FINAL

PROJECT REPORT

ALICE - Assistance for Better Mobility and Improved Cognition of Elderly Blind and Visually Impaired

Please send this report ELECTRONICALLY to the Central Management Unit (CMU) as well as a copy to the National Contact Persons (NCPs) of the coordinator and project partners

The coordinator of the project must submit this report within 60 calendar days after the final date of the project, on behalf of the consortium.

If you have any additional question,
please contact the AAL CMU at CMU@aal-europe.eu,
or your NCP (see details on www.aal-europe.eu/aal-ncp)

Report date	30/01/2015

PUBLISHABLE PROJECT INFORMATION (TO BE USED BY AALJP)

1A. PROJECT	
Project full title	Assistance for Better Mobility and Improved Cognition of Elderly Blind and Visually Impaired
Project acronym	ALICE
Project No.	AAL-2011-4-099
Project Website	www.alice-project.eu
Project duration	•Starting date: 01/06/2012 •Termination date: 31/12/2014
Coordinator's name and details	Full name: Mateja Vižintin E-mail address: mateja.vizintin@comland.si Telephone number: +386 1 4380 140 ** **Both** e-mail address **and** tel. number must be provided.*

1B. PROJECT PARTNERS					
No.	**Partner organisation name**	**Partner org. acronym**	**Type***	**Project costs: Public grant in Euro**	**Project costs: Partner own contribution in euro**
1 (coord.)	Comland d.o.o. IT Solutions Development	Comland	SME	253.495,00 €	70.564,00 €
2	Institut Mines-Télécom	IMT	RTD	437.000,00 €	404.340,00 €
3	Alpineon d.o.o.	ALP	SME	70.177,00 €	20.870,00 €
4	Union of the Blind and Partially Sighted of Slovenia	UBPS	END USER	33.327,00 €	3.703,00 €
5	Communication for Blind and Disabled People ltd.	COMBD	END USER	74.952,45 €	0,00 €
6	Granite5 Limited	Granite 5	SME	94.667,18 €	94.667,17 €
7	Information and Image Management Systems, S.A.	I&IMS	SME	111.105,00 €	116.545,00 €
**Please select one of these options: SMEs, Large, END USER, RTD, other*					

1C. PUBLISHABLE PROJECT RESULTS SUMMARY *(1 PAGE)*

In this section, please present the results of your project, including the following information:

- *what is your product/service (result of the AAL JP project work)*

Alice is a navigational assistant with cognitive abilities, integrated in light mobile devices (smart phones, tablets and laptops). The navigational assistant Alice offers blind and visually impaired users a cognitive description based on a fusion of perceptions gathered from a range of sensors, including image/video, GPS, audio and sensors integrated into mobile device. Alice enables the partial reinstatement of the cognitive sight system of the blind and visually impaired by supplying missing information to help them avoid obstacles, navigate and familiarize themselves with their surroundings, navigate to and from a specific point, search for objects or issue a warning about imminent danger.

- *what needs/problems does your product/service respond to*

Alice provides blind and partially sighted people with a device that will make them feel confident to leave their homes. Alice provides a reliable navigational device enabling them to step out into the world whilst receiving comprehension of the environment they are moving through.

- *what are the target groups of users and payers*

The first adopters will be older visually impaired blind people (age 50 – 65) who already have, or are considering, adopting smartphone technology. Our plans for the future are that Alice becomes solely a smartphone application. Because of that Alice will be more affordable and the market will widen to a larger group of end users. Economic growth in EU countries would potentially enable Alice to be listed as a product (co)financed by national health systems - this would further strengthen Alice distribution to a wider socio-economic group of visually impaired people.

- *what is the technological innovation of your product/service (in terms of novelty of concept, approach to the development etc.)*

Alice brings the latest developments in computer vision, speech synthesis and navigation into the hands of the visually impaired. At the same time the emphasis is not only on technology, but also on carefully adjusting technology to the end-user needs and requirements. A novel obstacle detection system that starts by selecting a set of interest points extracted based on an image grid and tracked using the multi-scale Lucas - Kanade algorithm was introduced. It estimates the camera and background motion through a set of homographic transforms. Other types of movements are identified using an agglomerative clustering technique. Obstacles are marked as urgent or normal based on their distance to the subject and the associated motion vector orientation. Next, using the detected obstacles a new real-time obstacle classification methodology is introduced. We incorporate HOG (Histogram of Oriented Gradients) descriptor into the BoVW (Bag of Visual Words) retrieval framework and we demonstrate that this combination is the most relevant, in terms of precision and recall, for obstacle classification. In addition, refined interest point representations have been achieved. They notably make it possible to reduce the computational complexity and exploit low vocabulary sizes without affecting the precision/accuracy of the recognition process. A reliable pedestrian crossing detector was developed by using a bottom-up approach – focusing on user needs. The method gives excellent performance while having low memory consumption. The Proteus TTS engine for Slovenian language uses concatenative approach for a speech synthesis technique. The engine is flexible and allows to pair it with speech corpora of different sizes – compact ones for low memory consumption and extended ones for high-quality speech output. The navigation module provides state-of-the-art navigational assistant for visually impaired, adjusting the level of information to the target group. The module combines GPS and inertial sensors with pre-annotated information that fills the gap between technology and end-users

- *what is the social innovation of your product/service (benefits to society and economic impact)*

Alice will provide blind and visually impaired people with easier orientation, navigation and interaction through their surrounding environment. This will enable them to live more independently. An indirect economic impact could also be achieved as blind and visually impaired people will need to use guides less often.

- *what is the expected time to market and*

We anticipate that it will take 1 to 2 years before we will be able to launch Alice on the market. Our goal is to make a new iteration of Alice, which will function with only a smartphone (without laptop). We believe that the new version of Alice will even decrease time to market.

- *how will you overcome the main possible barriers and exploit opportunities*

Our initial approach to the markets in Slovenia, Spain and the UK will be using different routes to our target group of visually impaired people. This includes sales via end-user charities, mobile network operators and specialist technology suppliers to the visually impaired.

Our goal for the future is to improve the underlying Alice technology so that the software can use the processing power of the new range of smartphones. This will have a major impact on the price of Alice and make the device more financially accessible to blind people as it becomes a software-only package that can be downloaded from Google Play Store or other mobile application markets.

A range of other activities will also help ensure that we exploit opportunities:

1. We will first seek and then meet the regulatory requirements of the Medical Devices Directive 93/42 EEC.
2. Industrial partners will initiate pre-distribution discussions with the potential partners outlined in our B&E Plans within Slovenia, Spain and the UK.
3. A full range of dissemination activities will take place including the use of social media and a continually updated website.

CONFIDENTIAL PART OF THE REPORT

2. DELIVERABLES SUBMITTED AND MILESTONES ACHIEVED DURING THE PROJECT

In this section, please provide details in case your project deviated from the Description of Work *(work plan) with respect to delivery dates, achievement of milestones or changes in planned outputs; please indicate whether and to whom (AAL NFA/NCP) the changes have been communicated.*

We finished the planned outputs as planned with minor deviations. Because we lost one technical partner (I&IMS), all partners had to put in additional effort to finish Alice project as planned. In order to achieve everything as planned we had to reschedule some milestones and tasks. We communicated that to AAL and all NCP's. That was also the main reason that we finished some deliverables and the first prototype later than we had originally planned. However, this did not affect the project as we achieved all planned project results in time.

Has the project been finalised in line with the Description of Work?	YES ☒	NO ☐	PARTLY ☐

IN CASE OF DEVIATION, *PLEASE EXPLAIN:*
Besides minor delays and rescheduling of some tasks there was no major misalignment with the plan proposed in the proposal.

Has the project achieved its expected results as described in the Description of Work?	YES ☒	NO ☐	PARTLY ☐

IN CASE OF DEVIATION, *PLEASE EXPLAIN:*
The project was finalized according to the proposed plan and achieved its goals. The result of the project is a fully operational prototype that is stable, robust and reliable for end-users (blind and visually impaired) to use it. There were minor deviations to the plan and some changes in the selected technology, mostly due to new information that was gathered through involvement of end-users in requirements analysis and throughout the testing phase. These deviations are of little consequence to the end prototype and are listed below::

- In the testing phase there was no testing in the virtual environment. This was due to the realization that testing alone will take considerable effort (because of the characteristics of end-user group) and because we were able to test the prototype in real-life already in the early stages of the development.
- Although basic indoor navigation methods were developed and tested (inertial navigation), the priority of the project was to focus on outdoor navigation in order to improve independence of the end-users. The inertial navigation is used extensively in outdoor scenarios in cases where there is no GPS signal (under passages, etc.).
- Obstacle detection was implemented only with a vision-based method, without sonar as it was envisioned at the beginning of the project. This is mostly because in order to have a shorter time to market, we have limited ourselves to hardware that is embedded in modern smartphones.

3 A. PROJECT RESULTS - SCIENTIFIC/TECHNICAL PROJECT RESULTS

Provide a summary of the confidential results, including:

- The progress per work-package
- The performance of the project consortium (added value of cooperation, added value and performance of each partner etc.)
- Scientific/technical achievements during the course of the project
- End-user services developed during the course of the project
- Other confidential information

- The progress per work-package

WP 1 – The most important outcome of WP1 is the definition of end-user's needs and requirements. Also user involvement plan was set, trial scenarios were designed and high level functional specifications defined. Another important part of this package was the preparation of ethical and privacy guide, which was a guideline for handling personal data. In order to obtain users' needs, a structured questionnaire was prepared. Based on collected results, the most needed functionalities were defined and trial scenarios designed.

In compliance with the Privacy Guide, the personal identity of each participant in the project was strictly protected. Personal data was carefully handled and reliably saved.

WP 2 - Most of the technical development was done through WP2. The work began with the definition of system requirements and a feasibility study. Furthermore we have analyzed sensory components and defined the hardware platform and sensors. During the whole development phase we were adapting our plan and development to insights gathered during development and discussion/testing with users. The main outcome of this work package was a set of perception and navigation modules that provided input to the Alice prototype (the reasoning about the environment). At the end, modules were evaluated and benchmarked according to common use.

WP 3 – One of the most important challenges when developing an application for visually impaired people is finding an efficient way to present valuable information to the user. The question of the appropriate human-machine interface (HMI) was addressed in WP3.

We created a semantic model that enables cognition and mobility of the user. This model combines usage of verbalization and sounds (alerts etc.) for the description of the scene. We use Text to speech service (TTS) to present textual information to the user.

It was also very important to provide multiple-language interface. We developed interfaces for all languages of the consortium partners. Text-to-speech support for all the languages therefore is a necessity. Since there was no TTS for Slovenian language available for Android OS we developed one in the scope of this project.

A lot of work was invested in the design of enactive communication methods and in construction of the principles that help us to avoid sensory overload problems.

WP3 related research and development resulted in the successful completion of all three deliverables: D3.1 - Visual Semantic model, D3.2 - User interaction concept for blind and vision impaired and D3.3 Human-machine interface.

WP 4 - We have successfully designed a modular, scalable platform that enables incorporation of different modules into the final prototype with little effort. All modules were integrated and tested by developers and end-users. The integration process took care of all communication between modules and solving other interoperability issues. The prototype was compared with functional specifications and fully tested by end-users.

WP 5 - A coherent Business & Exploitation Plan (B&EP) has been created that will act as a business framework for the commercial exploitation of Alice over the next 3 years. Individual B&EPs have been created for Slovenia, Spain and the UK using different routes to our market of visually impaired people. This includes sales via end-user charities, mobile network operators and specialist technology suppliers to the visually impaired.

The Alice dissemination efforts can be summarized into the following set of activities:

- Project web site,
- Participation in exhibitions and in particular symposia/events dedicated to end user associations for blind and visually impaired,
- Participation in international scientific/technical meetings and conferences,
- Contacts with industrial associations and industrial alliances,
- Contacts with universities and research centers and co-operation with other European projects,
- Training and education activities addressed to the blind and visually impaired communities,
- Publication and wide distribution of a flyer with the final results of the Alice Project.

WP 6 - The main goal for WP6 was technical coordination (work plan and technical progress); organizational coordination (cooperation with AAL and NCP's, consortium plenary and Skype meetings); administrative coordination (reports: annual,

mid-term review, final review) and financial coordination throughout the duration of the project. WP 6 also included planning and controlling of the project as well as performing quality assurance and risk management.

The Project Management Handbook and Quality Assurance Plan has been prepared in order to provide the overview of the project management structure, the roles and responsibilities, and quality control of all deliverables (documents and software).

- The performance of the project consortium (added value of cooperation, added value and performance of each partner etc.)

There was intense and effective communication between partners. Regular monthly Skype conference calls and regular plenary meetings as well as additional communication through email or phone helped establish a strong cooperation. Although the Spanish partner left the project, all consortium partners were willing to take over unfinished I&IMS tasks to accomplish the goal of the Alice project. Nearing the end of the project, strong cooperation between technical partners and end-user organizations was becoming necessary to achieve the project's goals and finish the project as it was planned. Technical partners finished the prototype while end-user organizations conducted user testing. The communication between all partners was strong and contributed to finishing the project on time and in line with the project plan and planned results.

- Scientific/technical achievements during the course of the project

The obstacle detection system is an integrated solution designed to identify both static and moving objects, in highly dynamic urban scenes. The technique starts by selecting a set of interest points, regularly spread on a frame, based on an image grid. The points are tracked between successive frames. The camera (background) motion is identified using a set of homographic transforms. Other moving objects existent in the scene are detected through an agglomerative clustering process. For the static obstacles a similar process can be applied by taking into account the foreground apparent movement. The object detection system is reinforced with a multi-frame fusion scheme that helps identify moving objects that disappear or are partially occluded for a period of time.

The obstacle/object classification system is an integrated solution designed to improve cognition and assist the navigation of the visually impaired users. The system starts by exacting for each image in the training dataset an adapted version of the HOG (Histogram of Oriented Gradients) descriptor. Next, we propose integrating the *Bag of Visual Words* (*BoVW*) model into a real-time video obstacle classification task. Following, an unsupervised learning step is performed over the entire set of descriptors to determine *k* clusters. The centroid of each cluster represents a visual word, while the codebook gives the vocabulary. After the feature vectors are quantized to clusters, the labeled data is sent to a *supervised learning machine* (SVM). The SVM training completes the *offline process* of the object classification framework. In the *online phase*, for each image patch extracted using the obstacle detection method, we develop a frequency histogram using the A-HOG features. Next, the histogram is matched to its closest word in the vocabulary.

The building recognition module makes it possible to recognize buildings/places of interest from still images acquired with the smartphone camera. An off-line learning stage is required in order to constitute a database of places/buildings related to the considered itinerary. Our approach exploits a small-sized vocabulary-tree of SIFT descriptors. Each SIFT descriptor in our dataset is saved along with its class label, its nearest neighbor from the vocabulary and the visual words corresponding to its spatial neighbors. To evaluate a new query image, we extract SIFT interest points and their descriptors and match it to a sub-list of descriptors that correspond to the same visual word. Then, as a verification step, we evaluate the spatial consistency. Finally, a voting scheme is used to decide which building category this image belongs to.

A module concerning the detection and tracking of user's objects of interest that can be personalized and learnt has also been proposed and demonstrated. Mainly dedicated to indoor environments, the module runs as a standalone application on an Android smartphone. The main achievements obtained notably concern the optimization of the computational aspects, which is made possible by the refinement of the interest point description with the inclusion of spatial and directional information.

The Proteus TTS for Android is the first TTS for Slovenian language for Android OS; the TTS engine is flexible and supports pairing of the engine with speech corpora of different sizes – compact ones for low memory consumption and extended ones for high-quality speech output. The engine-corpus pair used for Alice project is very responsive and fast and uses only 10 MB of memory. The intelligibility of the synthesized speech is suitable for navigation device for blind and visually impaired users.

Navigational module in combination with pre-annotated maps provides users an easy way to navigate in unknown environment. The biggest technological achievement in this aspect was taking care of all situations where pure GPS data fails. This is done by integrating inertial sensors into localization module, by using weighted, spring-based mapping of the location to the map and by exploiting domain knowledge.

Pedestrian crossing module provides users a way to be sure that they are crossing the street at the right location. Connecting pedestrian crossing with navigation boosts performance of both modules. The technical solution behind pedestrian crossing detection needs to take care of different cases of pedestrian crossing – partially covered, poorly visible, etc.

A module for **people recognition** makes state-of-the-art technology for people identification available to the end-users on their smartphones. The technology could be exploited for other business use-cases in the future.

Overall, Alice has seen great technical and scientific development during the project. The developed solutions are stable, robust and aligned with end-user needs.

- End-user services developed during the course of the project

Before we were able to start testing the Alice prototype with end users, we had to teach them how to use smartphones.

3 B. PROJECT RESULTS – BUSINESS MODELS & INDICATORS

*Please insert here a short summary of the **business model** selected for your product/service (max. ½ page). If not explained in the publishable summary section, please describe:*

*What **product/service** will you offer?*

We will be offering a navigational device for blind and partially sighted people, presently called 'Alice,' to enable them to safely move within their homes and in outside environments.

*What main problem(s) does it solve or what **benefits** does it provide to the customer?*

Alice resolves the problem of safely 'reading' environments. Alice achieves cognitive abilities by having a small laptop linked to a smartphone designed to see and feel the environment. Along with a camera Alice is equipped with sensors for position detection, orientation, movement, distance from obstacles, and people recognition. The benefit is that visually impaired people will feel confident to leave their homes and step out into the world where they will be able to interact with it and contribute to their communities.

*What is the **added value** of your product/service versus that of competitors and/or compared to existing solutions on the market? What is your **unique selling proposition**?*

The added value of our product, our USP, is the unique functionality of Alice compared with competitors. Namely, the sensors which provide the visually impaired user navigation on the path, the ability to safely cross pedestrian crossings, to move up most types of stairs and to recognize obstacles and the distance to them.

*How will the product be sold? Who will **provide** products/services?*

Alice will use different business models to sell its services. In Slovenia it is envisaged that mobile network operators will distribute Alice with support and training being provided by end-user organisation Union of the Blind and Partially Sighted of Slovenia. In Spain the end-user organisation 'Once' is the obvious partner for Alice and in the UK a specialist distributor of technology for the visually impaired.

Please answer the questions below, if possible:

What is the **targeted range of manufacturing/service costs** per product/service unit (€, € per month etc.)?	Alice initial sales price will be around €2090 to include software, headphones, backpack, smartphone, laptop and harness. In Slovenia, Spain and the UK the price will be slightly different dependent on the margin of the distributor. Once Alice software can operate solely using the processing power of the smartphone (anticipated in 1 – 2 years) then Alice can be sold as downloadable software

	from Google Play Store at an anticipated cost of €300.
What is the **estimated size of the targeted market** in Europe for your product/service (in €)?	€36m
In your business model, **who will pay** for the product/service (you can tick more than one box): ☒ End user (older person) ☒ Informal carers ☒ Formal care providers ☐ Public subsidies ☒ Insurance ☐Other (add if necessary) ☐ not yet decided	
In your business model, **who will take the decision about purchase** of the product/service (you can tick more than one box): ☒ End user (older person) ☒ Informal carers/family ☒ Formal care providers ☐ Public subsidies ☐ Insurance ☐Other (add if necessary) ☐ not yet decided	
At what **stage of development** are you with your product/service (e.g. research, pilot, real life trial etc.)?	Working prototype
When will your product/service be **ready for market**?	1 – 2 years
What type of **further research/development** is necessary to finalize the product (technical, adoption, market research etc.)?	The product is finished and we can sell it as it is. In the present version of Alice, users have to carry a laptop with them. Our goal is to continue with the development of Alice so that Alice can operate solely using the processing power of the smartphone and the software becomes a downloadable application. Before we achieve this we will need more technical research and development and consequently more interactions with end users.
What **further investments** are necessary to launch product on the market?	To launch Alice on the market we need to invest in marketing and distribution. Our plans for the future are to invest in a new version of the Alice product, which will run solely on a smartphone. To achieve this we need to invest in new technology research, market research and further development of the application
Which is the **expected turnover** to be generated by your product/service in 2-3 years?	We anticipate sales of 319.000,00 € in year 2 and 466.000,00 € in year 3

Please insert here any other information related to the business model, such as:

- *what is the targeted market niche?*

Initial first adopters will be wealthier older visually impaired people aged 50 – 65 who are comfortable with smartphones or willing to learn how to operate one. As we plan for the future that Alice will be a downloadable app the market will widen to include other socio-economic groups and ages, although it will remain predominantly older people.

- *do you need certification for your product/service before gaining access to the market?*

Yes we need certification for Alice.

- *what type of certification and from who?*

Alice needs to be certified as meeting the requirements of the Medical Devices Directive 93/42 EEC. Certification can be provided by any EU country's 'Competent Authority' as defined by the Medical Devices Directive 93/42 EEC. For instance in the UK this is the Medicines and Healthcare products Regulatory Agency.

- *do you need to perform reliability testing?*

Yes, as part of meeting the requirements of the Medical Devices Directive 93/42 EEC and getting certification as detailed above.

- *Any other information*

3 C. PROJECT RESULTS – END USER INDICATORS

In the section below, please provide the information you have gathered during your project on primary, secondary and tertiary end-users[1] of your product/service. Note that secondary end-users can be formal and informal careers (see footnote). For the indicators cited below, please provide information if available; any other qualitative or quantitative information on beneficiaries can be provided instead.

Type of end-user (primary, formal and informal secondary, tertiary end-users)	End-users are people with visual impairments between the ages of 55 and 75; blind and partially sighted of all ages; their family members, friends, experts, care persons, representative organizations; social security systems, insurance companies.
Total number of end-users involved (by type of end-user, gender, etc.)	40 (20 in UK, 20 in SLO); 50% males and a 50% females; 67,5% blind or severe sight loss, 32,5% partially sighted.
Average age and age distribution of involved end-users	Slovenia: average age 60,8; age distribution 30% in 50's, 40% in 60's, 30% in 70's. UK: average age 60; age distribution 35% in 50's, 30% in 60's, 35% in 70's.
Location of end-user (rural, town, large city, etc.)	Location of end-user: big city 60%, large town 5%, small town 13%, village 22%.
Situation of end-users (single household, family setting, independence, etc.)	60% of end-users live in family setting, 40% in single household. 52,5% are white cane users, 15% have a guide dog. 50% end-users use only familiar routes; only 45% of them would navigate independently in unfamiliar environments; 82,5% of them want to know where they are.
Health status (disabilities, mobility, cognitive function, etc.)	40 % of users have some other impairments/health difficulties: spinal injuries, deafness, heart defects and hip replacements, diabetes, high blood pressure, knee replacements, balance and co-ordination problem, RSI with wrists, chronic fatigue syndrome, osteoarthritis and osteoporosis.
Socio-economic background (education, income class, etc.)	Users' level of education: primary school 2,5%, secondary school 27,5%, vocational or similar qualification 22,5%, undergraduate

1 Definition of end-users in AAL Joint Programme:

- *Primary end-user is the person who is actually using an AAL product or service, a single individual, "the well-being person". This group directly benefits from AAL by increased quality of life.*
- *Secondary end-users are persons or organisations directly being in contact with a primary end-user, such as formal and informal care persons, family members, friends, neighbours, care organisations and their representatives. This group benefits from AAL directly when using AAL products and services (at a primary end-user's home or remote) and indirectly when the care needs of primary end-users are reduced.*
- *Tertiary end-users are such institutions and private or public organisations that are not directly in contact with AAL products and services, but who somehow contribute in organizing, paying or enabling them. This group includes the public sector service organizers, social security systems, insurance companies. Common to these is that their benefit from AAL comes from increased efficiency and effectiveness which result in saving expenses or by not having to increase expenses in the mid and long term.*

	degree 22,5%, master degree 17,5%, doctorate or another higher degree 7,5%. Regarding economic background, 32,5% are retired, 20% are working full time, 5% are working part time, 5% are self-employed and 37,5% are retired early due to disability.
Total number of end-users effectively using the AAL solution beyond the project implementation period	40 users were recruited as primary users into the Alice project. Potential users are all people with sight loss – the total number would vary from country to county (depending also whether Alice could be recognized as medical-technical aid). According to the membership of end-user organizations, a few hundred potential users are estimated shortly after project ends.
Any other information	

Please describe here the principles applied and procedures followed in handling ethical issues such as ethics towards technology use, to privacy, data management, ethical considerations regarding human-robot interaction, exit strategy, etc.

Ethical principles have been taken into account from the beginning of the project in the Technical annex and Consortium agreement. Later in the project we described all ethical issues in the deliverable D 1.4 Ethical and privacy guide.
The importance of protecting private date is an important issue in the Alice project. For achieving this purpose, Ethical Guideline and Data Protection Plan has been developed in order to ensure that all consortium partners respect ethical aspects throughout the project and that their activities are guided by four main principles which are: non malfeasance, beneficence, justice and respect of autonomy. Ethical aspects affect not just end users but are also relevant for people and organisations participating in the project and they also apply to every project activity: research, development, testing, evaluation and dissemination. The plan also addressed how data would be kept secure.
Our ethical guide has taken into consideration not just European laws, but also national laws and decrees. An exhaustive analysis has been carried out in order to achieve compliance with the ethical issues in relation to users' privacy, confidentiality, consent and respect of all the participants of the project.

3 D. PROJECT RESULTS – OTHER INDICATORS	
Patents, which are the direct result of the project work	None
Other **Intellectual Property Rights** (IPR) resulting from the project work	The IPR rights between partners have been established from the beginning of the project in the consortium agreement.
Collaboration to **standards**, which are the direct result from the project work	The main standards identified as related to the project are MPEG-7 and WCAG, described in D 5.3.
Publications (scientific or other), which are the direct result from the project work (please provide details)	Results stemming from the project have been published in 8 international conferences, *cf*. dissemination report D 5.4. A journal paper is under submission.
Other **dissemination activities**	Participation in the AAL Forum in 2013 and 2014. Participation in various exhibitions (Futur en Seine, Sight Village). Web site, Flyers, Interview in press.
Type and size of audience reached by dissemination activities	From general public to scientific community, passing through end user communities
Technology transfer agreements and/or any other **business deals** achieved	The principles of technological transfer are established in the Consortium agreement
Spin-off/s set up	None
Number of **jobs** created	For the time of the project there were 5,5 new jobs created: UPBS: 1; IMT: 2; COMBD: 3 part-time jobs; Granite5: 2 part-time jobs

4. FINANCIAL INFORMATION - OTHER COMMENTS

Please check appropriate box:

The financial part of the project ☒ is in line with (or) ☐ deviates from the partner's Grant Agreements & Work Packages plans (personal efforts, other costs, etc.)**?**

In case of deviation, please give a short explanation:

In respect of Comland, IMT; Alpineon, UBPS, COMBD and Granite 5 the financial part of the project is mostly in line with the last Grant Agreements and Annexes (a few hundred € of differences). For the whole project COMBD requested less money than it was planned at the beginning of the project approx. 5.000 € as they spend less effort than planned. At the beginning of the project total project cost was estimated to 1.785.412,80 € and required grant for all partners together was 1.074.723,63 €. At the end of the project partners requested for 1.066.668,68 €, so consortium requested 8.054,95 € less than planned.

Spanish partner I&IMS left the project in April 2014 so additional personal efforts were made by all partners in order to finish all the work that I&IMS was responsible for. Consortium issued another Technical Annex 6.0 in order to distribute I&IMS tasks between partners, reschedule a few milestones and extend the project for 1 month.

Other comments related to financial part of the project:

Slovenian and French partners received money with delays but that didn't jeopardise the work on the project.
Spanish partner I&IMS left the consortium but still received all the money even though they didn't finish all the work.
Other partners had to finish the work I&IMS was responsible for, but they were not able to receive any payment for that.

5. AAL JP PROGRAMME

Please comment, using your AAL project experience, on the main advantages and disadvantages of AALJP projects.

Main advantages:

1. Opportunity to work in a multicultural team to create technology solutions that include the participation of end-users.
2. Widen team participant's skills and knowledge.
3. Learning the configuration of the European market for blindness products.

Main disadvantages:

1. Spanish national funding agency provided funds to Spanish partner ahead of work package completion – no incentive to partner to complete work!
2. UK national funding agency (Technology Strategy Board) whilst helpful and flexible made considerable demands through quarterly monitoring that took up considerable time.