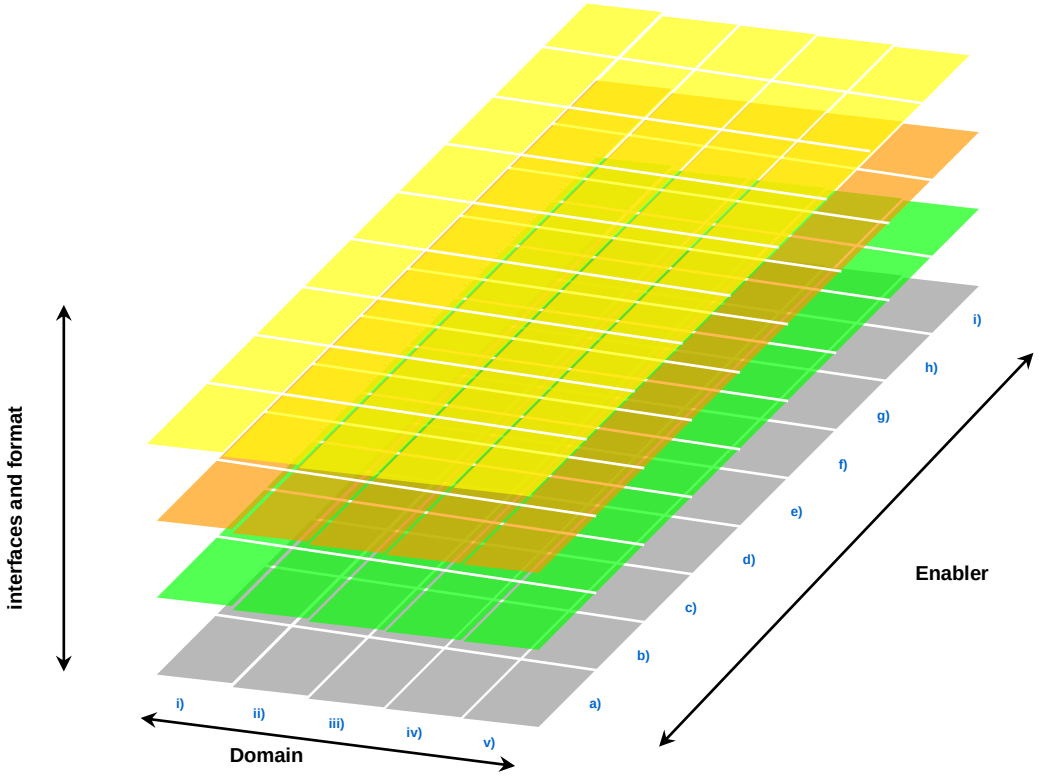


Figure A.3 The Use Case Model

A 2.3. The Use Case Template

Further more a use case template was developed to provide a structure for the use case (see Use Case Template on following page). With this use case template it is possible to analyze the use case and to provide a detailed description of the use case model.

USE CASE NAME:

Version of Template: v 0.9

1 Description of the Use Case

1.1 General

Critical System	Less Critical System	Well-being System

1.2 Name of Use Case

ID	Domain Role See Annex A	Function see Annex B	Name of Use Case

1.3 Version Management

Changes / Version	Date	Name Author(s) or Committee		Approval Status draft, for comments, for voting, final

1.4 Basic Information to Use Case

Source(s) / Literature	Link	Conditions (limitations) of Use

Maturity of Use Case – in business operation, realized in demonstration project, , realised in R&D, in preparation, visionary
Generic, Regional or National Relation
View - Technical / Business/…
Further Keywords for Classification

1.5 Scope and Objectives of Use Case

Scope and Objectives Use Case and “AAL-Theme” (see also Annex C)
•

1.6 Narrative of Use Case

Narrative of Use Case
Short description *– max 3 sentences*
Complete description

1.7 Actors: People, Systems, Applications, Databases, the Power System, and Other Stakeholders

Actor Name	*Actor Type*	*Actor Description*	*Used Technology*
•			
•			
•			
•			

1.8 Issues: Legal Contracts, Legal Regulations, Constraints and others

Issue - here specific ones	*Impact of Issue on Use Case*	*Reference – law, standard, others*

1.9 Referenced Standards and / or Standardization Committees (if available)

Relevant Standardization Committees	*Standards have to be considered in the Use Case*	*Standard Status*

1.10 Relation with other known use cases

Known use case	*Source*	*UC Status*
	…	

1.11 General Remarks

General Remarks
---

2 Drawing or Diagram of Use Case

Drawing or Diagram of Use Case *– recommended “context diagram” and “sequence diagram” in UML*

A 2.4. Domains

2.4.1. Global

Denotes all space outside populated areas as well as all outdoor and on the move spaces in a populated area, including public transport;

Example: in a train, at the country side, on a ship, in a park, on the street.

2.4.2. Public building

Denotes all other relevant in-door environments (so “public” refers to access, not to ownership here); these are not customizable but instead will be equipped for generic support of the common denominator of user groups; and would thus include generic infrastructure aimed to support a large variety of individuals typically visiting any particular place;

Example: At an airport, in a shopping centre, in the city hall, in a metro station.

2.4.3. Personal vehicle

Denotes all personal vehicles.

Example: cars, motor cycles, cycles or vehicles designed for elderly people, whether hand-operated (stability aids) or engine powered (electrical bicycles and scooters).

2.4.4. Home

Denotes the private, hence highly customizable indoor area where the AAL service user lives, alone or with friends, relatives or room-mate(s) and would thus include dedicated infrastructure aimed to support those individuals;

Example: Includes infrastructure and devices (including mainstream solutions) such as home wireless networks, routers, gateways and concentrators, audio-video aids (microphones, cameras, screens, speakers, head sets, headphones, etc.), in-house only vehicles and walking / moving aids, in-house only appliances and robots, connected TVs, monitoring and security means, medical aids (e.g. blood pressure devices).

2.4.5. Body and Personal (Aura)

Denotes the immediate area around the body.

Example: tablet, smartphone, step counter, blood pressure sensor, personal alarm button.

A 2.5. Actions

2.5.1. Interaction with humans (Monitoring)

Denotes all direct **interaction of** or through **AAL system elements with humans**

Example:

1) **measurements** in or on the body (vital signs, position, movement and acceleration, …);

2) **control operations by a human** (pressing alarm button, viewing and operating all sorts of human interfaces, …) and so on.

2.5.2. Social Participation

1) **audio-visual interaction** (both artificially generated or with other humans, or even animals, through the AAL system);

2) **personal care** (e.g. hair combing, shaving, feeding support, …).

2.5.3. Physical interaction with human environment (Assistance Systems)

Denotes all direct **physical interaction of** or through **AAL system elements with the human environment** and thus includes tele-operated or autonomously operating appliances. (Interaction within systems or machines).

Example: Thus includes

1) **Machineries** like Vacuum cleaner, robot making the bed, cooking aids,

2) door and light **switches**, etc. but excludes digital / virtual interactions (data acquisition, steering actuators digitally, …).

2.5.4. Data acquisition

Denotes all **data acquisition** through sensors (gathering the data), but also the interaction between data entry in the human interface (which is Interaction with humans) and the further processing (which is any one of the items below).

Example: To get the physical state of the parameter measured.

2.5.5. Mechatronics and control

Denotes “local” control loops including mechatronics.

Example:

1) To **automatically** steer a robot arm or moving aid to a certain position,

2) to **balance** a 2-wheel vehicle or manoeuvre a wheel chair up the stairs, and so on.

2.5.6. Data aggregation and storage

Denotes all **content-agnostic data handling**.

Example:

1) **Storage**,

2) **communicating**,

3) **aggregation**, etc. of data.

2.5.7. Defined function control and support

Denotes all **digital** and **physical activity** in **immediate support** of any given **single AAL function**.

Example:

1) **Sending a reminder** that the medication has not been fully taken today yet,

2) **dispatching a task** for a house robot to vacuum the living,

3) **turning on the lights** upon detection it is getting dark, etc.

2.5.8. Complex Cross- function service control and support

Denotes all **tactical level coordination** necessary **to perform composed, more complex functions** in a meaningful manner.

Example:

1) The (guided, semi-automated or fully autonomous) **verification** of fridge content,
2) followed by **assembling** a shopping list followed by dispatching tele-shopping orders and
3) **printing** a shopping list for human shopping by the assisted person or an assistant, and so on.

2.5.9. Integral service programs

Denotes all **overall level coordination** necessary **to perform composed groups of services** over longer time spans in a meaningful manner:
Example: The assessment what services an AAL service user need, the customization of the to-be-provided services from an available “menu” over a future period, alignment with the individual and with any relatives or friends about this program, planning and arranging for digital and / or physical aids or infrastructure to be delivered and installed, etc; or at public building or higher domain levels the planning for those groups that need to be served (as opposed to individuals).

A 2.6. Categories

Different categories are used to clarify the scope of the related system and to highlight the exceptional scenarios which may not otherwise have been considered.

2.6.1. Daily life support

Denotes all techniques and systems which help and support the user during the daily life (like a managing system, a calendar or reminder or other support systems).

2.6.2. Safety, security and privacy at home

Denotes all technical support including fall detection and prevention, ambient sensors or actuators, alarm systems and localization.

2.6.3. Healthcare and wellness

Encompasses medicine compliance as well as telemonitoring (system) aspects and teleconsultation as well as prevention and motivation aspects.

2.6.4. Active aging

Denotes all topics concerning the agile and active aging e.g. learning, the work environment and processes, exercises and information needed for an active aging.

2.6.5. Mobility

Encompasses all systems which are useful for mobile processes e.g. mobility aid, safety and security on the move, transport or information of outdoor conditions.

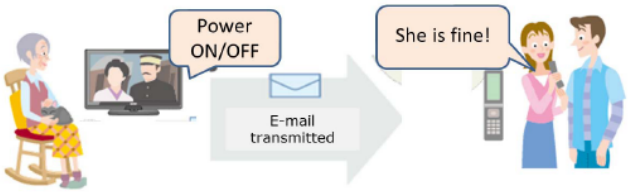
2.6.6. Social interaction

Denotes all systems for social connections and networking as well as the possibility for knowledge transfer.

3 Example of a use case

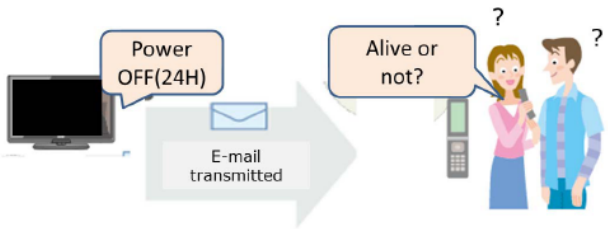
Example
Telemonitoring with Connected TV USE CASE (1)

- Telemonitoring with Connected TV USE CASE (provided by Japan)
- Monitoring of the vital signs of a Connected TV AAL service users. The concept is to monitor the AAL service user's health status via the Connected TV at home by establishing a communication link between the user and the health care provider. The current TV sets provide data to make the necessary action or not. When the power switch and channel selection of the Connected TV are operated, this information is sent by email to the registered email address on a cell phone or PC of the health care provider or family members. This means the Connected TV user is in healthy condition.

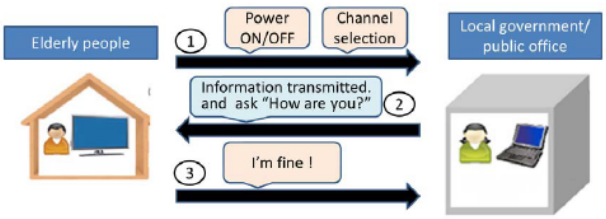


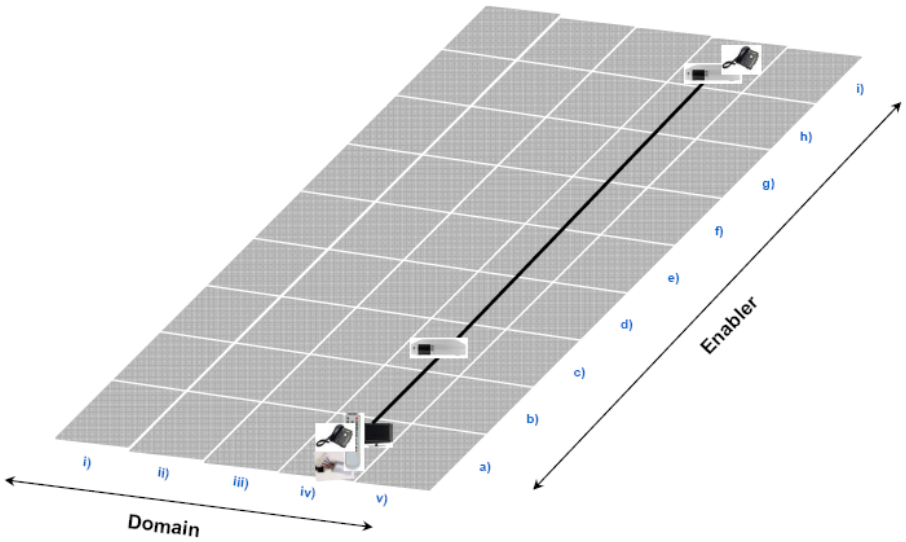
Example
Telemonitoring with Connected TV USE CASE (2)

- An email is also transmitted when the power switch of the TV set is not used for twenty four hours. This may mean that the AAL user needs assistance or the health condition has deteriorated. The health care provider has to make a call or visit to the AAL user.



- Information, e.g. local weather on the residential area, is transmitted and displayed on the Connected TV set automatically. The TV user can answer to a question by remote control.

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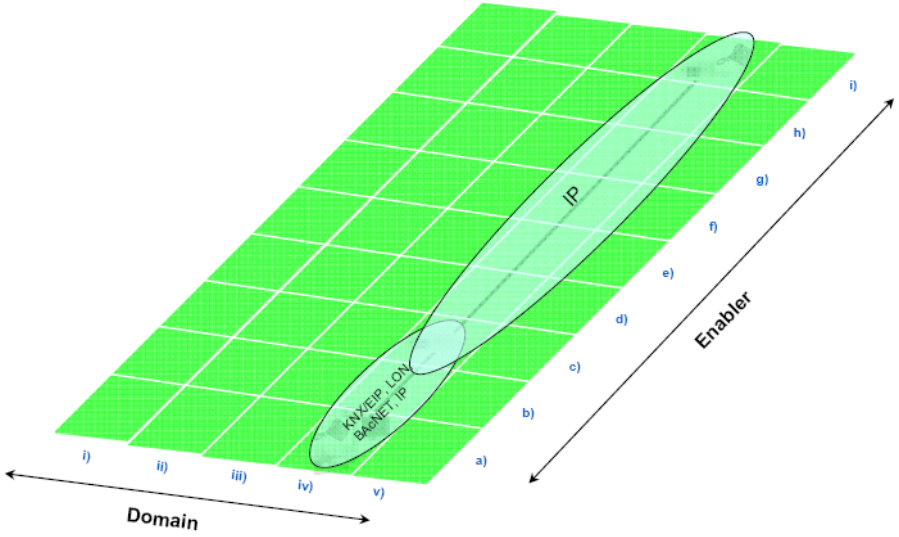
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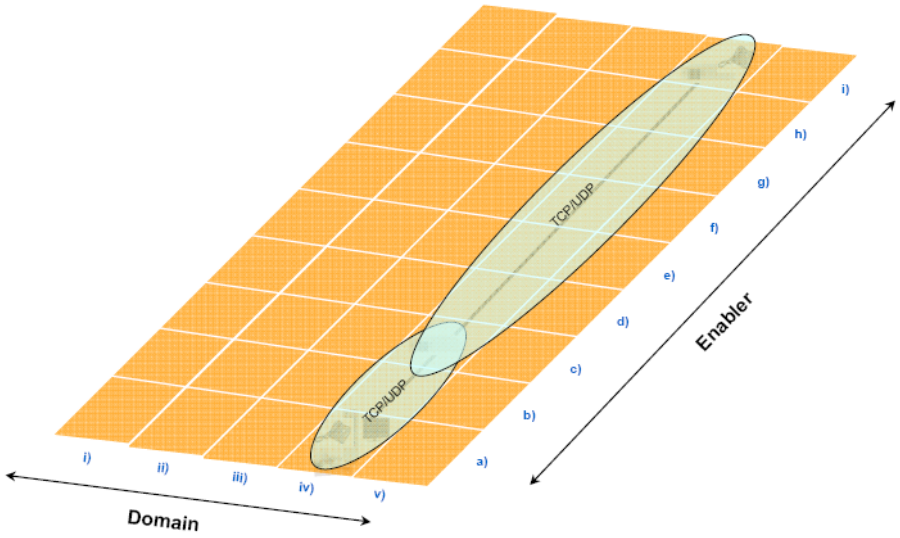
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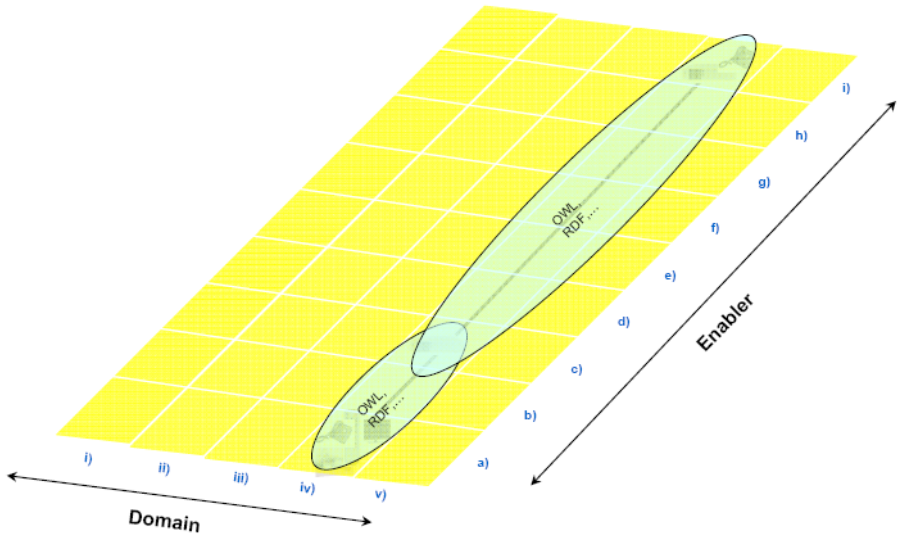
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Annex B

Standardisation related to AAL

B1. General

SEG-AAL attempted to provide an overview of the current status concerning the availability of standards related to AAL. As a first step, a list of Technical Committees that might be involved in AAL was established. Then, the publication catalogue for these TCs was screened to sort the standards that could be in relation to AAL. The same work was done about the ISO side, and further investigations were made at national level. The outcomes of the work from ISO/IEC JTC 1 *Special Working Group on Accessibility* have also been taken into account. SG5 identified over 500 standards that can be related to AAL. In order to retrieve a global overview of the standardisation in the field of AAL, a classification of the standards was made by using two criteria. The standards in the database also have a third criteria which makes the link with de *domains* defined in the AAL reference model.

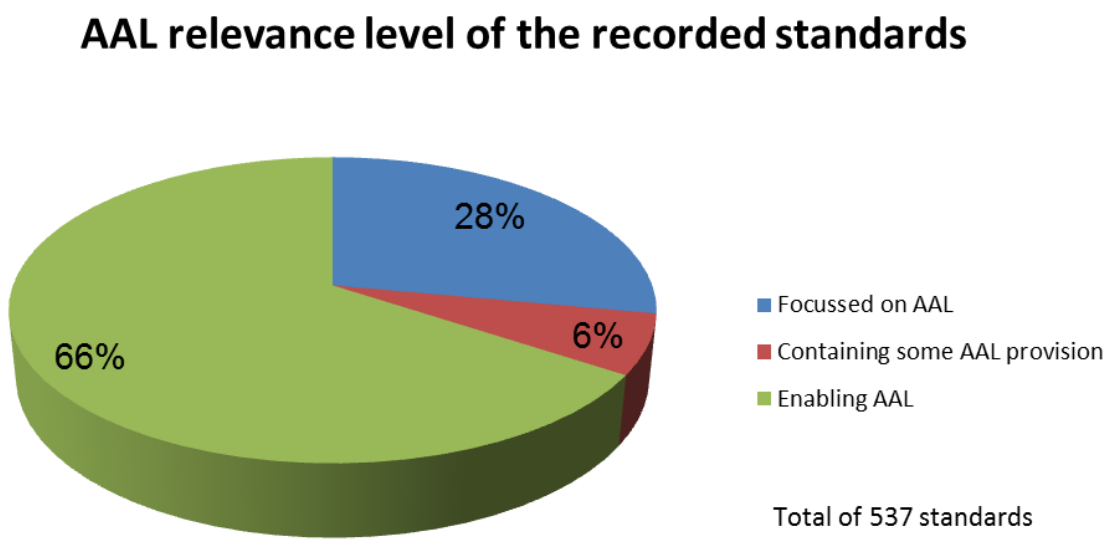
B1.1 The "Category" criteria

All the standards recorded in the database have received a category number based on an evaluation made in SG5/Team Status.

Category 1: Standards focussed on AAL

Category 2: Standards containing some AAL provisions

Category 3: Standards enabling AAL



Picture B1 – Number of standards by subject

Conclusions:

Having two third of the standards "enabling AAL" is not a surprise. Almost a third of the standards focussed on AAL is an encouraging result. A possible reason for such a standard is that many standards already deal with usability, mainly in the IT area. A usability standard has usually a short section for the not disabled persons, and then contains provisions which will allow the same usability level for disabled persons.

The only 6% of standards containing AAL provisions globally concern product standards that contain a section about usability for disabled persons. This is where the most effort should be done by promoting the application of Guide 71 in the future SYC. The needs for electrotechnical products should be addressed.

B1.2 The "Subject" criteria

All the standards recorded in the database have received a subject number based on an evaluation made in SG5/Team Status.

Subject 1: Data acquisition (sensors)

Subject 2: Communication/IT standards software and hardware

Subject 3: Data reliability, safety and privacy standards

Subject 4: Home and building automation standards

Subject 5: Robots standards

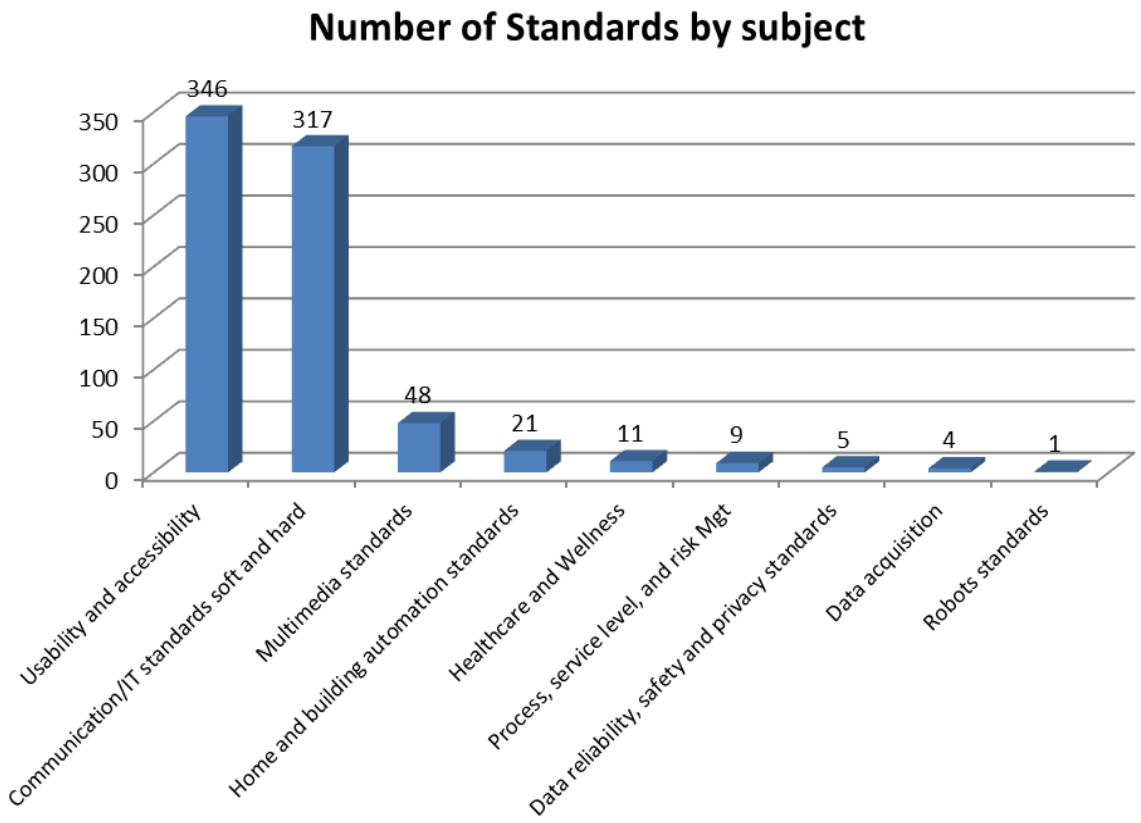
Subject 6: Multimedia standards

Subject 7: Usability and accessibility

Subject 8: Process, service level, and risk Management

Subject 9: Healthcare and Wellness

Please note that standards may deal with more than one subject. A subject number of 27 would denote that the standard is related to subjects 2 and 7.



Picture B2 – Number of standards by subject

B1.3 Conclusions:

Picture B2 shows over 750 occurrences. This means that one out of two standards combines two subjects. The number of standards combining the subjects 2 and 7 is a total of 198. The IT technology is the most advanced in the area of usability and AAL. The multimedia products have also already done a significant work. The areas with the most improvement potential are the consumer products (home appliances, etc.) and the professional electrotechnical equipment. But the TC cannot be blamed for this. The intent of a standard is to ensure the safety, and performance. Thus provisions concerning the usability for AAL-persons are not widely introduced in standards.

B2. List of IEC and ISO committees

The Members of SG5/Team Status reviewed the list of the IEC and the ISO TCs. The evaluation of the TCs relationship with AAL is based on their experience and knowledge of IEC and ISO as well as on advise and documents about AAL and standardisation. The list is expected to be as close as possible to the reality. Some

TCs have been listed, although no standard related to AAL could be found in their publications.

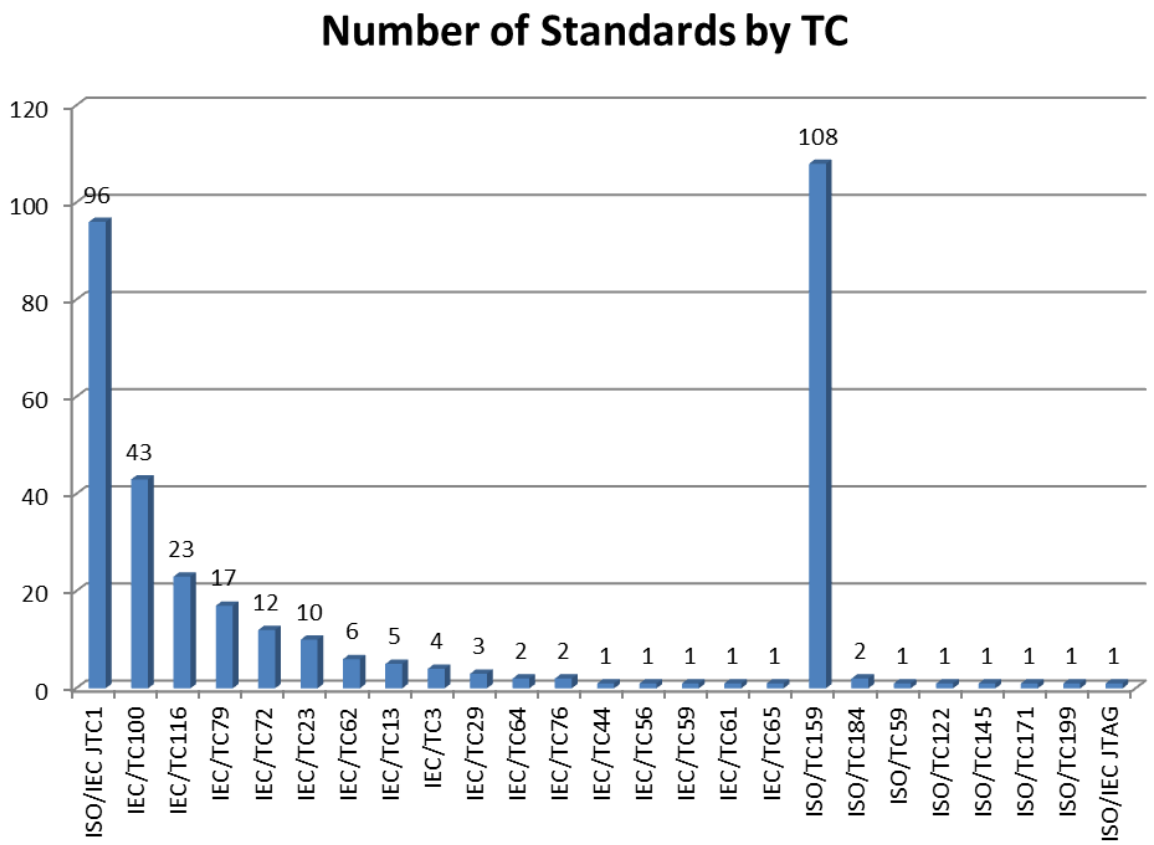
Relevance: Level of estimated actual or future relationship with AAL (*=low, **=medium, ***=High)

Direct/Indirect: Denotes if the relationship with AAL is direct or indirect (global communication standards used also for AAL)

Number of AAL Standards: The number of standards listed in the AAL Standards database

Table B1 - List of IEC and ISO committees

Committee		Description	Relevance	Direct / Indirect	Number of Standards
IEC	TC 3	Information structures, documentation and graphical symbols	***	D	4
IEC	TC 13	Electrical energy measurement, tariff- and load control	*	I	5
IEC	TC 23	Electrical accessories	**	D	9
IEC	TC 29	Electroacoustics	**	D	3
IEC	TC 34	Lamps and related equipment	*	I	0
IEC	TC 44	Safety of machinery - Electrotechnical aspects	**	I	1
IEC	TC 56	Dependability	*	I	1
IEC	TC 59	Performance of household and similar electrical appliances	***	D	1
IEC	TC 61	Safety of household and similar electrical appliances	***	D	1
IEC	TC 62	Electrical equipment in medical practice	***	D	6
IEC	TC 64	Electrical installations and protection against electric shock	*	D	2
IEC	TC 65	Industrial-process measurement, control and automation	*	I	1
IEC	TC 72	Automatic electrical controls	*	I	12
IEC	TC 76	Optical radiation safety and laser equipment	*	I	2
IEC	TC 79	Alarm and electronic security systems	**	D	17
IEC	TC 100	Audio, video and multimedia systems and equipment	***	D	43
IEC	TC 108	Safety of electronic equipment within the field of audio/video, information technology and communication technology	*	D	0
IEC	TC 110	Electronic display devices	*	I	0
IEC	TC 116	Safety of motor-operated electric tools	*	D	23
IEC	PC 118	Smart grid user interface	*	I	0
ISO/IEC	JTC 1	Information technology / User interface (Special Working Group on Accessibility)	**	D	96
ISO	TC 59	Buildings and civil engineering works	**	D	1
ISO	TC 122	Packaging	**	D	1
ISO	TC 145	Graphical symbols	**	D	1
ISO	TC 159	Ergonomics	***	D	109
ISO	TC 171	Document management applications	*	I	1
ISO	TC 184	Automation systems and integration	**	I	2
ISO	TC 199	Safety of machinery	**	D	1



B3. List of SDO and fora and consortia related to AAL

Nearly every SDO and a large number of fora and consortia could be found. The list in Table B2 is limited to the ones which are in relation with the industry, the standardization or regulation areas.

Table B2 - List of SDO and fora and consortia related to AAL

Short name	Region	Organization full Name
ABA	USA	Commission on Law and Aging
ACB	USA	American Council of the Blind
ACMA	Australia	Australian Communications Authority
AENOR	Spain	Asociación Española de Normalización y Certificación
AAMI	USA	Association for the Advancement of Medical Instrumentation
ANSI	USA	The American National Standards Institute
BSI	UK	The British Standards Institution
CADTC	China	China Assistive Devices and Technology Center for Persons with Disabilities
CEA	Canada	Canadian Electricity Association
CEA	USA	Consumer Electronics Association
CEN	Europe	European Committee for Standardization
CENELEC	Europe	European Committee for Electrotechnical Standardization
CHEARI	China	China Household Electric Appliance Research Institute

Short name	Region	Organization full Name
CIMIT	USA	Center for Integration of Medicine and Innovative Technology
Continua	EU & USA	Continua Health Alliance
CSA	Canada	Canadian Standards Association
DAC	USA	Designing Accessible Communities
DIN	Germany	Deutsches Institut für Normung
ECHAlliance	Europe	International Network of Connected Health Ecosystems
EIA	USA	Electronic Components Industry Association
ETSI	Europe	European Telecommunications Standards Institute
FCC	USA	Federal Communications Commission
FDA	USA	Food and Drug Administration
HFES	USA	Human Factors and Ergonomics Society
ICTA	USA	International Commission on Technology & Accessibility
IEEE	Global	Institute of Electrical and Electronics Engineers
IETF	Industry	The Internet Engineering Task Force
IGRS	China	Intelligent Grouping and Resource Sharing
IMS	USA	Instructional Management Systems
INCITS	USA	InterNational Committee for Information Technology Standards
ITopHome	China	Consortia for Chinese digital home industry
ITU-T	Global	International Telecommunication Union - Telecom division
JBMIA	Japan	Japan Business Machine and Information System Industries Association
JIS	Japan	Japanese Industrial Standards
Joint Commission	USA	Joint Commission on Accreditation of Healthcare Organizations
MIC	Korea	Ministry of Information and Communication
N4A	USA	National Association of Area Agencies on Aging
NIH	USA	The National Institutes of Health
NIST	USA	The National Institute of Standards and Technology
Norden	North Europe	The Nordic Council of Ministers
NSCLC	USA	National Senior Citizens Law Center
ONC	USA	The Office of the National Coordinator
SA	Australia	Standards Australia
Statskontoret	SE	The Swedish Agency for Public Management
TIA	USA	Telecommunications Industry Association
TTA	Korea	Telecommunications Technology Association
UL	USA	Underwriters Laboratories
VDE	Germany	VDE Verband der Elektrotechnik Elektronik Informationstechnik e.V.
W3C	Industry	World Wide Web Consortium

B4. List of standards

This list cannot be a complete descriptions of all the standards related to AAL. This area is moving and new documents are regularly published. We expect the screening of the IEC and ISO standards to be quite exhaustive. Concerning the standards from other sources, the listed are the ones that our investigations allowed to find out.

We found that the organization "AAliance2" has also built a repository of standards related to AAL. The selection was made based on the definition of AAL made by SG5. The future System Committee shall revise the standard inventory that has been develop in the SEG.

Standard	Description/Title	Organi-zation
IEC 60073	Basic and safety principles for man-machine interface, marking and identification - Coding principles for indicators and actuators	IEC
IEC 60447	Basic and safety principles for man-machine interface, marking and identification - Actuating principles	IEC
IEC 60617	Graphical symbols for diagrams	IEC
IEC/ISO 82079-1	Preparation of instructions for use - Structuring, content and presentation - Part 1: General principles and detailed requirements	IEC
IEC/TR 62051-1	Electricity metering - Data exchange for meter reading, tariff and load control - Glossary of terms - Part 1: Terms related to data exchange with metering equipment using DLMS/COSEM	IEC
IEC 62055-41	Electricity metering - Payment systems - Part 41: Standard transfer specification (STS) - Application layer protocol for one-way token carrier systems	IEC
IEC 62055-51	Electricity metering - Payment systems - Part 51: Standard transfer specification (STS) - Physical layer protocol for one-way numeric and magnetic card token carriers	IEC
IEC 62055-52	Electricity metering - Payment systems - Part 52: Standard transfer specification (STS) - Physical layer protocol for a two-way virtual token carrier for direct local connection	IEC
IEC 62056-XX	Electricity metering - Data exchange for meter reading, tariff and load control (all parts)	IEC
IEC 62080	Sound signalling devices for household and similar purposes	IEC
IEC 60669-1	Switches for household and similar fixed-electrical installations – Part 1: General requirements (should include AAL usability)	IEC
IEC 60884-1	Plugs and socket-outlets for household and similar purposes - Part 1: General requirements (should include AAL usability)	IEC
IEC 60906-1	IEC system of plugs and socket-outlets for household and similar purposes - Part 1: Plugs and socket-outlets 16 A 250 V a.c. (should include AAL usability)	IEC
IEC 60906-2	IEC system of plugs and socket-outlets for household and similar purposes - Part 2: Plugs and socket-outlets 15 A 125 V a.c. and 20 A 125 V a.c	IEC
IEC 60906-3	IEC System of plugs and socket-outlets for household and similar purposes - Part 3: SELV plugs and socket-outlets, 16 A 6V, 12 V, 24 V, 48 V, a.c. and d.c.	IEC
IEC 62094-1	Indicator light units for household and similar fixed-electrical installations - Part 1: General requirements	IEC
IEC 60320-1	Appliance couplers for household and similar general purposes - Part 1: General requirements	IEC
IEC 62196-1	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 1: General requirement	IEC
IEC 61020-1	Electromechanical switches for use in electrical and electronic equipment – Part 1: Generic specification (should include AAL usability)	IEC

Standard	Description/Title	Organi-zation
IEC 60118-0	Hearing aids. Part 0: Measurement of electroacoustical characteristics	IEC
IEC 60601-2-66	Medical electrical equipment - Part 2-66: Particular requirements for the basic safety and essential performance of hearing instruments and hearing instrument systems	IEC
IEC 62489-2	Electroacoustics - Audio-frequency induction loop systems for assisted hearing - Part 2: Methods of calculating and measuring the low-frequency magnetic field emissions from the loop for assessing conformity with guidelines on limits for human exposure	IEC
IEC 62508	Guidance on human aspects of dependability	IEC
IEC 60528	Applicable to non-dispersive infra-red analyzers specified for installation either indoors or outdoors and used for the continuous determination of certain aspects of air quality by measuring the gaseous constituents. Special definitions. Functional characteristics. Test methods for determining the performance and for verifying compliance with specifications.	IEC
IEC60730-1	Automatic electrical controls - Part 1: General requirements	IEC
IEC60730-2-5	Automatic electrical controls - Part 2-5: Particular requirements for automatic electrical burner control systems	IEC
IEC60730-2-6	Automatic electrical controls for household and similar use - Part 2-6: Particular requirements for automatic electrical pressure sensing controls including mechanical requirements	IEC
IEC60730-2-7	Automatic electrical controls for household and similar use - Part 2-7: Particular requirements for timers and time switches	IEC
IEC60730-2-8	Automatic electrical controls for household and similar use - Part 2-8: Particular requirements for electrically operated water valves, including mechanical requirements	IEC
IEC60730-2-9	Automatic electrical controls for household and similar use - Part 2-9: Particular requirements for temperature sensing controls	IEC
IEC60730-2-11	Automatic electrical controls for household and similar use - Part 2-11: Particular requirements for energy regulators	IEC
IEC60730-2-12	Automatic electrical controls for household and similar use - Part 2-12: Particular requirements for electrically operated door locks	IEC
IEC60730-2-13	Automatic electrical controls for household and similar use - Part 2-13: Particular requirements for humidity sensing controls	IEC
IEC60730-2-14	Automatic electrical controls for household and similar use - Part 2-14: Particular requirements for electric actuators	IEC
IEC60730-2-15	Automatic electrical controls for household and similar use - Part 2-15: Particular requirements for automatic electrical air flow, water flow and water level sensing controls	IEC
IEC60730-2-17	Automatic electrical controls for household and similar use - Part 2-17: Particular requirements for electrically operated gas valves, including mechanical requirements	IEC
IEC60825-12	Safety of laser products - Part 12: Safety of free space optical communication systems used for transmission of information	IEC
IEC/CIE 62471	Photobiological safety of lamps and lamp systems	IEC
IEC 60839-5-1	Alarm systems - Part 5: Requirements for alarm transmission systems - Section 1: General requirements for systems	IEC
IEC 60839-5-2	Alarm systems - Part 5: Requirements for alarm transmission systems - Section 2: General requirements for equipment	IEC

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IEC 60839-5-4	Alarm systems - Part 5: Requirements for alarm transmission systems - Section 4: Alarm transmission systems using dedicated alarm transmission paths	IEC
IEC 60839-5-5	Alarm systems - Part 5: Requirements for alarm transmission systems - Section 5: Requirements for digital communicator systems using the public switched telephone network	IEC
IEC 60839-5-6	Alarm systems - Part 5: Requirements for alarm transmission systems - Section 6: Requirements for voice communicator systems using the public switched telephone network	IEC
IEC 60839-7-1	Alarm systems - Part 7-1: Message formats and protocols for serial data interfaces in alarm transmission systems - General	IEC
IEC 60839-7-2	Alarm systems - Part 7-2: Message formats and protocols for serial data interfaces in alarm transmission systems - Common application layer protocol	IEC
IEC 60839-7-3	Alarm systems - Part 7-3: Message formats and protocols for serial data interfaces in alarm transmission systems - Common data link layer protocol	IEC
IEC 60839-7-4	Alarm systems - Part 7-4: Message formats and protocols for serial data interfaces in alarm transmission systems - Common transport layer protocol	IEC
IEC 60839-7-5	Alarm systems - Part 7-5: Message formats and protocols for serial data interfaces in alarm transmission systems - Alarm system interfaces employing a two-wire configuration in accordance with ISO/IEC 8482	IEC
IEC 60839-7-6	Alarm systems - Part 7-6: Message formats and protocols for serial data interfaces in alarm transmission systems - Alarm system interfaces employing ITU-T Recommendation V.24/V.28 signalling	IEC
IEC 60839-7-7	Alarm systems - Part 7-7: Message formats and protocols for serial data interfaces in alarm transmission systems - Alarm system interfaces for plug-in alarm system transceivers	IEC
IEC 60839-7-11	Alarm systems - Part 7-11: Message formats and protocols for serial data interfaces in alarm transmission systems - Serial protocol for use by digital communicator systems using ITU-T Recommandation V.23 signalling at interfaces with the PSTN	IEC
IEC 60839-7-12	Alarm systems - Part 7-12: Message formats and protocols for serial data interfaces in alarm transmission systems - PTT interfaces for dedicated communications channels using ITU-T Recommendation V.23 signalling	IEC
IEC 60839-7-20	Alarm systems - Part 7-20: Message formats and protocols for serial data interfaces in alarm transmission systems - Terminal interfaces employing ITU-T Recommendation V.24/V.28 signalling	IEC
IEC 60839-10-1	Alarm systems - Part 10: Alarm systems for road vehicles - Section 1: Passenger cars	IEC
IEC 60839-11-1	Alarm and electronic security systems - Part 11-1: Electronic access control systems - System and components requirements	IEC
IEC 60728-1	Cable networks for television signals, sound signals and interactive services - Part 1: System performance of forward paths	IEC
IEC 60728-1-1	Cable networks for television signals, sound signals and interactive services - Part 1-1: RF cabling for two way home networks	IEC
IEC 60728-1-2	Cable networks for television signals, sound signals and interactive services - Part 1-2: Performance requirements for signals delivered at the system outlet in operation	IEC

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IEC 60728-2	Cable networks for television signals, sound signals and interactive services - Part 2: Electromagnetic compatibility for equipment	IEC
IEC 60728-3	Cable networks for television signals, sound signals and interactive services - Part 3: Active wideband equipment for cable networks	IEC
IEC 60728-3-1	Cable networks for television signals, sound signals and interactive services - Part 3-1: Active wideband equipment for cable networks - Methods of measurement of non-linearity for full digital channel load with DVB-C signals	IEC
IEC 60728-4	Cable networks for television signals, sound signals and interactive services - Part 4: Passive wideband equipment for coaxial cable networks	IEC
IEC 60728-5	Cable networks for television signals, sound signals and interactive services - Part 5: Headend equipment	IEC
IEC 60728-6	Cable networks for television signals, sound signals and interactive services - Part 6: Optical equipment	IEC
IEC/TR 60728-6-1	Cable networks for television signals, sound signals and interactive services - Part 6-1: System guidelines for analogue optical transmission systems	IEC
IEC 60728-7-1	Cable networks for television signals, sound signals and interactive services - Part 7-1: Hybrid Fibre Coax Outside Plant status monitoring - Physical (PHY) layer specification	IEC
IEC 60728-7-2	Cable networks for television signals, sound signals and interactive services - Part 7-2: Hybrid fibre coax outside plant status monitoring - Media access control (MAC) layer specification	IEC
IEC 60728-7-3	Cable networks for television signals, sound signals and interactive services - Part 7-3: Hybrid fibre coax outside plant status monitoring - Power supply to transponder interface bus (PSTIB)	IEC
IEC 60728-9	Cabled distribution systems for television and sound signals - Part 9: Interfaces of cabled distribution systems for digitally modulated signals	IEC
IEC 60728-10	Cable networks for television signals, sound signals and interactive services - Part 10: System performance of return paths	IEC
IEC 60728-11	Cable networks for television signals, sound signals and interactive services - Part 11: Safety	IEC
IEC 60728-12	Cabled distribution systems for television and sound signals - Part 12: Electromagnetic compatibility of systems	IEC
IEC 60728-13	Cable networks for television signals, sound signals and interactive services - Part 13: Optical systems for broadcast signal transmissions	IEC
IEC 60728-13-1	Cable networks for television signals, sound signals and interactive services - Part 13-1: Bandwidth expansion for broadcast signal over FTTH system	IEC
IEC 60958-1	Digital audio interface - Part 1: General	IEC
IEC 60958-3	Digital audio interface - Part 3: Consumer applications	IEC
IEC 60958-3	Digital audio interface - Part 3: Consumer applications	IEC
IEC 60958-4	Digital audio interface - Part 4: Professional applications	IEC
IEC 60958-4	Digital audio interface - Part 4: Professional applications	IEC
IEC 62002-1	Mobile and portable DVB-T/H radio access - Part 1: Interface specification	IEC
IEC 62002-1	Corrigendum 1 - Mobile and portable DVB-T/H radio access - Part 1: Interface specification	IEC
IEC 62298-1	Teleweb application - Part 1: General description	IEC

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IEC 62298-2	TeleWeb application - Part 2: Delivery methods	IEC
IEC 62298-3	Teleweb application - Part 3: Superteletext profile	IEC
IEC 62298-4	TeleWeb application - Part 4: Hyperteletext profile	IEC
IEC 62379-1	Common control interface for networked digital audio and video products - Part 1: General	IEC
IEC 62379-2	Common control interface for networked digital audio and video products - Part 2: Audio	IEC
IEC 62448	Multimedia systems and equipment - Multimedia e-publishing and e-books - Generic format for e-publishing	IEC
IEC 62481-1	Digital living network alliance (DLNA) home networked device interoperability guidelines - Part 1: Archtecture and protocols	IEC
IEC 62481-2	Digital living network alliance (DLNA) home networked device interoperability guidelines - Part 2: DLNA media formats	IEC
IEC 62481-3	Digital living network alliance (DLNA) home networked device interoperability guidelines - Part 3: Link protection	IEC
IEC 62481-5	Digital living network alliance (DLNA) home networked device interoperability guidelines - Part 5: DLNA Device Profile guidelines	IEC
IEC 62514	Multimedia gateway in home networks - Guidelines	IEC
IEC/TR 62865	Multimedia home server systems - Relationship between the content usage contract and the digital rights permission code	IEC
IEC 62907 Ed. 1.0	Use cases related to Ambient Assisted Living (AAL) in the field of audio, video and multimedia systems and equipment	IEC
PWI 100-1 Ed. 1.0	Accessibility for audio, video and multimedia systems and equipment standards	IEC
IEC 60745-1	Hand-held motor-operated electric tools - Safety - Part 1: General requirements	IEC
IEC 60745-2-1	Hand-held motor-operated electric tools - Safety - Part 2-1: Particular requirements for drills and impact drills	IEC
IEC 60745-2-2	Hand-held motor-operated electric tools - Safety - Part 2-2: Particular requirements for screwdrivers and impact wrenches	IEC
IEC 60745-2-3	Hand-held motor-operated electric tools - Safety - Part 2-3: Particular requirements for grinders, polishers and disk-type sanders	IEC
IEC 60745-2-4	Hand-held motor-operated electric tools - Safety - Part 2-4: Particular requirements for sanders and polishers other than disk type	IEC
IEC 60745-2-5	Hand-held motor-operated electric tools - Safety - Part 2-5: Particular requirements for circular saws	IEC
IEC 60745-2-6	Hand-held motor-operated electric tools - Safety - Part 2-6: Particular requirements for hammers	IEC
IEC 60745-2-7	Safety of hand-held motor-operated electric tools. Part 2: Particular requirements for spray guns for non-flammable liquids	IEC
IEC 60745-2-8	Hand-held motor-operated electric tools - Safety - Part 2-8: Particular requirements for shears and nibblers	IEC
IEC 60745-2-9	Hand-held motor-operated electric tools - Safety - Part 2-9: Particular requirements for tappers	IEC
IEC 60745-2-11	Hand-held motor-operated electric tools - Safety - Part 2-11: Particular requirements for reciprocating saws (jig and sabre saws)	IEC
IEC 60745-2-12	Hand-held motor-operated electric tools - Safety - Part 2-12: Particular requirements for concrete vibrators	IEC
IEC 60745-2-13	Hand-held motor-operated electric tools - Safety - Part 2-13: Particular requirements for chain saws	IEC

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IEC 60745-2-14	Hand-held motor-operated electric tools - Safety - Part 2-14: Particular requirements for planers	IEC
IEC 60745-2-15	Hand-held motor-operated electric tools - Safety - Part 2-15: Particular requirements for hedge trimmers	IEC
IEC 60745-2-16	Hand-held motor-operated electric tools - Safety - Part 2-16: Particular requirements for tackers	IEC
IEC 60745-2-17	Hand-held motor-operated electric tools - Safety - Part 2-17: Particular requirements for routers and trimmers	IEC
IEC 60745-2-18	Hand-held motor-operated electric tools - Safety - Part 2-18: Particular requirements for strapping tools	IEC
IEC 60745-2-19	Hand-held motor-operated electric tools - Safety - Part 2-19: Particular requirements for jointers	IEC
IEC 60745-2-20	Hand-held motor-operated electric tools - Safety - Part 2-20: Particular requirements for band saws	IEC
IEC 60745-2-21	Hand-held motor-operated electric tools - Safety - Part 2-21: Particular requirements for drain cleaners	IEC
IEC 60745-2-22	Hand-held motor-operated electric tools - Safety - Part 2-22: Particular requirements for cut-off machines	IEC
IEC 60745-2-23	Hand-held motor-operated electric tools - Safety - Part 2-23: Particular requirements for die grinders and small rotary tools	IEC
IEC/TR 61592 Ed 2.0	Household electrical appliances - Guidelines for consumer panel testing	IEC
IEC 60335-1	Household and similar electrical appliances - Safety - Part 1: General requirements	IEC
IEC 60601-1 Ed3.1	Medical electrical equipment - Part 1: General requirements for basic safety and essential performance	IEC
IEC 60601-1-11	Medical electrical equipment – Part 1-11: General requirements for basic safety and essential performance – Collateral Standard: Requirements for medical electrical equipment and medical electrical systems used in the home healthcare environment	IEC
IEC 62366 Ed1	Medical devices - Application of usability engineering to medical devices	IEC
IEC 60601-2-47 Ed2	Medical electrical equipment - Part 2-47: Particular requirements for the basic safety and essential performance of ambulatory electrocardiographic systems	IEC
IEC 60601-2-52 Ed1	Medical electrical equipment - Part 2-52: Particular requirements for the basic safety and essential performance of medical beds	IEC
IEC 80601-2-30 Ed1.1	Medical electrical equipment - Part 2-30: Particular requirements for the basic safety and essential performance of automated non-invasive sphygmomanometers	IEC
IEC 60364-7-710 Ed1	Electrical installations of buildings - Part 7-710: Requirements for special installations or locations - Medical locations	IEC
IEC 60364-7-718 Ed1	Low-voltage electrical installations - Part 7-718: Requirements for special installations or locations - Communal facilities and workplaces	IEC
ISO 1503	Spatial orientation and direction of movement — Ergonomic requirements	ISO
ISO 6385	Ergonomic principles in the design of work systems	ISO

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ISO 26800	Ergonomics — General approach, principles and concepts	ISO
ISO/IEC 10779	Information technology — Office equipment accessibility guidelines for elderly persons and persons with disabilities	ISO
ISO/IEC 17549-2	Information technology — User interfaces guidelines on menu navigation — Part 2: Navigation with 4-direction devices	ISO/IEC
ISO/IEC/TR 20007	Information technology — Cultural and linguistic interoperability — Definitions and relationship between symbols, icons, animated icons, pictograms, characters and glyphs	ISO/IEC
ISO/IEC/TR 24785	Information technology — Taxonomy of cultural and linguistic adaptability user requirements	ISO/IEC
ISO/IEC 26514	Systems and software engineering — Requirements for designers and developers of user documentation	ISO/IEC
ISO/IEC 17799	Information technology -- Security techniques -- Code of practice for information security management	ISO/IEC
ISO/IEC 27002	Information technology -- Security techniques -- Code of practice for information security management	ISO/IEC
ISO/TS 10303-1015	Industrial automation systems and integration -- Product data representation and exchange -- Part 1015: Application module: Security classification	ISO
ISO/AWI 18646-1	Robots and robotic devices -- Performance criteria and related test methods for service robot -- Part 1: Wheeled mobile servant robot	ISO
ISO Guide 71	Guidelines for standards developers to address the needs of older persons and persons with disabilities	ISO
ISO 9241-20	Ergonomics of human-system interaction -- Part 20: Accessibility guidelines for information/communication technology (ICT) equipment and services	ISO
ISO TR22411	Ergonomic data and guidelines for the application of ISO/IEC Guide 71 in standards related to products and services to address the needs of older persons and persons with disabilities	ISO
ISO/IEC 24756	Information technology -- Framework for specifying a common access profile (CAP) of needs and capabilities of users, systems, and their environments	ISO/IEC
CWA 14661	Guidelines to Standardisers of ICT products and services in the CEN ICT domain	CEN
DIN TR 124	Barrierefreie Gebrauchsgüte	DIN
ETSI SR 001 996	Human Factors (HF); An annotated bibliography of documents dealing with Human Factors and disability	ETSI
ETSI TR 102 849	Human Factors (HF); Inclusive eServices for all; Background analysis of future interaction technologies and supporting information	ETSI
ETSI EG 202 116	Human Factors (HF); Guidelines for ICT products and services; "Design for All"	ETSI
ETSI EG 202 848	Human Factors; Inclusive eServices for all: Optimizing the accessibility and the use of upcoming user-interaction technologies	ETSI
JIS X 8341-1	Guidelines for older persons and persons with disabilities -- Information and communications equipment, software and services -- Part 1: Common Guidelines	JIS
JIS Z 8071	Guidelines for standards developers to address the needs of older persons and persons with disabilities	JIS
Stanca Act	Provisions to support the access to information technologies for the disabled	Federal Law
Korea Guidelines	Recommendation Guidelines to Improve Accessibility for the Disabled and the Elderly to the IT services/IT products	MIC

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Nordic Guidelines	Nordic Guidelines for Computer Accessibility	Nordic Council of Ministers
US 508	Section 508 of the US Rehabilitation Act	Federal Law
ETSI EG 201 472	Human Factors (HF); Usability evaluation for the design of telecommunication systems, services and terminals	ETSI
ISO 1503	Ergonomic requirements for design on spatial orientation and directions of movements	ISO
ISO 6385	Ergonomic principles in the design of work systems	ISO
ISO 26800	Ergonomics – General approach, principles and concepts	ISO
ISO 9241-1	Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 1: General introduction	ISO
ISO 9241-2	Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 2: Guidance on task requirements	ISO
ISO 9241-11	Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 11: Guidance on usability	ISO
ISO/IEC 10779	Information Technology – Office equipment accessibility guidelines for elderly persons and persons with disabilities	ISO/IEC
ISO/IEC 12905	Integrated circuit cards -- Enhanced terminal accessibility using cardholder preference interface	ISO/IEC
ISO 24503	Ergonomics -- Accessible design --Tactile dots and bars on consumer products	ISO
ISO/IEC 29136	Information Technology — User Interfaces — Accessibility functions for personal computers	ISO/IEC
IEC/TR 62678	Audio, video and multimedia systems and equipment activities and considerations related to accessibility and usability	IEC
ANSI C.63.19	American National Standard for Methods of Measurement of Compatibility between Wireless Communication Devices and Hearing Aids	ANSI/IEEE
ETSI ES 201 381	Human Factors (HF); Telecommunications keypads and keyboards; Tactile identifiers	ETSI
ETSI ES 202 130	Human Factors (HF); User Interfaces; Character repertoires, orderings and assignments to the 12-key telephone keypad (for European languages and other languages used in Europe)	ETSI
ETSI ETS 300 381	Telephony for hearing impaired people; Inductive coupling of telephone earphones to hearing aids	ETSI
ETSI ETS 300 488	Terminal Equipment (TE); Telephony for hearing impaired people; Characteristics of telephone sets that provide additional receiving amplification for the benefit of the hearing impaired	ETSI
ETSI ETS 300 679	Terminal Equipment (TE); Telephony for the hearing impaired; Electrical coupling of telephone sets to hearing aids	ETSI
ETSI ETS 300 767	Human Factors (HF); Telephone Prepayment Cards; Tactile Identifier	ETSI
ETSI EN 301 462	Human Factors (HF); Symbols to identify telecommunications facilities for the deaf and hard of hearing people	ETSI
JBMS-71	Auditory signal	JBMIA
JIS S0011	Guidelines for all people including elderly and people with disabilities - Marking of tactile dots on consumer products	JIS
JIS S 0012	Guidelines for all people including elderly and people with disabilities - Usability of consumer products	JIS

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JIS S 0013	Guidelines for the elderly and people with disabilities - Auditory signals on consumer products	JIS
JIS S 0014	Guidelines for the elderly and people with disabilities - Auditory signals on consumer products - Sound pressure levels of signals for the elderly and in noisy conditions	JIS
JIS X 8341-2	Guidelines for older persons and persons with disabilities -- Information and communications equipment, software and services -- Part 2: Information processing equipment	JIS
JIS X 8341-4	Guidelines for older persons and persons with disabilities-- Information and communications equipment, software and services -- Part 4: Telecommunications equipment	JIS
JIS X 8341-5	Guidelines for older persons and persons with disabilities -- Information and communications equipment, software and services -- Part 5: Office equipment	JIS
TIA 504-A	Telecommunications-Telephone Terminal Equipment-Magnetic Field and Acoustic Gain Requirements for Headset Telephones Intended for Use by the Hard of Hearing	TIA
UNE 139801	Computer applications for people with disabilities. Computer accessibility requirements. Hardware.	AENOR
ISO 7000	Graphical symbols for use on equipment -- Index and synopsis	ISO
ISO 9241-3	Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 3: Visual display requirements	ISO
ISO 9241-4	Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 4: Keyboard requirements	ISO
ISO 9241-7	Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 7: Requirements for display with reflections	ISO
ISO 9241-8	Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 8: Requirements for displayed colours	ISO
ISO 9241-9	Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 9: Requirements for non-keyboard input devices	ISO
ISO 9241-300	Ergonomics of human-system interaction -- Part 300: Introduction to electronic visual display requirements	ISO
ISO 9241-302	Ergonomics of human-system interaction -- Part 302: Terminology for electronic visual displays	ISO
ISO 9241-303	Ergonomics of human-system interaction -- Part 303: Requirements for electronic visual displays	ISO
ISO 9241-304	Ergonomics of human-system interaction -- Part 304: User performance test methods	ISO
ISO 9241-305	Ergonomics of human-system interaction -- Part 305: Optical laboratory test methods for electronic visual displays	ISO
ISO 9241-306	Ergonomics of human-system interaction -- Part 306: Field assessment methods for electronic visual displays	ISO
ISO 9241-307	Ergonomics of human-system interaction -- Part 307: Analysis and compliance test methods for electronic visual displays	ISO
ISO TR 9241-308	Ergonomics of human-system interaction -- Part 308: Surface-conduction electron-emitter displays (SED)	ISO
ISO TR 9241-309	Ergonomics of human-system interaction -- Part 309: Organic light-emitting diode (OLED) displays	ISO
ISO TR 9241-310	Ergonomics of human-system interaction -- Part 310: Visibility, aesthetics and ergonomics of pixel defects	ISO
ISO 9241-331	Ergonomics of human-system interaction -- Part 331: Optical characteristics of autostereoscopic displays	ISO

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ISO 9241-400	Ergonomics of human--system interaction -- Part 400: Principles and requirements for physical input devices	ISO
ISO 9241-410	Ergonomics of human-system interaction -- Part 410: Design criteria for physical input devices	ISO
ISO TS 9241-411	Ergonomics of human-system interaction -- Part 411: Evaluation methods for the design of physical input devices	ISO
ISO 9241-420	Ergonomics of human-system interaction -- Part 420: Selection of physical input devices	ISO
ISO 9241-910	Ergonomics of human-system interaction -- Part 910: Framework for tactile and haptic interactions	ISO
ISO 9241-920	Ergonomics of human-system interaction -- Part 920: Guidance on tactile and haptic interactions	ISO
ISO 9355-1	Ergonomic requirements for the design of displays and control actuators -- Part 1: Human interactions with displays and control actuators	ISO
ISO 9355-2	Ergonomic requirements for the design of displays and control actuators -- Part 2: Displays	ISO
ISO 9355-3	Ergonomic requirements for the design of displays and control actuators -- Part 3: Control actuators	ISO
ISO/IEC 9995-1	Information technology -- Keyboard layouts for text and office systems -- Part 1: General principles governing keyboard layouts	ISO/IEC
ISO/IEC 9995-2	Information technology -- Keyboard layouts for text and office systems -- Part 2: Alphanumeric section	ISO/IEC
ISO/IEC 9995-3	Information technology -- Keyboard layouts for text and office systems -- Part 3: Complementary layouts of the alphanumeric zone of the alphanumeric section	ISO/IEC
ISO/IEC 9995-4	Information technology -- Keyboard layouts for text and office systems -- Part 4: Numeric section	ISO/IEC
ISO/IEC 9995-5	Information technology -- Keyboard layouts for text and office systems -- Part 5: Editing section	ISO/IEC
ISO/IEC 9995-7	Information technology -- Keyboard layouts for text and office systems -- Part 7: Symbols used to represent functions	ISO/IEC
ISO/IEC 9995-8	Information technology -- Keyboard layouts for text and office systems -- Part 8: Allocation of letters to the keys of a numeric keypad	ISO/IEC
ISO/IEC 9995-9	Information technology -- Keyboard layouts for text and office systems -- Part 9: Multilingual-usage, multiscript keyboard group layouts	ISO/IEC
ISO/IEC 9995-10	Information technology -- Keyboard layouts for text and office systems – Part 10: Conventional symbols and methods to represent graphic characters not uniquely recognizable by their glyph on a keyboard and in documentation	ISO/IEC
ISO/IEC 13818-1	Information technology -- Generic coding of moving pictures and associated audio information: Systems	ISO/IEC
ISO/IEC 13251	Collection of graphical symbols for office equipment	ISO/IEC
ISO/IEC 14754	Information technology -- Pen-Based Interfaces -- Common gestures for Text Editing with Pen-Based Systems	ISO/IEC
ISO/IEC 14755	Information technology -- Input methods to enter characters from the repertoire of ISO/IEC 10646 with a keyboard or other input device	ISO/IEC
ISO/IEC 15411	Information technology -- Segmented keyboard layouts	ISO/IEC
ISO/IEC 15412	Information technology -- Portable computer keyboard layouts	ISO/IEC

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ISO/IEC TR 15440	Information technology -- Future keyboards and other associated input devices and related entry methods	ISO/IEC
ISO/IEC 15938 -5	Information technology -- Multimedia content description interface -- Part 5: Multimedia description schemes	ISO/IEC
ISO/IEC 21000-7	Information technology -- Multimedia framework (MPEG-21) -- Part 7: Digital Item Adaptation	ISO/IEC
ISO/IEC 24757	Information technology -- Keyboard interaction model -- Machine-readable keyboard description	ISO/IEC
IEEE 1621	IEEE Standard for User Interface Elements in Power Control of Electronic Devices Employed in Office/Consumer Environments	IEEE
BS 4822	Specification for keyboard allocation of graphic characters for data processing	BSI
CSA Z243.200	Canadian Keyboard Standard for English and French Languages	CSA
DIN 2137	Text and office systems - Keyboards - German keyboard for data and text processing, as well as for typewriters, information on graphic characters or symbols	DIN
ETSI EG 201 103	Human Factors (HF); Human factors issues in Multimedia Information Retrieval Services (MIRS)	ETSI
INCITS 154	Office Machines and Supplies - Alphanumeric Machines - Keyboard Arrangement (formerly ANSI X3.154-1988 (R1999))	INCITS
ISO 9241-129	Ergonomics of human-system interaction -- Guidance on individualization	ISO
ISO 9241-171	Ergonomics of human-system interaction -- Guidance on software accessibility	ISO
ISO 9241-392	Ergonomics of human-system interaction -- Part 392: Ergonomic requirements for the reduction of visual fatigue from stereoscopic images	ISO
ISO/IEC 13066-1	Information Technology — Interoperability with Assistive Technology (AT) – Part 1: Requirements and recommendations for interoperability	ISO/IEC
ISO/IEC TR 13066-2	Information Technology — Interoperability with Assistive Technology (AT) — Part 2 Windows Automation Framework accessibility API	ISO/IEC
ISO/IEC TR 13066-3	Information Technology — Interoperability with Assistive Technology (AT) — Part 3 IAccessible2 accessibility API	ISO/IEC
ISO/IEC TR 13066-4	Information Technology — Interoperability with Assistive Technology (AT) — Part 4 Linux / UNIX graphical environments accessibility API	ISO/IEC
ISO/IEC TR 13066-6	Information Technology — Interoperability with Assistive Technology (AT) — Part 6 Java accessibility API	ISO/IEC
ISO TS 16071	Ergonomics of human-system interaction -- Guidance on accessibility for human-computer interfaces	ISO
ISO/IEC TR 19764	Information technology -- Guidelines, methodology and reference criteria for cultural and linguistic adaptability in information technology products	ISO/IEC
ISO/IEC TR 19765	Information technology -- Survey of icons and symbols that provide access to functions and facilities to improve the use of information technology products by the elderly and persons with disabilities	ISO/IEC
ISO/IEC TR 19766	Information technology -- Guidelines for the design of icons and symbols accessible to all users, including the elderly and persons with disabilities	ISO/IEC
ISO/IEC 20071-11	Information Technology — User interface component accessibility – Guidance for text alternatives for images	ISO/IEC

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ISO/IEC 24786	Information technology -- User interfaces -- Accessible user interface for accessibility settings	ISO/IEC
ATAG 1.0	Authoring Tool Accessibility Guidelines 1.0	W3C
ATAG 2.0	Authoring Tool Accessibility Guidelines 2.0	W3C
UAAG 1.0	User Agent Accessibility Guidelines	W3C
ANSI/HFES 200.2	ANSI/HFES 200: Human Factors Engineering of Software User Interfaces – Part 2: Accessibility	ANSI
ETSI ES 202 076	Human Factors (HF); User Interfaces; Generic spoken	ETSI
ETSI ES 202 432	Human Factors (HF); User Interfaces; Access symbols for use with video content and ICT devices	ETSI
JIS X 8341-2	Guidelines for older persons and persons with disabilities -- Information and communications equipment, software and services -- Part 2: Information processing equipment	JIS
TTAS.KO-10.0213	Software Accessibility Guidelines 1.0	TTA
TTAS.OT-10.0073	Korean User Agent Accessibility Guidelines 1.0	TTA
TTAS.OT-10.0074	Korean Authoring Tools Accessibility Guidelines 1.0	TTA
UNE 139802	Computer applications for people with disabilities. Computer accessibility requirements. Software	AENOR
24 hour agency web guidelines	Guidelines for an accessible public administration	SE Governm ent
ISO/IEC 11581-10	Information Technology — User Interface Icons — Part 10: Framework and general guidance	ISO/IEC
ISO 9241-12	Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 12: Presentation of information	ISO
ISO 9241-13	Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 13: User guidance	ISO
ISO 9241-14	Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 14: Menu dialogues	ISO
ISO 9241-15	Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 15: Command dialogues	ISO
ISO 9241-16	Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 16: Direct manipulation dialogues	ISO
ISO 9241-17	Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 17: Form filling dialogues	ISO
ISO 9241-110	Ergonomics of human-system interaction -- Part 110: Dialogue principles	ISO
ISO 9241-143	Ergonomics of human-system interaction -- Part 143: Forms	ISO
ISO 9241-151	Ergonomics of human-system interaction -- Part 151: Guidance on World Wide Web user interfaces	ISO
ISO 9241-161	Ergonomics of human-system interaction -- Part 161: User-interface elements	ISO
ISO 9241-910	Ergonomics of human-system interaction -- Part 910: Framework for tactile and haptic interactions	ISO
ISO 9241-920	Ergonomics of human-system interaction -- Part 920: Guidance on tactile and haptic interactions	ISO
ISO/IEC 10741-1	Information technology -- User system interfaces -- Dialogue interaction -- Part 1: Cursor control for text editing	ISO/IEC
ISO/IEC TR 11580	Information technology -- Framework for describing user interface objects, actions and attributes	ISO/IEC

Standard	Description/Title	Organi-zation
ISO/IEC 11581-1	Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 1: Icons – General	ISO/IEC
ISO/IEC TR 11581-1	Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 1: Introduction to and overview of icon standards	ISO/IEC
ISO/IEC 11581-2	Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 2: Object icons	ISO/IEC
ISO/IEC 11581-3	Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 3: Pointer icons	ISO/IEC
ISO/IEC 11581-5	Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 5: Tool icons	ISO/IEC
ISO/IEC 11581-6	Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 6: Action icons	ISO/IEC
ISO/IEC 11581-40	Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 40: Management of icon registration	ISO/IEC
ISO/IEC TR 11581-41	Information technology -- User interface icons -- Part 41: Data structure to be used by the ISO/IEC JTC1/SC35 icon database	ISO/IEC
ISO 14915-1	Software ergonomics for multimedia user interfaces -- Part 1: Design principles and framework	ISO
ISO 14915-2	Software ergonomics for multimedia user interfaces -- Part 2: Multimedia navigation and control	ISO
ISO 14915-3	Software ergonomics for multimedia user interfaces -- Part 3: Media selection and combination	ISO
ISO/IEC 17549	Information technology -- User interfaces -- Guidelines on menu navigation with 4-direction devices	ISO/IEC
ISO/IEC 18021	Information technology -- User interfaces for mobile tools for management of database communications in a client-server model	ISO/IEC
ISO/IEC 18035	Information technology -- Icon symbols and functions for controlling multimedia software applications	ISO/IEC
ISO/IEC 18036	Information technology -- Icon symbols and functions for World Wide Web browser toolbars	ISO/IEC
ISO/IEC TR 20007	Information technology -- NP Symbols, Icons, Characters and Glyphs	ISO/IEC
ISO/IEC 24738	Information technology -- Icon symbols and functions for multimedia link attributes	ISO/IEC
ISO/IEC 24755	Information technology -- Screen icons and symbols for personal mobile communication devices	ISO/IEC
ISO/IEC 24757	Information technology -- Keyboard interaction model -- Machine-readable keyboard description	ISO/IEC
ISO/IEC 30109	Worldwide-available personalized computing environment	ISO/IEC
ISO/IEC 30113-1	Gesture-based interface –Navigation gestures common between mice, touch pads, touch screens, tablets and similar devices - Framework	ISO/IEC
ISO/IEC 30113-2	Gesture-based interface –Navigation gestures common between mice, touch pads, touch screens, tablets and similar devices – Mouse gestures	ISO/IEC
ISO/IEC 30122-1	Information technology -- User interfaces -- Principal voice commands -- Part 1: Framework and general guidance	ISO/IEC
ISO/IEC 30122-4	Information technology -- User interfaces -- Principal voice commands -- Part 4: Management of voice command registration	ISO/IEC
ETSI ES 202 076	Human Factors (HF); User Interfaces; Generic spoken command vocabulary for ICT devices and services	ETSI

Standard	Description/Title	Organi-zation
ANSI/HFES 200.1	HFES 200: Human Factors Engineering of Software User Interfaces – Part 1: Introduction	ANSI
ANSI/HFES 200.3	HFES 200: Human Factors Engineering of Software User Interfaces – Part 3: Interaction Techniques	ANSI
ISO 14289-1	Document management applications -- Electronic document file format enhancement for accessibility -- Part 1: Use of ISO 32000-1 (PDF/UA-1)	ISO/IEC
ISO/IEC 15897	Information Technology - Information technology -- Procedures for registration of cultural elements	ISO
ISO 17630	Ergonomics -- Accessible design -- Colour combination for younger and older people	ISO
ISO/IEC 20016-1	Information technology for learning, education and training -- Language accessibility and human interface equivalencies (HIEs) in e-learning applications -- Part 1: Framework and reference model for semantic interoperability	ISO/IEC
ISO/IEC 21000-7	Information technology -- Multimedia framework (MPEG-21) -- Part 7: Digital Item Adaptation	ISO/IEC
ISO/IEC 30112	Specification methods for cultural conventions	ISO/IEC
ISO/IEC 40500	Information technology -- W3C Web Content Accessibility Guidelines (WCAG) 2.0	ISO/IEC
IEC PT 62665	Multimedia systems and equipment - Multimedia e-publishing and e-books technologies - Texture map for auditory presentation of printed texts	IEC
ITU-T H. Sup. 1	Video Quality for sign language and lip reading	ITU-T
WCAG 1.0	Web Content Accessibility Guidelines 2.0	W3C
WCAG 2.0	Web Content Accessibility Guidelines 2.0	W3C
CWA 14835	Guidelines for making information accessible through sign language on the web	CEN
JIS X 8341-3	Guidelines for older persons and persons with disabilities -- information and communications equipment, software and services -- Part3:Web Content	JIS
KICS.OT-10.0003	Internet Web Contents Accessibility Guideline	MIC
UNE 139803	Computer applications for people with disabilities. Web content accessibility requirements	AENOR
UNE 139804	Guidance on the use of the Spanish Sign Language on computer networks	AENOR
ISO/IEC 23009-1	Information technology -- Dynamic adaptive streaming over HTTP (DASH) -- Part 1: Media presentation description and segment formats	ISO/IEC
BS 7000-6	Design management systems. Managing inclusive design. Guide	BSI
BS 8878	Web accessibility. Code of practice	BSI
ISO 9241-210	Ergonomics of human system interaction — Part 210: Human-centred design for interactive systems	ISO
ISO 9241-304	Ergonomics of human-system interaction -- Part 304: User performance test methods	ISO
ISO 9241-305	Ergonomics of human-system interaction -- Part 305: Optical laboratory test methods for electronic visual displays	ISO
ISO 9241-306	Ergonomics of human-system interaction -- Part 306: Field assessment methods for electronic visual displays	ISO
ISO 9241-307	Ergonomics of human-system interaction -- Part 307: Analysis and compliance test methods for electronic visual displays	ISO

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ISO 9241-391	Ergonomics of Human System Interaction -- Part 391: Requirements, analysis and compliance test methods for the reduction of photosensitive seizures	ISO
ISO 9241-910	Ergonomics of human-system interaction -- Part 920: Framework for tactile and haptic interactions	ISO
ISO 9241-940	Ergonomics of human-system interaction -- Part 940: Evaluation of tactile and haptic interactions	ISO
ISO/IEC 11581-40	Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 40: Management of icon registration	ISO/IEC
ISO/IEC 12207	Information technology -- Software life cycle processes	ISO/IEC
ISO 13407	Human-centred design processes for interactive systems	ISO
ISO/IEC 15288	Systems engineering -- System life cycle processes	ISO/IEC
ISO/IEC 15289	Systems and software engineering -- Content of systems and software life cycle process information products (Documentation)	ISO/IEC
ISO TR 16982	Ergonomics of human-system interaction -- Usability methods supporting human-centred design	ISO
ISO PAS 18152	Ergonomics of human-system interaction -- Specification for the process assessment of human-system issues	ISO
ISO TR 18529	Ergonomics -- Ergonomics of human-system interaction -- Human-centred lifecycle process descriptions	ISO
ISO TS 20282-2	Ease of operation of everyday products -- Part 2: Test method	ISO
ISO/IEC 25060	Software product Quality Requirements and Evaluation (SQuaRE) — Common Industry Format (CIF) for Usability — General Framework for Usability-related Information	ISO/IEC
ISO/IEC 25062	Software engineering -- Software product Quality Requirements and Evaluation (SQuaRE) -- Common Industry Format (CIF) for usability test reports	ISO/IEC
ISO/IEC 25063	Systems and software engineering — Systems and software product Quality Requirements and Evaluation (SQuaRE) — Common Industry Format (CIF) for Usability: Context of Use Description	ISO/IEC
ISO/IEC 25064	Systems and Software engineering - Systems and software engineering — Software product Quality Requirements and Evaluation (SQuaRE) — Common Industry Format (CIF) for Usability: User needs report	ISO/IEC
ISO/IEC 24751-1	Information technology -- Individualized adaptability and accessibility in e-learning, education and training -- Part 1: Framework and reference model	ISO/IEC
ISO/IEC 24751-2	Information technology -- Individualized adaptability and accessibility in e-learning, education and training -- Part 2: "Access for all" personal needs and preferences for digital delivery	ISO/IEC
ISO/IEC 24751-3	Information technology -- Individualized adaptability and accessibility in e-learning, education and training -- Part 3: "Access for all" digital resource description	ISO/IEC
ISO/IEC 24751-9	Information technology -- Individualized adaptability and accessibility in e-learning, education and training -- Part 9: Access for All Personal User Interface Preferences	ISO/IEC
ISO/IEC 24751-10	Information technology -- Individualized adaptability and accessibility in e-learning, education and training -- Part 10: Access for All User Interface Characteristics	ISO/IEC

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ISO/IEC 24751-11	Information technology -- Individualized adaptability and accessibility in e-learning, education and training -- Part 11: Access For All Personal needs and Preferences for Non- digital Resources	ISO/IEC
ISO/IEC 24751-12	Information technology -- Individualized adaptability and accessibility in e-learning, education and training -- Part 12: Access For All Non-digital Resource Description	ISO/IEC
ISO/IEC 24751-13	Information technology -- Individualized adaptability and accessibility in e-learning, education and training -- Part 13: Access For All Personal Needs and Preferences for LET Events	ISO/IEC
ISO/IEC 24751-14	Information technology -- Individualized adaptability and accessibility in e-learning, education and training -- Part 14: Access For All LET Events Description	ISO/IEC
ISO/IEC TR 24785	Information Technology - Taxonomy of cultural and linguistic adaptability user requirements	ISO/IEC
ETSI ES 202 746	Human Factors (HF); Personalization and User Profile Management; User Profile Preferences and Information	ETSI
IMS	IMS AccessForAll Meta-data Overview (Instructional Management Systems)	IMS
CSA B659-01	Design for Aging	CSA
ETSI EG 202 301	Universal Communications Identifier (UCI); Using UCI to enhance communications for disabled, young and elderly people	ETSI
ETSI ES 202 746	Human Factors (HF); Personalization and User Profile Management; User Profile Preferences and Information	ETSI
JIS S 0031	Guidelines for the elderly and people with disabilities - Visual signs and displays - Specification of age - related relative luminance and its use in assessment of light	JIS
JIS S 0032	Guidelines for the elderly and people with disabilities - Visual signs and displays - Estimation of minimum legible size for a Japanese single character	JIS
JIS S 0033	Guidelines for the elderly and people with disabilities -- Visual signs and displays -- A method for colour combinations based on categories of fundamental colours as a function of age	JIS
ISO/IEC 15944-7	Information technology -- Business Operational View -- Part 7: eBusiness vocabulary	ISO/IEC
ISO/IEC TR 24714-1	Information technology -- Biometrics -- Jurisdictional and societal considerations for commercial applications -- Part 1: General guidance	ISO/IEC
ISO 7250-1	Basic human body measurements for technological design -- Part 1: Body measurement definitions and landmarks	ISO
ISO TR 7250-2	Basic human body measurements for technological design -- Part 2: Statistical summaries of body measurements from individual ISO populations	ISO
ISO 10075	Ergonomic principles related to mental work-load -- General terms and definitions	ISO
ISO 10075-2	Ergonomic principles related to mental workload -- Part 2: Design principles	ISO
ISO 10075-3	Ergonomic principles related to mental workload -- Part 3: Principles and requirements concerning methods for measuring and assessing mental	ISO
ISO 11226	Ergonomics -- Evaluation of static working postures	ISO
ISO 11228-1	Ergonomics -- Manual handling -- Part 1: Lifting and carrying	ISO
ISO 11228-2	Ergonomics -- Manual handling -- Part 2: Pushing and pulling	ISO

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ISO 11228-3	Ergonomics -- Manual handling -- Part 3: Handling of low loads at high frequency	ISO
ISO 14738	Safety of machinery -- Anthropometric requirements for the design of workstations at machinery	ISO
ISO 15534-1	Ergonomic design for the safety of machinery -- Part 1: Principles for determining the dimensions required for openings for whole-body access into machinery	ISO
ISO 15534-2	Ergonomic design for the safety of machinery -- Part 2: Principles for determining the dimensions required for access openings	ISO
ISO 15534-3	Ergonomic design for the safety of machinery -- Part 3: Anthropometric data	ISO
ISO 15536-1	Ergonomics -- Computer manikins and body templates -- Part 1: General requirements	ISO
ISO 15536-2	Ergonomics -- Computer manikins and body templates -- Part 2: Verification of functions and validation of dimensions for computer manikin systems	ISO
ISO 20282-1	Ease of operation of everyday products -- Part 1: Context of use and user characteristics	ISO
ETSI EG 202 132	Human Factors (HF); User Interfaces; Guidelines for generic user interface elements for mobile terminals and services	ETSI
ETSI EG 202 191	Human Factors (HF); Multimodal interaction, communication and navigation guidelines	ETSI
ISO TS 14415	Ergonomics of the thermal environment -- Application of International Standards to people with special requirements	ISO
ISO 21542	Building construction -- Accessibility and usability of the built environment	ISO
ISO 24500	Guidelines for all people, including elderly persons and persons with disabilities -- Auditory signals on consumer products	ISO
ISO 24501	Guidelines for all people including elderly persons and persons with disabilities - Auditory signals on consumer products- Sound pressure levels of signals for the elderly and in noisy conditions	ISO
ISO 24502	Guidelines for all people including elderly persons and persons with disabilities -- Visual signs and displays -- Specification of age - related relative luminance and its use in assessment of light	ISO
ISO 24504	Ergonomics -- Accessible design -- Sound pressure levels of spoken announcements for products and public address systems	ISO
ISO 28802	Ergonomics of the physical environment -- Assessment of environments by means of an environmental survey involving physical measurements of the environment and subjective responses of people	ISO
ISO 28803	Ergonomics of the physical environment -- Application of international standards to people with special requirements	ISO
CSA B651	Accessible Design for the Built Environment	CSA
JIS S0014	Guidelines for the elderly and people with disabilities - Auditory signals on consumer products - Sound pressure levels of signals for the elderly and in noisy conditions	JIS
JIS T 0901	Guidelines of electronic guide system using audible signage for visually impaired persons	JIS
ISO 7731	Ergonomics -- Danger signals for public and work areas -- Auditory danger signals	ISO
ISO 9241-5	Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 5: Workstation layout and postural requirements	ISO

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ISO 9241-6	Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 6: Guidance on the work environment	ISO
ISO 9921	Ergonomics -- Assessment of speech communication	ISO
ISO 11428	Ergonomics -- Visual danger signals -- General requirements, design and testing	ISO
ISO 11429	Ergonomics -- System of auditory and visual danger and information signals	ISO
IETF RFC 3351	User Requirements for the Session Initiation Protocol (SIP) in Support of Deaf, Hard of Hearing and Speech-impaired Individuals (Internet Engineering Task Force)	IETF
ITU-T TACL	Telecommunications Accessibility Checklist	ITU-T
ITU-T Rec. E.135	Human Factors Aspects of Public Telecommunication Terminals for People with Disabilities	ITU-T
ITU-T Rec. F.790	Telecommunications Accessibility Guidelines for Older Persons and Persons with Disabilities	ITU-T
ITU-T Rec. V.18	Operational and Interworking Requirements for DCE:s Operating in the Text Telephone Mode	ITU-T
ITU-T Rec. V.151	Procedures for end-to-end connection of analogue PSTN text telephones over an IP network utilizing text relay	ITU-T
ITU-T Rec. F.703	Multimedia conversational services	ITU-T
AS/ACIF S040	Requirements for Customer Equipment for use with the Standard Telephone Service - Features for special needs	Australian Communications Authority
AS/NZS 4277	Text telecommunications - User interface requirements - For Deaf people and people with hearing and speech disabilities	SA
CSA T510-95	Performance and Compatibility Requirements for Telephone Sets With Loop Signaling	CSA
CSA T516	Telecommunications - Telephone Terminal Equipment - Requirements for Pay Telephone Keypads and Function Keys with Particular Regard to Use by Persons with Disabilities	CSA
ETSI ETR 333	Human Factors (HF); Text Telephony; Basic user requirements and recommendations	ETSI
ETSI TR 101 806	Human Factors (HF); Guidelines for Telecommunication Relay Services for text and video	ETSI
ETSI ES 202 975	Human Factors (HF); Harmonized relay services	ETSI
JIS X 8341-4	Guidelines for older persons and persons with disabilities-- Information and communications equipment, software and services -- Part 4: Telecommunications equipment	JIS
US 255	Section 255 Telecommunications Access For People with Disabilities of the US Communications Act	Federal Law
ETSI TS 102 577	Human Factors (HF); Public Internet Access Points (PIAPs)	ETSI
ISO/IEC 24752-1	Information technology -- User interfaces -- Universal remote console -- Part 1: Framework	ISO/IEC
ISO/IEC 24752-2	Information technology -- User interfaces -- Universal remote console -- Part 2: User Interface Socket Description	ISO/IEC
ISO/IEC 24752-3	Information technology -- User interfaces -- Universal remote console -- Part 3: Presentation Template	ISO/IEC
ISO/IEC 24752-4	Information technology -- User interfaces -- Universal remote console -- Part 4: Target Description	ISO/IEC
ISO/IEC 24752-5	Information technology -- User interfaces -- Universal remote console -- Part 5: Resource Description	ISO/IEC

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ISO/IEC 24752-6	Information technology — User interfaces — Universal remote console — Part 6: Web service integration	ISO/IEC
CEA-608	Line 21 Data Services	ANSI
IETF RFC 2198	Redundancy for RTP payloads	IETF
IETF RFC 2327	SDP; Session Description Protocol	IETF
IETF RFC 2793	RTP Payload for Text Conversation	IETF
IETF RFC 2833	RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals	IETF
IETF RFC 3261	SIP; Session Initiation Protocol	IETF
IETF RFC 3550	RTP: A Transport Protocol for Real-Time Applications	IETF
IETF RFC 3711	SRTP; Secure Real Time Protocol	IETF
IETF RFC 3840	Indicating User Agent Capabilities in the Session Initiation Protocol (SIP)	IETF
IETF RFC 3841	Caller Preferences for the Session Initiation Protocol	IETF
IETF RFC 4102	Registration of the text/red MIME Sub-Type	IETF
IETF RFC 4103	RTP Payload for Text Conversation	IETF
IETF RFC 4351	RTP Payload for Text Conversation interleaved in an audio stream	IETF
IETF RFC 4504	SIP Telephony Device Requirements, Configuration and Data	IETF
IETF RFC 4566	Session Description Protocol	IETF
IETF RFC 4733	Definition of Events For Modem, FAX, and Text Telephony Signals	IETF
IETF RFC 5012	Requirements for Emergency Context Resolution with Internet Technologies	IETF
IETF RFC 5194	Framework of requirements for real-time text conversation using SIP	IETF
IETF RFC 5370	The Session Initiation Protocol (SIP) Conference Bridge Transcoding Model	IETF
ITUT NGN	NGN Release 1	ITU-T
ITU-T Rec. F.700	Framework Recommendation for multimedia services	ITU-T
ITU-T Rec. F.724	Service description and requirements for videotelephony services over IP networks	ITU-T
ITU-T Rec. F.733	Service description and requirements for multimedia conference services over IP networks	ITU-T
ITU-T Rec. F.742	Service description and requirements for distance learning services	ITU-T
ITU-T Rec. H.224	A real time control protocol for simplex applications using the H.221 LSD/HSD/MLP channels	ITU-T
ITU-T Rec. H.245	Control protocol for multimedia communication	ITU-T
ITU-T Rec. H 248	Gateway control protocol	ITU-T
ITU-T Rec. H 248.2	Gateway control protocol: Facsimile, text conversation and call discrimination packages	ITU-T
ITU-T Rec. H 248.21	Gateway control protocol: Semi-permanent connection handling package	ITU-T
ITU-T Rec. H.320	Narrow-band visual telephone systems and terminal equipment	ITU-T
ITU-T Rec. H.323	Packet-based multimedia communications systems	ITU-T
ITU-T Rec. H.324	Terminal for low bit-rate multimedia communication	ITU-T
ITU-T Rec. T.134	Text chat application entity	ITU-T
ITU-T Rec. T.140	Protocol for multimedia application text conversation	ITU-T
ITU-T Rec. V.8	Procedures for starting sessions of data transmission over the public switched telephone network	ITU-T

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ITU-T Rec. V.8bis	Procedures for the identification and selection of common modes of operation between data circuit-terminating equipments (DCEs) and between data terminal equipments (DTEs) over the public switched telephone network and on leased point-to-point telephone-type circuits	ITU-T
ITU-T Rec. V.16	A simultaneous voice plus data modem, operating at a voice plus data signalling rate of 4800 bit/s, with optional automatic switching to data-only signalling rates of up to 14 400 bit/s, for use on the General Switched Telephone Network and on leased point-to-point 2-wire telephone type circuits	ITU-T
ITU-T Rec. V.150.1	Modem-over-IP networks: Procedures for the end-to-end connection of V-series DCEs	ITU-T
ITU-T Rec. V.152	Procedures for supporting voice-band data over IP networks	ITU-T
ITU-T Rec. V.250	Serial asynchronous automatic dialling and control	ITU-T
ITU-T Rec. Y.1541	Network performance objectives for IP-based services	ITU-T
ITUT Rec. Y.2000SerSup1	NGN Release 1 Scope	ITU-T
ITUT Rec. Y.2012	NGN Release 1 Requirements	ITU-T
ANSI T1.209	American National Standard for Operations Administration and Maintenance and Provisioning (OAM&) – Network Tones and Announcements	ANSI
ANSI/TIA-127-A	Enhanced Variable Rate Codec Speech Service Option 3 for Wideband Spread Spectrum Digital Systems	ANSI/TIA
ANSI/TIA-968-A	Telecommunications - Telephone Terminal Equipment - Technical Requirements for Connection of Terminal Equipment to the Telephone Network	ANSI/TIA
ETSI TS 102 747	Human Factors (HF); Personalization and User Profile Management; Architectural Framework.	ETSI
ETSI TS 122 101	Universal Mobile Telecommunications System (UMTS); LTE; Service aspects; Service principles (3GPP TS 22.101)	ETSI
ETSI TS 122 226	Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Global text telephony (GTT); Stage 1: Service description (3GPP TS 22.226)	ETSI
ETSI TS 123 226	Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Global text telephony (GTT); Stage 2 (3GPP TS 23.226)	ETSI
ETSI TS 124 008	Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Mobile radio interface Layer 3 specification; Core network protocols; Stage 3 (3GPP TS 24.008)	ETSI
ETSI TS 126 110	Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Codec for circuit switched multimedia telephony service; General description (3GPP TS 26.110)	ETSI
ETSI TS 126 226	Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Cellular text telephone modem; General description (3GPP TS 26.226)	ETSI
ETSI TS 126 230	Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Cellular text telephone modem; Transmitter bit exact Ccode (3GPP TS 26.230)	ETSI
ETSI TS 126 231	Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Cellular text telephone modem; Minimum performance requirements (3GPP TS	ETSI

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	26.231)	
ETSI TS 126 235	Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Packet switched conversational multimedia applications; Default codecs (3GPP TS 26.235)	ETSI
ETSI ES 202 067	Universal Communications Identifier (UCI); System framework	ETSI
ETSI EG 202 320	Human Factors (HF); Duplex Universal Speech and Text (DUST) communications	ETSI
ETSI EG 202 416	Human Factors (HF); User interfaces; Setup procedure design guidelines for mobile terminals and services	ETSI
ETSI EG 284 004	Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Incorporating Universal Communications Identifier (UCI) support into the specification of Next Generation Networks (NGN)	ETSI
TIA-688	DTE/DCE Interface For Digital Cellular Equipment	TIA
TIA -825a	A Frequency Shift Keyed Modem for use on the Public Switched Telephone Network	TIA
TIA 1001	Transport of TIA-825-A Signals over IP Networks	TIA
TIA/EIA/IS-707-A	Data Services Options for Spread Spectrum Systems	TIA / EIA
TIA/EIA/IS-733-1	High Rate Speech Service Option 17 for Wideband Spread Spectrum Communications Systems, Addendum 1	TIA / EIA
TIA/EIA/IS-789-A	Electrical Specification for the Portable Phone to Vehicle Interface	TIA / EIA
TIA/EIA/IS-823-A	TTY/TDD Extension to TIA/EIA 136- 410 Enhanced Full Rate Speech Codec	TIA / EIA
TIA/EIA/IS-840-A	Minimum Performance Standards for Text Telephone Signal Detector and Text Telephone Signal Regenerator	TIA / EIA
TSB-121	Cellular Subscriber Unit Interface for TDD (2.5 mm Audio Interface For Mobile Wireless Handsets - Text Telephones (TTY))	TSB
AS 3769	Automatic teller machines: User access	SA
CEA-708-D	Digital Television (DTV) Closed Captioning	CEA
CSA B651.1	Barrier-Free Design for Automated Banking Machines	CSA
CSA B651.2	Accessible design for self-service interactive devices	CSA
EG 202 487	Human Factors (HF); User experience guidelines; Telecare services (eHealth)	ETSI
EIA 608	Recommended Practice for Line 21 Data Service (Analog Television Closed Captioning)	EIA
EIA 708 B	Digital Television (DTV) Closed Captioning	EIA
ETSI EG 202 487	Human Factors (HF); User experience guidelines; Telecare services (eHealth)	ETSI
ANSI/HFES 200.4	ANSI/HFES 200: Human Factors Engineering of Software User Interfaces – Part 4: Voice Input / Output and Telephony	ANSI
TTAS.OT-09.0001	Digital Talking Book Guidelines 1.0	TTA
TTAS.KO-07.0050	The Standard for DTV Closed Caption System	TTA
UNE 153010	Subtitling for deaf and hard-of-hearing people. Subtitling by teletext	AENOR
UNE 153020	Audio description for visually impaired people. Guidelines for audio description procedures and for the preparation of audio guides	AENOR
US Part 79.1	47 C.F.R. § 79.1 Closed Captioning Of Video Programming (relating to: Telecommunications Act, Section 713)	Federal Regulatio

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		n
US Part 79.1	47 C.F.R. § 79.2 Accessibility of programming providing emergency information(relating to: Telecommunications Act, Section 713)	Federal Regulatio n
ISO 9241-154	Ergonomics of human-system interaction -- Part 154: Interactive voice response (IVR) applications	ISO
ISO 11064-1	Ergonomic design of control centres -- Part 1: Principles for the design of control centres	ISO
ISO 11064-2	Ergonomic design of control centres -- Part 2: Principles for the arrangement of control suites	ISO
ISO 11064-3	Ergonomic design of control centres -- Part 3: Control room layout	ISO
ISO 11064-4	Ergonomic design of control centres -- Part 4: Layout and dimensions of workstations	ISO
ISO 11064-5	Ergonomic design of control centres -- Part 5: Displays and controls	ISO
ISO 11064-6	Ergonomic design of control centres -- Part 6: Environmental requirements for control centres	ISO
ISO 11064-7	Ergonomic design of control centres -- Part 7: Principles for the evaluation of control centres	ISO
ETSI TR 102 202	Human Factors (HF);Human Factors of work in call centres	ETSI
ISO/IEC 7811-9	Identification cards -- Recording technique -- Part 9: Tactile identifier mark	ISO/IEC
ISO 11156	Packaging -- Accessible design -- General requirements	ISO
JIS S 0021	Guidelines for all people including elderly and people with disabilities - Packaging and receptances	JIS
JIS S 0022	Guidelines for all people including elderly and people with disabilities - Packaging and receptacles - Test methods for opening	JIS
JISS 022-3	Guidelines for all people including elderly and people with disabilities -Packaging and receptacles-Tactile indication for identification	JIS
JISS 022-4	Guidelines for all people including elderly and people with disabilities-Packaging and receptacles-Evaluation method by user	JIS
JIS S 0025	Guidelines for all people including elderly and people with disabilities - Packaging and receptacles - Tactile warnings of danger-Requirements	JIS
ISO/IEC 18019	Software and system engineering -- Guidelines for the design and preparation of user documentation for application software	ISO/IEC
ISO/IEC TR 29138-1	Information technology -- Accessibility considerations for people with disabilities -- Part 1: User needs summary	ISO/IEC
ISO/IEC TR 29138-2	Information technology -- Accessibility considerations for people with disabilities -- Part 2: Standards inventory	ISO/IEC
ISO/IEC TR 29138-3	Information technology -- Accessibility considerations for people with disabilities -- Part 3: Guidance on user needs mapping	ISO/IEC
UL 365	Police Station Alarm Units	UL
UL 1076	Proprietary Burglar Alarm Units and Systems	UL
UL 1610	Central Station Alarm Units	UL
UL 2572	Mass Notification Systems	UL
UL 1069	Hospital Signaling and Nurse Call Equipment	UL
UL 827	Central-Station Alarm Services	UL
UL 2825	Outline for Resiliency of Network Infrastructure Components	UL

Standard	Description/Title	Organi-zation
VDE-AR-E 2757-1	Ambient Assisted Living (AAL) - Terms and definitions	VDE
VDE-AR-E 2757-2	Service Staying at Home - Requirements for suppliers of combined services	VDE
VDE-AR-E 2757-3	Staying at Home service - Criteria for the selection and installation of AAL components	VDE
VDE-AR-E 2757-4	Staying at home service - Quality criteria for providers, services and products of Ambient Assisted Living (AAL)	VDE
VDE-AR-E 2757-100	Ambient Assisted Living (AAL) - Guideline for the development of AAL products	VDE
VDE-AR-E 2750-200	Approach to the classification of medical devices and the selection of conformity assessment procedures	VDE
DIN SPEC 91280	Ambient Assisted Living (AAL) - Classification of Ambient Assistant Living services in the home environment and immediate vicinity of the home	DIN
DIN SPEC 77002	Ambient Assisted Living (AAL) - Requirements for AAL services	DIN
DIN 77800	Quality requirements for providers of "Assisted living for the elderly"	DIN
DIN CEN/TS (DIN SPEC 77101) 16118	Sheltered housing - Requirements for services for older people provided in a sheltered housing scheme; German version CEN/TS 16118:2012	DIN
DIN SPEC 91300-1	Guide for the development of a business model for home related services - Part 1: Organizational structure	DIN
DIN SPEC 91300-2	Guide for the development of a business model for home related services - Part 2: Operational structure	DIN
DIN SPEC 91300-3	Guide for the development of a business model for home related services - Part 3: Interfaces	DIN
DIN SPEC 91300-4	Guide for the development of a business model for home related services - Part 4: Financing models	DIN
IEC 62061	Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems	IEC
ISO 13849-1	Safety of machinery -- Safety-related parts of control systems -- Part 1: General principles for design	ISO

Annex C

Projects related to AAL

C1. General

The following list is a partial list of funded European projects dealing with AAL.

The description in the table has been provided by the various project leaders.

C2. List of projects

#	Project	Description
1	**HOBBIT - The Mutual Care Robot**	Ageing has been prioritised as a key demographic element affecting the population development within the EU member states. Experts and users agree that Ambient Assisted Living (AAL) and Social and Service Robots (SSR) have the potential to become key components in coping with Europes demographic changes in the coming years. From all past experiences with service robots, it is evident that acceptance, usability and affordability will be the prime factors for any successful introduction of such technology into the homes of older people. While world players in home care robotics tend to follow a pragmatic approach such as single function systems (USA) or humanoid robots (Japan, Korea), we introduce a new, more user-centred concept called Mutual Care. The intention is to create a possibility for the Human to take care of the robot like a pet. It is easier to accept assistance from a robot when in certain situations the Human can also assist the machine. In turn, older users will more readily accept the help of the HOBBIT robot. Close cooperation with institutional caregivers will enable the consortium to continuously improve acceptance and usability. In contrast to current approaches, HOBBIT, the mutual care robot, will offer practical and tangible benefits for the user with a target price tag considerably below present solutions. Through an interface designed specifically for elderly users, HOBBIT will be able to follow a user and guide a user through the home, assist with getting up and offer alert functions, it will be able to learn user-defined objects and be able to retrieve them. Connection to other AAL equipment is foreseen. With this, HOBBIT will offer the benefit to remain longer in the private home environment, which will justify the expenses. We will insure that the concept of HOBBIT seeds a new robotic industry segment for ageing well in the European Union.

#	Project	Description
2	**FLORENCE - Multi Purpose Mobile Robot for Ambient Assisted Living**	Due to increasing mobility and the ageing society the demand for care will increase significantly, leading to high costs and unrealistic manpower demands. Florence will alleviate this by keeping elderly independent much longer by providing care and coaching services, supported by robots. This will greatly improve the efficiency in care and reduce costs. The second problem addressed by Florence is the acceptance of robots by elderly. For this purpose the project adopts a user-centric approach, by starting with focus-group sessions, having lab-tests in the OFFIS IDEAAL lab, and finally evaluating the services in the Granada AAL living labs. The Florence consortium contains partners from the complete value chain: robot vendors, care providers, and consumer electronics vendors. The consortium positions the service robot as a consumer device, supporting various lifestyle services. In particular the following services will be evaluated in the project: * Social Connectedness: provide access to the social networks, including web-2.0 and synchronous communication tools * Coaching: give feedback on specific activities like physical exercises, and advise on activities of daily life * Care support: log care-related activities at home that are shared among professional or volunteer caretakers. * Safety: use the robot as additional ears and eyes in comfort or safety situations, controlled by service providers or the elderly users. In order to support this multitude of services, the Florence system is based on a service-oriented architecture that provides programmatic interfaces towards the (interaction) capabilities provided by the robot, the home, and remote service providers. Such integration will effectively turn the Florence system into a generic platform for home-services, integrating an autonomous robot with the smart home.

#	Project	Description
3	**EASYREACH**	EasyReach is an innovative and sustainable ICT solution to allow elderly and less educated people to participate in the benefits of IT-based social interactions. The project builds a system, called EasyReach that supports many styles of social interaction between users provide them an easy way to organize groups of people that already know each other, create groups of people that care for a certain common topic, organize groups for the purpose of ‘interfacing’ with real world social groups and organize help sessions where a skilled user helps or train others. The services of EasyReach also provide elderly people with proper means for support of interactions like appointments and things to-do, automatic structure and maintain user’s information, monitor of users’ quality of interaction in order to provide feedback and foster new interactions. The use of TV as the core communication interface device and a simple remote control for accessing the services, EasyReach becomes an especially accessible system, easy to install, configure and apply in every-day life. Download the poster of the project Objectives: EasyReach targets in: • Keeping people socially active, increasing the number and the quality of contacts proposing users to join new groups; • Supporting elder people in becoming the leader of a group of people he or she is “consulting” for on the basis of past work experience, by creating the right frameworks to pass along the knowledge that comes with experience: • Helping a user remembering and organizing activities of any kind (not only the social interaction activities that are provided by EasyReach); • Managing the interaction between a real community and a person that belonged to that community but, for physical reasons, cannot participate anymore; The system will tangibly improve the quality of life of home-bound users by preserving existing relationships; boosting self-esteem of users; helping users in performing common activities. Expected results and impact: EasyReach requires and will bring an advancement of knowledge in three areas: 1. Breaking the remote control usability barrier: going beyond on/off, changing channels and volume controls; 2. Devising new IT social interaction models. 3. Investigating automatic ways of supporting user interaction Implication for TC100: smart home technologies (TV and easy remote control)

#	Project	Description
4	**FOSIBLE**	The FoSIBLE approach builds on TV-based Social Interaction technologies in the context of Smart Living Rooms, using entertainment console and social media technologies to provide communication, interaction & entertainment services. To fulfil our aim, FoSIBLE activities are organized in such a way that functionalities are designed and implemented into components to address specific user requirements that can be combined to support full-scale application scenarios. FoSIBLE prototypes are developed using a user centred and participatory approach. End-users from Austria, Germany and France are involved in the project. In addition, the end-user organization Les Arcades is in charge of evaluating the potential benefits of the solution. Objectives: FoSIBLE aims at the well-being and self-esteem of older people by supporting an active life-style to prevent loneliness. FoSIBLE aims at providing bridging spaces to foster social interactions and experiences by acknowledging the diversity of preferences, needs and interests. Fosible will develop a Social TV community platform with game technologies and smart furniture and will provide adapted input devices including gesture recognition fostering social support between peers through virtual communities and entertainment applications. Expected results and impact: FoSIBLE is targeted around providing a TV-based Social Media Centre with services for : • Staying in touch with relatives and friends, as well as contacting peer groups • Participating in games and physical activity • Sharing interests (cooking, poetry, etc.) The project intends to provide new ways to control social technology applications, e.g. via tablet control, gestures, or smart furniture. An open platform will allow for additional integration and dissemination to end-users. Implication for TC100: smart home technologies (Smart TV)

#	Project	Description
5	**HOMEDOTHOLD**	The HOMEdotOLD project aims to provide a TV-based platform with cost-effective services that will be delivered in a personalised and intuitive way and will advance the social interaction of elderly people, aiming at improving the quality and joy of their home life, bridging distances and reinforcing social voluntariness and activation, thus preventing isolation and loneliness. HOMEdotOLD will be primarily based on the Philips NetTV platform and secondarily on the A1TA AonTV platform. More specifically, the whole bouquet of services will be implemented and provided to the users of the Greek, Austrian and Dutch pilot sites. The HOMEdotOLD consortium includes three partners who ensure the direct involvement of elderly users throughout the project lifetime, including requirements collection phase of the project, as well as the pilot trial activities that will take place at least twice during the project. Objectives: HOMEdotOLD is an ICT-based project that uses the TV medium in order to deliver a number of cost-effective services to elderly people. The targeted services are expected to advance the social interaction of elderly people by bridging distances and reinforcing social voluntariness and activation, thus preventing isolation and loneliness. The project main objectives are to provide a technological platform to provide services allowing the elderly to stay socially active and to bridging distances and supporting elderly people’s existing roles. Expected results and impact: • Personal motivation services, i.e. services for staying socially active, preventing loneliness and isolation, enabling voluntariness, motivation and activation; • Social networking services: i.e. services for bridging distances and supporting existing role; • The business plan for the deployment of the HOMEdotOLD services; Implication for TC100: smart home technologies (Smart TV)

#	Project	Description
6	**HOPES**	Taking into account user requirements, expectations and social experiences, HOPES will integrate a range of ICT-based solutions for: • managing existing e-information by exhaustive search of existing information (Web and databases crawling) and intelligent structuring (i.e. TextMining) in the HOPES repository; • then transforming selected information into personalised solutions,and finally providing validated solutions as “e-Social Best Practices” (SBP)*. This stepwise process represents the “HOPES virtuous circle” for transforming raw data into knowledge (SBP) with help of many European organisations (end users). The SBP will be provided to HOPES end users together with recommendations about how and when they can be best used during the elderly person’s daily life (“personal social calendar”). The social pertinence and high quality of the proposed HOPES SBP will be guaranteed through a validation process based on the Web 2.0 strategy (by and for end users) and following the “Evidence-Based Medicine” (EBM) method for certification. Cooperation technology will ensure user-friendly interactivity, personalisation, practical accessibility and usability of the HOPES platform, ICT solutions and content. The technology will support interoperability and multiple roles as content user and provider, semantic technologies for semantic similarity reasoning and routing, human – system interfaces adapted to the elderly and a single but multilingual access point to share HOPES SBP all over Europe. In the pilot phase, each end user will be asked, in an iterative and interactive process, to provide his/her personal feed back about the SBP he/she tested, then about its impact (social relevance and user satisfaction) and social benefits on his/her quality of life and autonomy. HOPES will thus be in a position, soon after the end of the pilot, to commercialise a global and validated e-service. Objectives: The HOPES project aims at developing an intelligent multimedia platform providing innovative social e-services for European elderly persons and their social entourage (as carers / supporters and ICT tutors when needed). Through this platform, HOPES will create the first European network dedicated to social interactions of the elderly and selfanimated by its adherents. The ultimate goal of the project is to enhance socialisation, quality of life and autonomy of elderly persons by preventing isolation and loneliness, and generating positive social experiences and behaviour. Specifically, HOPES aims to address the needs of the elderly population with adapted ICT, by: • Creating a European network of virtual greying e-community(ies) in a multicultural and multilingual social environment, following European guidelines concerning quality,reliability and privacy; • Preventing social exclusion by encouraging and/or re-creating special interactions, social engagement and self-esteem, as well as sharing of knowledge with other seniors (“communitying”); • Carrying out a large analysis of user expectations, barriers, requirements and meaningful solutions that have the potential to change aging persons’ behaviour regarding ICT; • Providing the technical environment, based on a web platform with innovative but validated ICT (containers, features / interfaces and contents), that allows to search for or create, evaluate and validate, organise and disseminate shared solutions for SBP in an iterative process allowing stepwise optimisation of the proposed SBP (“HOPES virtuous circle”);

#	Project	Description
	Hopes (cont)	• Using ICT to create / develop the “personal social calendar”, to organise and prioritise day-to-day rituals and social experiences, and recommend the preferred time for SBP; with electronic motivator services, e.g. email alerts; ; • Enabling an active and intuitive interaction of users (elderly persons and their entourage when needed) with the system and with other people through the system, by means of an advanced multimedia and multilingual cooperation platform, according to a social web philosophy; • Using adapted ergonomic interfaces and features, intelligent information solutions and ontologic / semantic technologies to ease management, sharing and use of its validated content, especially with regard to the targeted user group of elderly people who are generally weak users of ICT; • Developing and implementing a participative, interactive and personalised validation system, (“HOPES certification”) based on a Web 2.0 strategy (online when possible,otherwise with help from entourage) and the EBM method, to guarantee the quality of the SBP and other solutions stored in the HOPES repository and shared with all users; • Evaluating the time spent by end users (or their relatives as helpers / tutors) to use HOPES e-services properly, and use this information to improve the platform ergonomics; • Evaluating the HOPES platform and SBP in a real end user situation (European-size Expected results and impact: The HOPES project proposes to foster social interactions through the development of an accessible, easy-to-use and innovative ICT platform as forum of well aging and exchange of SBP and socialisation services in a European network. Through the cooperative multimedia and multi-language social platform created by HOPES, its intelligent support systems, knowledge repository of SBP, social calendar and practical solutions, and provision of services “on the spot”, elderly people and their social entourage will be empowered to help themselves and others in their everyday life Increased beneficial social interaction will reduce isolation and loneliness by conserving personal social rituals for better quality of life and mobility. HOPES will contribute to progress beyond the state-of-the-art by developing a Europeanwide, social network platform for elderly and their entourage. HOPES innovation will come from implementation of an innovative ICT service with the most up-to-date yet userfriendly technology (hard-/software, interfaces) on the one side, and focus on an innovative elderly-centred approach with adapted models from geriatric psychology and ethnology, person-centred communication, evidence based medicine, practice and healthcare and health belief models on the other side. READ THE BROCHURE HOPES will contribute to the improvement of quality of life both directly and indirectly by considering three main dimensions of enhancing social interactions and quality of life of elderly persons (wellness and healthy behaviour; social and cognitive activities; improving / re-activating rituals) Implication for TC100: smart home technologies

#	Project	Description
7	**SENIOR CHANNEL**	SeniorChannel will give elderly care professionals an innovative approach to developing and managing the specific social needs of the elderly in the wider community. To achieve this goal, SeniorChannel will develop an Interactive Internet Protocol Television Channel (SENIORCHANNEL) that will not only provide elderly people with a method of interacting but also with a unique means of access to the range of diverse activities in their community including the opportunity to share knowledge and experience, the ability to participate in topical debates, entertainment services, work-shops and discussion groups regardless of their geographical location. The integrated system will be tested and evaluated, setting up a TV studio and production centre in Spain and broadcasting programs to a pilot user group. The feedback generated during user testing will provide the basis for modification and refinement thus bringing the design of the application more into line with the preferences and needs of those involved Objectives: The goal in project SeniorChannel is to integrate innovative technologies and high added value content in order to provide elderly people with an opportunity to interact and share their knowledge, opinions and aspirations with the wider community and derive enjoyment from the experience. SeniorChannel will develop an Interactive Internet Protocol Television Channel (SENIORCHANNEL) that will not only provide elderly people with a method ofinteracting but also with a unique means of access to the range of diverse activities in their community including the opportunity to share knowledge and experience, the ability to participate in topical debates, entertainment services, work-shops and discussion groups regardless of their geographical location. Expected results and impact: The expected results includes: The first interactive IPTV channel exclusively for elderly people with content and programmes specifically designed to promote socialisation. • First, substantive experience in interactive TV using hybrid Set-top Boxes designed to meet the specific requirements of the elderly; • A low cost integrated TV Studio and production centre with all the necessary equipment and software to produce interactive IPTV content • The first repository of documentaries and programs specifically produced for elderly people; • The first broadcast service which will provide elderly people with a mechanism for expressing their creativity by involving them in the production and broadcast of programme content and formats as well as allowing them to participate in programmes from the comfort of their own homes. Implication for TC100: smart home technologies (Smart TV/IPTV)

#	Project	Description
8	**SO MEDALL**	A prototype service will be implemented and tested among the seniors over national borders. SoMedAll project produces a platform that offers social media focused on the needs of the elderly with a variety of easy-to-use user interfaces including web, PC, IPTV and mobile phone (equipments already at home) taking into account the skill levels of the users. We implement a prototype service, test use it among the elderly over national borders. We study the usability and the impact of the services to the life quality of the elderly.End-users’ point of view will be taken into account in practice in Italy, Finland and possibly in Slovenia. One important issue is also to analyse possible cultural effects on the acceptance and desire for these kinds of social media services. Objectives: Objective is to make social media usable for senior people: • to build social media applications and activities around the content; to provide easy ways to create, store and share knowledge, experiences and memories • to provide easy fast communication, social interaction and creation of social networks to develop tools that support co experience and co presence • to develop easy, adaptable and guided user interfaces for creating, managing and sharing content taking into account the mental and physical capabilities of the elderly people the service can be used with users own language and supports multicultural communication Expected results and impact: Technology deployment timeline we have two different kinds of results: SoMedAll software platform with including modules that has been developed in the project as the prototype and pilot. Pilot is expected to be ready for deployment in the short term. Service concepts that use the new SoMedAll software modules to adapt to the user conditions and predict their evolution and adaptive interfaces will only be deployed in homes in the medium term. One important result will be also the knowledge achieved concerning the cultural differences and attitudes towards technology based social media services among elderly people. Implication for TC100: smart home technologies (Smart TV)
9	**2PCS**	The 2PCS solution is based on a unique combination of innovative software features and a mixture of state of the art technologies aligned to a life-phase oriented business process logic. A modular approach allows for individual customisation and thus personalised and adjusted services for end-users. Depending on the end-users’ needs, all features and services can be activated as well as deactivated by the user or by an entitled secondary end-user. In Order to ensure that the 2PCS solution addresses the life-phase challenges as good as possible, primary end-users, secondary end-users as well as tertiary end-users are integrated into the development process of services and functions. Next to a set of research activities various end-user-groups will be able to participate in idea gathering, defining requirements, use cases, innovation processes and pilots aligned to various life-phases. Regardless of age-groups, the solution is targeted at various user groups who need functions and services based on their distinct life-phases, challenges and needs The goal is to develop an attractive, intelligent, demand oriented and age-independent personal protection and caring system (2PCS device and infrastructure) without stigmatisation, restriction of freedom and permanent monitoring. The aim of the project is to improve the mobility, the information accessibility and the subjective as well as objective safety of elderly people. Another goal of the 2PCS system is to reduce the emotional and psychological burden for care persons as well as for family members and to improve mobility, safety and freedom along all relevant life-phases www.2pcs.eu Implication for TC100: smart home technologies

#	Project	Description
10	**CARE@HOME**	Care@Home involve continuous, automatic and remote monitoring (e.g. by mobile phone/wireless / fixed sensors) of real time emergencies and lifestyle changes over time in order to manage the risks associated with independent living. Care@Home enables such care services to the home environment without the prohibitive costs of retrofitting existing dwellings. Care@Home aims at creating an open platform able to enable services to elderly who care to live independently while enjoying the assurance of timely access to caregivers when needed and thereby offer better living which provides elderly around the world with a sense of security, comfort and joy. Care@Home is about enabling empowerment, wellness and social care services to the home of the elderly through interactive multimedia SmartTV. The idea is to enclose the social support system for the elderly and carry this as a personalized communication and service channel in their home. Whereby the technology provide a two-way communication for family, friends and care givers as well as entertainment and services for household, shopping and community information. Expected results and impact: The progress beyond to the state-of-the-art of Care@Home project is that relevant technology regarding sensors, wireless networks, communication and multimedia is to be integrated in community driven products and services for the elderly, which are highly personalized and easy-to-use. Because of the easy accessible ‘design platform’ of Philips SmartTV, development new applications and services are in reach of many organizations and companies. http://www.careathome-project.eu Implication for TC100: smart home technologies, Smart TV
11	**FOOD**	The devised solution consists of a home-based system that enables elderly people to deal with feeding and food-related tasks in a safe, effective and rewarding way. It is based on the seamless integration of sensors, intelligent appliances able to offer functionalities in the house and Internet based services and applications, able to give access, through a natural interface, to information and communication in different social environments. Its innovation lies in the integration and cooperation of Internet of things, Semantic Web and Web 2.0. The availability of relevant data from sensors on people and their environment and the cooperation of artificial and human intelligence through the network will contribute to support independence of people. Moreover, it is supposed that the quality of the end-users everyday life will improve not only due to the support in crucial activities in the house, but also for the possibility of interaction with the outside world both for practical purposes (e.g. ecommerce, e-government, etc.) and for socializing. The idea will be tested with pilots in three countries addressing a basic need of people, i.e.feeding. Pilots will be carried out in Italy, Romania and Netherlands, in order to compare its impact in different social environments. Objectives: The proposal addresses elderly people with a sufficient level of autonomy for independent life, if suitably supported. It aims at preserving and enhancing independence of elderly people in all aspects of daily life (addressing activities at home, security, health care control), to guarantee them the possibility of taking active part in the “self-serve” society (ability to access information and negotiate and or be supported for getting necessary items if mobility out of the house is a problem), and to secure social contacts and/or support, when necessary. http://www.food-aal.eu/ Implication for TC100: smart home technologies

#	Project	Description
12	**GOLDUI**	A key concept to GoldUI is the development and maintenance of a cloud-based secure user profile, which is intended to be maintained by a trusted relative or carer. The profile indicates the user’s language, eyesight, hearing, mobility and memory capabilities and communication preferences as well as account information for key services via a series of plugins. The key technological innovations that we want to introduce to enable GoldUI project are related to 1) Representation of multimedia content description, 2) Personalization and contextualization of information, 3) Interactive search and agent interfaces able to mitigate complex tasks, bring expertise to the user, and provide more natural interaction; and 4) Human-Computer Interfaces. All these technologies will be employed in an integrating way; this means that, different prototypes will be available along all the phases of the project that will incrementally include the different features and technologies according to the end-users specifications and feedback. http://www.goldui.eu Implication for TC100: smart home technologies
13	**HOST**	The partners of the project will develop a digital infrastructure of the social housing and a gateway to their services. Within the project, the proposed idea is (i) to raise awareness of independent control among older consumers in selecting their own appropriate responses to requirements for a self-serve solution system; (ii) to improve the life of the elderly living in the current social house park, by developing the digital infrastructure of the social housing and giving a better access to their services; (iii) to provide the elderly in social housing with a large panel of ICT services and ease communication with and between their service providers and the “circle of support” composed of the family and local services, both public and private Aim of solution is to provide easy-to-use technologies and services in social housing flats to allow a better quality of communication and a better access to package services from the elders; by experimenting a European model of “connected flats” for elder people, characterised by specific equipments enabling easier relations with, family, service providers and housing operators, through enriched supports (images, text, voice, documents) the host project should: • Bring more comfort of living to the elders • Reinforce social inclusion (with friends, family, administrations, social operators…) • Allow a longer stay in their house Implication for TC100: smart home technologies

#	Project	Description
14	**INCLUSION SOCIETY**	InclusionSociety provides a preventive health solution for senior citizens at home & in institutions by providing a management portal with an overview of Service Users condition and data collected by medical & “smart home” sensors. The care manager on duty can focus on preventive health principals through knowing where to act. The solution consists of: The homePad – a user friendly intuitive touch screen tablet; The friends & family portal – facilitating easy communication & remote care between Service Users & their families; And the nursePad – designed with high usability & EMR function for nurses visiting senior citizens at home or in institutions. The Care Management System is for Service Providers or Municipal Health Services & gives the central care office an up-dated overview of those at home through an alerts system as well alarm warnings in emergency situations. Objectives: Inclusion Society is a connected service system which will support organisations delivering an improved community care service. The aim is to help people adapt their lifestyle, improve their health, and feel connected. InS aims to encourage a change in behaviour by applying motivational techniques and thinking. The client uses a tablet PC & records health data via smart sensors. Social interaction with family, friends & care provider is supported by a network of cloud ‘portals’. InS will provide preventive health care for senior citizens at home and institutions, improving their security and quality of life. Expected results and impact: InclusionSociety development will deliver 4 modules, where at an early stage homePad and the friends & family portal can be installed. The system will grow with their demands to cover the demands of care by bridging the homePad to Care Management System at the Service Provider’s center. Further, when there will be a demand for medical support, the nursePad will be linked to follow up in home or in institutions for senior citizens. InclusionSociety will meet the goals to give senior citizens an opportunity to stay longer at home with a higher quality life as well as improving utilization of the municipality facilities http://www.inclusionSociety.com Implication for TC100: smart home technologies
15	**LILY**	Lily project focuses on wellbeing services for self-serve supporting environment according to third age people needs from the viewpoint of ICT and taking account the whole human life-cycle. The basic target group is 55+ aged people and the other target groups considered are health and social care giving personnel, local authorities, family members, relatives and friends, service providers, content suppliers, retailers and merchandisers. Lily solutions will be developed using industry-adopted and emerging technologies such as web 3.0 standards, including web services and semantic technologies, video technologies, touch-screens and a variety of end-user devices and interfaces. Co-operational models will be bases for creating value network’s business models. Lily solutions will be developed on a base on three existing systems and piloted in two real living environments. For the new user interfaces the project will pilot sensory environments using printed electronics. Objectives: LILY is focusing on the improvement of the quality of life, autonomy, participation in social life, skills and employability through a transportable adapted home environment for a self serve of daily living activities. LILY aims at putting the technology at the service of three dimensions of users: the single individual older persons, persons in direct contact with their professional care and social workers as well as family members, together with the institutions and private organizations paying and enabling services that are public sector, social security or insurance companies. Implication for TC100: smart home Technologies

#	Project	Description
16	**SOCIALIZE**	The project SOCIALIZE develops itself in three technologic macro areas to implement: 1. a service-oriented software architecture to supply network services with cloud computing modalities, 2. a set of user interfaces and access devices (with a particular focus on mobile devices) to optimize the experience of using the services that are available in the network for first level end-users (elderly people) 3. a set of software tools to implement services. The tools will be available to social organizations, which will enable them to implement and provide their services through the SOCIALIZE platform. The SOCIALIZE platform will offer information and entertainment content geared to the needs and interests of elderly people, content which will be provided in a barrier-free and user friendly way tailored to this age group and across the different SOCIALIZE devices. Objectives: The SOCIALIZE project will develop a hardware/software platform able to put in close contact the elder users with the community where they live, promote elderly social interaction and proactive involvement in the democratic development of their own community through the use of new technology implemented in the elderly day by day contest. SOCIALIZE technology will be accessible by different channel and in different geographical locations. Furthermore the SOCIALIZE mobile user interface will offer to the users to benefit of a subset of system functions through mobile devise. Expected results and impact: The key principle of SOCIALIZE is to create a complete technological solution which fulfils effectively the general objectives of simplify the modalities with which elderly people have access to dedicated services provided from different devices (in particular mobile devices), with particular focus on the age group from 55 to 80 with a basic or already consolidated knowledge of Information Technologies and use of electronic devices, already accessing internet services and knowing at least basic computer fundamental because of their working experience or everyday job, living in a technology-served environment irisconsortium.eu Implication for TC100: smart home technologies, smart TV?

#	Project	Description
17	**VASSIST**	The goal of vAssist is to provide specific voice controlled Home Care and Communication Services for older persons. The consortium considers user, technical and economic constraints in a sound methodological setup. A User Centred Market Oriented Design process (UCMOD) involves end users in all phases of the development process considering market aspects from the initial project phase. This procedure assures that the iteratively developed service and business model(s) are adapted to the requirements and needs of older persons showing a high market potential within the next 2-3 years. In the requirement phase focus groups in three different countries (AT, FR, IT) will involve seniors, family members and health professionals. Further, iterative lab and field trials will focus on the evaluation of the developed solution together with all actors focusing on usability, accessibility, user experience and acceptance of the vAssist system. Objectives: vAssist aims at providing specific voice controlled Home Care and Communication Services for two target groups of older persons: Seniors suffering from chronic diseases and/or suffering from (fine) motor skill impairments. The main goal is the development of simplified and adapted interface variants for tele-medical and communication applications using multilingual natural voice interaction. vAssist aims to enhance the perceived quality of Home Care and Communication services and to reduce costs supporting existing hardware and interfaces in the home of older persons (TV, Smart Phone, PC). Expected results and impact: The result of vAssist are multilingual natural voice interfaces for a specific set of communication and tele-medicine services along with specific hard and software developments to provide these services in the older users’ home. In this way vAssist will provide an alternative and easy access to existing communication and tele-medical solutions for senior persons. vAssist will reduce costs related to the service delivery by using existing on-site hardware and infrastructure such as TV, Smart Phone and PC. http://vassist.cure.at Implication for TC100: smart home technologies
18	**ALICE**	Assistive device Alice will consist of smartphone wirelessly connected to local or in perspective remote processing unit. Apart from the camera, Alice will utilise sensors for position detection, orientation, movement and distance from obstacles. The position and distance mapping will be cross-referenced and processed in combination with the visual information, avoiding ambiguities in the semantics. Alice will use artificial intelligence to plan and anticipate based on fusion of sensory inputs and previous knowledge. The system will verbalize its perceptions trough intuitive audio system and synthesised voice to translate visual to verbal in comprehensive and user friendly manner. The user will be able to communicate with the system through a voice interface. Principal end users are elderly blind who will be involved in each iteration of ALICE development by providing suggestions and guiding the change of requirements according to their experiences. Other users of the system are relatives and carers who will set-up and share routs for navigation leading to the development of a respective community. Implication for TC100: audio system, voice interfaces

#	Project	Description
19	**AALuis**	The user interface (UI) is an important feature of interaction between the human and the machine (services). Thus the main focus of the project lies on the development of innovative UIs and a layer for the easy and standardized integration of new and existing UIs. The aim is to build these interfaces and the connection layer on open and already existing middleware platforms. The improvement of the user interfaces and thus of devices and solutions for older people based on design for-all principles shall improve older people’s access to, acceptance of and use of ICT-based services. End-users’ needs and abilities in their (daily) life are explored by two user organizations from the very beginning of the project following ethical and user involvement guidelines. In addition needs of technical stakeholders, such as developers and services providers, when creating AAL Systems will be taken into account.
20	**AALIANCE 2**	The AALIANCE2 project, funded by the European Commission's ICT Programme within the European Framework Programme, will continue and built upon the successful work and the wide network already established in the AALIANCE Innovation platform (2008-2010). Subject of the Coordination Action will be Ambient Assisted Living (AAL) solutions based on advanced ICT technologies for ageing and wellbeing of older persons in Europe. AALIANCE2 seeks to: 1.Transform the existing AALIANCE Community in a long-term sustainable network: ◦create the central entity for all AAL-related issues and stakeholder in Europe ◦to form an European Technology Platform focusing not solely on technology but on integrated solutions for a societal challenge ◦to provide a central node for global interaction 2.Find solutions for major challenges in AAL which consist of: ◦coordinating the various activities of European industry and research institutions in the field of Ambient Assisted Living by building consenus upon research priorities in a AAL Roadmap and Strategic Research Agenda for the upcoming decades ◦standardisation requirements in the field of ICT and Wellbeing (incl. care and healthcare standards) ◦providing recommendations for a overcoming market barriers and effective regulations in AAL markets ◦investigating the the current state-of-the-art and market developments in AAL in North America and Asia
21	**GiraFFPlus Project**	GiraffPlus is a complex system which can monitor activities in the home using a network of sensors, both in and around the home as well as on the body. The sensors can measure e.g. blood pressure or detect e.g. whether somebody falls down. Different services, depending on the individual’s needs, can be pre-selected and tailored to the requirements of both the older adults and health care professionals. At the heart of the system is a unique telepresence robot, Giraff, which lends its name to the project. The robot uses a Skype-like interface to allow e.g. relatives or caregivers to virtually visit an elderly person in the home. Special emphasis in the project is given to evaluations and input from the users so that the system can have an empathetic user interaction and address the actual needs and capabilities of the users. The Giraff+ system will be installed and evaluated in at least 15 homes of elderly people distributed in Sweden, Italy and Spain. These evaluations will drive the development of the system.

#	Project	Description
22	**Relaxed Care**	RelaxedCare: follows the user-inspired innovation process in combination with ISO 9241 and basis its technological developments on existing AAL middleware platforms that will be adopted and extended. A focus is put on the mathematical models and algorithms for the multi-level behaviour pattern recognition approach including a social activity layer and the development of pervasive user interfaces that are nicely designed and fun to use. To create a working system, reliability and acceptance are crucial. Therefore two end user organisations as well as experienced designers and usability experts will include informal caregivers and assisted persons throughout the project in the development process. Basing RelaxedCare on working AAL infrastructure (middleware, components) from research institutions and extending it with innovative products from business orientated companies will put the focus on a solution with high potential to reach the AAL market designed by and with end users, for end-users.
23	**SocialRobots**	The goal of the Social Robots Project is to overcome the human-robot social barrier. Towards this end, we are in the process of developing a robot which bears a personality, and which can behave according to social conventions. The idea is that communication and interaction with robots should be easy and enjoyable, both for unfamiliar users and trained professionals. We want robots to behave more like people, so that people do not have to behave like robots when they interact with them. With the continuing computerization of the workspace and home, many people are looking towards the ease of interaction between humans and computers. However, we believe that making the process easy is not enough; it should also be enjoyable.
24	**Monarch**	The MOnarCH project focus is on social robotics using networked heterogeneous robots and sensors to interact with children, staff, and visitors, engaging in edutainment activities in the pediatric infirmary at the Portuguese Oncology Institute at Lisbon (IPOL), Portugal. Besides being a realistic scenario, the ethical regulations enforced by IPOL for the pediatric ward introduce important constraints on the use of some technologies, representing a challenging research opportunity. Moreover, it is an environment where socially admissible interactions can be well framed and implemented within current state of the art technologies.
25	**Citard Services**	The Social Robot project aims to provide an answer to the demographic change challenge, through knowledge transfer and the creation of strategic synergies between the project's participating academia and industry regarding the development of an integrated Social Robotics system (SocialRobot) for "Ageing Well". The work focuses on bringing together the Robotic and Computer Science fields by integrating state of the art Robotic and Virtual Social Care Communities technologies and services to provide solutions to key issues of relevance for improved independent living and quality of life of elderly people and efficiency of care.

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