

Project acronym	INCARE
Project number	AAL-2017-059-INCARE
Project full name	Integrated Solution for Innovative Elderly Care
Dissemination level	Public
Type of deliverable	Report
Contractual Date of Delivery	M5
Actual Date of Delivery	M5 revised after the change in DoW
Deliverable Number	D4.3
Deliverable Name	Quality Assurance Plan
Work package / Task	WP4 /Task 4.3
Work package responsible / Task responsible	CITST/CITST
Number of Pages	13
Contributors	CITST
Version	4

Abstract

This document is presenting the Quality Assurance Plan (QAP) for the INCARE project. It comprises an overview of the INCARE project and workplan along with the organization of the management team which ensures that the proposed work is delivered in time and at a high level of quality. Risk management, risk analysis and contingency plans are also presented based on their identification at the proposal stage. If identified, additional risks will be added along the project progress along with the measures implemented to correct them.

Table of Contents

ABBREVIATIONS.....3

List of Figures3

List of Tables.....3

1 Executive summary5

2 Introduction.....5

3 Project overview.....5

4 Project implementation.....6

5 Project management structure.....8

6 Risk management.....9

7 Quality assurance assessment 10

 1.1 Quality assurance framework 10

 1.2 Quality assurance metrics..... 11

8 Conclusions..... 12

ABBREVIATIONS

AAL	Active and Assisted Living
INCARE	Integrated Solution for Innovative Elderly Care
QAP	Quality Assurance Plan
QAA	Quality Assurance Assessment
QAM	Quality Assurance Metrics
DoW	Description of Work
WP	Work Package
ICT	Information and Communication Technologies
NITICS	Networked InfrasTructure for Innovative home Care Solutions
RAPP	Robotic Applications for Delivering Smart User Empowering Applications
FP	Framework Program
EC	European Commission
CO	Project Coordinator
KPI	Key Performance Indicators

List of Figures

Figure 1. INCARE user level functionalities.6

Figure 2. Gant diagram showing also interdependencies between tasks in WPs.6

List of Tables

Table 1. Work package (WP) overview list7

Table 2. Deliverables overview list.....7

Table 3. INCARE defined management processes and corresponding methodologies. 11

Table 4. KPIs for the INCARE technical QAMs..... 12

1 Executive summary

This document is presenting the Quality Assurance Plan (QAP) for the INCARE project. It comprises an overview of the INCARE project and workplan along with the organization of the management team which ensures that the proposed work is delivered in time and at a high level of quality. Risk management, risk analysis and contingency plans are also presented based on their identification at the proposal stage. If identified, additional risks will be added along the project progress along with the measures implemented to correct them.

The structure of this deliverable is as follows:

Section 1 – “Executive Summary”

Section 2 – “Introduction” which is presenting the scope of the current deliverable

Section 3 – “Project overview” is an overview of the INCARE project

Section 4 – “Project implementation” is presenting the work packages and the description of work (DoW) as well as the project deliverables and timing

Section 5 – “Project management structure” is presenting the overall project management approach

Section 6 – “Risk management” is presenting the identified risks and the corresponding management strategies

Section 7 – “Quality assurance assessment” describes the framework and measures for quality assurance.

Section 8 – “Conclusions”

2 Introduction

This document summarizes all the Quality Assurance procedures that will be followed by the INCARE consortium and external bodies (e.g. Project Advisory Board) in order to guarantee a high quality of the performed work and reaching the INCARE objectives. These procedures are to be seen as a firsthand guideline of the INCARE consortium which can be enriched during the project progress. Consequently, it represents a dynamic means to ensure the desired level of work quality.

One important aspect that this is addressing, are the risks that can be encountered during the INCARE project. Some of these risks have been identified at proposal level. Other risks might be foreseen during the course of the project. Also, unforeseen risks can appear for which the consortium will need to implement corrective measurements and suitable mitigation actions. All these risks will be added to the current deliverable during the project progress.

3 Project overview

The European population is ageing and tends to live longer and independently which requires them to have a good quality of life in their daily environment. It is time for the European Commission (EC) Active and Assisted Living Joint Programme (AAL JP) to integrate the technological solutions brought about by the national and European funding programs into viable products for sustainable elderly care. In this respect, there is a lack of complex but well

integrated solutions that are intuitively usable, adaptable, and take into consideration the user’s life span dimension. The “Integrated Solution for Innovative Elderly Care” – INCARE project addresses precisely these aspects. Its main objective is to build upon two successful platforms (AAL-NITICS and FP7-RAPP) a new readily available product whose seamless operability and modularity are demonstrated in extensive end-user pilots that help its fast uptake by the market. We will start from previously validated user insights and will use a co-creation approach to tune the INCARE solution. Pilots carried out in four different countries, *i.e.* Poland, Slovenia, Romania and Hungary, will not only aid the development but will also bring evidence about the effectiveness of the INCARE solution. At larger scale, our aim is to increase awareness and strengthen the trust of primary, secondary and tertiary users (especially policy makers) in the positive effects and huge potential of high-tech AAL solutions, including realistic use of robotic platforms.

The INCARE project builds on two successful solutions developed within previous AAL and European projects and designed for supporting elderly people and their caregivers:

- NITICS (Networked InfrasTructure for Innovative home Care Solutions) funded within the AAL 2012 call ([NITICS webpage](#))
- RAPP (Robotic Applications for Delivering Smart User Empowering Applications) funded 2013-2016 by the EC through the 7th Framework Programme FP7 ([RAPP webpage](#))

The selected platforms offer complementary functionalities and services to elderly and their caregivers. Within INCARE, we will extent the platforms with new technologies and services for both indoor and outdoor support. (see Figure 1).

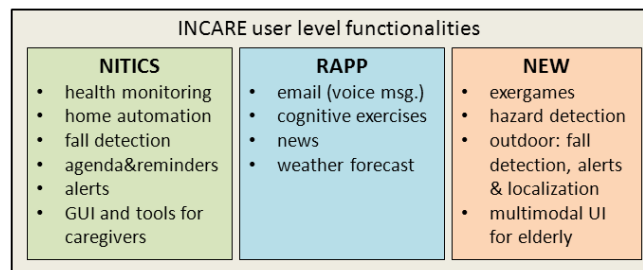


Figure 1. INCARE user level functionalities.

4 Project implementation

The work to be carried out in the project is divided into 4 work packages (WPs). The succession in time of the tasks in all WPs and their interconnectivity is given in the Gant diagram in Figure 2.

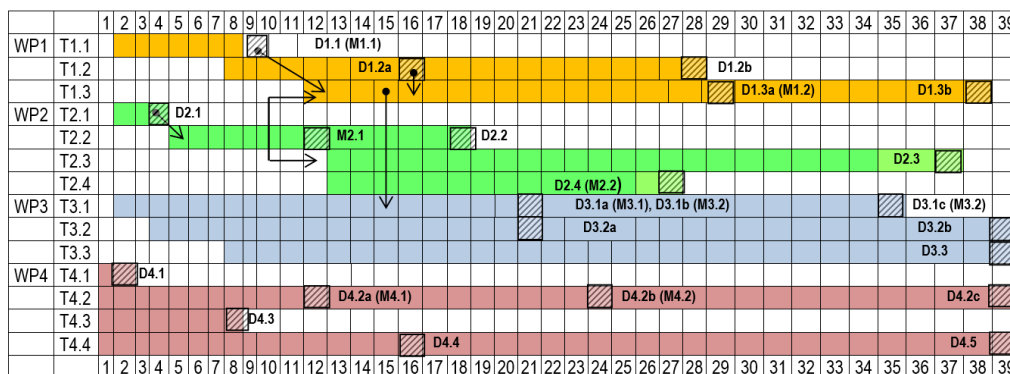


Figure 2. Gant diagram showing also interdependencies between tasks in WPs.

Each WP is comprised of several tasks, each task corresponds to an activity or group of activities having a common goal. Each WP is coordinated by one of the partners but tasks within a WP can also have a different leader if his expertise is more appropriate. Due to the user centered design approach of the project which requires end-user organizations to work hand in hand with technical partners, all partners are involved in all tasks. Technical partners will get continuous feedback from end-user organizations. At the same time, end-user organizations need to stay connected to the technical development in order to be able to answer user’s questions on the various aspects of the technology (e.g. risks, data protection, security). WP1 is dedicated to involving users in all aspects of the project. The user’s needs, expectations and acceptance of the ICT technologies in the integrated platforms will be covered by previous surveys within the consortium partners and available statistics. Thus, WP1 is focusing on preparing and conducting pilot studies. WP1 will give input to WP2 for technical development and to WP3 for business development. WP2 will start in M2 and is dedicated to the integration of NITICS and RAPP as well as to the development and integration of new components. Lab testing of the new components with end-users is also part of this task. Integration through RAPP of robotic platforms to be used in WP1 is also foreseen. Several platforms are considered. The choice will be made based on the architecture developed in T2.1 (see Figure 2). WP1 and WP2 are tightly connected as WP1 will give feedback to WP2 which will tune the INCARE platform and will provide improved versions to the pilot studies. WP3 is designing business models, involving stakeholders and disseminating project findings. It extends over the whole project duration (M1-M39). WP4 conducts management (both external and internal) throughout project (M1-M39). All partners are involved in a continuous cooperation of end-user organization, technical teams and business partners such as to optimize the design for target users within functional, technical and cost specifications. The main involvement of the consortium partners can be summarized as: (1) artificial intelligence, machine learning and multimodal interfaces (UPB); (2) robotics and ROS (WUT, CITST); (3) security, communication, standards (EXYS); (4) end-users involvement (STOCZNIA, IZRIIS, BZN, CITST); (5) ethical issues (STOCZNIA, BZN, IZRIIS); (6) gamification (UPB, SOFTIC); (7) business development (EXYS, SOFTIC, CITST).

The list of WPs and deliverables is given in the tables below (Table 1 and Table 2).

Table 1. Work package (WP) overview list.

WP	WP title	Type	Lead partic. n°	Lead partic. name	PM	Start Month	End Month
1	<i>Primary and secondary user involvement and pilot studies</i>	RTD	6	STOCZNIA	117	M2	M38
2	<i>Platform design, implementation and integration</i>	RTD	3	UPB	153	M2	M37
3	<i>Dissemination and exploitation strategy</i>	DEM	2	EXYS	60	M2	M39
4	<i>Project Management</i>	MGT	1	CITST	21	M1	M39
	TOTAL				351		

Table 2. Deliverables overview list.

Del. n°	Deliverable name	from WP n°	Nature/type of deliverable	Dissemination level	Delivery date
---------	------------------	---------------	-------------------------------	------------------------	------------------

D1.1	End-user classification and recruitment report	1	Report	Restricted	M9
D1.2a	Intermediate report on pilots setup	1	Report	Restricted	M16
D1.2b	Final report on pilots setup	1	Report	Restricted	M28
D1.3a	First report on pilot studies	1	Report	Public	M28
D1.3b	Second report on pilot studies	1	Report	Public	M38
D1.4	Report on the exit strategy	1	Report	Restricted	M38
D2.1	Report on system architecture	2	Report	Restricted	M4
D2.2	Report on platform integration	2	Report	Restricted	M18
D2.3	Report on platform tuning and optimization	2	Report	Restricted	M37
D2.4	Report on newly developed components	2	Report	Restricted	M27
D3.1a	Intermediate Business plan and business model*	3	Report	Restricted	M21
D3.1b	Exploitation plan*	3	Report	Restricted	M21
D3.1c	Final Business plan/Business model	3	Report	Restricted	M35
D3.2(a,b).	Regular reports on stakeholder concerns and demonstrator sessions	3	Report	Restricted	M18; M39
D3.3	Scientific dissemination report	3	Report	Public	M39
D4.1	Internal Communication Infrastructures	4	Report	Restricted	M2
D4.2(a,b,c)	Calendar year report*	4	Report	Restricted	M12; M24; M39
D4.3	Quality Assurance Plan	4	Report	Public	M5
D4.4	Mid-term review questionnaire*	4	Report	Restricted	M21
D4.5	Final report*	4	Report	Public	M39

NOTE: This section has been updated after the extension of the project in 2020 and the change in DoW.

5 Project management structure

The INCARE overall management approach is explained in the DoW and its focus is to accomplish all scientific, technical, organizational, financial, contractual and commercial project goals within the given budget and time constraints. This requires a very efficient, clear and well-structured project organization. Of particular importance is the clear distribution of responsibilities as well as an efficient communication policy. A thorough project assessment system and an underlying risk management system will assure the proper achievement of the

project’s objectives. The organizational structure is streamlined in order to reach the following goals:

- Involvement of all project partners in the decision-making procedures;
- A clear and efficient decision structure;
- Mechanisms for the prevention of conflicts and for resolution of disputes;
- A management which ensures an in-time, high-quality and within-budget project performance.

All of the mentioned tasks, responsibilities and roles are defined in such a way that unnecessary work load and interaction between the different Consortium’s partners is avoided while an efficient and transparent workflow is guaranteed. The different roles and responsibilities within the project are allocated according to the individual strengths and expertise of each project member.

6 Risk management

Project risk management applied to INCARE includes the processes concerned with conducting risk management planning, identification, analysis, responses, monitoring and controlling. It is very important that potential project risks are timely identified and assessed. These risks can be classified into the following major groups: (1) involvement of end-users (especially elderly); (2) partner problems (e.g. a partner is underperforming or a partner is leaving the project); (3) project execution risks (e.g. key milestones or critical deliverables are delayed); (4) financial risk (e.g. performing the agreed tasks within the agreed budget); (5) technological risks (e.g. key technologies or components don’t perform according to expectations or become discontinued); (6) risks related to a conflict of interests (e.g. consortium partners cannot agree because of opposite interests); (7) market and user related risks (e.g. the market environment or the users’ views change and results become obsolete); (8) risks related to competition (e.g. a competing solution comes up and makes the results less valuable). In this context, a risk table will be set up at the beginning of the project for all risks with medium or high probability and major impact on the project itself, possible countermeasures as well as contingency plans will be discussed and fixed within the project consortium. These specific risks will be carefully tracked during the project as “risky items”.

The Project Coordinator (CO), assisted by the project members, is responsible for coordinating and monitoring all risk management activities. All participants and in particular the WP Leaders shall inform the CO about any newly identified risk or any event that implies a change in the risk assessment. The project work-in-progress will be continuously monitored for new and changing risks. A regular review of the risk table will be performed during conference calls and meetings. A summary of identified risks and potential solutions is shown in the table below.

NOTE: Rows colored in gray are risks which were added during the course of the project.

Risk	Contingency plan	Probability	WP
Needed technologies/software-packages, already integrated in the NITICS and RAPP platform have been disconnected or are not supported anymore.	A similar solution will be sought and integrated. Negative impact is kept at a minimum due to the modular structure of the platform	Medium	2
Involvement of elderly users proves to be	Alternative plans will be prepared to face the recruiting difficulties, e.g. maximize the	High	1

difficult and recruiting process slow.	benefit/burden ratio by carefully taking into account the vulnerability of the users.		
End-users withdraw from field tests	Replace them with users of the same profile with the help of the end-user organizations	Small	1
Services do not meet user expectations	Extensive end-user involvement and co-creation approach which allows for an iterative design through feedback loops	Small	1,2
Delays in delivering products	Monitor, management, realistic planning, time buffers. Despite these actions, we had to change the DoW and extend the project because of the pandemic situation	High	4
Financial risk (e.g. performing the tasks within the agreed budget)	All partners and mainly the CO must review the budget issues and monitor costs during the whole project	Medium	all
Competitiveness of the proposed solution	Follow-up market survey and adapt solution	Small	4
Intellectual properties sharing issues	Clear definition of IP strategy between all the involved parties (consortium agreement) at project start.	Small	4
End-users in care facilities became unavailable because of the COVID-19 pandemics	We had to plan for individual users to be involved in the pilots and thus extend the project, decrease the number of users in the pilots and their duration	High	1

7 Quality assurance assessment

The purposes of the Quality Assurance Assessment (QAA) are:

- to establish a common practice among the INCARE partners about quality procedures,
- to assist each partner in implementing such procedures in his environment,
- to provide each partner and the AAL Central Management Unit (CMU) with sufficient insights on the consortium and its quality practices.

1.1 Quality assurance framework

This QAA pursues two objectives:

- to ensure quality of the INCARE project management and consequently, of all its deliverables,
- to establish measurement criteria that allow the verification of the success of the INCARE project.

The INCARE work shall follow a set of procedures that ensure the quality of deliverables. These procedures are used for the QAA together with other useful administrative information (contacts, document templates, document list, abbreviations, management structure, project Web site, agenda and minutes templates).

The agreed procedure is the following:

- The task leader (unless otherwise specified, the task leader is the WP leader) provides, unless otherwise agreed among task participants, an initial table of content for the deliverable corresponding to the given task;
- The table of content is subject to the agreement by all partners involved in the task;
- The sections in the table of content are distributed by the task leader to the partners who have implemented the task and are responsible for preparing the deliverable;
- The contributions received from the partners are integrated by the task leader who is preparing the first complete version of the deliverable;
- The deliverable is subject to the evaluation of two WP leaders;
- The final deliverable is prepared based on the received WP leaders’ feedback.

1.2 Quality assurance metrics

It is important to define and use metrics that can enable the INCARE Consortium to measure the success of the project intended investigations. The INCARE Quality Assurance Metrics can be categorized into management-oriented QAMs that are more related to the management procedures that will be followed in the INCARE framework and technical-oriented ones that are mapped described to the key performance indicators.

The QAMs that are mapped to the project management can be expressed in terms of level or degree of fulfillment or implementation of the deliverables, financial management, etc. Several management bodies and were defined in the DoW and in D4.1 in order to guarantee that the INCARE project is executed in a very professional (see Table 3).

Table 3. INCARE defined management processes and corresponding methodologies.

Process/Methodology	Description
Communication Infrastructure and Meetings	<p>For the success of the overall project, it is quite important that each project member is kept up to date on the present status of the project, work completed, the next steps, the outcome of meetings, the allocation of tasks as well as has access to all official documents/information. Therefore, an efficient and continuous communication is vital for any project.</p> <p>Within the project INCARE the following communication channels will be used beside physical meetings:</p> <ul style="list-style-type: none"> • e-mail lists and phone calls for communication; • an Internal Communication Platform created on google.drive will keep all the information regarding the working work packages, meeting minute, partners information (mail list, skype Ids, phone numbers). • Telephone (video) conferences in order to intensify team work between physical meetings. • Of special interest is the professional organisation of the first project meeting (Kick-off meeting). • For all meetings a clear and well structured agenda will be circulated among the participants to allow them to prepare themselves for the meeting. After each meeting minutes will be distributed within the project consortium. The chairperson of the meeting will also be responsible to create a productive

	working environment.
Financial Management	Financial Management covers financial planning, budgeting and monitoring of costs in connection with the different partner budgets. As INCARE is a trans-national project, funding will be provided by the different national funding bodies, every partner will be responsible for submitting their cost statements to the national funding bodies.
Quality Management, Reporting and Project Monitoring	All Quality Assurance procedures will be summarized within a so called “Quality Assurance Plan” at the beginning of the project. These quality assurance procedures will be applied to all internal and external results and deliverables. Quality assurance will be the joint responsibility of all project partners at all levels of project activities. If excellent quality is to be achieved permanent monitoring of the work progress and the evaluation of processes and results are highly demanded. This will be carried out in a clear reporting and monitoring framework which will be introduced at the beginning of the project. The goal of this framework is to recognize critical situations (errors, deviations) as early as possible in the project’s life cycle. This will enable the Consortium to apply corrective actions or contingency plans in due time.

Technical-oriented QAM that are mapped described to the key performance indicators which were defined at the start of the project and which will be updated during the pilots. The initially defined KPIs are given in the Table 4.

Table 4. KPIs for the INCARE technical QAMs.

KPI description	KPI target
user satisfaction	user satisfaction not lower than 7 out of 10 (70%) by the end of the pilots. No more than 15 – 25 % dropouts after half year.
caregiver burden	reduction of the burden of the caregiver
acceptance of robotic platforms	70-75% acceptance rate
frequency of physical activity	daily - either indoor (INCARE platform) or outdoor (e.g. walking)
adherence to medication and medical appointments	90% due to INCARE reminder module
non-appropriate emergency calls	1% (falls, home alerts, health alerts)
competitive market position	10% decrease in costs for end-users care over prolonged time

NOTE: The KPI table was updated after the change in the DoW.

8 Conclusions

This document defined the set of Quality Assurance procedures that will be used for the ICNARE work in order to guarantee an excellent quality for it. As the risks that can be encountered in the INCARE framework should be handled appropriately for the project work success, a specific focus of this document was dedicated for the definition of the set of risks that can occur when performing the INCARE work, their quantification (impact, likelihood and level) and the proposed contingency plans for them.

9 Document history

Date	Changes	Version	Author
November 2018	ToC initiated	1	CITST
December 2018	revision of the risk table based on discussions with all partners	2	CITST
February 2019	Final revision	3	CITST
June 2020	revision because of the COVID pandemics based on input from all partners	4	CITST