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Project Title:	Decrease of cOgnitive decline, malnutrRtion and sedEntariness by elderly empowerment in lifestyle Management and social Inclusion

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*Dissemination Level:
PU=Public
PP=Restricted to other program participants (including Commission Services)
RE=Restricted to a group specified by the consortium (including Commission Services).
CO=Confidential, only for members of the consortium (including Commission Services).

**Nature of Deliverables:
R=Report
P=Prototype
D=Demonstrator
O=Other

PROJECT PERIODIC REPORT

Grant Agreement number: 611650

Project acronym: DOREMI

Project title: Decrease of cOgnitive decline, malnutrRtion and sedEntariness by elderly empowerment in lifestyle Management and social Inclusion

Funding Scheme: Programme acronym: FP7-ICT, Subprogramme area: ICT-2013.5.1, Collaborative project

Date of latest version of Annex I against which the assessment will be made: July 31st, 2014 (version 05)

Periodic report: **1st ☒ 2nd ☐ 3rd ☐ 4th ☐**

Period covered: **from 01.11.2013 to 31.10.2014**

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DECLARATION BY THE SCIENTIFIC REPRESENTATIVE OF THE PROJECT COORDINATOR

I, as scientific representative of the coordinator of this project and in line with the obligations as stated in Article II.2.3 of the Grant Agreement declare that:

- The attached periodic report represents an accurate description of the work carried out in this project for this reporting period;
- The project (tick as appropriate) [1]:

  X has fully achieved its objectives and technical goals for the period;

  ☐ has achieved most of its objectives and technical goals for the period with relatively minor deviations.

  ☐ has failed to achieve critical objectives and/or is not at all on schedule.

- The public website, if applicable

  X is up to date

  ☐ is not up to date

- To my best knowledge, the financial statements which are being submitted as part of this report are in line with the actual work carried out and are consistent with the report on the resources used for the project (section 3.4) and if applicable with the certificate on financial statement.
- All beneficiaries, in particular non-profit public bodies, secondary and higher education establishments, research organisations and SMEs, have declared to have verified their legal status. Any changes have been reported under section 3.2.3 (Project Management) in accordance with Article II.3.f of the Grant Agreement.

Name of scientific representative of the Coordinator: Prof. Oberdan Parodi

Date: 23/ 12/ 2014

For most of the projects, the signature of this declaration could be done directly via the IT reporting tool through an adapted IT mechanism and in that case, no signed paper form needs to be sent

[1] If either of these boxes below is ticked, the report should reflect these and any remedial actions taken.

List of Beneficiaries

No	Participant organisation name	Short name	Country	Project entry month	Project exit month
1	Consiglio Nazionale Delle Ricerche	CNR	IT	1	36
2	Università di Pisa	UNIPI	IT	1	36
3	TSB Real Time Location Systems SL	MYSPHERA	ES	1	36
4	AIT Austrian Institute of Technology GmbH	AIT	AT	1	36
5	Fundació per a la Universitat Oberta de Catalunya	UOC	ES	1	36
6	The Extracare Charitable Trust	Extra	UK	1	36
7	Imaginary Srl	IMA	IT	1	36
8	De Montfort University	DMU	UK	1	36
9	Age Platform Europe AISBL	AGE	BE	1	36
10	SI4LIFE – Scienza e impresa insieme per migliorare la qualità della vita scrl	SI4LIFE	IT	1	36
11	Accord Housing Association Ltd	Accord	UK	1	36

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1. PUBLISHABLE SUMMARY

1.1 Summary description of project context and objectives

The DOREMI Project context and Scientific and Technological objectives are:

- Development of an unobtrusive monitoring environment keeping track of the daily activities of the elderly people at risk of malnutrition, sedentariness and cognitive decline according to the "active ageing lifestyle protocol"(MS1, M8) established by the specialist.
- Development of a smart environment for context awareness and service orientation (MS6, M33) for the dynamic analysis of elderly behaviour and compliance to the active ageing lifestyle protocol.
- Development of a gamified environment to engage the elderly and stimulate social interaction and physical activity (MS7, M24).
- Prove the concept and validate (MS8, M28 and MS9, M36) the effectiveness and impact of the proposed solution in a pilot study carried out in Italy (SI4LIFE) and UK (Extra and Accord), involving both elderly users and care providers.

1.2 Work performed since the beginning of the project and the main results achieved so far

The work performed in the first year project activities has been strategically directed to the achievement of the first three milestones of the project MS1 (Month 8), MS2 (Month 9) and MS3 (Month 12).
The progress towards the achievement of these milestones passed through a devised and well-coordinated execution of tasks and sub-tasks under the relevant WPs, namely WP2, WP3, WP4 and WP5.
Considering the relevant dependency of the technical development work packages (WP3, WP4 and WP5) with the main scientific model and target user work package (WP2), the scientific and technical coordinators have agreed to follow a WP interaction approach based on an iterative instead of a sequential method. For this purpose the progress of work in WP2, leading to the main objective of the Active Ageing Lifestyle Protocol definition, has been constantly reported to the dependent technical WP leaders and, in parallel, several technological constraints have been taken into consideration by the clinical partners in the selection of the more appropriate set of protocols. The main result of this constructive interaction is the common definition and design agreed by both clinical and technical partners of the Active Ageing Lifestyle Protocol of the DOREMI project. The partners agreed that, in order to avoid mismatch between the requirements and the technological implementation, the design of the DOREMI protocol and the selection of the main items from the various protocols taken from the literature, must take in full consideration the opportunities and constraints offered by the gamification environment and monitoring environment that will have to finally automate the process of monitoring and assessment of the target user daily improvements compared to the level of impairments registered at the baseline. As a result, the following figure 1 represents the synthesis of the major phases followed to reach the main objective.

a) The first phase, discussion and agreements on the main protocols to be selected and studied from the literature in the scientific areas of cognitive (main impairment), nutritional, physical activity, social interaction (from real life and virtual perspective) and useful to provide the main items as well as the evaluation thresholds. All this was reported in the submitted D2.1
b) The second phase, the discussion and agreements on the DOREMI monitoring environment and the parameters, activities, behaviors and actions to be selected as main representative and useful to monitor the progress and improvements of the target subject. As reported in the submitted D2.1 and detailed in the D2.2 as well as the related technological perspective whose results will be fully reported in the first deliverables of the WP3, WP4 and WP5 and whose progress activities are reported in this Interim report.
c) The third phase, the organization and systematization of all the testes and procedures defined in D2.1 and D2.2 and the design of the entire validation process of DOREMI environment. The structural elements are the matching areas between monitoring parameters available by the use of the technology and the items of the protocols needed to provide the evaluation scales.

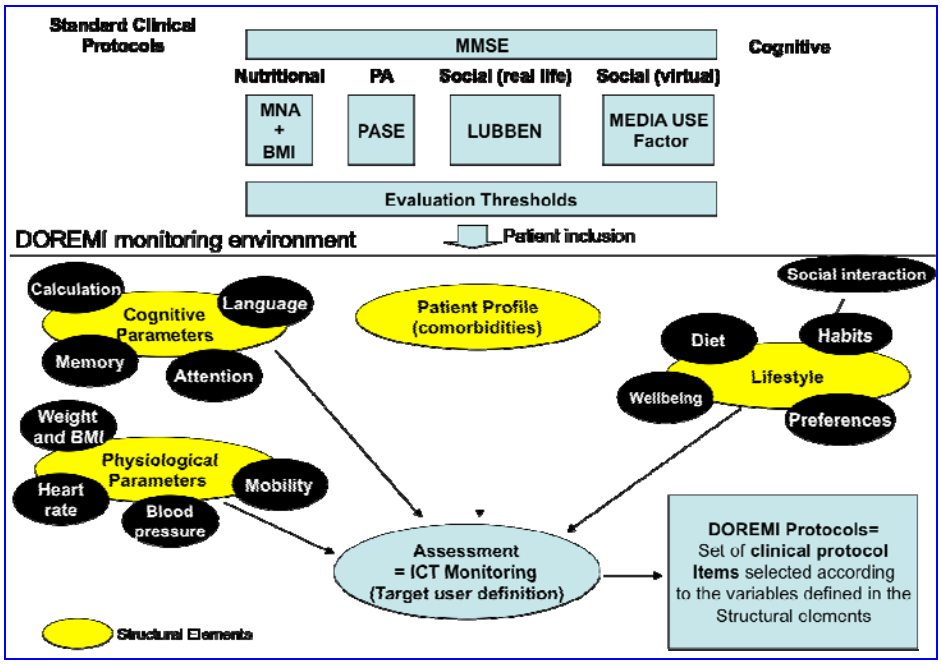

Figure 1: DOREMI users selection and profiling workflow

WP3 was focused on the development of WSN environment and the auto configuration system. These elements were developed gathering requirements in coordination with WP2 and WP4. In particular, in WP3 was:

- selected most appropriate sensors and devices and started designing and development of sensors and devises foreseen in the project (bracelet) or integrated in commercial solutions (smart carpet);
- performed a data collection and retrieval layer necessary for data processing and interoperability with the smart environment (WP4);
- started the initial design and development of auto configuration system and the integration of sensors in WSN environment.

WP4 has worked on the identification of computational learning tasks of Activity Recognition and its requirements investigating machine-learning solutions for both explorative and predictive data analysis.
In particular, WP4 has:

- contributed to the design of high-level DOREMI system architecture throughout a close integrated activity between clinical requirements and technical specifications;
- released a requirement analysis and a specification of the services implemented by the smart environment system, an analysis of the computational methodology adopted for the activity recognition and reasoning components;
- produced a summary of the guidelines for the collection of annotated training data in WP6.

Object of WP5 was the development of the overall gamified active ageing support environment for older users.
In particular, WP5 work was focused on:

- definition of gamified active ageing protocol
- collaboration with medical partners for identification of main structural elements of DOREMI protocol
- design and development of the game-based environment.
- development of a preliminary set of cognitive games prototypes

WP7 was focused in this first year to define the communication strategy of the project.
Main activities were:

- development dissemination plan, with particular attention to the design and development of DOREMI website and portal useful for the on-line engagement of DOREMI stakeholders
- development of exploitation plan focused on a market analysis to quantify the market segments of DOREMI solution.

- development of IPR strategy of the DOREMI consortium

1.3 The expected final results and their potential impact and use (including the socio-economic impact and the wider societal implications of the project so far)

The main challenge of the DOREMI project is to effectively engage the elderly people on pursuing an "active ageing lifestyle". Being physically and social active, eating a healthy diet can all reduce the risk of chronic diseases in older adults. This holistic approach will lead to the actual improvements in the daily activities of older persons as well as the increased personal independence, prolonging active participation in society and integrated care processes for the ageing population.

Therefore the evaluation of usage of innovative processes and technologies to improve elderly persons' life style will not consider only the impact on elderly psycho-physical and cognitive capabilities and the implications for health care specialist in their practices. It rather will also explore the changes in caring processes and it will also measure how the new practices will modify the way of caring and assisting elderly by the other stakeholders (e.g. nurses, relatives, third sector voluntaries, etc.).

Examples of variables that will be analysed in order to evaluate the impact of the active ageing protocols and the new way of delivery to elderly life style are as follows:

- Impact variables: life style variables, psycho-physical variables, behavioural variables
- Independent variables: age, gender, diseases characteristics, treatments and caring process, parents and relatives degree of involvement, voluntary degree of engagement in the caring process and assistance, degree of exposure and engagement in the gamification process.

Existing cause-effect relationships amongst the above variables will be detected together with the implication of the new practices and technological support proposed by the project would have on the caring practices as well as on the interaction process amongst elderly and the caring stakeholders impacted. Thus, a clear evaluation of the possible impact of the project on the caring processes of elderly people will be provided per each caring actors involved. This would be beneficial to assess the overall implication of the proposed solutions for further exploitation of the project results.

1.4 The address of the project public website

http://www.doremi-fp7.eu

2. CORE OF THE REPORT FOR THE PERIOD: PROJECT OBJECTIVES, WORK PROGRESS AND ACHIEVEMENTS, PROJECT MANAGEMENT

2.1 Project objectives for the period

The project objectives achieved in the period are reported below and extensively described at WP level in section 2.3.

a) Investigation of target users' needs made trough literature analysis and knowledge provided by partners, has been a fundamental input to both the protocol development and the games scenarios.
b) Definition of Active Ageing Lifestyle protocol, definition of inclusion/exclusion criteria for the study entry, main parameters related to the impairments to be evaluated, operationalization of different phases (baseline, training, treatment, final evaluation) of the DOREMI protocol. WP2 activities are preparatory to WP6.
c) Selection of the complete set of parameters needed to be monitored according to the:
   - Selection of the most appropriate group of sensors and devices that will be employed in the Active Ageing Lifestyle Protocol, as a result of the interaction between WP3 and WP4 based on WP2 specifications. The hardware will be both off-the-shelf or prototype-developed by partners
   - Specifications of the activity recognition models, developed by WP4, based on WP2 requirements
   - Definition of the high level and logical architecture for module identification, dependencies and data flow hypothesis.
d) Initial hypothesis of game scenarios discussed with the scientific partners are the result of interaction between WP2 and WP5
e) Development of exploitation, dissemination and business plan during WP7 activities.

2.2 Summary of recommendations from previous reviews (in any)

NOT APPLICABLE

2.3 Work progress and achievements during the period

In the section below a detailed description of work progress and achievements by work package is provided.

2.3.1 WP1 Project Coordination and Management

Please see section 2.4

2.3.2 WP2 End user profile and Active Ageing Lifestyle protocol development

The main goal of WP2 was to define and implement the Active Ageing Lifestyle protocol based on a well target user profile.

Activities were focused on: analysis of literature of most recent and important studies for the three impairments (Sedentariness, Malnutrition, Cognitive decline) in older population and their relation with a series of pathologies (cardiovascular diseases, metabolic alterations, osteoporosis, cancer); inputs for game environment development in WP5 (in collaboration with IMA); definition of set of parameters and scales for impairment evaluation and quantification (MNA, BMI, PASE, MMSE/MoCA); definition of user selection process, included selection criteria (inclusion and exclusion criteria); procedures for DOREMI user profiling; elaboration of Active Aging Lifestyle protocols focused on nutrition, physical activity and cognitive stimulation; identification of expected improvement levels for each impairment after DOREMI treatment; identification of key performance indicators (clinical, social and technical) for Active Aging Lifestyle Protocol

As observed above, this WP represents a key element for the project feeding the remaining WPs in terms of requirements and specifications necessary for their development (Figure 2

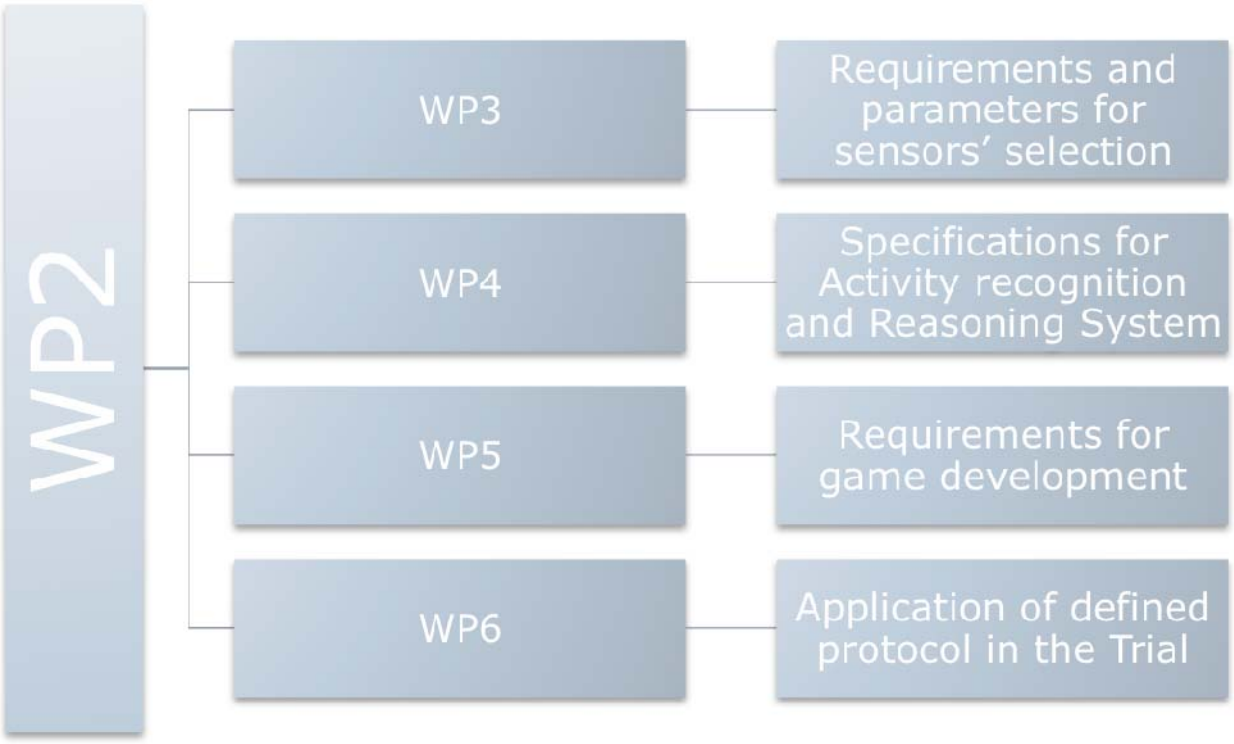

Figure 2. WP2 Interactions with WP3-4-5-6 .

Dependencies and outputs have been created among each Task of WP2 and the other technical WPs (WP3-4-5), as shown in Figure 3

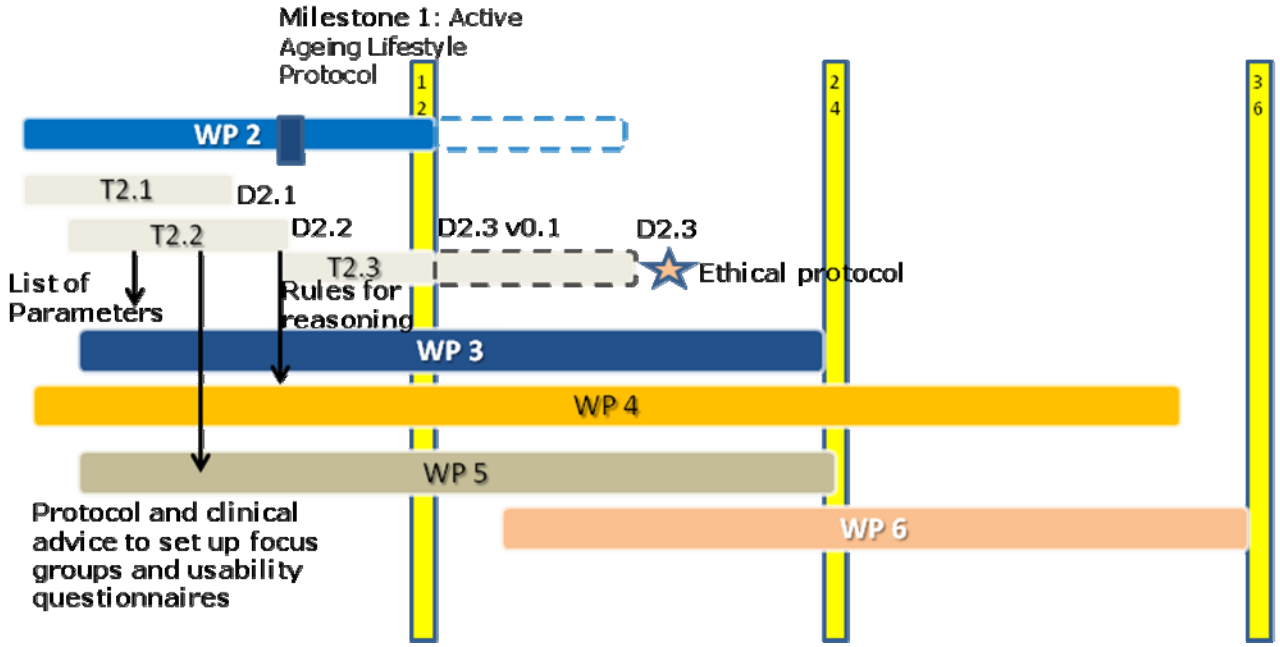

Figure 3. WP2 big picture with interactions with other WPs and outputs

CNR IFC, as Leader of WP2, has organized several meetings (12/11/2013, 04/02, 25/02, 19-20/05/2014 Milan; 26/11/2013, Genoa; 12/05/2014, Bologna; 17/06/2014, Birmingham; 04/03, 03/04, 30/04, 28/05, 10/06, 01/07, 29/07, 19/09, 27-28/10/, 04/11/2014 Pisa) to discuss with partners (UNIPI, CNR ISTI, SI4LIFE, IMA, DMU, Extra, Accord) details of the DOREMI lifestyle protocol and of the users' interaction with the DOREMI environment; the implementation-level details of the Context-Awareness and Reasoning system; the requirements and main interfaces of the DOREMI reasoning system.

- Objectives
  - Investigate, trough literature analysis and knowledge provided by the partners (Task 2.1), the target users' needs as fundamental input to both the protocol development and the games scenarios. For the latter, the identification of lifestyle profiles will allow a selection of generic games scenarios suitable for easy personalization.
  - Identify the criteria for the selection of the elderly people sample to be enrolled in view of the validation activities.
  - Select the complete set of parameters to be monitored according to the Active Ageing Lifestyle protocols (Task 2.2).
  - Start to define the protocol rules needed for the development of the reasoning system (Task 4.4).
  - Develop a validation plan including four sub-set specifically designed for the clinical validation plan of the services, the technical validation plan of the platform and the usability plan of the platform as guideline for the validation to be performed in WP6 (Task 2.3).
  - Design the pilot study (task 2.3) that will be carried out in UK and IT during T6.4. The study project will be submitted to the local Ethics Committees in the first semester of Year 2.

- Summary of progress towards objectives and details for each task

Task 2.1 Target user definition, literature analysis and survey for scenarios of use (CNR IFC) – M1-M6
CNR IFC is the task leader. SI4LIFE, UOC, IMA, Extra and Accord were the partners involved in this task.

Activities of Task 2.1 were focused on the elaboration of Deliverable 2.1 (D2.1). This was based on the review and analysis of the most recent and important published studies conducted in Europe addressing the need of a well target user definition, elderly people in risk of cognitive decline, malnutrition and sedentariness. These literature survey and analysis were the background for the preparation of the Active Ageing Lifestyle protocol, carried out in task 2.2.

Primarily, CNF-IFC and SI4LIFE have investigated the influence and possible association of the impairments with pathologies' modulation: cardiovascular diseases, metabolic alterations, osteoporosis and cancer appear as the main diseases in strong relation with the objects of the project. UOC have focused its work on: review of scientific and grey literature on motivational aspects and social interactions of young and older adults; identification of metrics and scales for measuring and evaluating of motivational aspects and social interaction of the target users of DOREMI; identification of the implication of motivational aspects and social interactions' scales and metric for the gamification environment of DOREMI.

After, D2.1 described the selected set of parameters and scales useful for functional evaluation and quantification of impairments. For malnutrition (CNR IFC), Mini Nutritional Assessment (MNA, under-nutrition), Body Mass Index (BMI, over-nutrition) were the main evaluation criteria of unhealthy dietary habits. For a quantitative measure of body composition, in terms of body water content, body mass (fat, muscle) and metabolic rate, the Bioelectrical Impedance Analysis (BIA) were selected. To this purpose, CNR IFC met in two occasions (one of them also with CNR ISTI participation) the managerial staff of Akern Company (Pontassieve, Italy), one of the most accredited Company in the world for hardware and software development of bioelectrical impedance instrumentation. A scientific collaboration has been developed with that Company, to find out the most reliable parameters and instrumentation to monitor body composition parameters by BIA during the pilot study.

For sedentariness (CNR IFC), direct and indirect approaches were selected; the first using accelerometer/pedometer, to have a quantified measure of physical activity, the second by the administration of Physical Activity Scale for Elderly (PASE) test, useful for user habits. Linked to physical activity, the user stability assessment was also taken in account by its evaluation with Berg Balance Scale (BBS). The inclusion of this latter test will be of relevance when the balance board, embedded in the smart carpet, will be applied to evaluate the daily balance of the participant at the trial.

For cognitive decline (SI4LIFE), the impairment reference test was the Mini Mental State Examination (MMSE), which measures five different areas of cognitive functions (orientation, registration, attention/calculation, recall and language/praxis). Other tests, more specific for each cognitive function, were the Token test, Phonemic and Semantic Fluency, Attentional Matrices, Montreal Cognitive Assessment (MoCA), Digit Span and Reaction Time Test. A long discussion has been undertaken among SI4LIFE and DMU on the most suitable test for patient selection into the trial.

DMU will perform a second run of the test on a population with characteristics similar to those of the DOREMI users during November and December 2014 (M13-M14) to compare differences between the MMSE and the Montreal Cognitive Assessment (MoCA) tests. The MoCA test might show a higher sensitivity for the recognition of MCI in the population screened for the pilot study.

CNR IFC has worked to the development of diet protocols. These activities require the development of a simplified user interface between user and nutritionist, either to facilitate user dietetic anamnesis, or for development of a dietary game (not foreseen in the DoW). As a matter of fact, CNR IFC realized that activity recognition-based dietary habits by HAPIfork and Mandometer (page 25 of the DoW), would not allow to gather accurate dietary information and, mainly interaction between user and specialist, requisites for correction of unhealthy dietary habit. An in-house solution, between Consortium partners, was not available. CNR IFC has evaluated the possibility to interface DOREMI platform with commercial software: the choice has been the use of METADIETA® software (Me.Te.Da s.r.l, San Benedetto del Tronto, Italy). A meeting between the coordinator and the Company managers allowed to reach an agreement between the Company and the Consortium, which foresees the METADIETA® database interfacing with DOREMI platform and makes compatible this database with British foods (~1000 foods), in terms of food pictures and bromatological composition. However, this agreement let DOREMI platform to be independent by Me.Te.Da system with possible replacement by other software solutions. The solution to "convert" the Italian database in Britain one was an agreement with the owner of CARB & CAL database, Chris Chayette,

who will furnish picture and bromatological composition of British foods. CNR IFC supported the charge of CARB & CAL pictures to be reproduced in METADIETA®database.
Finally, CNR IFC have defined the main inclusion and exclusion criteria for DOREMI user selection, as also, in collaboration with IMA, the relevant inputs necessary for game environment development in WP5.
Extra and Accord have contributed to drafting of the document, while DMU and UOC have furnished support for the deliverable revision and analysis of potential critical points.
MYSPHERA has furnished pre-release report analysis and feedback, has participated to discussions regarding the scenarios and use cases, from the point of view of the technology provider, furnishing a technological prospection over the different use cases analyzed.

Task 2.2 Active Ageing Lifestyle protocol development (SI4LIFE) – M2-M8

CNR IFC replaced SI4LIFE as Task leader. DMU, was actively involved in this task, together with SI4LIFE, UOC, Extra and Accord .
Activities of Task 2.2 were focused on the elaboration of Deliverable 2.2 (D2.2). This was based on the selection and integration of clinical protocols (described in D2.1), which were translated into a complete set of parameters to be monitored by the monitoring environment. The deliverable was organized in three main areas: user selection methodology, user profiling and DOREMI protocols. Indicators of effectiveness of DOREMI interventions and primary key performance indicators have been also identified, and were described in the final chapters of the report.
CNR IFC, DMU and SI4LIFE have structured the selection process in four steps: inclusion criteria, exclusion criteria, evaluation of impairments, including MMSE test for cognitive impairments and, finally, tests or parameters for malnutrition (MNA, BMI) and physical activity (PASE, BBS) assessment. The final result of this process is to provide the user population involved in DOREMI environment. The selected users are subjected to a specific profiling in terms of:

- acquisition of demographic and clinical data (CNR IFC)
- cognitive function characterization (memory, language, attention, calculation, orienteering, visual-spatial abilities and praxis) (SI4LIFE, DMU)
- lifestyle definition as nutritional habits, motivational aspects, social interactions, wellbeing, preferences (SI4LIFE, UOC, CNR IFC)
- physiological parameters (e.g., weight, BMI, heart rate, blood pressure, blood oxygenation, glucose, blood lipid profile, other laboratory tests) (CNR IFC, SI4LIFE, DMU, Extra, Accord)

DOREMI protocols have been defined and divided into Sedentariness, Malnutrition and Cognitive Decline.
In sedentariness (CNR IFC), the indoor and outdoor activities to be performed by users have been detailed, according to a selection of physical activities described in international guidelines. Furthermore, CNR IFC has “translated” indoor physical activity exercises in a series of videos that have being integrated in an application for tablet (iOS platform) and will be included in the gamification environment.
For malnutrition (CNR IFC), the dietary schemes and the METADIETA software have been described.
SI4LIFE has focused interventional phases and cognitive functions to be stimulated by serious games.
In D2.2, the main indicators of effectiveness of DOREMI protocol were also been defined by the clinical partners, with relative expected improvements respect to baseline evaluation: PASE and BERG (sedentariness and subject’s balance), MNA (malnutrition in defect), BMI (malnutrition in excess), MMSE, semantic fluency, phonemic fluency, attentional matrices, Token test, MoCA, Digit span and reaction time test (cognitive decline).
The primary key performance indicators of DOREMI protocol effectiveness, divided for clinical and social indicators have been defined, based on use of parameters previously selected in literature analysis (D2.1). These parameters will give a specific evaluation of effectiveness and user acceptability of DOREMI platform. All the partners collaborated to the definition of the indicators.
Finally, the application of International Classification of Functioning, Disability and Health (ICF) has been described.
Extra and Accord furnished contribution to drafting the deliverable, DMU and UOC have discussed with CNR IFC and SI4LIFE on potential critical points in the choice and application of the proposed protocols.

Task 2.3 Validation Plan (UOC) – M9-12

UOC is the task leader. CNR IFC, SI4LIFE, DMU, Extra and Accord are the main partners involved in this task. Activities of Task 2.3 are focused on the elaboration of Deliverable 2.3 (D2.3). This is based on the findings of the previous deliverables D.2.1 and D.2.2. Deliverable D2.3 is aimed at reorganize and systematize all the tests and procedures described in the previous deliverables produced under WP2 activities, to design the whole validation process of DOREMI solution, and to prepare all documents necessary to submit the study protocol to the local Ethics Committees in UK and IT.

The task participants have structured the validation process in three main steps: sample selection and composition of the treated and control groups (Step 1-4) (Figure 3); site preparation, baseline data collection and training activity (Figure 4); trial data collection and final evaluation (Figure 4).

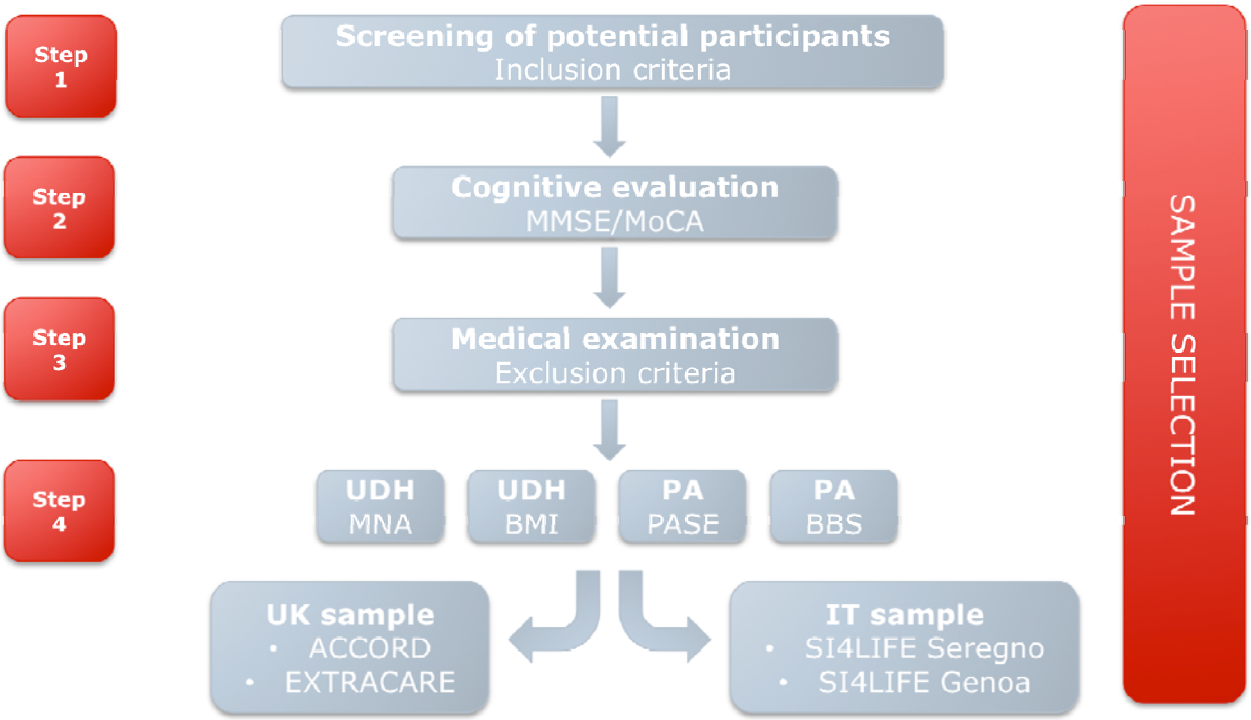

Figure 4. Participants' selection criteria.

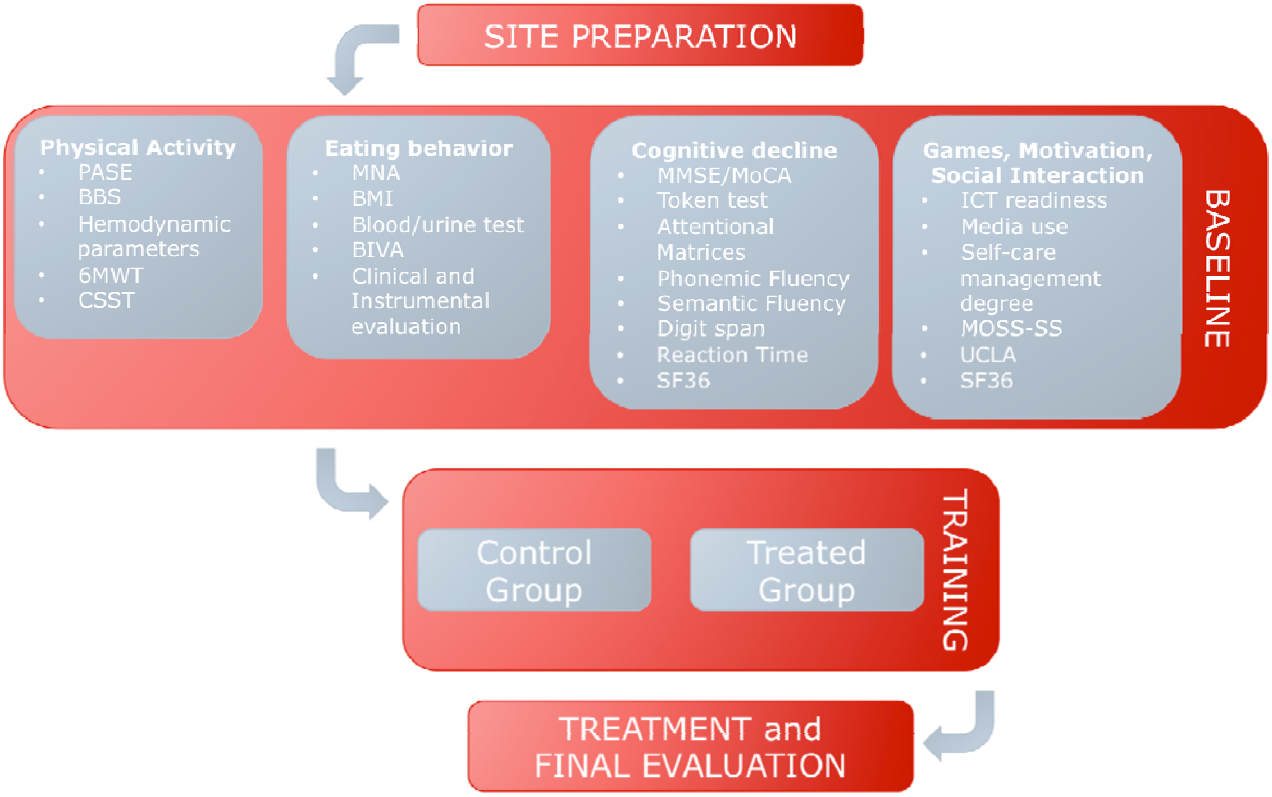

Figure 5. Scheme of DOREMI trial.

UOC has organized and coordinated the efforts of all the Task 2.3 participants to achieve an integrated and agreed detailed description of the activities that would be carried out in each step of the validation process. To this end, various contributors have provided their expertise and capabilities to finalize the deliverable. In particular:

- SI4LIFE and DMU have designed all the tests and protocols related to the evaluation of the cognitive ability of the participants to the validation process of DOREMI solution. They have also defined the inclusion criteria related to cognitive ability of the potential participants to the project trial as well as the set of data related to the degree of cognitive ability of the treated and control groups that would be collected at the baseline and at the end of the trial. For what concern the use of the cognitive games that will be part of the gamified environment of DOREMI solution, they have designed the training activities for the trial participants to start using these games through tablets PC and they have also provided a detailed description of the daily routine of the participants to the trial for what concern the cognitive games use. They have also set up an evaluation protocol for comparing two cognitive ability tests (MMSE and MoCA). This protocol will be applied in a testing carried out on November and December 2014, to assess which of the two tests is the most suitable for being used in DOREMI validation process (see deviation of the plan described below).
- CNR IFC has designed all the tests and protocols related to the evaluation of the eating behavior and the physical activity of the participants to the validation process of DOREMI solution. It has also defined the exclusion criteria related to the medical evaluation of the potential participants to the trial as well as the set of data related to physical ability and eating behavior of the treated and control groups that would be collected at the baseline and at the end of the trial.
- The exergame that will be part of the gamified environment of DOREMI solution has training activities that have been designed to provide a detailed description of the daily routine for the participants in the trial for doing physical exercises. Moreover, in collaboration with IMA, it has defined the training protocol for using METADIETA software as well as the daily routine of the trial participants in respect to the monitoring of their eating behavior.
- UOC has designed all the tests and protocols related to the evaluation of the social inclusion of the participants to the validation process of DOREMI solution. It has also contributed to the design of

the inclusion criteria related to the evaluation of the capability of use of a computer and Internet of the potential participants to the trial. It has also defined the set of data related to the degree of social inclusion of the treated and control groups that would be collected at the baseline and at the end of the trial. The social interaction functionalities that will be part of the gamified environment of DOREMI solution outline the training activities for the trial participants to start using the gamified environment and it has also provided a preliminary description of the daily routine of the participants to the trial for social inclusion activities. This preliminary description will be further developed in collaboration with IMA, DMU and the technical partners (see below in the deviation of the plan).

To the purpose of providing a comprehensive description of the validation process, other DOREMI project partners have contributed to the completion of this deliverable. In particular:

- CNR ISTI has contributed to the description of how the test sites will be set up before the trial activity. CNR ISTI and CNR IFC have collaborated with other partners on the identification of parameters to monitor for the system validation. CNR ISTI produced preliminary data flow process diagrams describing which DOREMI subsystems generate and process data in order to provide patient evaluation support.
- Extra and Accord, together with SI4LIFE have assessed the whole validation process described in the deliverable, being them in charge for the recruitment of the potential participants and of the hosting of the trial activities. In addition Extra and Accord have provided comments and edits to various drafts of the D2.3 validation plan.
- IMA has contributed to the design of the eating behaviors validation process providing suggestions for the definition of the training activities related to this specific module of DOREMI solution as well as for the specification of the daily activities of the trial.
- Finally, the technical partners AIT, CNR ISTI and MYSPHERA, together with the partners responsible of the tasks, have contributed to the design of the “daily treatment diagram” (Annex P of the deliverable) and of the typologies of data that will be collected during the daily trial activity.

Significant results of WP2

- Exhaustive survey of literature and selection of tests for characterization of the three impairments
- Definition of set of parameters and scales for impairment evaluation and quantification.
- Definition of Active Aging Lifestyle protocol rules and their integration for development of reasoning system.
- Submission of D2.1 and D2.2 to European Commission
- Submission of D2.3 draft version (25/11/2014): final submission scheduled for M18, including all documents submitted to the local Ethics Committees.
- Identification of selection methodology of DOREMI user population composed by Inclusion criteria, Exclusion criteria, Cognitive parameters, Unhealthy Dietary Habits (UDH), Sedentariness
- User profiling DOREMI protocols composed by a series of activities necessary to contrast sedentariness, UDH, cognitive decline as well as protocols to monitor and improve social interaction
- Definition of indicators to evaluate effectiveness on active healthy aging, set of parameters and relative improvement level, definition of primary key performance indicators, a series of indicators useful to evaluate the clinical and social performance of the DOREMI end-users
- Process of sample selection and relative criteria
- Definition of the baseline data collection regarding Physical activity, Eating behaviours, Cognitive decline, Motivation and Social interaction
- Planning of the Training activities for the Observed an Control groups
- Definition of treatment and the post-treatment data collection activities
- Study protocol (trial) definition, including timescale, logistics, campaign for participants’ selection, preliminary screening tests, role of partners in management of the clinical trial and responsibilities, safety and security issues, privacy issues.

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- Deviations from Annex I and their impact on other tasks as well as on available resources and planning (if applicable)

Deliverable D2.3 was submitted on 25th of November 2014 and only in draft version. The final version is expected by March 2015.

- Reasons for failing to achieve critical objectives and/or not being on schedule and explain the impact on other tasks as well as on available resources and planning (if applicable)

At the time of submission of D2.3, three essential points for Ethics Committees application have been not yet solved:

1. The choice of the most accurate test for measurement of Mild Cognitive Impairment (MCI).
2. The criteria and technical tools to be used to quantify Social Interaction through the DOREMI Gamified environment.
3. The design of the statistical evaluation process that will be applied on the collected data.

In particular:

1. In D2.1 and D2.2, the MMSE test was identified as the main selection and evaluation criteria for MCI. This test is commonly used in the definition of cognitive impairments but, after a first set of tests performed by UK partners, it appeared that this test does not show a high sensitivity in identifying mild levels of cognitive decline. DMU will perform a second run of the test on a population with characteristics similar to those of the DOREMI users during November and December 2014 (M13-M14) to compare differences between the MMSE and the Montreal Cognitive Assessment (MoCA) tests. This latter may show a higher sensitivity for the recognition of MCI in our population. On the basis of this assessment, MMSE or MoCA will be selected as screening test for selection of trial's candidates as described in the following chapter.
2. Social interaction is one of the parameters, together with MCI, Sedentariness and unhealthy dietary habits, to be monitored in DOREMI project. Monitoring and quantification of social interaction activities by using DOREMI environment have raised technical and privacy issues; for instance the use of audio/video systems (e.g., cameras, ambient microphones) is not ethically acceptable. Discussion on how to sort out this problem is still going on although the consortium has a propensity for evaluating the time spent at home by the DOREMI users, making use of interpolated data obtained through the project specific bracelet and environmental sensors. Moreover, the measurement of virtual social interaction of the target population of DOREMI solution is still under discussion because of it depends on how the gamified environment of DOREMI solution will be designed and which level of virtual social interaction through the DOREMI solution will be considered feasible for the target population.
3. The Validation process foreseen to collect a large amount of data that have to be used to demonstrate the effectiveness of the DOREMI solution in changing health status and the habits of the older population. To this end we need to design a robust statistical evaluation process that can be fully defined when we will have a complete picture of the data that we could collect during the Trial. These data are under discussion and also depend on the point 1 and 2 above. Therefore we plan to provide the details of the statistical evaluation process of the data we are going to collect during the trial in the final version of this deliverable.

We don't expect that this delay will impact on the implementation of the Validation plan since the deliverable is planned to be completed at least 7 months earlier than the expected begin of the Validation activity.

- Explain deviations (if any) between actual and planned person-months (per beneficiary)

Not applicable

- Corrective actions

In Task 2.2, CNR IFC substituted SI4LIFE as task leader, taking in charge the coordination of D2.2 elaboration.

Other corrective actions are already described above in the plan and they are related to the activities for completing the D2.3. In particular:

1. DMU will test MMSE and MoCA tools during November and December 2014, and the final choice of which test to use in the Validation process is expected in January 2015.
2. UOC, DMU and IMA will have already set up meetings to discuss and finalize the social interaction functionalities of the DOREMI gamified environment, and the final specifications are expected by February 2015.
3. UOC together with the other partners in charge for the Validation plan have already planned meetings to define the statistical elaboration process of the data that will be collected during the Validation activities of DOREMI solution. Its detailed description is foreseen to be included in the final version of the D2.3.
4. During early 2015 Accord, Extra and SI4LIFE will provide the specifications that each local Ethics Committee requires to run a clinical trial. On the bases of these specifications, UOC and the other partners in charge of the D2.3 will prepare the documents needed for the Ethics Committees approval of DOREMI trial at UK and IT sites.

2.3.3 WP3 Development of WSN environment and auto configuration system

The main goal of WP3 is to develop the WSN environment and auto configuration system by a set of coordinated tasks.
During this period, the work on WP3 focused on the preparation of the development of the WSN, gathering requirements from the project partners in coordination with WP2 and WP4. According to the DoW and the first requirements from WP2, the research of suitable OEM sensor and electronic devices has been completed, remaining only a further support on this task in order to effectively integrate the sensors in the system. The full set of parts to integrate in the wristband have been chosen and some analyses based on this have been performed in order to predict the energy consumption and the prototype costs. By this moment, the material acquisition costs associated to the wristband are below 100€ per unit in variable costs.
The custom devices (wristband and weight -balance smart carpet) specification has been especially discussed, as well as the system architecture and use cases of the outdoor and indoor scenarios, resulting in the document D3.1.
For the next period, it is planned to complete the development of the custom devices and system protocols, under the responsibility of MYSPHERA and with the collaboration of CNR ISTI for the smart carpet development. It is also planned to develop and release the final version of the middleware and auto-configuration system, so that pilots with real users will be able to start immediately after the next period (M24), these task will be lead, as until now, by CNR ISTI (middleware) and AIT (auto-configuration system). Tests in Living Lab with real users will start during this period thanks to the intermediate milestone at month 18, which will release a wearable functional version of the WSN and its components.
Several meetings, during the first year of project, were organized to discuss the details of the DOREMI lifestyle protocol and its integration in WSN environment (requirements and parameters) (04/03, 03/04, 30/04, 30/06, 01/07/2014, Pisa), the development of custom devices (29/07, 19/09/2014, Pisa) and the requirements and main interfaces of the DOREMI reasoning system (28/05, 27-28/10/2014, Pisa).

- Objectives
  - Selecting the most appropriate group of sensors and devices that will be distributed in the preferred environment of the elderly person. These sensors and devices will be both off-the-shelf or prototype developed by the partners (completed 100 %).
  - Design and development of the devices and sensors that will be developed in the project (e.g. bracelet/wristwatch) or integrated by the use of commercially available sensor or devices (as in the case of the smart carpet (in progress, 30 %).
  - Perform a data collecting and retrieval layer that will support the data processing and the interoperability with the smart environment developed in WP4 (in progress 70 %).
  - Design and develop an auto configuration system (in progress, 20%).
  - Integration of the full set of sensors into the WSN monitoring environment (just started, 15 %).

- Summary of progress towards objectives and details for each task

Task 3.1 Requirements, parameters and sensor selection (MYSPHERA) – M3-M9

The task was completed at M9. The definition of functional and non-functional requirements reported in D3.1 –as planned in the DoW- and the final selection of sensors –which is the MS2- have been based in the following inputs:

- Outcomes of WP2, especially D2.2.
- Exchange of ideas with end users.
- Contributions of WP4, especially whose involved in Activity Recognition task.
- Analysis of maps and information reported by WP6.
- Expertise and preliminary tests performed by WP3 partners.

All OEM devices have been selected and analysed in order to check their suitability for DOREMI and WP3/WP4 objectives.

This task included the discussion of custom developed sensors specification (wristband and weight sensor) and the network architecture and use cases in outdoor and indoor scenarios.
The main outcomes of this task are accessible in the deliverable document D3.1 released on July (M9) of this year, during this period. The document is basically a general description of the wireless sensor network and a specific description including functional, non-functional requirements and use cases of each module that composes the system. The final selection of sensors (MS2) has been provided as part of the D3.1.
CNR ISTI participated with MYSPHERA and CNR IFC to the selection of the wearable sensors. The specification of all characteristics and features of the custom wristband was deeply discussed, evaluating separately each part to be included and working modes when indoor and outdoor. The final choice was to include a 3-axis accelerometer (ADXL362), a heart rate monitor (AFE 4400), and a Bluetooth Low Energy chip (CC2541), and a LED for communication purposes. The system will prioritize identified key features such as battery life, avoiding data losses or HR measurement when physical activity is happening
CNR ISTI focused on identifying the requirements for the WSN mainly regarding the Smart Carpet device, the Middleware architecture and the data store for raw sensor data, while MYSPHERA has worked on the custom wearable sensors, the location system and the off-the-shelf sensors.
As the bracelet prototype was not planned to be released in this period, CNR ISTI started to collect sample accelerometer data and heartbeat measurement using off-the-shelf components (Samsung Gear Live, Garmin Premium Heart Rate Monitor), as to start evaluation of data analysis processes and issues that could arise with the devices that will be provided by MYSPHERA.
At the end of this period, in month 12, WP3 has released a preliminary dataset. The preliminary dataset, defined as MS3, is a set of information coming from the selected off-the-shelf sensors that enable WP4 to start working with real data coming for the real devices that are going to be installed in pilot sites. As described in the DoW, this is defined as preliminary given that, since it is released just three months after starting the custom devices development (that is, 15 months earlier the planned final release of prototypes), not all the final information is available at that point of project. The preliminary dataset is going to be expanded as more devices and sensors will be integrated and tested. The dataset is made of the sensor data produced by executing tests agreed with WP4 and performed by MYSPHERA in monitored environments. These tests made necessary a preliminary integration of the off-the-shelf sensors into a test environment and a first installation of devices in CIAMI Living Lab (Valencia). CNR-ISTI also collected preliminary data from the smart carpet, included in MS3.
UNIPI has contributed to the initial definition and selection of the sensors, based on the requirements induced by the activities performed in WP4.
SI4Life and Extracare teams did a first inspection of the apartments located in Seregno (Italy) and Milton Keynes (UK) respectively, where the trials will be carried on, in order to have an overview of the environment structure and logistics and study the feasibility of the sensors installations. Maps were thus provided, including sizes and arrangement of the living spaces. We also had a preliminary discussion with the elderly living in these flats, made available by the retirement home village, to first assess their willingness to participate to the projects, thus getting a positive feedback.
Pilot sites maps have been analysed by MYSPHERA to determine the distribution of WSN in real scenarios and an estimate on the number of sensors required in each apartment (see Annex I).
Extra has also provided information from pilot sites and provided different non-functional requirements for the network regarding the installation process and end-users point of view.
CNR IFC proposed a solution for the smart carpet development. This was split in two devices: the bioelectrical impedance system and the smart carpet composed by an integrated system for weight and balancing measurement. This solution is due to technical difficulties to assemble the bioelectrical impedance technology in a smart carpet while producing an inexpensive solution that could effectively and precisely measure bio-impedance without errors. For bioelectrical impedance, CNR IFC has chosen the BIA® system of AKERN Company (Pontassieve, Italy).
CNR ISTI and CNR IFC performed a thorough research on commercially available force platform in order to see which device can fulfil Smart Carpet requirements. CNR ISTI identified the Wii Balance Board as the device of choice, as it proved both inexpensive and effective when compared with professional balance assessment force platforms. Several tests were performed by CNR ISTI and UNIPI on the device in order to check functionalities and data characteristic to see if it is suited for WP4 data analysis tasks.

AIT has produced an analysis of requirements for the middleware and sensor integration with respect to the reasoning and auto-configuration modules. A subset of HOMER software project modules was identified as suitable for the auto-configuration system.

Task 3.2 Sensors development and production (MYSPHERA) – M6-M24

MYSPHERA started the integration of accelerometer with the location wristband and Bluetooth Low Energy (BLE) communication system. MYSPHERA tested different OEM accelerometers to choose the more suitable for the described requirements in D3.1. Up to now, the selected accelerometer[2] (ADXL362) is correctly sending information through an interface to the wristband microcontroller. The firmware has been modified in order to tag correctly the information coming from the accelerometer. The next step is send wirelessly the data (raw acceleration and calculated step counting) from the sensing node to the wireless sensor network.

So far, it has been purchased a hardware development kit (HDK) for the heart rate measurement unit (energy expenditure calculation). Some preliminary tests have been performed but those without connecting the HDK to the wristband interface. The tests have consisted in the characterization of the output signal, noise inspection and output when user is active.

All the indoor location system has been switched to BLE successfully and now it remains to establish connections by demand in order to implement the outdoor scenario. Some tests have been also made for the outdoor scenario, testing the BLE communication using smartphones with this technology. Currently, a smartphone app can receive information from a BLE localization wristband with a payload. I that payload will be placed the information with acceleration, step counting and heart rate of the DOREMI custom wristband.

The development of wireless communicating fixed beacons that will enable the indoor location have been started and is over the 70 % completed. The development of a new kind of beacon devices has been necessary due to the impossibility to wire with Ethernet cable the rooms of users in pilot sites.

A sample wristband has been purchased, in order to reduce the PCB design, as far as the layout has been also provided by the manufacturer, and most of the parts can be reused for DOREMI custom wristband.

MYSPHERA implemented a preliminary communication system of the off-the-shelf Z-Wave sensors in order to perform the experiments needed for MS3 and, thus, releasing the MS3 dataset. This preliminary code will be reused for middleware integration of these sensors.

CNR ISTI worked directly on the development of the Smart Carpet solution, using the device identified in T3.1, the Wii Balance Board. A set of available software libraries for data retrieval in Java Runtime Environment was initially tested to check device available functionalities. A custom Java device driver layer was then developed by CNR ISTI to add needed features (send the information automatically to the gateway and control the data acquisition). CNR-ISTI developed a Java software layer, integrated in the first released version of the Middleware, for collecting data in laboratory from the balance board, and a database for storing the raw sensor data.. The available information of the balance board have been included in the preliminary dataset (MS3) and includes four curves of pressure for balance assessment and weight measurement.

Even if driver and software libraries for smart carpet access seems to be complete, CNR ISTI will continue to maintain related software libraries and consider adding other features if new requirements arise.

CNR IFC has developed the user scenario of use for balance board, has defined its requirements and together with CNR ISTI and UNIPI will test it (M14-M15) on a user population similar to those of the DOREMI trial.

Task 3.3 Sensor Integration and Middleware (CNR ISTI) – M6-M24

During the first month of the allocated period for task 3.3 CNR ISTI started defining the architecture for the distributed data collection and retrieval layer (middleware). The use cases specification concerning the

[2] Technical specifications available in D3.1, chapter 6.

system was produced in order to specify the main functionalities to be delivered, this specification has been included in D3.1. CNR ISTI laid out a draft of the system architecture by producing several UML artifacts: class, sequence, component and deployment diagrams. These diagrams describe aspects and interfaces of the middleware to be implemented.
Meanwhile, a study on available platform implementations and scientific bibliography regarding IoT middleware platforms was performed in order to define the main functionalities and characteristics that the system could deliver. This activity also helped identifying challenges in developing middleware solutions for the IoT for sensors integrators. CNR ISTI released a first version of the Middleware solution by providing a set of software Java bundles for the OSGi platform. A set of testing utilities was also produced in order to ease the integration and testing phases. CNR ISTI worked on the development of a data storage solution for raw sensor data collected depending on the developed Middleware software.
CNR ISTI performed some tests on cheap commercially available board-PC (Raspberry PI, BeagleBone) in order to see whether these inexpensive devices are suitable for deployment in DOREMI pilot houses. CNR ISTI and MYSPHERA worked on eliciting the set of devices to be installed in DOREMI pilot houses, while considering cost constraints. In the latter months of the reporting period, CNR ISTI revised the produced Middleware software system and started the development of a second version in order to facilitate sensor integration by adding a simpler API and more functionalities, hiding unnecessary details to sensor integrators. The development of the second version will be completed before the end of 2014 along with the developer and administrator documentation.
During the next year, the work on this task will focus on integrating identified sensors with the developed middleware solution (version 2.0).

Task 3.4 Auto configuration system and calibration (AIT) - M9-M24

CNR ISTI collaborated with AIT on the definition of requirements for the auto-configuration system during several meetings, also eliciting interactions between components and responsibilities. A subset of HOMER middleware system bundles were will be used for the configuration of sensor properties. Starting in the next reporting period, HOMER bundles will be tested and integrated with the Middleware platform.
A technical physical meeting took part in Pisa to discuss how Auto-configuration system functionalities and implementation plan.
The requirement specifications, and the setup of the remote server have started. The system that is used as Auto-configuration system is developed according to state-of-the art software development paradigms, fulfilling the requirements for a flexible and modular architecture. HOMER is developed in Java and embedded in the KARAF OSGI framework.

Significant results of WP3

- Definitive WSN architecture specification and requirements documentation specification.
- OEM accelerometer and heart rate state of art.
- Accelerometer communicating with the wristband.
- Parts (Bluetooth controller, accelerometer, hear rate sensor) to be integrated analysed and tested with hardware development kits.
- Preliminary reference design with real parts.
- Indoor location system switched to BLE enabling wristband integration.
- New fix beacons specification to meet pilot needs.
- List of commercial off-the-shelf sensors identified and released.
- Dataset for WP4 (MS3) released, available to all the partners in the project intranet, hosted in https://share.ifc.cnr.it/share/page/site/doremi/dashboard.
- Off-the-shelf sensors communication integrated with Java application.
- Smartphone to be used identified.
- Smart carpet solution defined and developed tools for data collection in laboratory.
- Produced a first draft design of the system architecture detailing part of system modules, interactions between them, deployment scenarios.

- Produced a first version of Middleware system and data storage layer
- Requisites for HOMER integration and auto-configuration system.

- Deviations from Annex I and their impact on other tasks as well as on available resources and planning (if applicable)

CNR ISTI in collaboration with CNR IFC is responsible for the development of Smart Carpet in substitution of MYSPHERA, which will collaborate to its integration within the Middleware by Bluetooth solutions.
MYSPHERA will need to produce a significant greater number of devices, according to the change in the number of individuals participating in the pilot phase (22 now versus 8 planned). This will impact in production and manufacturing costs, but will be assumed by MYSPHERA with no impact in the project budget.
A different kind of fixed location beacons must be used in order to minimize the impact in the user houses. That will require a higher amount of effort in the network development.

- Reasons for failing to achieve critical objectives and/or not being on schedule and explain the impact on other tasks as well as on available resources and planning (if applicable)

Not applicable

- Explain deviations (if any) between actual and planned person-months (per beneficiary)

Not applicable

- Corrective actions

Not applicable

2.3.4 WP4 Development of a Smart Environment for Context Awareness

The main goal of WP4 is to define and implement activity recognition models.
During Year 1, WP4 partners have collaborated with the clinical stakeholders and other technical partners of the project to the characterization of the high-level requirements and workflow of the DOREMI system. WP4 activities have started as planned according to the progress in the definition of the architecture of the system and of the applicative scenarios of the DOREMI project. The focus of the activities across Year 1 has been on the identification of the computational learning tasks for Activity Recognition and its related requirements in terms of data and computational models. The requirements elicited as part of Task 4.1 have served to guide the preliminary development activities in Tasks 4.2, 4.3 and 4.4. The results of the design and specification activities in Task 4.1 have been circulated in Deliverable D4.1, released at M8 according to the project DoW schedule. Also, it has been produced a breakdown of the WP4 activities and of the implementation process that will be followed to yield to an effective deployment of the activity recognition and context awareness technologies by WP4 within the final pilot sites in WP6.
A WP4 coordination team has been put into place, including members of UNIPI, CNR ISTI and CNR IFC, which has held monthly meetings with the project management and the clinical stakeholders to progress design of the integrated DOREMI system and its experimental scenarios, and ultimately contributing to the definition of the high level DOREMI architecture.
Recruitment activities have progressed as planned: UNIPI has completed the enrolment of 1 Researcher contracted for the duration of the project.

- Objectives

This WP investigates machine-learning solutions for both explorative (Task 4.2) and predictive (Task 4.3) data analysis. Explorative approaches typically rely on unsupervised learning models and are useful both as a preliminary pre-processing step (e.g. to filter, segment and cluster relevant sensor data) as well to discover some informative grouping of the sensor data, when little supervised expert information exists. Predictive approaches, on the other hand, usually rely on supervised learning models and are tailored to acquire robust predictive models of a process for which there is insufficient background knowledge to set up a procedural algorithmic solution, but a sufficient set of real-life supervised example data is available. These latter models will be used, in Task 4.3, to learn a short term activity recognition/classification system from expert labeled data that will support a more high level reasoning service on long-term user data in Task 4.4.

- Summary of progress towards objectives and details for each task

Task 4.1: Data preparation and models assessment specification (UNIPI) – M1-M8

The first part of Task 4.1 (M1-M8) has been completed and its outcomes documented with the release of Deliverable D4.1 at M8. The key activities of Task 4.1 have dealt with the elicitation of the requirements and the specification of the "Smart Environment for Context Awareness" system, following the requirements of the DOREMI scenarios and of the DOREMI middleware.

The key outcomes of Task 4.1 during the period of interest are

- A requirement analysis for the functionalities developed within WP4, according to the user activities of interest identified for DOREMI and to the lifestyle protocol;
- A critical analysis of the scientific background to identify a preliminary ensemble of computational methodologies suitable to realize the WP4 objectives and that will be subject to experimental assessment when annotated data will be available from WP6;
- A detailed specification of the services implemented by the smart environment system, together with details on the adopted computational methodology;
- A specification of the data format and properties for the information consumed and generated by the activity recognition and reasoning components which serve as requirements for WP3 (sensors devices and middleware) and WP6 activities (annotated data collections).

UNIPI has lead Task 4.1 activities and has coordinated writing of Deliverable D4.1. During the reference period, UNIPI efforts have been dedicated primarily to the analysis of the DOREMI application scenarios and clinical requirements which have led, throughout a collaboration with the partners in WP2, WP3, WP5 and WP6, to a definition of the monitored user activities by the activity recognition system and to the associated specification of the computational learning tasks which will serve to implement the activity recognition components developed in Task 4.3. UNIPI has performed a preliminary background analysis to identify a set of machine-learning solutions suitable to address the activity recognition tasks. This preliminary background analysis suggests that Echo State Networks can be a viable approach to the efficient adaptive processing of times-series from sensor data on the supervised short-term tasks: The adequacy of such Echo State Network model for each specific DOREMI task will be experimentally assessed on real-world data from the DOREMI laboratories sites as this becomes available (through a model selection phase) . The result of such an experimental analysis and the critical comparison with competing approaches from the Machine Learning\HAR literature will inform the second part of Task 4.1 (originally planned for months M20-M30 as per DoW), which may possibly lead to a revision of the design choices for the machine learning models for activity recognition (on the basis of the most critical tasks).
Further, UNIPI has contributed to provide guidelines for the collection of annotated data in WP6 (according to the requirements of the supervised activity recognition computational learning tasks) and has contributed to specification of the data format for storing activity recognition information in the central database managed by AIT.
During the reporting period, CNR ISTI has begun a preliminary analysis of the state-of-the-art for sensor characterization models in the context of IoT (Internet of Things) middleware systems. On this subject, two major areas were identified: (i) Sensor description: sensor properties that affect sensor data (e.g.: resolution), sensor properties that do not affect measured data, relationship with features of interest (e.g.: rooms, peoples). (ii) Features of interest description: Features of interest represent entities, either physical or virtual, that are related to the measurements reported by sensor. A model for the representation of those entities is needed in order to enable data querying. Several approaches have been examined during the analysis, such as OGC SWE SensorML, Global Sensor Network, and HomeML.
CNR ISTI has performed an analysis aimed at choosing the most efficient backend for storing sensor data. A performance analysis aimed at addressing most common scenarios of use has been performed. As a result of the activity MongoDB was selected as the technology of choice.
UNIPI and CNR ISTI have collaborated, on the application requirement side, to the design of the smart carpet system and to a preliminary accelerometer and heartbeat data fusion system. The task activities have been described in details in deliverable D4.1 released at month 8. CNR ISTI has contributed to the definition of the data requirements for task 4.2, in the assessment of the data preprocessing chain, of the integration with the DOREMI middleware, and in the study of possible approaches to be adopted in the long-term monitoring activities described in task 4.2.
AIT has collected format requirements from other partners for the data to be stored in the central database and has provided the associated specification. These data will be used by the reasoner later on. Moreover the definition of the reasoner rules and their output has been started, with contributions by other consortium partners, mainly CNR-IFC. Overall, after the detailed specification of the requirements for the modules AIT is responsible for, a decision has been made to use the AIT KIOLA platform to provide an all-in-one solution for the central database, the reasoner and the dashboard.
The coordinator partner CNR IFC has organized 5 meetings related to the activities of Task 4.1 (12/11/2013, Milan;26/11/2013, Genoa; 14/02, 04/03, 03/04, 30/04, 30/06, 01/07/2014, Pisa), to discuss the details of the DOREMI lifestyle protocol and of the users' interaction with the DOREMI environment, for the purpose of providing the technical partners with the necessary details to implement the DOREMI activity recognition system. CNR IFC has identified a set of parameters, summarized in D2.1, which can be monitored to evaluate and assess of Malnutrition and Sedentariness in the DOREMI subjects. SI4life has also provided preliminary information on parameters concerning cognitive decline and social interaction, which will be monitored within the Lifestyle protocol, to support the activity of requirement definition by the technical partners.
One teleconference meeting (21/05/2014) and one extended technical meeting that has taken place at CNR, including members of CNR ISTI,CNR IFC, UNIPI and AIT (27-28/05/14), took place to identify the

requirements and main interfaces of the DOREMI reasoning system that is developed as part of Task 4.4. Also, implementation-level details have been identified, such as the interfacing with the METADIETA software with the DOREMI reasoning system (as described in Task 2.1).

Task 4.2: Activity recognition: explorative data analysis (CNR ISTI) – M6-M30

A preliminary analysis of the state-of-the-art techniques for data filtering and aggregation has been performed. In order to deal with imperfection, correlation, inconsistency, and disparateness of data coming from environmental and motion sensors, a first layer of filtering has been investigated such as median, windowed standard deviation, and low pass filtering. Since different kind of sensors will be used in this task, a preliminary study of data aggregation techniques such as custom decision trees has been performed.

The results of this analysis have been extensively described in the deliverable D4.1. Particular attention has been given to the data preparation layer; in this regard CNR ISTI has designed unsupervised exploratory data analysis algorithms in order to pre-process the sensor streams. A first stage of data filtering, segmentation and fusion to extract relevant information that may serve as input for the activity recognition components has been implemented and applied to data coming from the prototypal smart carpet designed by UNIPI and CNR ISTI.

Another activity involved in task 4.2 is represented by the application of unsupervised approaches to long-term user behavior discovery by means of environmental sensors. A first analysis of possible sensors to be used has been performed taking into account the requirements coming from the deployment concerns in real test sites. The sensors have been chosen trying to maintain a low level of obtrusiveness and to guarantee the privacy of the user.

Task 4.3: Activity recognition: predictive machine learning approach (UNIPI) – M6-M30

An activity of implementation-level specification of the computational learning models used to realize the DOREMI activity recognition system has been carried out as part of Task 4.3. An operational summary of the guidelines for the collection of annotated training data in WP6 has been provided to the consortium, together with a validation plan for the developed learning models; both contributions have been released as part of Task 4.3 contribution in Deliverable D4.1 given their close relationship with the requirements for the supervised activity recognition computational learning tasks.

Implementation activities have progressed as planned, through the development of a first version of a Java API implementing learning components based on a candidate approach, starting with the most efficient cases (see ESN class of models), which will serve to assess and validate the activity recognition system on real-world experimental data from DOREMI sites, as per subtask 4.3.2 described in D4.1. Additionally, it has been progressed the implementation of software tools providing procedures for training, validation and testing of the activity recognition components (as part of a preliminary work-in-progress version of the "Supervised Activity Recognition models and system" resulting for the first sub-task of T4.3).

A preliminary experimental assessment, targeted at exploring the learning capabilities of the developed ESN model on human activity recognition tasks, has been conducted on benchmarks available from general Ambient Assisted Living scenarios (e.g. from public international competitions) [1]. Further, UNIPI, CNR ISTI and CNR-IFC have collaborated on a preliminary experimental campaign (based on staff volunteer) targeted at the acquisition of example data signals related to the assessment of the Berg Balance Score in 5 (healthy) subjects: this experimental campaign contributes to meet the expected requirements in terms of preliminary data collection in Milestone MS3 (by WP3), along with the data gathering process guidelines indicated to the partners involved in MS3. These preliminary data are also currently under analysis to perform initial tests of the activity recognition for automated balance assessment within the DOREMI protocol.

During the reference period, two meetings of the WP4 coordination team have been held at CNR IFC (29/07 and 19/09/14, Pisa) to refine implementation-level details of the Context-Awareness and Reasoning system and to devise the experimental campaign on the Berg Balance score, including design of the balance scale sensor equipment involved in data collection and of a preliminary script for the data gathering process for the *Balance assessment* task. Between M14 and M15, first tests for balance board system evaluation

(hardware and data gathering process) will be carried out by CNR IFC in collaboration with UNIPI and CNR ISTI. One extended technical meeting has taken place at CNR, including members of CNR ISTI, CNR IFC, UNIPI and AIT (27-28/10/2014) to discuss data structures and interfaces between the DOREMI middleware, the activity recognition components and the reasoning system. In particular, CNR IFC has furnished the clinical specifications for activity recognition system and the specific rules for Physical Activity and Malnutrition to be applied.

Task 4.4: Reasoning system and Personalization (AIT) – M10-M30

The design and the planning of the reasoning and as well as the personalization of the DOREMI system started on month 10. First task have been the screening of appropriate algorithms to provide a flexible reasoning of data which can be easily to be adapted to different demands and data fusions. The Reasoner will be set up using a hybrid approach founding on static rules and probabilistic methods. Multiple-stage decisions refer to decision tasks that consist of a series of interdependent stages leading towards a final resolution. The decision-maker must decide at each stage what action to take next in order to optimize performance (usually utility) or which recommendations to give or to visualize at the dashboard.
For the data handling of the reasoning system the database structure has been defined as well as the data for the first reasoning specified including the data flow (data fusion).

Significant results of WP4

WP4 has successfully released deliverable D4.1 at M8 and has contributed to meeting the following project milestones

- Milestone MS1 at M8, by releasing the requirement analysis and specification for WP4 within D4.1, as well as by contributing to elicit the requirements for the DOREMI middleware developed by WP3.
- Milestone MS3 at M12, by contributing to the definition of the wireless sensor infrastructure that will be deployed in the DOREMI sites as well as by participating to the design and implementation of an experimental campaign targeted at the acquisition of preliminary data for validation purposes.

WP4 has contributed to the design of the high-level DOREMI system architecture throughout a close integrated activity with the project management and the other technical WP2, leading to the characterization of the high-level requirements and workflow of the DOREMI system. On the system design level, WP4 has participated to the characterization of the sensor models in the context of IoT (Internet of Things) middleware systems and has contributed to the identification of MongoDB as the best-suited backend technology for storing sensor data.
As concerns the internal WP4 objectives, WP4 has released, as part of Deliverable D4.1, a detailed requirement analysis and a specification of the services implemented by the smart environment system, a critical analysis of the computational methodology adopted for the activity recognition and reasoning components, as well as the details of the data-format and interfaces of the key software components. Further, WP4 has produced an operational summary of the guidelines for the collection of annotated training data in WP6, to ensure the timely availability of the high-quality annotated data necessary to deploy a validated smart environment system in the final pilot sites.
WP4 contributed to the design of the smart carpet and of an accelerometer and heartbeat data fusion systems from the activity recognition perspective. In particular, UNIPI, CNR ISTI and CNR IFC have designed and implemented an experimental smart-carpet platform for the acquisition of balance-related sensor measurements. Such platform has been used to collect a preliminary set of sensor data that, when enriched with significant labeled samples, will be used for a preliminary phase of training and validation of the activity recognition models.
A preliminary version of Java Software, implementing the main components of the computational learning model for supervised activity recognition, has been developed, together with an initial set of tools supporting model validation and testing.

AIT KIOLA platform have been proposed as an all-in-one solution for the WP4 components concerning the central database, the reasoner and the dashboard.
UNIPI has completed the enrolment of 1 Researcher contracted for the duration of the project.
A paper has been submitted for journal publications on a preliminary experimental assessment of the learning models over benchmark human activity recognition data [1].
[1] Filippo Palumbo, Claudio Gallicchio, and Alessio Micheli. Human Activity Recognition using Multisensor Data Fusion based on Reservoir Computing. Submitted to Journal of Ambient Intelligence and Smart Environments. IOS Press.
A study on the possibility of locating the user in the DOREMI home using only context information from environmental sensors [2] has been submitted and accepted to international peer reviewed journal.
[2] Francesco Potortì and Filippo Palumbo. CEO: a Context Event Only indoor localization technique for AAL. To be issued on Journal of Ambient Intelligence and Smart Environments. IOS Press.

- Deviations from Annex I and their impact on other tasks as well as on available resources and planning (if applicable)

Not applicable

- Reasons for failing to achieve critical objectives and/or not being on schedule and explain the impact on other tasks as well as on available resources and planning (if applicable)

Not applicable

- Explain deviations (if any) between actual and planned person-months (per beneficiary)

During the kick-off meeting it was agreed to switch the end of Tasks 4.2 e 4.3 from M30 to M33.
Starting of the activities of Task 4.4 has been anticipated to M10 to better reflect the synergetic development of the reasoning system with the activity recognition components.

- Corrective actions

Not applicable

2.3.5 WP 5 Development of Social and gamified environment

Work package 5 is dedicated to the aggregation and presentation of the overall gamified active ageing support environment to the different categories of users involved.
The definition of the gamified active ageing protocol that is the main objective of the T5.1 is an activity conducted in parallel with the definition of the medical protocols in WP2. For this reason, in this first part of the DOREMI project, WP5 strictly collaborated with WP2 on the definition of medical protocols, in particular identifying the main structural elements (i.e. physiological data, lifestyle models, inclusion/exclusion criteria).
Furthermore, to design and develop the game-based active ageing environment (Task 5.2), WP5 conducted a market research on cognitive games in order to create an updated state of the art. This analysis also included a study of the technologies and methods usually used to prevent cognitive decline. This analysis was essential for the design and development of a gamified protocol, which must be based on published scientific data and on latest methodologies.
The user-centered design activities started with older people, with the aim to validate the gamified protocols step by step. These activities are still ongoing.
D5.1 was delivered, presenting the gamification of the medical protocols, highlighting important inputs for game development.
Furthermore, a preliminary set of cognitive games prototypes was designed and developed based on evidence presented in D5.1, to be evaluated through user-centered design activities with older people. Several meetings were organized between WP2 and WP5 partners (IMA, CNR IFC, SI4LIFE, DMU) (12/11/2013, 04/02, 25/02, 19/05/2014 Milan; 12/05/2014 Bologna) to discuss requirements and specifications for game environment

- Objectives
  - The generation of multi-parametric flexible serious games both for physical and cognitive stimulation and motivation Dynamic aggregation all the components and services that need to be presented to users, offering older people a coherent and consistent virtual/augmented highly-interactive environment that can be used to access all the available features, providing a guide to both the DOREMI solution usage and the active ageing gamified environment (including training on daily life aspects) also by means of an intelligent virtual companion
  - Promote the development of social communities addressing the areas of engagement proposed in DOREMI (e.g. diet, physical activity, leisure etc.) aiming at stimulating real life social interaction through a proper use of selected and developed game-based/networking/communication services.
  - Integrate the game platform with the Web 2.0 services developed in T7.4 and animated by the involvement of older communities

- Summary of progress towards objectives and details for each task

Task 5.1 Gamified active ageing protocol definition (DMU) – M3-M8

The first step to reach this task was the creation of a specific document to model the active ageing and motivational protocol (D5.1). This protocol started from the medical protocols, finalized in WP2 (D2.1 and D2.2). For this reason, during the first months IMA participated at the common 'working table' with medical partners (CNR IFC and SI4LIFE), trying to generate a unique process (as suggested by CNR IFC). This document was delivered in draft from in M9 for comment by partners and then and delivered in final form in M11.
Starting from the same common 'working table' IMA started to design the user profile module, which will be developed during next phases of the project.
The determination of the suitability of different gamification devices intended for the DOREMI target population is a challenging task, as all participants will have cognitive impairment, commensurate with the specified MMSE score.
As part of T5.1, the proposed gamification mechanisms need to be evaluated with the active participation of older people. Ethics approval for the participatory design activities involving groups of older people in

the UK has been granted (DMU). University ethics committee approval is sufficient if the work does not involve people under the care of the UK National Health Service (NHS) nor uses NHS premises. A framework for the identification and mapping of gamification mechanisms for inclusion in applications and serious games has been developed at DMU.

Task 5.2 Game-based active ageing environment (IMA) – M6-M14

IMA started to design the game-based active ageing module that will be ready by M14 in a working and usable beta version, and will be connected to the different atomic games, including social aspects and also the exergames that will be developed at a later stage.

CNR IFC provided initial specifications for exergames development and started a discussion about diet gamification, integrating data coming from METADIETA software.

Going on this path SI4Life started a preliminary analysis for providing an in-depth description of the games' characteristics and scenarios needed to assess and improve the older person's functionalities in 7 outlined domains (memory, language, attention, calculation, orientation, visual-spatial functioning and praxis). This information include: the kind of data that should be drawn from the games, scores, motivation modes, complexity levels according to functionality levels, sequence of activities to be performed in a time-schedule. Together with IMA these information and descriptions will be discussed, trying to highlight the needed characteristics that cognitive games must have for the outlined domains. At the end of year 1, a preliminary set of cognitive games prototypes was designed and developed.

- Significant results of WP5

D5.1 was delivered (30/09/2014).

The 'active ageing and motivational protocol' was designed and developed in the first draft version, starting from first results of the user centered design activities in Italy and UK and including the evidences presented in D5.1.

A preliminary set of cognitive games prototypes was designed and developed. It has been tested through the user centered design and usability testing activities in Italy and UK.

- Deviations from Annex I and their impact on other tasks as well as on available resources and planning (if applicable)

Task 5.1 was delivered in preliminary form in M9 for comment by consortium partners. Following consultation D5.1 was delivered in final form by the end of M11 (ref. corrective actions §). The impact on the delay on the Task 5.2 timing was minimal and the risk for a consequent delay is very low.

- Reasons for failing to achieve critical objectives and/or not being on schedule and explain the impact on other tasks as well as on available resources and planning (if applicable)

DMU has expertise in the design of serious games, human-computer interaction and gamification within its Faculty of Technology. It has expertise in the psychology of well-being of older people and in evaluating interventions of the type that DOREMI will make within its Faculty of Health and Life Sciences. It was clear from the outset that DMU would provide a multi-disciplinary input to the project. The recruitment of two specialist staff to work on the project took longer than expected with one joining in M5 and the other in M7.

- Explain deviations (if any) between actual and planned person-months (per beneficiary)

According to the budget, DMU would have spent 7 MMs of effort by the end of Month 6 in WP5. However, due to the delayed start in the activities outset, only 2 MM of one staff member have been accounted. The remaining 5 MMs were invested in the extended timing (M8-M11) as proposed in the corrective actions.

- Corrective actions

From the beginning of May (M7), progress on T5.1 accelerated and WP5 caught up with the DOW work plan by the end of M11.

2.3.6 WP6 Validation driven system integration at lab and pilot site

Start of WP6 anticipated at M14 (T6.1) instead of M18 (see section 2.4 “Project management during the period”)

2.3.7 WP7 Exploitation, Dissemination and IPR

This Workpackage is aimed at upscaling at EU level the results achieved by the project.
In the first period of project development the WP7 activities were concentrated on the definition of the communication strategy of the project. To this end the main developments have been the design and development of the project web site and the definition of the dissemination and exploitation.

- Objectives
  - To assess the expected impacts of the project at EU27 level in relation to the emerging trends of the ageing population in EU Member States;
  - To disseminate the project outcomes in EU27 at large through social media and targeted actions;
  - To design and to set up an exploitation process of the project results in line with the specificity of the DOREMI consortium members and the characteristics of the Ageing Marketplace in EU27.

- Summary of progress towards objectives and details for each task

This work package includes the dissemination and exploitation activities of the DOREMI project and will be implemented with the contribution of all project partners under the leadership of CNR, which is in chief of both the dissemination and exploitation tasks. In the reporting period the efforts of the consortium were mainly targeting towards the dissemination of the project. CNR (IFC) has produced the project logo and website, along with the project official presentation template and has issued the first press release.

A list of dissemination events organised or attended by the partners is provided.

Task 7.1 - Development of exploitation and dissemination plan (UOC) – M3-M9

UOC is the task leader. AGE Platform Europe and CNR IFC are the main contributors to this task. All the other partners are involved.
Under this task UOC in collaboration with CNR IFC and AGE platform and with the contribution of the other partners, has produces a set of deliverables aimed at supporting the dissemination and exploitation activities of the DOREMI consortium.
For what concern the dissemination activity, UOC has developed the “Dissemination plan” (D7.1) that contains all the strategies that the consortium wants to apply to engage the stakeholders interested in DOREMI activities and its related outcomes. To this end AGE has contributed to the definition of the stakeholders engagement strategy thanks to its valuable body of knowledge and expertise in the field as well as to its extensive list of contacts. The engagement strategy and the list of potential stakeholders to be engaged have been further systematized by UOC in the deliverable D7.8 (“DOREMI portal”) where it has been described the main engagement strategies that will be implemented during the next two years of the project activity for the on-line engagement of DOREMI stakeholders. In the D7.1 preparation CNR provided its contribution in the description of the DOREMI web site to which UOC has added additional descriptions of possible new media tools that the consortium could use in implementing its dissemination strategy. UOC and CNR IFC have provided detailed descriptions of these tools in the D7.5 (“Dissemination activity toolkit”). Finally, UOC has coordinated the contribution of the DOREMI consortium members in the presentation of their individual dissemination plan as well as it has described the overall dissemination plan at level of the consortium as a whole.
For what concern the exploitation strategy, UOC has coordinated the activity of the D7.2 (“Exploitation plan”) In particular in D7.2, UOC in collaboration with CNR IFC has conducted a market analysis trying to quantify the market segments of DOREMI solution. Then it has coordinated the contribution of the technical partners in order to achieve at a preliminary description of the final DOREMI solution and its main components. This was an important activity for several reasons: first of all it has allow to identify the possible competitors of DOREMI solution and the positioning of the solution itself in comparison with the actual similar solutions existing on the market or foreseen in the next few years; secondly it has laid the bases for the designing DOREMI business plan that is foreseen in the next deliverables (M24 and M36); finally it has allowed to outline a preliminary IPR strategy among the consortium participants which results

are reported in the D7.3.1. Finally, UOC has coordinated the activities of all the consortium members in the definition of their individual exploitation strategy and it has outlined the overall exploitation of the DOREMI consortium as a whole.

Task 7.2 – Market assessment and outline of the business plan (UOC) – M10-M15

UOC has coordinated the preparation of the D7.3.1 ("Updated Exploitation plan and business plan – IPR rules"). The Deliverable was aimed at defining the IPR strategy of the DOREMI consortium. To this end UOC and CNR IFC have designed a questionnaire aimed at collecting the IPR expectations of each member of DOREMI consortium. All the consortium members replied to the questionnaire and the results were elaborated by UOC and reported in D7.3.1. These findings will be used in the next General Assembly of the project to reach an agreement amongst the partners on the IPR of DOREMI solution and to outline a further release of the exploitation plan of the project. This task will also continue the assessment of the competitiveness of DOREMI solution based on the market analysis outcomes provided in D7.2.

Task 7.3 – Impact assessment on Health Care system and on society at large (UOC) – M10-M15; M23-M24; M35-M36

UOC in collaboration with CNR IFC has conducted a literature review in order to define the typologies of health care systems existing in EU28 and to define the most relevant EU28 MSs where DOREMI solution could be exploited. This latter activity was based on the identification of the most sensitive ageing market segmentation criteria that have been used to quantify the size of the potential market of DOREMI solution in each country. The achievements have been included in the D7.1 already discussed in the description of Task 7.1 activity.

Task 7.4 – Dissemination activities (CNR IFC) – M3-M36

CNR IFC developed the DOREMI WEB site (D7.7). All involved partners contribute to the dissemination of the project results under the coordination of CNR IFC. In the section below ("Significant results of WP7") the work performed by each partner in the reporting period is described.

Significant results of WP7

Project website publicly available;
Submission of several deliverables:

- D7.1 dissemination plan (11/08/2014)
- D7.2 exploitation plan (11/08/2014) and its update with business plan (D7.3.1) (11/11/2014)
- D7.5 dissemination activity toolkit (04/11/2014)
- D7.7 DOREMI website and press release (29/05/2014)
- D7.8 DOREMI portal (18/08/2014)

CNR IFC

- Official project logo and project's templates
- Project Management Plan (PMP) including project logo, website and the project's templates. The PMP (Deliverable 1.1) was submitted on 03/01/14.
- Full set-up of the project website, including web pages design and entry of content. The website is operating since mid April 2014 (www.doremi-fp7.eu) and is constantly updated and enriched with new material coming from the consortium partners.
- Facebook and Twitter webpages active and linked to DOREMI website
- Press release
- Newsletter
- DOREMI project presentation in the UK pilot sites (Extra, Accord), organized as workshop during the "Better connected event" West Midlands, June 18, 2014.

UOC

- Exploitation and IPR strategy.
- Dissemination strategy and plan.
- Stakeholders' map and engagement strategy.

CNR ISTI

- No dissemination activity till now has been done by CNR ISTI.

MYSPHERA

- MYSPHERA: participation in the project Kick off meeting on 03/12/2013.

AGE

- Publication of the press release in CoverAGE (AGE Platform monthly newsletter) and ePractice website (AGE Platform)
- Task 7.1: Provision to the Consortium with EU policy insights on DOREMI subjects
- Task 7.4: Presentation of the project in various settings:
  - AGEING WELL newsletter – January issue
  - Presentation of DOREMI at the INNOVAGE Project Meeting (January 2014)
  - Presentation of DOREMI at the B-DEBATE: Impact of Ageing on Mental Health and Well-Being (January 2014)
  - Introduction of DOREMI to AGE Council of Administration (March 2014)
  - Introduction of DOREMI at the HAIVISIO Training (May 2014)
  - Dissemination of DOREMI at the EXPAND Workshop (May 2014)
  - Introduction of DOREMI at the "Get up and Go: Is sitting so bad for older people?" webinar (August 2014)
  - Presentation of DOREMI at EU Marketplace for eHealth & EIP on Active and Healthy Ageing (September 2014)
  - Dissemination of DOREMI at AAL Side event at European Open Days "Why investing in ICT for ageing? A regional perspective" (September 2014)
  - Dissemination of DOREMI at the European Open Days, "Paving the way for eHealth, active ageing and independent living products and services generated by European Research & Innovation projects" (October 2014)
  - Presentation of DOREMI at AGEING WEALTH Conference (October 2014)
  - Dissemination of DOREMI at the conference "eHealth: Independence and Inclusion in the 21st century", AER conference (October 2014)
  - Dissemination of DOREMI at the INTERREG i-Age Final conference (November 2014)
  - Dissemination of DOREMI at the ENGAGED Conference - EHTEL symposium (November 2014)
  - Dissemination of DOREMI at AGE Annual Conference (December 2014)

Accord

- Publication of the press release in the Group news and Our House Newsletter

EXTRA

- ExtraLife Magazine
- Organization of a workshop during the "Better connected event" West Midlands, June 18, 2014, to present DOREMI project

- Deviations from Annex I and their impact on other tasks as well as on available resources and planning (if applicable)

  A revised version of D7.2 will be provided by the end of January 2015. According to the Reviewers' suggestions gathered during the review meeting hold in Brussels at the beginning of December 2014, the new version will contain a preliminary competitive analysis of the main components of DOREMI solution. This activity will also continue in Task 7.2 and then in task 7.3 during the preparation of the intermediate and final exploitation plan.

- Reasons for failing to achieve critical objectives and/or not being on schedule and explain the impact on other tasks as well as on available resources and planning (if applicable)
  Not applicable

- Explain deviations (if any) between actual and planned person-months (per beneficiary)

  No deviation it is foreseen for the revision of the D7.2.

- Corrective actions
  Not applicable

2.4 Project management during the period

- Objectives

The WP1 is the Management work package and will last for the whole duration of the project. Its objective is to set a management structure, techniques and procedures aimed at guaranteeing that:

- the research project is carried out according to the settled time schedule and budget;
- the project objectives are efficiently achieved;
- a system to provide a continuous evaluation feedback and constant project monitoring is created;
- an effective co-ordinated structure is created and maintained;
- the project is managed according to the contract between the DOREMI Consortium and the EC, maintaining a continuous link with the EC;
- overall legal, contractual, ethical, financial and administrative management of the project.

- Consortium management tasks and their achievement

In the first 12 months of the project, management activities have been intense by both the project coordinator as well as the individual participants. The management activities that have been performed in this period were aiming mainly at establishing all these means and infrastructures that are required for the efficient communication and collaboration among the partners, as well as among the project, the EC and the external community. Highlights of activities that have been performed by the consortium in this reporting period can be summarised as follows:

- Preparation of the Grant Agreement, under the responsibility and coordination of the Project Coordinator, CNR IFC. The document was finalised and signed on 23rd October 2013;
- Organisation of the project's Kick-off meeting that took place in Pisa (Italy), on 02/12/2013. The meeting was organised and hosted by the project coordinator;
- Co-organisation of the project's Year 1 Plenary meeting held in Valencia (Spain) on 2-3 October 2014 in collaboration with MYSPHERA;
- Set-up, maintenance and continuous update of the project's mailing lists (doremi-fp7@ifc.cnr.it, technicalcoordinator@doremi-fp7.eu, wpleaders@doremi-fp7.eu, info@doremi-fp7.eu);
- Preparation of the Consortium Agreement under the coordination of CNR-IFC. The document was finalised and signed on 19/03/2014;
- Distribution of the pre-financing (€ 1.420.999,00) from the project coordinator to all partners;
- First amendment of the DoW (now version 05 – July 31st, 2014) following changes of CNR (IFC) and SI4LIFE legal representatives details and modified description of work (third parties description, pages 65 – §B2.3 and 66 - §B2.4);
- Establishment of the project's web-based collaboration tool and repository, operating in the framework of the website as a secure-access private area for consortium members only. The collaboration area is administered with the responsibility of the project coordinator and populated with the contributions of all consortium members;
- Establishment of internal reporting procedures for the more efficient follow-up of the project progress and partners' performance and establishment of all the templates to be used by the consortium for the project's deliverables, documents, reports, presentations and outputs in general (Project Management Plan – D1.1);
- Quality check and submission of deliverables to the Commission;
- Distribution of FP7 guides related to project management, financial handling and general issues to the consortium;
- Establishment of the general management structure and specification of the management bodies ruling the project;
- Constant communication between the consortium members;
- Regular communication and update provided by the project coordinator to the PO.

The table below shows the status of the project tasks.

Table 1: Status of the project tasks

WP no	WP name/ tasks	Leader	Start month	End month	Status
WP1	**Project Coordination and Management**	**CNR**	**1**	**36**	
Task 1.1 Project Management		CNR-IFC	1	36	Active, in progress
Task 1.2 Administrative Management		CNR-IFC	1	36	Active, in progress
Task 1.3 Risk Management and Quality assurance		CNR-IFC	1	36	Active, in progress
WP2	**End user profile and Active Ageing Lifestyle protocol development**	**CNR**	**1**	**12**	
Task 2.1 Target users definition, literature analysis and survey for scenarios of use		CNR-IFC	1	6	Completed
Task 2.2 Active Ageing Lifestyle protocol development		SI4LIFE	2	8	Completed
Task 2.3 Validation Plan		UOC	9	12	Completed
WP3	**Development of WSN environment and autoconfiguration system**	**MYSPHERA**	**3**	**24**	
Task 3.1 Requirements, parameters and sensor selection		MYSPHERA	3	9	Completed
Task 3.2 Sensors development and production		MYSPHERA	6	24	Active, in progress
Task 3.3 Sensor Integration and Middleware		CNR-ISTI	6	24	Active, in progress
Task 3.4 Auto configuration system and calibration		AIT	9	24	Just started
WP4	**Development of a Smart Environment for Context Awareness**	**UNIPI**	**1**	**33**	
Task 4.1: Data preparation and models assessment specification		UNIPI	1	8	Completed
Task 4.2: Activity recognition : explorative data analysis		CNR-ISTI	6	30	Active, in progress
Task 4.3: Activity recognition: predictive machine learning approach		UNIPI	6	30	Active, in progress
Task 4.4: Reasoning system and Personalization		AIT	20	33	
WP5	**Development of Social and gamified environment**	**IMA**	**3**	**24**	
Task 5.1 Gamified active ageing protocol definition		DMU	3	8	Completed
Task 5.2 Game-based active ageing environment		IMA	6	14	Active, in progress
Task 5.3 Exergames development		IMA	13	24	
Task 5.4 Social games development		UOC	13	24	
Task 5.5 Cognitive games development		IMA	13	24	
WP6	**Validation driven system integration at lab and pilot site**	**SI4LIFE**	**20**	**36**	
Task 6.1: Data Collection and pilot site preparation		CNR-IFC	20	30	
Task 6.2: Living lab validation and integration of WSN and Context aware system		CNR-ISTI	20	30	
Task 6.3 Validation of Social and gamified environment through behavioral analysis		UOC	20	30	
Task 6.4 Validation of integrated system and refinement		SI4LIFE	28	36	
WP7	**Exploitation, Dissemination and IPR**	**UOC**	**3**	**36**	
Task 7.1 - Development of exploitation and dissemination plan		UOC	3	9	Completed
Task 7.2 – Market assessment and outline of the business plan		UOC	10	15	Active, in progress
Task 7.3 – Impact assessment on Health Care system and on society at large		UOC	10	15	Active, in progress
Task 7.4 – Dissemination activities		CNR-IFC	3	36	Active, in progress

Problems which have occurred and how they were solved or envisaged solutions

- The Metadieta dietary software problem (WP2) mentioned in the Interim Report was sorted out. The new version of the software with English foods is in progress.
- The smart carpet issue (WP3) described in the Interim Report was solved. Consortium partners decided that the smart carpet would include a balance board to evaluate at the same time stability and weight of the elderly enrolled in the trial. CNR ISTI and CNR IFC are developing this activity in collaboration with UNIPI (activity recognition). Both hardware and software are ready; assembly of the components will be ready by March-April 2015 (M17-M18).
- The 3-month delay in task 5.1 (WP5) is now fully absorbed.
- A new timing of the clinical trial was established. Details are provided below under the project planning and status section.

Quality and Risk Management

The DOREMI project started to implement its quality and risk management procedures on January 2014 by implementing the D1.1 Project Management Plan to ensure consistency on internal processes, procedures,

and outcome generation. The main purpose of D1.1 Project Management Plan was to provide the DOREMI consortium with a detailed handbook for the explanation of a number of procedures and tools to be followed and used for a more effective and a higher qualitative level of the project implementation. The deliverable contents and guidelines were intended for each project participant, either organization and single Researcher, to raise awareness of the project execution management rules that the consortium has to follow in order to maintain an high level of project quality.

The **Scientific and Quality Manager (SQM) of DOREMI** has both the overall technical/scientific responsibility and the quality responsibility for the documentation configuration control of the project, and provides support to the Project Manager in these managements. The SQM monitors compliance of the project progress with the work plan on the basis of quarterly progress reports provided by each Work Package Leader. Furthermore the SQM is in charge of: defining project guidelines for quality control and quality assurance and has the monitoring responsibility on this; coordinating the quality control and quality assurance processes for the project deliverables, publications and dissemination of results. The Scientific and Quality Manager and the Execution Manager (EM) are responsible for the Risk management related activities, namely assessment and contingency.

Deliverable D1.5.1 – Quality and Risk Management report, submitted on 11th November 2014, outlines the achievements in Quality and Risk Management in 2014. The report is based on the evaluation of the project execution based on quality procedures established in the Project Management Plan (PMP) D1.1. The report includes all the results of the project execution review process carried out among the project coordinator and the WP leaders.

While this first Quality and Risk Management report specifically focuses on technical Work Packages in charge for the development of the **modules and components** of the DOREMI platform, namely WP3 - WP4 and WP 5, a more administrative risk assessment was devised on the basis of the Consortium Agreement.

Description of the risk	WP involved	Contingency Plan
One partner fails to achieve project activities/tasks /outputs Impact: high Probability: low	All	The Project Coordination Committee (PCC) will decide whether uncovered project activities can be carried out by one of the other partners. If this is not possible, another partner with adequate expertise will be identified.
One partner is not able to produce deliverable(s) according to the work plan Impact: high Probability: low		Quality and risk management procedures are in place to monitor overall development progress to avoid such risk. In case a partner is not performing well, the PCC will evaluate which action is to be taken, including possibility of a budget reallocation. If this not possible, another partner will be identified and invited to join the project. In the Consortium Agreement a specific section is devoted to manage this kind of risk (Section 4: Responsibilities of Parties); specific management procedures are described for partners who are not able to fulfil their obligations

Changes in the consortium (if any)

Not applicable

List of project meetings, dates and venues

- A complete list of all project meetings (plenary, technical and cross-partner collaboration meetings) held in the first year of the project is given below:

Table 2: List of project meetings

		Type of Meeting	Date	Venue	Participants
D1.2.2 Annual periodic Report (Period 1)	1	Technical Meeting on WP2, WP4, WP5, WP6	12/11/2013	Milan, Italy	CNR IFC, CNR ISTI, UNIPI, IMA, SI4LIFE
	2	Technical Meeting on WP2, WP3, WP4, WP6	26/11/2013	Genova, Italy	CNR IFC, UNIPI, SI4LIFE
	3	Kick-off Meeting	02/12/2013	Pisa, Italy	All partners involved
	4	Technical Meeting on WP2, WP3	03/12/2013	Pisa, Italy	CNR IFC, CNR ISTI, UNIPI, MYSPHERA, UOC, Extra, DMU, SI4LIFE
	5	Skype conference on WP1, WP2, WP3	14/01/2014	N/A	CNR IFC, CNR ISTI, MYSPHERA
	6	Skype conference on WP1, WP2, WP5	14/01/2014	N/A	CNR IFC, CNR ISTI, IMA
	7	Technical Meeting on WP2, WP5	04/02/2014	Milan, Italy	CNR IFC, IMA, SI4LIFE
	8	Technical Meeting on WP2: UK Doremi projects partners	04/02/2014	Birminghan, UK	Extra, Accord
	9	Skype conference on WP1, WP3	24/02/2014	N/A	CNR IFC, CNR ISTI, MYSPHERA
	10	Technical Meeting on WP2, WP5	25/02/2014	Milan, Italy	CNR IFC, IMA, SI4LIFE
	11	Technical Meeting on WP2, WP4	04/03/2014	Pisa, Italy	CNR IFC, CNR ISTI, UNIPI
	12	EC invitation to coordinators of FP7/ICT projects	12/03/2014	Brussels, Belgium	CNR IFC
	13	Technical Meeting on WP2, WP4	03/04/2014	Pisa, Italy	CNR IFC, CNR ISTI, UNIPI
	14	Technical Meeting on WP2	24/04/2014	Milton Keynes, UK	Extra, Accord
	15	Technical Meeting on WP2, WP4	30/04/2014	Pisa, Italy	CNR IFC, CNR ISTI, UNIPI
	16	Technical Meeting on WP2, WP5	12/05/2014	Bologna, Italy	CNR IFC, IMA
	17	Call Conference on WP3	15/05/2014	N/A	CNR IFC, CNR ISTI, UNIPI, MYSPHERA
	18	Technical Meeting on WP2, WP5	19/05/2014	Milan, Italy	CNR IFC, IMA, DMU
	19	Technical Meeting on WP2, WP6	20/05/2014	Milan, Italy	CNR IFC, DMU
	20	Technical Meeting on WP2, WP5	21/05/2014	Milan, Italy	IMA, Si4LIFE
	21	Call Conference on WP4	21/05/2014	N/A	CNR ISTI, UNIPI, AIT
	22	Technical Meeting on WP2, WP3, WP4, WP5	28/05/2014	Pisa, Italy	CNR IFC, CNR ISTI, UNIPI, AIT
	23	Technical Meeting on WP2, WP6	10/06/2014	Pisa, Italy	CNR IFC, SI4LIFE
	24	Technical Meeting on WP2, WP6	17/06/2014	Birminghan, UK	CNR IFC, Extra, DMU, Accord
	25	Technical Meeting on WP2, WP4	01/07/2014	Pisa, Italy	CNR IFC, CNR ISTI, UNIPI
	26	Skype conference on WP3	11/07/2014	N/A	CNR ISTI, MYSPHERA
	27	Technical Meeting on WP2, WP4	29/07/2014	Pisa, Italy	CNR IFC, CNR ISTI, UNIPI
	28	Technical Meeting on WP2, WP4	19/09/2014	Pisa, Italy	CNR IFC, CNR ISTI, UNIPI
	29	Plenary meeting	02/10/2014	Valencia, Spain	All partners involved
	30	Technical meeting on WP3, WP4, WP5	03/10/2014	Valencia, Spain	All partners involved
	31	Skype conference on WP2-WP5	24/10/2014	N/A	SI4LIFE, DMU, IMA
	32	Technical Meeting on WP2, WP4	27-28/10/2014	Pisa, Italy	CNR IFC, CNR ISTI, UNIPI, AIT
	33	Technical Meeting on WP2	31/10/2014	Genova, Italy	CNR IFC, SI4LIFE

In addition to the meetings listed in the table, three meetings took place with the company AKERN (2 meetings) and 1 with ME.TE.DA company that will deliver to the project the impedentiometers and food software respectively.

Project planning and status

The project is progressing in accordance to the specified work plan and timetable as described in the Annex.

Following deviations in time occurred:

During the Plenary Meeting held in Valencia in early October 2014, partners decided the deviations described below.

WP2 – D2.3

Delay submission of D2.3 – Validation Plan from M12 to M17 (March 2015) in order to better define:

- a specific test for the evaluation of the main impairment on which the project focuses, namely the Mild Cognitive Impairment;
- clear criteria for the quantification of social interaction effects of the DOREMI users;
- design of the statistical evaluation process that will be applied on the collected data.

This deliverable is crucial for the project, as it will define the protocol that will be used for the local Ethical Committees applications before the trial starts. A draft version was provided to the EC during M14.

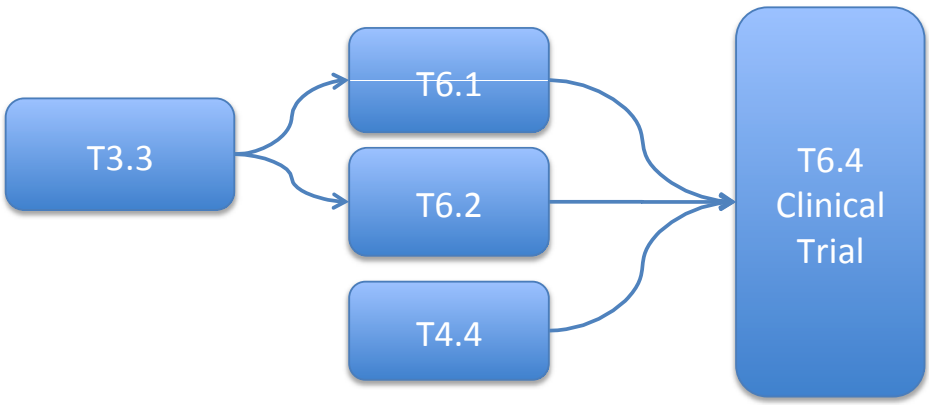
WP6

Timing of this WP was redesigned to ensure a smooth start of the clinical trial (T6.4) at M27 with all preliminary technical aspects arranges on time. In particular:

- Task 6.1 – data collection and pilot site preparation will start at M14 (data collection) instead of M25 and will end at M25 instead of M30.
- T6.2 – living lab validation and integration of WSN and context aware system will be anticipated (M20-M30 → M18-M25). Installation of the DOREMI validated system will take place at M26.
- Task 6.4 – Validation of integrated system and refinement. Clinical and technical partners agreed that the technical installations in the elderly residences would take place at M26 and the trial will begin at M27 instead of M28 starting with the UK. The rationale for this decision is that the UK residences are all very similar in size and design (compared to the Genoa, Italy, residences which vary considerably and are geographically spread out) making initial set up easier.

New timing has an impact on WP3 -Task 3.3 – Sensor Integration and Middleware - to be completed earlier (at M20 instead of M24) that will feed tasks 6.1 and 6.2 as well as on WP4, task 4.4 – Reasoning system and personalization needed for T6.4.
Partner 03 AIT has begun at M10 Task 4.4 (instead of M20) in collaboration with partners 02 UNIPI, 01 CNR ISTI, and CNR IFC.

The figure below summarises main dependencies.



Additionally, apart from the weighting and balance recognition activities, physical activity protocols (not described in the DOW) were included as new activity recognition (T4.2 and T4.3). Clinical partners acknowledged that domestic activity itself was not sufficient, as this does not increase physical activity. For this reason recognition of indoor physical activity protocols were developed (T4.2). The physical activity recognition will start at M14; this will impact on Task 6.1 of WP6 that will start earlier to allow for data collection.

Table 3: WP3, WP4, WP6 timing versus DoW

New timing

		M1-3	M4-6	M7-9	M10-12	M13-15	M16-18	M19-21	M22-24	M25-27	M28-30	M31-33	M35-36
WP3	**OLD**												
	T3.3		**M6**						**M24**				
WP3	**NEW**												
	T3.3		**M6**					**M20**					

		M1-3	M4-6	M7-9	M10-12	M13-15	M16-18	M19-21	M22-24	M25-27	M28-30	M31-33	M35-36
WP4	**OLD**												
	T4.4							**M20**				**M33**	
WP4	**NEW**												
	T4.4				**M10**						**M30**		

		M1-3	M4-6	M7-9	M10-12	M13-15	M16-18	M19-21	M22-24	M25-27	M28-30	M31-33	M35-36
WP6	**OLD**												
	T6.1							**M20**			**M30**		
	T6.2							**M20**			**M30**		
	T6.4										**M28**		
WP6	**NEW**												
	T6.1					**M14**				**M25**			
	T6.2						**M18**			**M25**			
	T6.4									**M27**			

WP7

During the early stages of the project, an agreement was reached between partner UOC and the coordinator concerning the website, initially planned to be developed by UOC. This has entailed a delay in the submission of the Deliverable "D7.7 - DOREMI website and press release for the EC" due at M3 but submitted at M6. To be noted that the press release was issued on time.
Finally, due to a typo in the DoW, end of task 7.1 is indicated at M5 instead of M9.

Project planning with regard to the overall management and coordination includes the continuation of the regular activities ensuring the smooth implementation of the project, i.e.:

- constant communication and collaboration between project participants
- constant communication with the commission's PO
- maintenance and update of the project mailing list, website and collaboration tool
- regular reporting for the efficient follow-up of the project's progress and partners'performance
- organisation of the next plenary meeting, scheduled to take place in Vienna (Austria) at end of September/early October 2015, hosted by partner AIT.

Effort

Total effort spent in the reporting period corresponds to 33% of total project effort.

Table 4 below gives a breakdown of the effort spent per work package and per partner in the reporting period and in relation to the total effort in the DoW.

Table 4: Breakdown of the effort spent per work package and per partner in the reporting period

Workpackage	WP1		WP2		WP3		WP4		WP5		WP6		WP7		TOTAL per Beneficiary	
OVERALL USE OF RESOURCES FOR THE FIRST INTERIM REPORTING PERIOD (1/11/2013 - 30/04/2014)	ACTUAL	PLANNED	ACTUAL	PLANNED	ACTUAL	PLANNED	ACTUAL	PLANNED	ACTUAL	PLANNED	ACTUAL	PLANNED	ACTUAL	PLANNED	ACTUAL	PLANNED
Beneficiary 1- CNR-IFC	*5,60*	*12,20*	*12,70*	*9,00*	*1,80*	*0,00*	*1,45*	*1,00*	*1,90*	*1,00*		*6,00*	*1,50*	*3,00*	*24,95*	*32,20*
Beneficiary 1- CNR-ISTI	*0,20*	*0,50*	*1,00*	*1,00*	*11,50*	*22,50*	*6,51*	*17,00*				*8,00*		*0,50*	*19,21*	*49,50*
Beneficiary 1 - CNR	5,80	12,70	13,70	10,00	13,30	22,50	7,96	18,00	1,90	1,00		14,00	1,50	3,50	44,16	81,70
Beneficiary 2 - UNIPI	0,66	2,00	1,00	1,00	0,91	2,00	12,29	34,00				8,00	0,44	1,20	15,30	48,20
Beneficiary 3 - MYSPHERA	0,48	1,50	1,00	1,00	13,75	41,00						12,00	0,50	3,00	15,73	58,50
Beneficiary 4 - AIT	1,17	1,50	0,97	1,00	2,46	17,00	2,48	10,00				4,00	0,17	2,00	7,25	35,50
Beneficiary 5 - UOC	0,50	1,50	5,01	5,00					4,46	12,00		11,00	3,67	7,60	13,64	37,10
Beneficiary 6 - Extra	0,32	1,50	5,40	7,00	0,13	2,00		2,00	0,05	3,00		14,00	0,15	1,50	6,05	31,00
Beneficiary 7 - IMA	0,90	2,50	0,47	1,00					12,59	30,00		6,00	1,44	3,00	15,40	42,50
Beneficiary 8 - DMU	0,20	1,50	1,13	1,00					14,75	29,00		8,00	0,02	1,50	16,10	41,00
Beneficiary 9 - AGE	0,52	1,80											1,16	12,30	1,68	14,10
Beneficiary 10 - SI4LIFE	0,33	1,00	9,00	12,00	1,00	2,00	0,10	2,00	2,50	8,00		29,00	0,20	1,50	13,13	55,50
Beneficiary 11 - Accord	0,55	1,50	2,19	4,00	0,46	1,00			0,60	2,00		7,00	0,20	1,50	4,00	17,00
TOTAL	11,43	29,00	39,87	43,00	32,01	87,50	22,83	66,00	36,85	85,00	0,00	113,00	9,45	38,60	152,44	462,10

Effort spent per partner is consistent with work activities carried out from the beginning of the project.

Figure 6 shows the effort spent from the beginning of the project in relation to the effort planned in the DoW per WP. WP2, now completed, has spent 93% of the planned effort. Apart from the management (WP1) that has absorbed 39% of the effort, WP5, WP4 and WP3 that started at the beginning of the project and are still running have used 43%, 35% and 37% respectively of the effort so far.

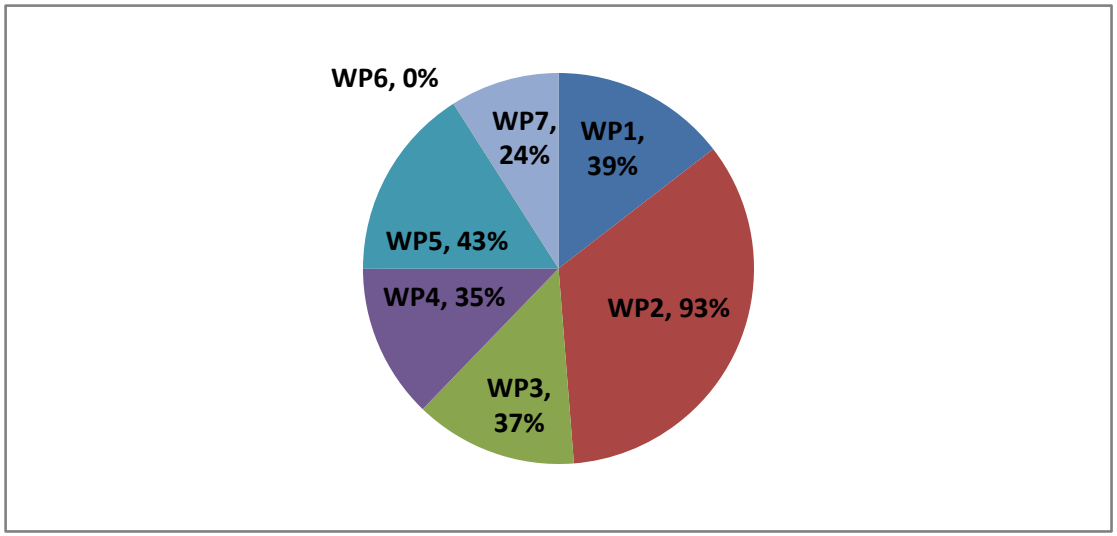
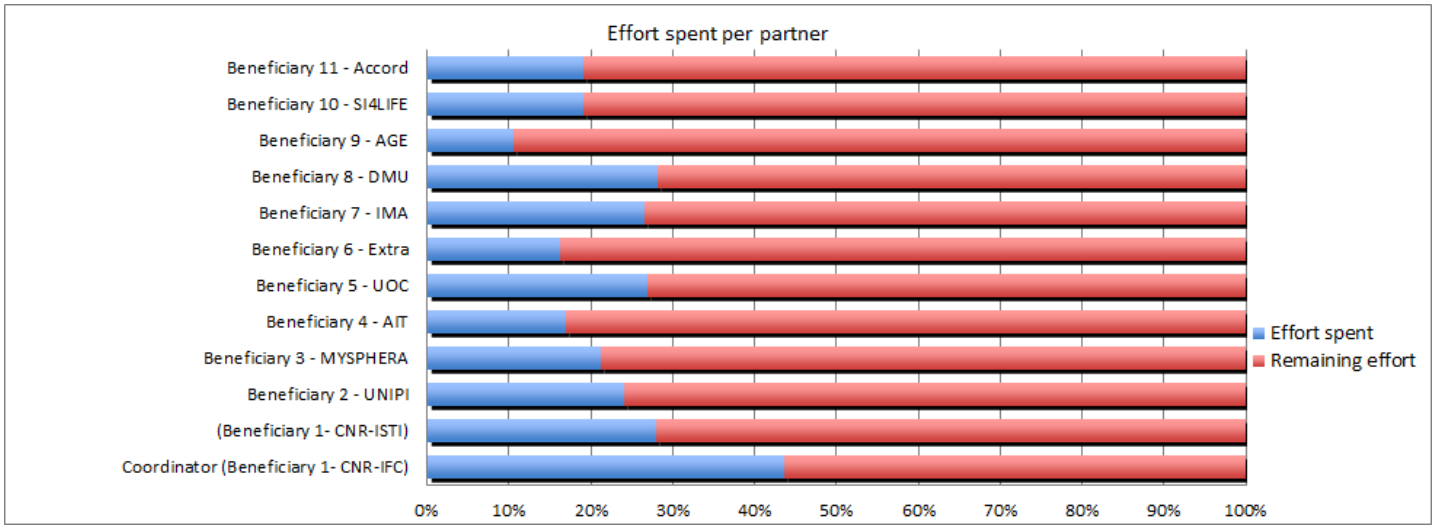


Figure 6: Effort spent per WP

Table 5 provides an overview of spent and remaining effort per partner.

Table 5: Effort spent per partner during the period



When the project commenced, some partners reviewed the work assigned and estimated that the effort assigned would not suffice to perform all activities. Partners listed below will claim more effort throughout the project lifetime although they do not expect to receive more funding than their allocation.

CNR IFC

The coordinator has carried out a number of extra activities that has entailed an increase of the total planned effort, namely:

WP2

- Taking over lead of T2.2 instead of SI4LIFE and drafting of the main sections of D2.2;
- Finalising the physical activity protocols and creating a number of videos to be used in the trial. These videos can also represent a background reference for the development of the exergames;
- Integrating the METADIETA dietary software in the DOREMI solution.

WP3:

- Development of the balance board to assess user stability by activity recognition analysis

WP7

- Development of the website

Moreover**,** Prof. Parodi, the project's coordinator, retired. He is now associated to CNR IFC and is therefore allowed to carry out any project related activities but no costs related to his work (apart from travels and subsistence) can be charged to DOREMI. The Institute will state his effort but this will not lead to more funding.

CNR ISTI

CNR ISTI will develop the smart carpet, an activity initially allocated to partner MYSPHERA. Task 3.2 of WP3 will therefore be increased by 3PMs effort in. In addition, one PM will be added in WP1. New total planned effort is 53,5PMs (instead of 49,5PMs).

DMU

DMU has estimated that the work assigned to them would take 48 MPs rather than the assigned 41 PMs.

Costs

Total costs incurred by the consortium in the period under consideration, amounts to €99.665 (including indirect costs)that represents about 26% of the total project budgeted costs. Breakdown of the costs shows that expenditure relates mainly to personnel costs.

Table 6: Personnel and other major direct costs per partner incurred during the period (without indirect costs)

Personnel, subcontracting and other major Direct cost items					
1st YEAR (1 November 2013 – 30 October 2014)					
n.	Short name	Personnel costs	Other direct costs	Subcontracting Costs	Total costs
	CNR IFC	*€ 98.096*	*€ 6.300*	*€ 453*	*€ 104.849*
	CNR ISTI	*€ 69.718*	*€ 990*	*€ 0*	*€ 70.708*
1	**CNR**	**€ 167.814**	**€ 7.290**	**€ 453**	**€ 175.557**
2	**UNIPI**	€ 65.518	€ 489	€ 0	**€ 66.007**
3	**MYSPHERA**	€ 40.276	€ 1.911	€ 0	**€ 42.187**
4	**AIT**	€ 36.903	€ 4.155	€ 0	**€ 41.058**
5	**UOC**	€ 59.041	€ 506	€ 0	**€ 59.547**
6	**Extra**	€ 29.920	€ 1.810	€ 0	**€ 31.730**
7	**IMA**	€ 64.498	€ 1.173	€ 0	**€ 65.671**
8	**DMU**	€ 63.739	€ 4.805	€ 0	**€ 68.544**
9	**AGE**	€ 7.975	€ 505	€ 0	**€ 8.480**
10	**SI4LIFE**	€ 59.953	€ 1.154	€ 0	**€ 61.107**
11	**Accord**	€ 29.498	€ 2.220		**€ 31.718**
	Total	**€ 625.135**	**€ 26.018**	**€ 453**	**€ 651.606**

As shown in the figures below, expenses concerning the first year are composed of 96% of personnel costs and 4% of other direct costs, which correspond to 625.135€ and 26.018€ respectively.

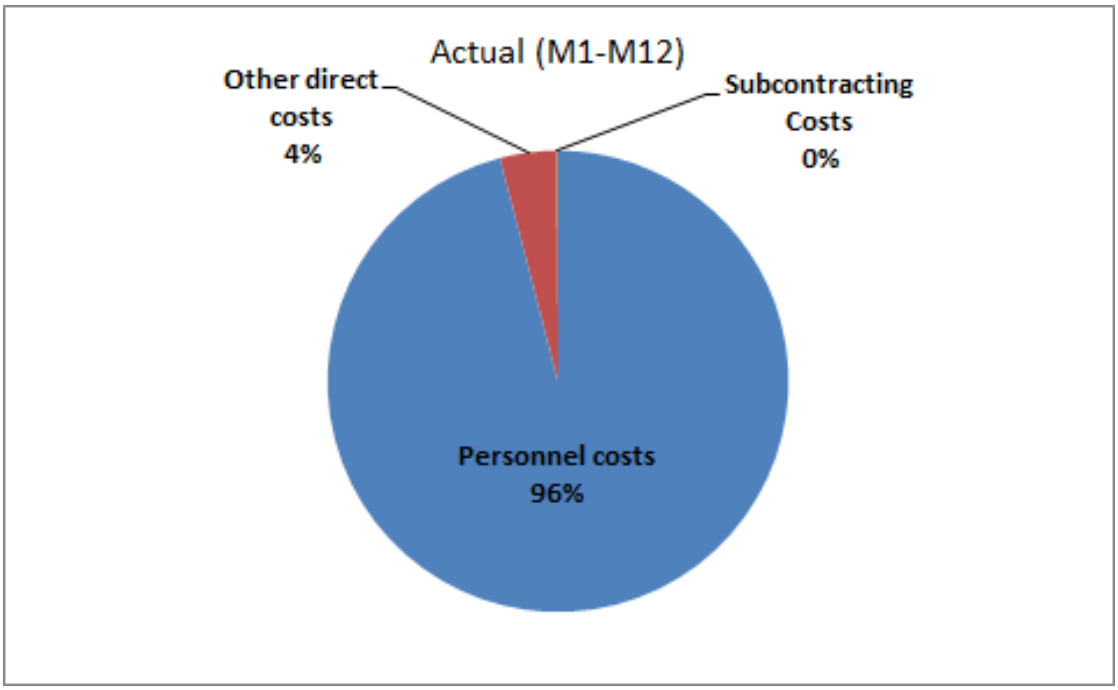


Figure 7: Total costs Year 1 (percentage and figures)

RTD costs represent 84% of the total costs while 16% refer to the management category, which includes also dissemination costs.

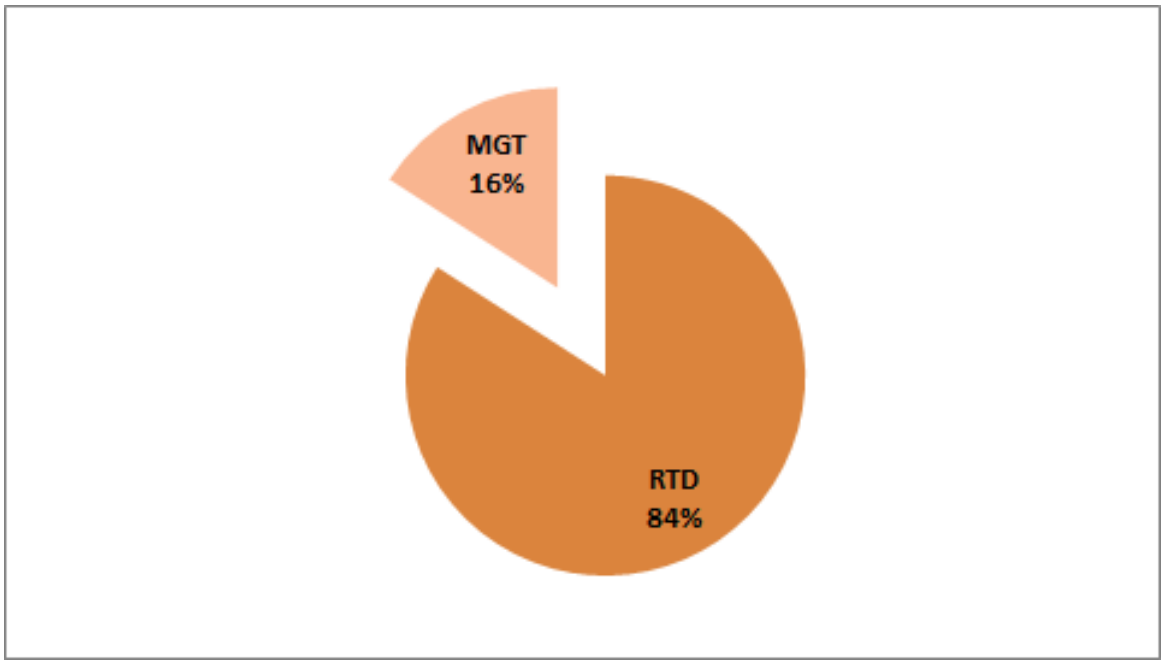


Figure 8: Percentage of RDT and MGT costs of Year 1

Total costs for the first year over the DoW show that 28% of the resources have been used to cover personnel costs while 10% for other direct costs.

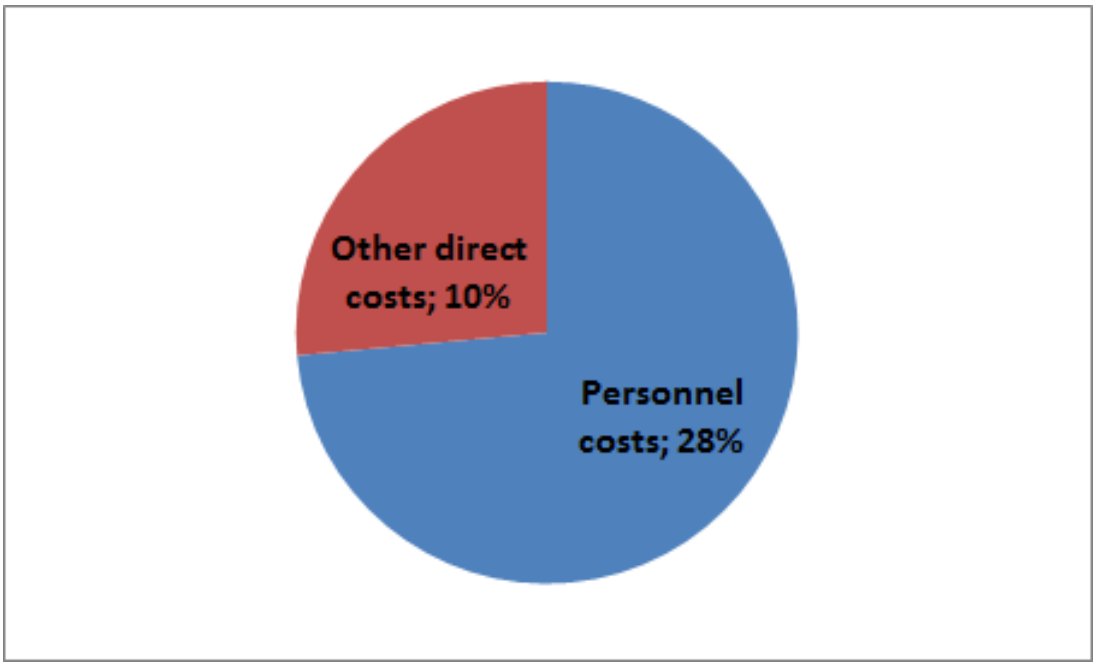


Figure 9: Total costs over DoW

Partner DMU notified the coordinator that there were issues with the Person Month rate of €3,850 assigned to them. Normally DMU would have requested a budget of €4,500 to €5,000 per Person Month (depending on staff involved). DMU did not want to withdraw from the project so agreed to operate with this budget in the knowledge that it would be exceeded during the life of the project. DMU also reviewed the staffing requirements and were able to staff the project with an estimated person month rate of €4,000 to €4,250. It will be DMU's intention to state actual costs in Form C y even if this is over budget. DMU do not expect to receive more funding than their allocation.

- Impact of possible deviations from the planned milestones and deliverables (if any)

Deviation from the planned submission timing of D2.3 will not impact on the project activities.

- Changes of the legal status of any of the beneficiaries (if any)

No changes in the legal status of the partners occurred.

CNR Institute of Clinical Physiology CNR has a new legal representative (Giorgio Iervasi instead of Eugenio Picano) as of 1st May 2014 but there was no change of the legal status.

SI4LIFE has new President and CEO. Dr. Francesco Costa was appointed as CEO as of 30th June 2014 instead of Dr. Angleo Bedin. Dr. Andrea Rando is the new President as of 20th June 2014.

- Development of the project website (if applicable)

The DOREMI project has established and operates its official website (www.doremi-fp7.eu) since mid-April 2014 under the responsibility of the Coordinator, CNR IFC. The website is structured in two distinct components, a freely-accessed public area and a securely accessed (password protected) internal space. Therefore, the website serves a two-fold purpose, the internal project collaboration and work management as part of the objectives of WP1, Project Management, along with the external dissemination of the project's objectives and achieved results as part of the objectives of WP7, Dissemination and Exploitation.

The public area of the website provides all the information relative to the project that is publishable and desirable to be exposed to the widest possible audience in order to enhance the project's visibility and its potentials to interact with other relative projects and initiatives. It comprises the main dissemination tool of the project and is constantly updated with all relative information and material as it gradually becomes available.

The internal area can be accessed by the project members only, and operates as a web-based collaboration tool and repository, collecting all project materials and information so that they can be easily retrieved and downloaded by the partners. Additional functionalities may be implemented in the time-course of the project.

- Co-ordination activities during the period (communication between beneficiaries, possible co-operation with other projects/programmes)

DOREMI is outward-looking and welcomes expressions of interest in collaboration. Over the first year of activity several contacts in terms of possible collaborations with other consortia took place.

Collaboration with NU-AGE, an FP7-KBBE funded project that seeks to demonstrate how, by dietary means, it could be possible to counteract and/or slow down the process of ageing, including decline of cognitive function, was officially approved and started in September 2014.

There are permanent discussions between all members of the Project Coordination Committee.

3. DELIVERABLES AND MILESTONES TABLES

3.1 Deliverables

Table 7: List of Deliverables

TABLE 6. DELIVERABLES										
Del. no.	**Deliverable name**	**Version**	**WP no.**	**Lead beneficiary**	**Nature**	**Diss. level[3]**	**Delivery date from Annex I (Project month)**	**Actual/ Forecast delivery date**	**Status Not submitted/ Submitted**	**Comments**
D1.1	Project Management Plan	1	1	1 CNR	R	PP	1	03/01/2014	Submitted	
D2.1	Target users and scenarios of use	1	2	1 CNR	R	PU	6	24/04/2014	Submitted	
D1.2.1	Interim Progress Report (Period 1)	1	1	1 CNR	R	PU	6	16/05/2014	Submitted	
D7.7	DOREMI web site and press release for the EC	1	7	5 UOC	P	PU	3	29/05/2014	Submitted	
D2.2	Active Ageing Lifestyle Protocol	1	2	10 SI4LIFE	R	PU	8	07/07/2014	Submitted	
D4.1	Data preparation and models assessment specification	1	4	2 UNIPI	R	PP	8	07/07/2014	Submitted	
D3.1	Specification of Wireless Sensor Network for LifeStyle	1	3	3 MYSPHERA	R	PP	9	11/08/2014	Submitted	

[3] **PU** = Public
PP = Restricted to other programme participants (including the Commission Services).
RE = Restricted to a group specified by the consortium (including the Commission Services).
CO = Confidential, only for members of the consortium (including the Commission Services).
Make sure that you are using the correct following label when your project has classified deliverables.
EU restricted = Classified with the mention of the classification level restricted "EU Restricted"
EU confidential = Classified with the mention of the classification level confidential " EU Confidential "
EU secret = Classified with the mention of the classification level secret "EU Secret "

	Protocol implementation									
D7.1	Dissemination plan	1	7	5 UOC	R	PU	9	11/08/2014	Submitted	
D7.2	Exploitation plan	1	7	5 UOC	R	CO	9	11/08/2014	Submitted	*Resubmitted on 05/09/2014 due to formatting problems*
D7.8	DOREMI portal	1	7	5 UOC	P	PU	9	18/08/2014	Submitted	
D5.1	Gamified active ageing protocol	1	5	8 DMU	R	PU	8	30/09/2014	Submitted	
D7.5	Dissemination activities toolkit	1	7	1 CNR	O	PU	12	04/11/2014	Submitted	
D7.3.1	Updated Exploitation plan and business plan	1	7	5 UOC	R	CO	12	11/11/2014	Submitted	
D1.5.1	Quality and Risk Management report	1	1	1 CNR	R	CO	12	17/11/2014	Submitted	
D2.3	Validation plan	DRAFT	2	5 UOC	R	PU	12	25/11/2014	Submitted	*Submitted as draft version*
D1.2.2	Annual Periodic Report (Period 1)	DRAFT	1	1 CNR	R	PU	12	05/12/2014	Submitted	*Submitted as draft version*
D1.2.2	Annual Periodic Report (Period 1)	FINAL	1	1 CNR	R	PU	12	23/12/2014	Submitted	

3.2 Milestones

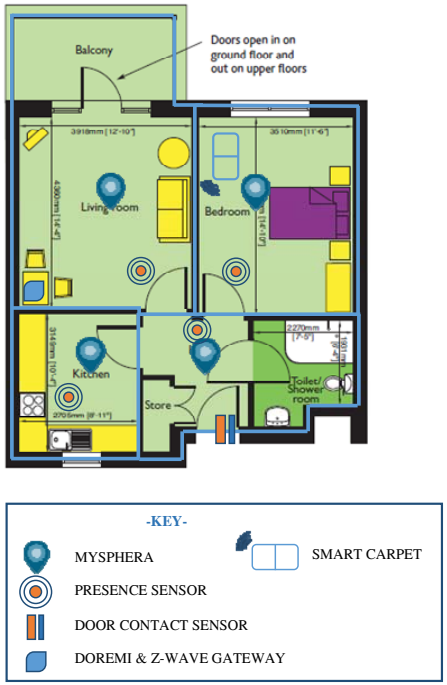
Table 8: List of Milestones

TABLE 7. MILESTONES							
Milestone no.	**Milestone name**	**Work package no**	**Lead beneficiary**	**Delivery date from Annex I**	**Achieved Yes/No**	**Actual / Forecast achievement date**	**Comments**
MS1	The Active Ageing Lifestyle protocol	WP2, WP3, WP4, WP5	1 CNR	Month 08	Yes	07/07/2014	Deliverable D2.2 Protocol approved and submitted to the EC. Content translated in functional requirements in WP3, WP4 and WP5.
MS2	Final Selection of the sensors	WP3	3 MYSPHERA	Month 09	Yes	30/09/2014	Final list approved by the clinical partners according to the parameters identified in the protocol
MS3	Preliminary data set collected from the selected sensors available for the data driven model of the context aware system	WP3, WP4	3 MYSPHERA	Month 12	Yes	Achieved	Approval of the final list of data by the WP3 leader and the SQM.

ANNEX I PILOT SITES BLUEPRINTS

typical one bedroom apartment

Gross Internal Area: 55.06m² (592.66ft²)



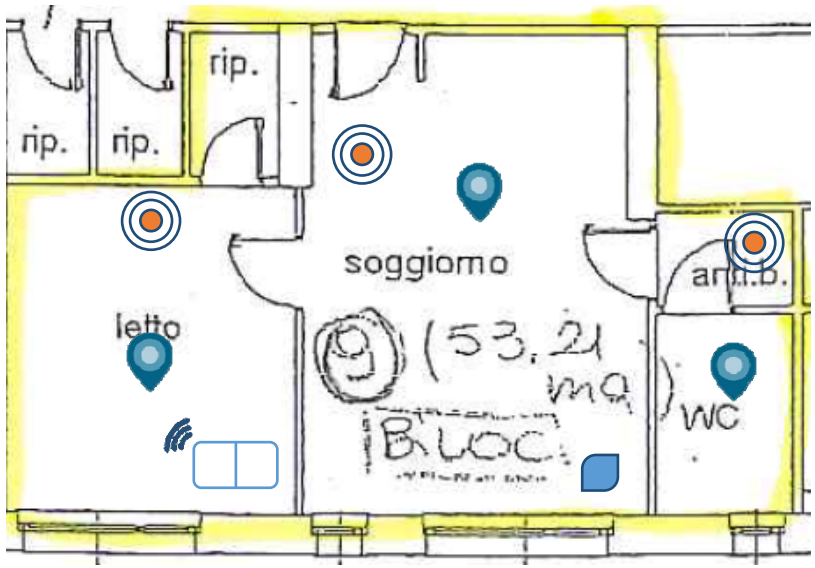
typical two bedroom apartment

Gross Internal Area: 75.85m² (816.44ft²)

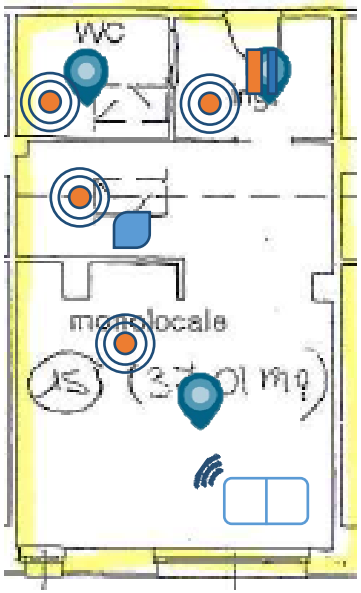
Milton Keynes (UK)

Seregno (Italy)

Type 1 apartment



Type 2 apartment



-KEY-

MYSPHERA BEACON

SMART CARPET

PRESENCE SENSOR

DOOR CONTACT SENSOR

DOREMI & Z-WAVE GATEWAY

MYSPHERA WIRELESS BEACON (under development): It needs a power socket. It can be mounted in the ceiling or in the walls.
PRESENCE SENSOR: 100% wireless (fed with 3xAA batteries). It can be mounted (for instance, with double-sided tap) to a wall or in the ceiling.
DOOR CONTACT SENSOR: 100% wireless, it is fixed to a door (it has two part, one for the door post and other for the door itself) with double sided tap.
DOREMI & Z-WAVE GATEWAY: Two different devices, both need to be plugged and both need wired internet access (Ethernet).

Room selection

Since the selection of individuals is still on-going by the pilot partners in each pilot site, actual rooms cannot be highlighted in the provided maps. This information will be updated as soon as the final selection of uses will be completed.

Sensor distribution

The current sensor distribution could be slightly modified according to WP4 Activity recognition feedback given based on preliminary Dataset analysis.

Devices per room

The count of devices per room according to the preliminary information provided by pilot sites will be the following:

Device	Milton Keynes 1 room	Milton Keynes 2 rooms	Seregno with soggiorno	Seregno monolocale
MYSPHERA Beacon	4	5	3	3
Presence Sensor	4	5	3	4
Door Contact Sensor	1	2	1	1
DOREMI gateway	1	1	1	1
Z-Wave gateway	1	1	1	1
Smart carpet	1	1	1	1

END OF DOCUMENT