



Ecosystem for COLlaborative Manufacturing PrOceSses – Intra- and
Interfactory Integration and AutomaTION
(Grant Agreement No 723145)

D7.5 Test, installation and operation plan template II

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1 Abbreviations and Acronyms

Acronym	Meaning
DSS	Decision Support System
IIMS	Integrated Information Management System
M2M	Machine to Machine
HMI	Human Machine Interface
GA	Grant Agreement
SW	Software

2 Introduction

The purpose of this document is to provide a preliminary test, installation and operation plan for each of the defined use cases. This document builds on deliverable 7.4 (Test, Installation and Operation Plan Template II), drawing on the experiences of the users of this document to make further enhancements.

2.1 Purpose, context and scope of this deliverable

As outlined in the program of work the technology components developed in COMPOSITION will be assessed for integration for each of the defined use cases. This deliverable comprises a template test, installation and evaluation plan to be developed for each use case. Factors such as re-configurability, scalability and interoperability will be taken into account for both real time monitoring and conditional monitoring by the COMPOSITION IIMS system. Whilst done concurrently with WP8 the activity will start as early as possible at a small 'lab-scale' level to combine, test, debug and stabilise parts of the system in a carefully controlled and intensely monitored deployment.

2.2 Content and structure of this deliverable

The deliverable is broken down into three components:

1. **Use case planning** will include details of the use case, technology components, data management and project management information.
2. **Initial installation** describes the scope and goals of the early stage use case deployment.
3. **Operation and maintenance** will include pertinent information relating to the ongoing operation and periodic maintenance required for each of the use case platform technologies.

2.3 System Test Methodology

A standard testing strategy will be followed depending on the deployment type (hardware and software) in partner labs initially and then at industry sites. These tests will include automated, manual, and exploratory tests to efficiently reduce risk and tighten release cycles. Tests come in several flavors:

- **Unit tests** validate the smallest components of the system, ensuring they handle known input and outputs correctly. Unit test individual classes in your application to verify they work correctly.
- **Integration tests** exercise an entire subsystem and ensure that a set of components work together.
- **Functional tests** verify end-to-end scenarios that your users will engage in.
- **Verification and Validation Testing** – primarily for the software elements of the project. It is the checking that the software system meets specifications and that it fulfils its intended purpose. It may also be referred to as software quality control. It is normally the responsibility of software testers as part of the software development lifecycle. In simple terms, software verification is: "Assuming we should build X, does our software achieve its goals without any bugs or gaps?"

3 Use Case Planning

3.1 Use case planning brief description

Provide a brief description of the use case.

Table 1: Use Case Planning Brief Description

No.	Item Description	Inputs / Comments
1.	Use case no.	
2.	Use case deployment location	
3.	Use case description	

3.2 Use case environment

Provide details of the use case environment including requirements not limited to factors such as:

Table 2: Use Case Environment

No.	Item Description	Inputs / Comments
1.	Undertake a site survey of deployment <ul style="list-style-type: none"> - Floorplan diagrams with measurements - Identify major equipment - Identify any restrictions of radio transmissions or equipment allowed. - Power sources 	
2	Review of existing software framework <ul style="list-style-type: none"> - Internet access points and firewall restrictions 	
3	Robustness check completed? <ul style="list-style-type: none"> - Extreme environmental conditions - RF robustness 	
4.	Interference <ul style="list-style-type: none"> - Identify interferences sources - Interference mitigation plan 	
5.	Scalability <ul style="list-style-type: none"> - State boundaries 	
6.	Ambient energies	
7.	Environmental (temperature, ingress, weather, noise, etc.)	

3.3 Baseline data

Table 3: Baseline Data

No.	Item Description	Inputs / Comments
1.	Baseline data already available	
2.	Baseline data needed	
3.	Investigations and plans to capture baseline data	
4.	Integration with use case – <ul style="list-style-type: none"> - who will manage, - how data is stored, integrated, validated, etc. 	
5.	Inter-operability considerations	
6.	Other comments (e.g. data fusion, links with models (planning and real-time) and DSS)	

3.4 Equipment and Software requirements

Table 4: Equipment and Software Requirements

No.	Item Description	Inputs / Comments
1.	Any new equipment needed for initial and full installations, infrastructure, testing, data capturing, etc.	
2.	Software development tools being used for the debugging of the software during implementation.	
3.	Number and type of sensors, interfaces, gateways, storage devices, etc. Who will purchase & install these?	

3.5 Technology evaluation and selection

Provide information on technology evaluation and selection for the use case in question including elements such as:

Table 5: Technology Evaluation and Selection

No.	Item Description	Inputs / Comments
1.	Sensor technology to be employed <ul style="list-style-type: none"> - Include trade off analysis - Show alignment to requirements 	
2.	Wired & wireless communication to be employed. <ul style="list-style-type: none"> - Include data transfer requirements and suitability of protocol to support. 	
3.	M2M & HMI	

No.	Item Description	Inputs / Comments
4.	Visualization	
5.	Algorithms & Models	
6.	Software	
7.	User requirements	

3.6 Sensor evaluation and selection

Provide information on sensor evaluation/selection for the use case in question including elements such as: State whether data is measured or from datasheet.

Table 6: Sensor Evaluation and Selection

No.	Item Description	Inputs / Comments
1.	Sensor types and modalities	
2.	Sensor enclosure and mechanical requirements identified	
3.	Duty cycle requirements	
4.	Power consumption	
5.	Energy harvesting compatibility	
6.	Algorithms/ supporting firmware/software needed (& who will source/develop)	
7.	Test specification	

3.7 Software Installations

Provide details surrounding of new software implementation required to achieve use case requirements.

Table 7: Software Installations

No.	Item Description	Inputs / Comments
1.	Is the Software new or a modification of existing site software? - Provide link to software download	
2.	Has the SW been pre-tested offsite, if so what was the result?	
3.	Does the SW install require internal industry partner qualification and validation (i.e. Life Sciences)	
4.	Does it require internal Industry partner IT personnel support	
5.	Is there recovery plan if the return SW to old revs if there is an issue	

3.8 Data management

Provide details surrounding how data will be managed and stored for each of the use cases including detail where applicable on:

Table 8: Data Management

No.	Item Description	Inputs / Comments
1.	Where is data stored, how is it visualized, who has/needs access?	
2.	Any algorithm development required. If so who will do this?	
3.	Any visualization required. If so who will do this?	
4.	Links to models (planning, real time?) & DSS (decision support systems)	
5.	Data fusion requirements/opportunities	
6.	Provide a data flow diagram if applicable	
7.	Can the data being captured throughout the use case life be stored, shared, used in publications, etc. in accordance with the project GA (grant agreement) and where appropriate anonymization, aggregation, etc. is used to protect individual and partner institutes.	

3.9 Security and Privacy

Provide details surround the Security and privacy elements relevant to the implementation of the test plan:

Table 9: Security and Privacy

No.	Item Description	Inputs / Comments
1.	Is the equipment or system accessible or restricted	
2.	What level of security is required	
3.	Is the data source open source or confidential	
4.	Is there any privacy issues with the accessed data i.e. personal data	
5.	Are cameras required to capture the data	
6.	Security clearance for project partners and how to achieve	

3.10 Project management

Details here should address the following:

Table 10: Project Management

No.	Item Description	Inputs / Comments
1.	Identify team at each site involved (service provider, industry partner) with clear lead for each stage	
2.	Confirm various departments & people at deployment site (outside COMPOSITION team) are involved and aware	
3.	Schedule created + schedule owner assigned	
4.	Confirm plan, installation, operation and maintenance plan is complete and reviewed by all involved. Include consideration of system / deployment fault detection.	
5.	Specific actions – who, what when?	
6.	Staffing requirements at Deployment to support implementation of test plan - number of personnel, types of skills, skill levels, expertise,	
7.	Deployment site personnel training required to use COMPOSITION SW	

3.11 Lessons learned

(Capture for future deployments)

4 Initial Installation

For larger installations it may be necessary to replicate this section for each phase. In that case update the document with each phase.

4.1 Initial installation brief description

Include details of the initial installation planned for the use case in question including information on:

Table 11: Initial Installation Brief Description

No.	Item Description	Inputs / Comments
1.	Size of the installation	
2.	Location – laboratory, industrial environment, level in system architecture	
3.	Scope	
4.	Schedule for completion - Include Gant chart	

4.2 Test specification

Include details of the expected test outcomes and procedures to include. The expectation is that a separate test specification document is created and its location referenced in this document. Below is a checklist of sections that should be included in this document.

Table 12: Test Specification

No.	Item Description	Inputs / Comments
1.	Test Specification document location	
2.	Requirements – data, conditions, constraints	
3.	Expected results	
4.	Actual results - Provide location of test results document if recorded in separate doc	
5.	Schedule	
6.	Criteria – tolerances, samples	
7.	Procedure – Set-up, initialisation, termination, equipment used	

4.3 Project management summary & updates

To be filled in at planning stage and any updates noted.

Table 13: Project Management Summary and Updates

No.	Item Description	Inputs / Comments
1.	Task owner & team assignment	
2.	Record any changes/updates/additions needed and why	
3.	Specific actions – who, what when?	

4.4 Data management summary & updates

To be filled in at planning stage and any updates noted.

Table 14: Data Management Summary and Updates

No.	Item Description	Inputs / Comments
1.	Who will manage	
2.	How data is stored, integrated, mined, aggregated, anonymised	
3.	How will the data be visualized	

4.5 Lessons learned

(Capture for future deployments)

5 Operation & Maintenance

5.1 Operation and maintenance brief description

Table 15: Operation and Maintenance Brief Description

No.	Item Description	Inputs / Comments
1.	Size - Description of the scale of the deployment, listing all equipment and quantities	
2.	Location	
3.	Scope - Description of what the deployment aims to achieve	
4.	Schedule	

5.2 Project management summary & updates

(Should be filled in at planning stage and any updates noted)

Table 16: Project management Summary and Updates

No.	Item Description	Inputs / Comments
1.	Task owner & team assignment	
2.	Record any changes/updates/additions needed and why	
3.	Who to call if there is any maintenance required?	
4.	Who is checking the data and system daily?	
5.	Specific actions – who, what when?	

5.3 Data management summary & updates

(Should be filled in at planning stage and any updates noted)

Table 17: Data management Summary and Updates

No.	Item Description	Inputs / Comments
1.	Who will manage	
2.	How data is stored, integrated, mined, aggregated, anonymised	
3.	How will the data be visualized	

5.4 Pilot Partner training

The pilot partners are typically the industrial partners who own the sites upon which pilots are deployed. Whilst the responsibility of design, deployment and maintenance rests with a specific research institution it may be required for the pilot partner to operate, maintain and configure pilots in their premises.

(Should be filled in at planning stage and any updates noted)

Table 18: Pilot Partner Training

No.	Item Description	Inputs / Comments
1.	Identify training needs	
2.	Pilot operation and configuration training	
3.	Pilot Maintenance training	

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