



IEC/TC OR SC:	SECRETARIAT:	DATE:
<b>SyC AAL</b>	<b>Central Office</b>	<b>2017-09-21</b>

Please ensure this form is annexed to the Report to the Standardization Management Board if it has been prepared during a meeting, or sent to the Central Office promptly after its contents have been agreed by the committee.

### A. SyC AAL – ACTIVE ASSISTED LIVING

#### A.1 Introduction

The IEC has a leading role in the development of standards for use by all persons. SyC AAL has been established to address concepts, products, services and systems combining technologies and social environment with the aim of improving the quality of people's (AAL users) lives. The AAL user is any person (of any age) who uses or benefits from, or uses and benefits from, Active Assisted Living (AAL) products, services and systems. The multiplicity of AAL technologies that the industry is developing, the large number of standards on the market today and the currently fragmented standardization landscape are challenges for the IEC in developing international and interoperable standards from which the AAL user can benefit. Therefore, the IEC has created the Systems Committee AAL which is tasked to develop systems standards taking into account the following: products, services and systems, safety, security and privacy.

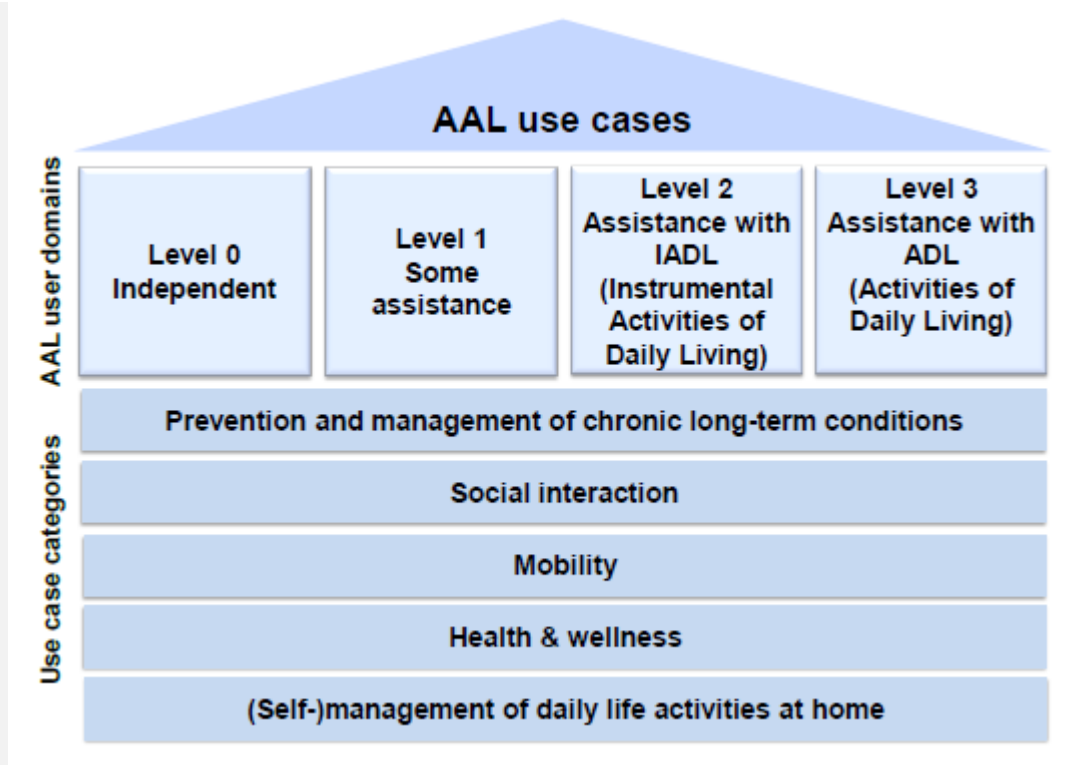
#### A.2 Vision

Foster standardization of Active Assisted Living (AAL) products, services and systems to enhance the quality of life and to enable independent living for ALL users of all ages.

#### A.3 Scope

- Create an understanding of Active Assisted Living (AAL) that takes account of evolution of technology and the market in order to benefit all AAL users.
- Foster AAL standardization by
  - enabling usability and accessibility of AAL products, services and systems
  - enabling cross-vendor interoperability of AAL products, services and systems
  - addressing systems level aspects such as safety, security and privacy
- Communicate the work of the SyC AAL and collaborate to foster a strong community of stakeholders

At the core of the SyC AAL work is the concept that AAL can be described by four levels of assistance and five use case categories.



AAL user domains, levels of assistance:

**Level 0 – Independent:** able to live independently with minimal assistance

**Level 1 – Some assistance:** able to live independently but some assistance is needed occasionally (not on a permanent basis)

**Level 2 – Assistance with IADL:** permanent assistance is needed with Instrumental Activities of Daily Living, which include, for example, the use of transportation, answering the telephone, shopping, cooking, housekeeping, cleaning, medication management, monetary management, etc. (IADL is defined in PD ISO IWA 18:2016, *Framework for integrated community-based life-long health and care services in aged societies*)

**Level 3 – Assistance with ADL:** permanent assistance is needed with Activities of Daily Living, which include the most basic human activities such as walking and moving around, going up a few steps of stairs, bathing, eating, clothing, continence, grooming, etc. (ADL is defined in PD ISO IWA 18:2016, *Framework for integrated community-based life-long health and care services in aged societies*)

Use case categories:

**1. Prevention and management of chronic long-term conditions**

- Prevention, early detection and efficient management of chronic long-term conditions
- Provision of AAL solutions for persons with identified risk factors or chronic conditions or both

- Improvement of medical prescriptions and adherence to treatment by provision of accurate information to the healthcare professional
  - Enable the wellbeing of people with chronic conditions and their communities (family, AAL caregivers, neighbourhood, AAL service providers, care system, etc.)
2. **Social interaction**
    - Enabling of people of all ages to be active and socially connected in the society, from both a societal and personal perspective, effectively contributing to their health, overall quality of life and to social inclusion
    - Including all systems for social connection and networking as well as the possibility for knowledge transfer
  3. **Mobility**
    - Enabling of people`s mobility in terms of moving in the home environment and domestic environment
    - Orientation and navigation
    - Transportation and travel activities
    - Encompasses all systems which are useful for mobility, e.g. mobility aid, safety and security on the move, transport, and information on meteorological conditions
  4. **Health & wellness**
    - Effective management of health and wellness
    - Prevention of functional decline and frailty
    - Including all technical support, for example for fall detection and prevention, ambient sensors or actuators, alarm systems and location tracking
    - Supporting sustainable care models
  5. **(Self-)management of daily life activities at home**
    - Enabling assisted living and helping persons to continue managing their daily activities in their home
    - Living independently for longer, with as little (professional) help as possible and with the choice and control over decisions, equipment and assistance affecting them
    - Living actively in the sense of remaining in charge of their own lives and participating in society the way they want. Including all techniques and systems which help and support the AAL user during his/her daily life (like managing an AAL system, a calendar or reminder or other support system).
    - Supporting of AAL care assistants

## AAL user domains mapping to levels of need

AAL user domain				
	Level 0 Independent	Level 1 Some assistance	Level 2 Assistance with IADLs	Level 3 Assistance with ADLs
<b>The AAL system runs</b>	to assist the independent AAL user	under the supervision of the AAL user	automatically but requires responses from the AAL user	automatically without supervision of the AAL user
<b>Assistance scope</b>	Independent	Social or emergency	Social and/or health	Social and health
<b>Health management</b>	Self monitoring	Some external monitoring may be needed	IADL monitoring needed	ADL management needed
<b>Activity assistance</b>	Independent	Only for extra daily activities	Needed for instrumental activities of daily living	Needed for activities of daily living or medical support
<b>Social life assistance</b>	Independent	Only for extra daily activities	Needed for daily activities	Needed for daily activities

NOTE: Emergency events and needs for medical assistance can occur at all levels, and can be notified either automatically, or by the AAL user.

## **B. MANAGEMENT STRUCTURE OF SyC AAL**

### **CAG**

The Chair's Advisory Group (CAG) is responsible for Coordination and Strategy of the SyC AAL work. The group has an advisory function and can submit recommendations to the Chair, (Co-)Convenors of the working groups and their experts on short-term, implementation and tactical management issues, as well as actions on long-term strategic plans. It is an incubator for new projects.

Under the heading "Coordination" the CAG is responsible in particular for organizing and coordinating the work of the SyC AAL, and focuses on the following topics:

- Structure of the SyC AAL and the establishment of new WGs and new projects
- Development of the work programme
- Coordination, monitoring and reporting of projects of the SyC AAL
- Allocation of all new work items of the SyC AAL
- Coordination of the AAL terminology
- Maintain the inventory of existing standards and standardization projects in progress
- Maintain membership participation
- Coordination with IEC TCs, external SDOs and stakeholders
- Liaise with the following relevant organisations:
  - Fora and consortia and SDOs such as the Continua Health Alliance and Personal Connected Health Alliance (PCHA)
  - Relevant ISO, IEC and ITU technical bodies
  - Key regional and national research initiatives in AAL
  - Key regional and national regulators
  - Relevant end user associations

Under the heading "Strategy" the CAG develops the vision and long-term strategy of the SyC AAL by taking into account the evolution of technology and the market, and user needs. It ensures a close connection of industry and the SyC AAL to strengthen the market relevance of AAL standardization. It focuses on the following topics

- Create a vision of AAL that takes account of the evolution of technology and the market
- Develop and maintain the SBP
- Develop and maintain a long-term SyC AAL roadmap
- Identify and oversee current and emerging commercial and market needs
- Incubate new projects
- Organize the outreach of the SyC AAL, such as participation in workshops, conferences, etc.

### **WG 1: User Focus**

The Working Group User Focus covers all user-related issues of AAL products, services and systems. The objectives of the WG User Focus are the following:

- To define use cases that take into account the needs of the AAL user including AAL beneficiaries and organizations relevant to the SyC AAL
- To develop user requirements based on these use cases
- To create risk management and contingency planning from these use cases
- To recommend products, services, systems and technologies needed for future standardization related to AAL

The WG gives discussion priority in the order of the above. The WG defines the use cases that are relevant for the SyC AAL and develops user requirements for each use case. As part of the user requirements, the aspects of safety, functionality, security and privacy should be addressed. The WG develops a possible deliverable that recommends new areas of standardization for the SyC AAL.

## **WG 2: Architecture and Interoperability**

Missing interoperability is known as one of the obstacles hindering the market entrance of AAL. But what level of interoperability is needed? The objective of this Working Group is to come up with a definition for an AAL reference architecture based on the user needs, which allows interoperability at different levels by taking into account security and privacy issues.

The WG will focus on the following tasks:

- Definition of reference terminology, ensuring its harmonization with that of other IEC TCs and SDOs
- Interoperability between domains that impact AAL functionality: home networking systems (one domain) and systems used for tele-support of and AAL service providers (second domain)
- Definition of systems and their topology based on the AAL use cases and stakeholders
- Definition of interoperability framework for products, services and systems of AAL systems using existing standards
- Study feasibility of existing AAL reference architectures
- Describe different architectural layers and how they interact with each other
- Describe interaction of all devices and systems with AAL services in the "cloud"
- Address security and privacy issues for AAL devices and services in the to be defined architecture
- Liaise with open platform providers and enable interoperability in the AAL environment

## **WG 3: Quality and Conformity Assessment**

The Quality and Conformity Assessment Working Group covers all quality, conformance and interoperability related issues of AAL extending into AAL products, services and systems. The objectives of the Quality and Conformity Assessment WG are as follows:

- To develop quality and conformity criteria based on the use cases and requirements developed by the other SyC AAL WGs
- To ensure that the standards developed allow quality and conformity assessment for both sides of the AAL architecture; the device and the services. This extends also to safety, privacy and security
- To help ensure that cost barriers and time to market barriers remain low

The WG will examine and ensure that products, services and systems can ultimately be tested and potentially certified which will at least meet the necessary levels of safety, reliability and performance in compliance with the relevant IEC International Standards.

## **WG 4: Regulatory Affairs**

Active Assisted Living (AAL) has a strong regional dimension. The objective of the WG on Regulatory Affairs is to develop an

- Overview of AAL initiatives on national and regional level with details on research & development (R&D) projects and trials
- Overview of regulatory requirements on national and regional level with details on AAL policies including social codes, laws on privacy, data protection and security
- Overview of the relevant AAL organizations on national and regional level such as elderly and disability organizations

Therefore, the WG has conducted a survey with the national committees and is developing a document which also provides recommendations for areas of standardization especially with respect to privacy, data protection and security.

## **WG 5: AAL in the connected home environment**

The WG covers horizontal integration and interoperability aspects relating to AAL concepts, products, AAL services, and systems in the connected home environment and the role of the actors (e.g. AAL user and other defined actors) involved.

NOTE: Care homes, retirement homes and other facilities with nursing services are outside the scope of this WG.

The objectives of the WG are as follows:

- Identify standardization needs and new areas of standardization specific to the use of AAL systems, devices, AAL services and technologies in the connected home environment.
- Identify requirements for the integration of assistive systems in connected homes (both new and existing homes).
- On the basis of the AAL use cases, determine and describe the components of assistive systems from planning to operation by ensuring the horizontal integration of key aspects of an AAL connected home environment, including network aspects, architectural (building) requirements and supporting AAL services to use and operate the AAL system.
- Identify inherent and functional safety requirements for AAL systems considering the use of attended and unattended devices, AAL services and technologies in the connected home.
- Define AAL-related risk and criticality requirements for AAL systems.
- Identify requirements relating to lifetime, safety, functionality, security and privacy.
- Develop international standards/deliverables which cover the above-mentioned objectives.

### **Terminology**

All Working Groups contribute to the development of terms and definitions and their harmonization within the SyC AAL groups and with other IEC committees and relevant organizations. The activity is coordinated by PT 60050-871.

### **C. BUSINESS ENVIRONMENT**

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.

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 as well as active and independent living. The highly heterogeneous group of people using AAL systems, together with the fact that AAL systems provide assistance for activities in diverse areas of daily living, results in a large number of functional and non-functional user requirements that have to be taken into consideration right from the start.

With respect to legal requirements, personal data protection laws and medical devices acts have a direct impact on AAL systems. These legal requirements differ from country to country, and from region to region worldwide.

The privacy and security concerns of AAL users need to be addressed otherwise they are an impediment to the adoption of AAL systems.

**D. MARKET DEMAND**

Customers for AAL systems and services come from all sectors of society and from all age groups. In the world of AAL, the focus is on the individual.

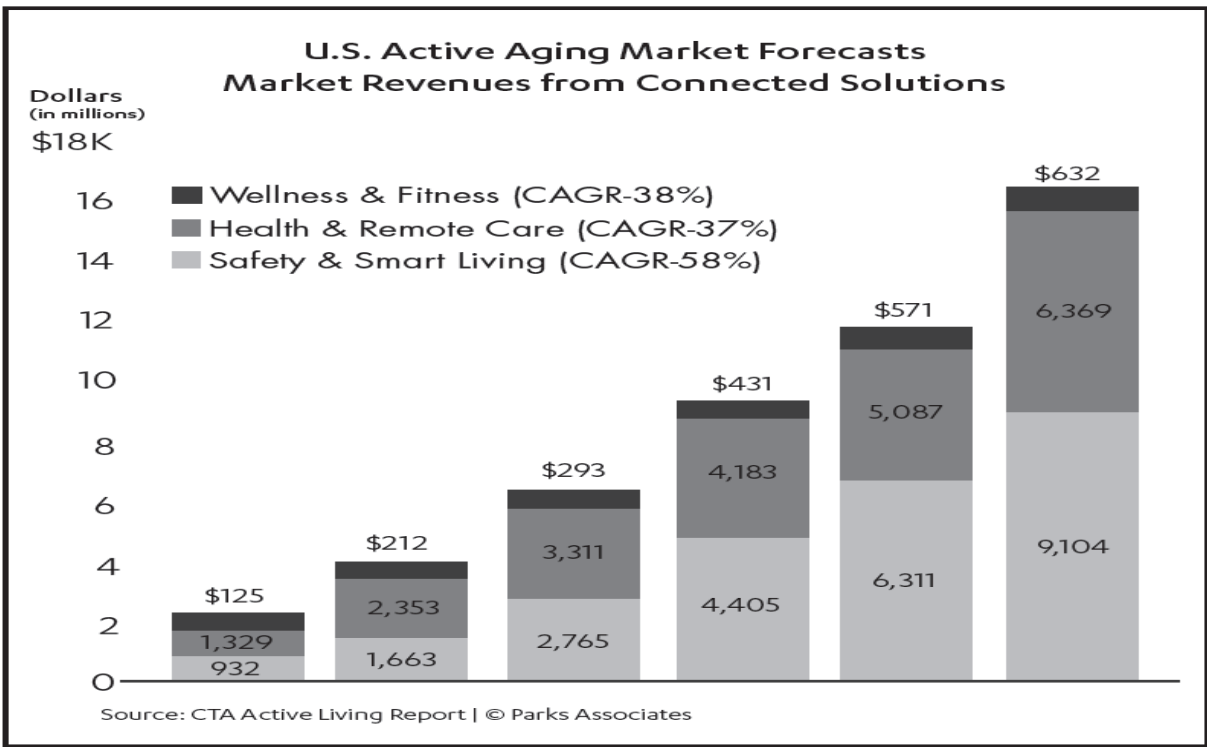
There are no longer clear boundaries between needs relating to wellness and health, nor between the needs of the younger and those of the older populations. The following figure shows some products, applications and services relating to wellness and health.

NOTE: The figures in section D are derived from external sources, and therefore the terminology used is not identical with the SyC AAL terminology as defined in IEC 60050-871.

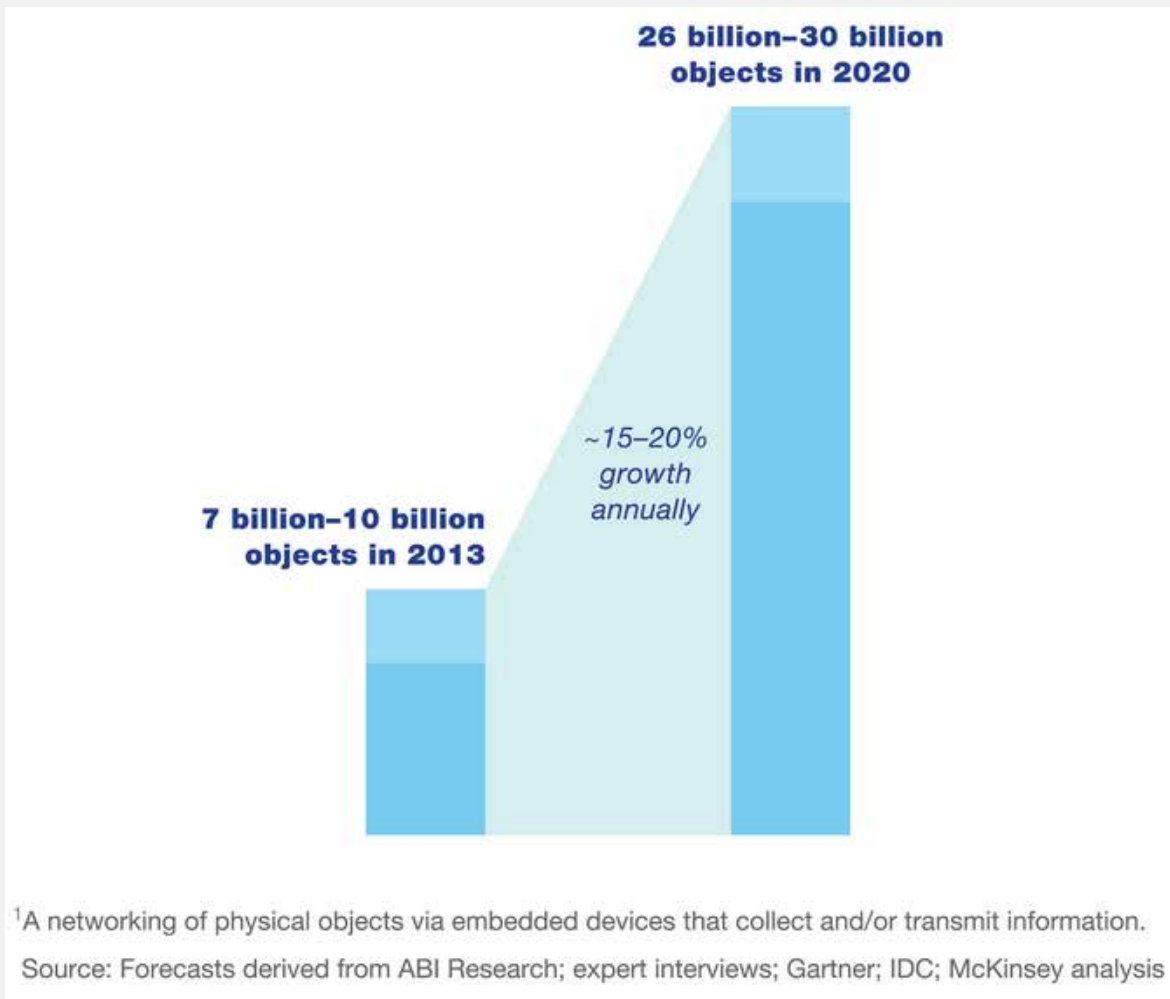
DIVISIONS OF HEALTH AND WELLNESS		
		Products, applications and services that...
<b>Safety and Smart Living</b>	Safety monitoring	Prevent seniors from home hazards and getting lost
	Emergency response	Alert family and service providers when emergency occurs
	Smart living	Improve living comfort through smart sensors & home controls
	Home living support	Address home chores and inconvenience with ease
<b>Health and Remote Care</b>	Personal health devices	Track health vital signs and manage conditions on their own
	Remote diagnosis & monitoring	Diagnose/manage patient conditions virtually by care workers
	Virtual consultation	Connect with an online doctor for non-acute health issues
<b>Wellness and Fitness</b>	Fitness tracking devices	Track/measure fitness progress against goals
	Diet/weight loss tools	Track/measure diet and weight for self improvement
	Wellness monitoring devices & apps	Address other wellness needs such as brain health, stress, etc.

Source: CTA, Parks Associates, *Active Aging Study*

The increasingly mobile lifestyle of the world's population extends user requirements (and thus the needs relating to provision of services, regulations, personal data privacy, etc.) beyond country and regional borders. The user requirements for integrability, interoperability and composability are high. US market forecasts predict a significant growth in the active aging market, as described in the figure below.



The number of connected devices will continue to increase sharply in the coming years.



[SOURCE: <http://www.mckinsey.com/industries/high-tech/our-insights/the-internet-of-things-sizing-up-the->



#### **E. TRENDS IN TECHNOLOGY AND IN THE MARKET**

AAL focuses on the AAL user (who can be a person of any age, and who can have a temporary or permanent disability or impairment). The objective is that AAL users should, to the greatest extent possible,

- live a meaningful, active and independent life,
- be fit and in good health and
- be socially connected.

The SyC AAL will focus on the development of standards that make products, services and systems reliable and trusted solutions that are able to function across all parts of the AAL user's life (e.g. in the home, in the domestic environment, at work, etc.). The key issue is the combination of services and tools, and thus integrability, interoperability and composability of AAL systems or components needs to be assured. As such AAL systems and services develop, everyone can enjoy the benefit of a personalized sub-set of AAL services for his/her particular needs and preference: young single person, family with young children, middle-aged person, older person living independently at home.

Within the context of this broad objective, a current major driving force for AAL standardization work is the emerging trend of the ageing population around the world. Many countries are projected to become “super-aged societies” with 15,5 % of the population being 65 years and older in 2050. Because populations are ageing and older people have a higher risk of disability, the number of people with disabilities is also growing (source: [http://apps.who.int/iris/bitstream/10665/70670/1/WHO\\_NMH\\_VIP\\_11.01\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/70670/1/WHO_NMH_VIP_11.01_eng.pdf), p. 6). These trends are increasingly challenging the current social and healthcare infrastructures. In the case where an AAL user is an older person or a person with a temporary or permanent disability or impairment, the support needs to extend also to all AAL care assistants (e.g. the user's family and AAL caregivers).

The issues involved cut across many fields of technology, and this is why the systems approach is being used to address them. Standardization is a key enabler to ensure the safety and cost effectiveness of AAL products and services. The ICT industry can contribute to improving the quality of people's lives through the provision of high technology products and services. Furthermore, the possibility to contribute to human health and fitness through remote health and activity monitoring and managing of illness (enabled through smart wearable devices and the “digitization” of housing, cities and vehicles) is providing compelling AAL business propositions.

SyC AAL will closely monitor the following emerging trends:

- accessibility, user needs and user interface technologies
- Internet of Things and of People
- daily life autonomy and health support
- health informatics
- wearable smart devices
- disruptive technologies
- service robotics
- 5th generation Internet
- smart cities, including intelligent (smart) homes and smart office buildings
- safety in the home environment
- security and data privacy
- big data and data analytics.

#### **F. SYSTEM APPROACH ASPECTS (REFERENCE - AC/33/2013)**

As mentioned earlier, the issues involved in AAL cut across many fields of technology, and impact the social, urban and home environments.

Adapting the technologies and environments to the needs of the AAL users is a cross-cutting issue

concerning many Technical Committees (TCs). The traditional TC to TC bilateral liaison is reaching its limits for such cross-cutting subjects, and this is where the collaboration platform offered by a Systems Committee provides a valuable solution for all the TCs involved in AAL.

A Systems Committee operates at the same level as a Technical Committee. It is not there to direct or to compete with any TC. Its main role is to ensure the coordination of the various AAL activities of the TCs. It defers to the TCs the standardization work falling within their scope, and concentrates on systems level standardization.

The SyC AAL is working closely with the following groups.

- IEC Technical Committees: TC 59, TC 61, TC 62, TC 79, TC 100
- IEC Systems Committees: Smart Cities
- ACART, Advisory Committee on Applications of Robotic Technology, including electrotechnology
- ACSEC, Advisory Committee on Information security and data privacy
- SEG 9, Smart Homes/Office Building Systems
- IEC TC 124 Wearable Electronic Devices and Technologies (former SG 10)
- ISO/IEC JTC 1: Information Technology, including the former WG 10 Internet of things (new name as per decision at Lillehammer Nov 2016: JTC 1 Subcommittee SC 41, Internet of Things and related technologies) and SC 35 User interfaces
- ISO/TC 159, Ergonomics
- ISO/TC 173, Assistive products for persons with disability
- ISO/TC 215, Health informatics
- ISO Strategic Advisory Group (SAG) on Ageing societies
- Continua Alliance and Personal Connected Health Alliance (PCHA)
- AALIANCE 2
- ITU-T/JCA-AHF, Joint Coordination Activity on Accessibility and Human Factors

The future operation of the SyC AAL may reveal the need to extend this list further.

In particular, the TC/SC publications will be used for IEC Conformity Assessment Systems (IECEE). WG 3's mission is to support SyC AAL in order to provide standards that will be fit for conformity assessment, in particular the assessment of complete AAL systems.

## **G. CONFORMITY ASSESSMENT**

SyC AAL has not yet published standards. Conformity assessment is a key requirement in order to ensure interoperability of the AAL products, components and services.

Currently the elements in the AAL environment are identified where conformity assessment is needed, where it already exists and possible gaps.

## **H. 3-5 YEAR PROJECTED STRATEGIC OBJECTIVES, ACTIONS, TARGET DATES**

SyC AAL was established in 2015.

Since then it has developed and arrived at a common understanding of the criteria that can be used to define the complex and diverse world of the AAL and thus to create a common basis for the AAL work: e.g. the levels of criticality, the AAL user domains, the categories for describing the AAL use cases, the AAL system components (including both animate and inanimate actors).

In so doing it has drafted an initial set of terms and definitions necessary to assure a common understanding, and has submitted it to IEC/TC 1, Terminology, for integration in the International Electrotechnical Vocabulary (IEV). As the work of the SyC AAL progresses, the harmonization of terminology across the WGs and diverse

aspects of their work and tools (e.g. between the AAL use case template, the architectural model, and the conformity assessment needs) is being assured, and fresh needs are being noted.

SyC AAL is currently finalizing its use case template, and is consolidating and analysing a set of use cases. Issues identified during the analysis will be validated with the various Technical Committees responsible for specific fields of standardization and gaps identified. Future deliverables will include an International Standard defining the particular aspects of the SyC AAL methodology, together with deliverables detailing the validated use cases.

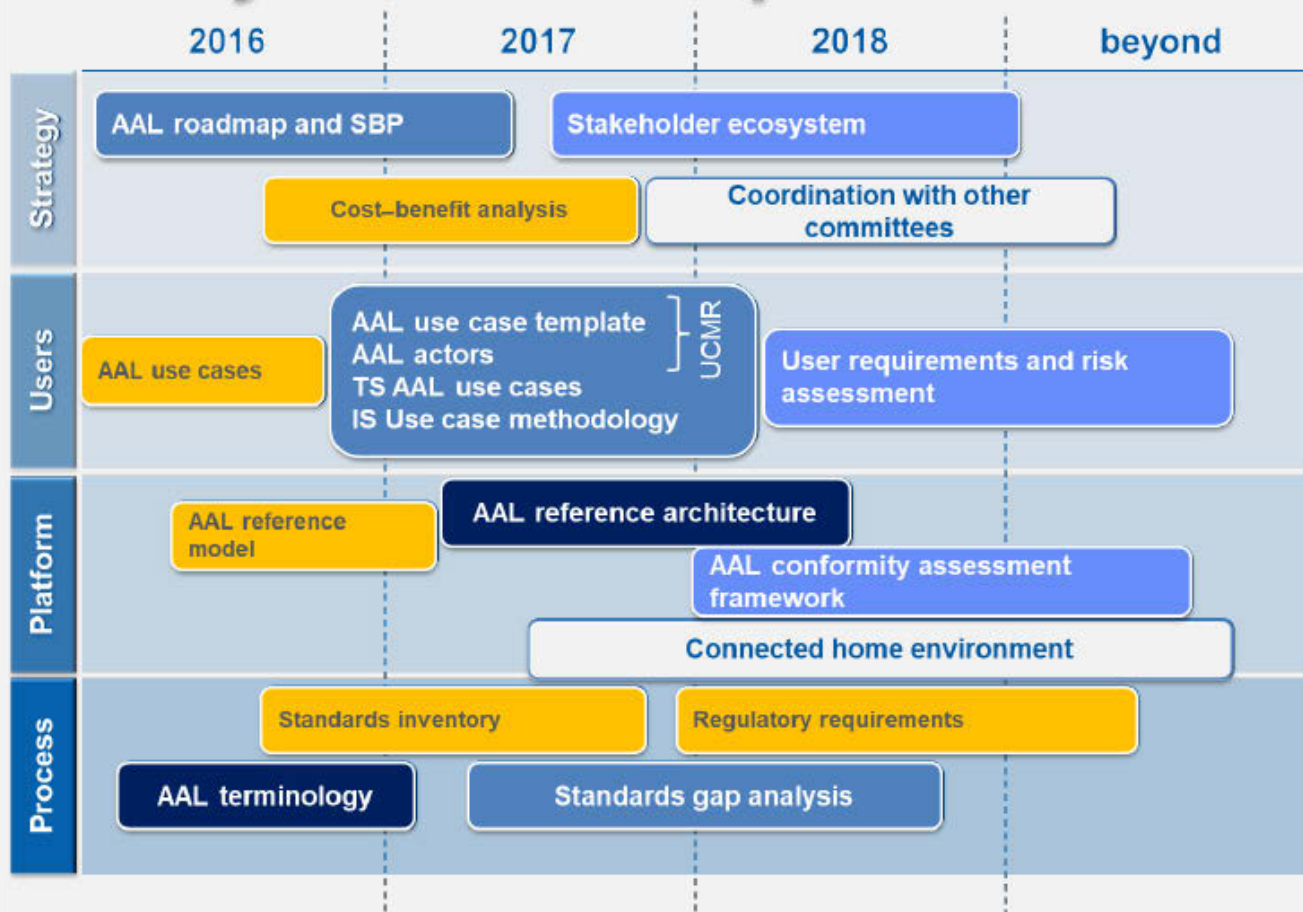
It is also finalizing the AAL architecture model, and fine-tuning it through mapping of the model against the use cases. A high-level description of the AAL reference architecture is being drafted.

A survey of the legal and regulatory documents in certain countries and regions has been carried out. An overview is being developed to provide a common framework for the complex and diverse web of country, regional and international laws, regulations and standards.

An AAL conformity assessment and interoperability framework is under development.

The results of an AAL risk management workshop are being analysed in order to develop an appropriate IEC deliverable.

# SyC AAL roadmap



# Working group deliverables

WG 1	WG 2	WG3	WG 5
<p>TS: AAL use cases</p>	<p>IS: AAL architecture model</p>	<p>IS: Conformity Assessment scheme</p>	<p>IS: Package of standards for Connected Home Environment</p>
<p>IS: AAL use case methodology</p>	<p>IS: AAL reference architecture</p>	<p>IS: Conformity Assessment verification method</p>	

IS: Terminology

Stakeholder ecosystem and liaisons

WG 4 Regulatory matters

Market trends watch, e.g. social robots, travel, smart cities, AI

Outreach and communication

Standards inventory