D1.1.4 Quality Assurance & Risk Management Plan v2.0

DURAARK

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Executive Summary

In this report, we present the second version of D1.1.2 Quality Assurance & Risk Management Plan (QA&RM). Newly introduced in this report with respect to the previous version are: (i) updates on the management structure; (ii) project communication mechanisms; (iii) updates on the identified risks. Future versions of the QA&RM plan will update risk management procedures accordingly during the course of the project.

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1 Introduction

The scope of the deliverable is to describe and establish the necessary procedures for quality assurance and to reflect on its use during the first year. Concerning quality assurance of the final outcomes, support will be provided to the work groups, at all stages of the development of the project, in compliance to the international quality standards. Quality assurance procedures must address both the process and the product. A Quality Assurance plan involves the definition and establishment of the necessary procedures for quality assurance work, working groups, communication and deliverables throughout the project (e.g. set-up a review process for internal documents and reports and ensure that both the final project report and regular progress reports are drafted and finalized on time and in line with the schedule and requirements of the description of work). Additionally, the Quality Assurance (QA) plan will address the final DURAARK products and services developed within the project.

The second main objective of this document is to document a list of potential problems/risks together with their contingency plans. The early identification of these potential risks to the project will help us to elaborate appropriate solutions and adjustments in time.

It should be stressed that the QA&RM plan complements existing agreements, such as the ones defined in the DURAARK description of work (DoW), Consortium Agreement and Grant Agreement.

Furthermore, a systematic approach will be adopted for monitoring resource spending against project budget, achievements against schedule and critical success factors.

Note that the procedures described in this deliverable are based on best practices for project and quality management as the ones described in [1] and [2].

In the rest of this document, we first elaborate on the QA procedures and then document the general risk management plan.

2 Updated Management Structure

The management structure of DURAARK is summarized in Figure 1. Key management roles and bodies are described hereafter.

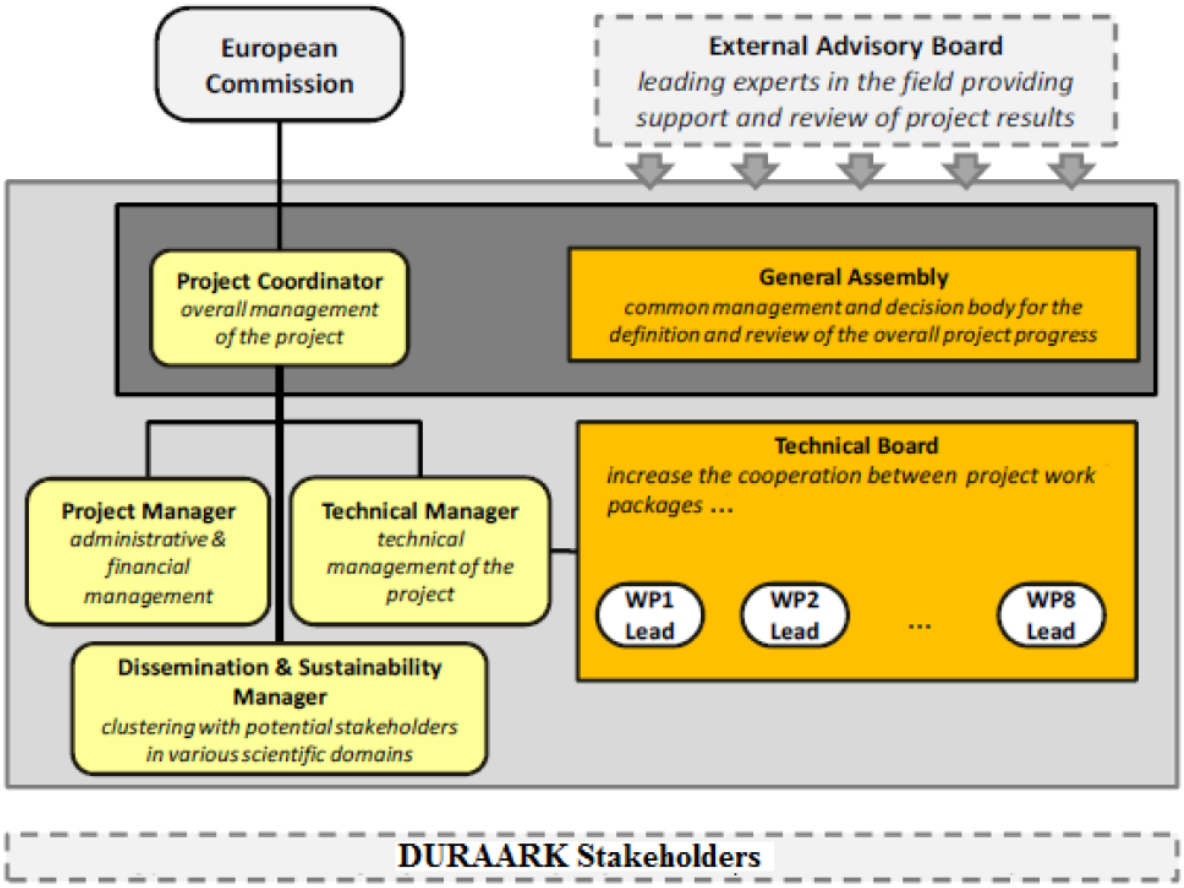


Figure 1: DURAARK Management structure

2.1 General Assembly (GA)

The DURAARK management structure is focused on the General Assembly that brings together all partners of the consortium and is established in order to have a common management body for the definition and review of the overall project progress. It is in charge of all high-level decisions regarding the direction of the project, and it is also responsible for guiding the overall work of the project and evaluating the performance of the working groups. The GA is comprised of one senior representative from each

participating partner and is chaired by the Project Coordinator. The GA will decide based upon consensus, only in case of continuous disagreement the full majority (over 60%, i.e. at least 6 partners out of 9) will be adopted. Physical or virtual meetings of GA are scheduled at least 3 times per year. The GA is the discussion and decision point for: approval of budgets and work plans, approval of major changes in the mission of the project, changes in the consortium, proposed changes to the contract or the Consortium Agreement, suspension or termination of all or part of the project or of the contract, actions to be taken in the case of default of a partner, major conflict resolution; and major decisions pertaining to overall risk management.

2.2 Project Coordinator (PC)

The Project Coordinator is appointed by LUH, acts as a chairman for the General Assembly and is responsible for the strategic and key decision making and overall coordination of the project's activities. He is the sole contact person for the project with the EC and responsible for the fulfillment of the financial and contractual obligations defined in the contract with the EC. In particular the PC is responsible for: the production and timely submission of reports to the commission (management, progress and financial reporting); the management of consolidated records of costs, resources and time-scales; the implementation and the continuous improvement of adequate project support systems like quality management and assurance, risk management, etc.; the implementation and maintenance of the necessary infrastructure for intra-project communication; the overall organization and facilitation of project meetings and events; the maintenance of the necessary infrastructures for dissemination activities; the operational liaison with the commission; the implementation and monitoring of deliverable reviewing processes; and the coordination of and communication with the External Advisory Board. The DURAARK PC will be Dr. Stefan Dietze. Stefan Dietze is a Senior Researcher at the L3S Research Center (LUH) and has a longstanding track record in leading roles in large-scale European research projects.

2.3 Project Manager (PM)

Specific responsibilities of the PM include: organization and coordination of logistics of the project meetings; day-to-day communication with project partners and collection of financial and administrative data, information and reports; preparation and first control

of cost statements (for submission to EC); resolving any issues related to financial and/or administrative rules of FP7 projects. Dr. Marco Fisichella will undertake the project financial management, reporting, organization of project meetings and in general the project administrative support, will be overall responsible for the logistics of the project management and will support the PC. Marco Fisichella is a Researcher and a Team manager at the L3S Research Center (LUH); he has been invited as reviewer and PC member at several scientific conferences and has been project manager with a proven positive track record at the EU-funded research project OpenScout.

2.4 Sustainability & Dissemination Manager (SDM)

The SDM will be in charge of the DURAARK post-project continuation activities and the implementation of the project's dissemination plan. In specific, he will be responsible to coordinate and establish communication with other project stakeholders, including user scientific communities and in particular stakeholders maintaining/providing large scale scientific information repositories in various scientific domains. The DURAARK SDM will be Östen Jonsson (LTU), who is a senior professional with proven experience in inter-disciplinary dissemination activities, clustering and liaison with architecture associations; currently, Östen Jonsson is the coordinator of the Long-term Digital Preservation Centre at Lulea University.

2.5 Technical Board (TB)

The technical management of DURAARK is facilitated by the Technical Board which is responsible for the implementation of the technological direction and strategies of the support action and the synergetic communication between the different Work Packages. The TB is chaired by the Technical Manager and is composed by the Work Package Leaders. One of its main objectives will be to increase the communication, coordination and cooperation between the project Work Packages. The TB will be responsible for the technical quality assurance of all project outputs delivered to the EC.

2.6 Technical Manager (TM)

The main objective of the TM is to coordinate the communication, co-ordination, and cooperation between the Work Packages of the project. The main duties of the Technical

Manager are to support the PC and GA in monitoring technical coordination aspects of project progress and quality of results; to request additional reports and remedial actions from Work Package Leaders, should there be any doubt concerning project progress; to assist the partners in building consensus in the case of disagreements in technological decisions. The DURAARK TM is Prof. Reinhard Klein (UBO) who has important expertise in leading roles in EC-funded R&D projects relevant to the DURAARK domain.

2.7 Work Package Leader (WPL)

The DURAARK work plan is organized in eight Work Packages (WP), each led by a consortium member who nominates a Work Package Leader (WPL) and his/her substitute. WPLs will be senior professionals with proven successful experience in leading focused technical work. The WPL has the overall responsibility for the progress and results of the Work Package, while specific responsibilities include: to propose and implement a detailed plan for the Work Package, clearly indicating its role with respect to the project vision and its contributions to the overall project objectives; to coordinate the technical and scientific work carried out by the WP members in line with the overall project work plan; to coordinate the development and delivery of the WP deliverables, their content and interrelationships, and to monitor the respective quality control procedures; to organize Work Package meetings and provide other communication mechanisms as needed to ensure the quality of the WP results; to establish and coordinate joint work and planning with related Work Packages, and to manage the exchange of information between them where necessary. The WPL are:

- WP 1 Project Management (LUH):

  Marco Fisichella (fisichella@L3S.de)

- WP 2 System Specification and Integration (FhA):

  René Berndt (Rene.Berndt@vc.fraunhofer.at)

- WP 3 Semantic Metadata Management and Enrichment (TUE):

  Jakob Beetz (J.Beetz@tue.nl)

- WP 4 Documenting the changing State of built Architecture (UBO):

  Sebastian Ochmann (ochmann@informatik.uni-bonn.de)

- WP 5 Recognition of Architecturally Meaningful structures and Shapes (UBO):
  Richard Vock (vock@cs.uni-bonn.de)
- WP 6 Long-term Preservation (LUH):
  Michelle Lindlar (Michelle.Lindlar@tib.uni-hannover.de)
- WP 7 Data acquisition, Evaluation and Test (CITA):
  Martin Tamke (Martin.Tamke@kadk.dk)
- WP 8 Dissemination and Exploitation (LTU):
  Östen Jonsson (osten.jonsson@ldb-centrum.se)

2.8 Work Package Team (WP Team)

WP Team members are responsible for the elaboration and on time delivery of the Work Package's deliverables and results. They work under direct control of their respective WP/Task Leader and report directly to them. The Work Package team will set up Work Package coordination sessions during consortium meetings, but will also use frequently other communication channels like conference calls.

2.9 External Advisory Board (EAB)

DURAARK management is supported and enhanced by the operation of the External Advisory Board, comprising of four members who were selected among leading experts in the field of scientific information management. They provide comments and scientific/ technical advice according to their experience & expertise, as well as feedback on major project directions, technical decisions and deliverables. In general, the advisory team consists of experts that can add value to the project and representatives of stakeholders such as prominent researchers, representatives of similar research initiatives, representatives from policy makers, etc. Therefore selection criteria included: sufficient representation of different stakeholders and disciplines, links with similar / relevant EU, US, etc. research initiatives, etc. The synthesis of the advisory team may change to ensure consistency with project activities. The members of the EAB were selected by the GA. They offer their services free of charge and are asked to review key deliverables and participate in 1 project meeting per year (travel costs are covered by the project). The following AB

members are steering and supporting the DURAARK project and have participated in the first year:

- **Thomas Liebich:** Dr.-Ing. Thomas Liebich studied to be an architect at the Bauhaus-University Weimar and did his doctorate there in 1994. In 1996 he founded TLConsulting, which was rebranded as AEC3 Deutschland GmbH in 2006. Since 1999 he has been the leader of the Model Support Group at buildingSMART International, that publishes and maintains the openBIM standard IFC. In 2001 he had a determining influence on the development of ePlanCheck in Singapore, the first automatic inspection system of building permit applications. Other important projects include the IFC implementation certification for many notable building software solutions, writing the first German BIM guideline and the first expert assessment on BIM for the public sector in Germany. As one of the leading BIM experts he is involved in many projects and events.

- **Andreas Rauber:** Andreas Rauber is an Associate Professor at the Department of Software Technology and Interactive Systems (ifs) at the Vienna University of Technology (TU-Wien). He furthermore is president of AARIT, the Austrian Association for Research in IT and Honorary Research Fellow in the Department of Humanities Advanced Technology and Information Institute (HATII), University of Glasgow. He received his MSc and PhD in Computer Science from the Vienna University of Technology in 1997 and 2000, respectively. In 2001 he joined the National Research Council of Italy (CNR) in Pisa as an ERCIM Research Fellow, followed by an ERCIM Research position at the French National Institute for Research in Computer Science and Control (INRIA), at Rocquencourt, France, in 2002. From 2004-2008 he was also head of the iSpaces research group at the eCommerce Competence Center (ec3).

- **Harald Sack:** Dr Harald Sack is working at the Hasso-Plattner-Institut für Softwaresystemtechnik in University of Potsdam, Germany. Currently, Harald Sack is working as a Senior Researcher and Head of the Research Group Semantic Technologies at HPI. His research interests cover the following topics: Semantic Multimedia, Linked Data Engineering and Applications, Semantically enhanced Information Retrieval (Semantic Search), Knowledge Representations and Ontological Engineering, Multimedia Analysis, Information Extraction and Data Mining, Semantically enriched e-Learning Applications.

- **Inés Zalduendo:** Inés Zalduendo is an architectural archivist with professional experience and graduate studies in both architecture and archives. She is the Special Collections Archivist and Reference Librarian at the Frances Loeb Library of Harvard University's Graduate School of Design where her duties and responsibilities include aspects of processing; reference; appraisal and accessions of collections; collection development; planning and administration; internal and external outreach. Before moving to the United States from Argentina, she had an architectural practice in Buenos Aires and was teaching at the Facultad de Arquitectura, Diseño y Urbanismo, Universidad de Buenos Aires. She is part of the FACADE2 team, a collaborative project between the Frances Loeb Library and MIT Libraries to further develop a shared production tool, workflows, and a shared repository for the collecting, archiving, access and preservation of electronic architectural files. She holds a Diploma in Architecture, Universidad de Buenos Aires (1984), a Masters in Architecture, Harvard University Graduate School of Design (1995), and a MS (Masters in Library and Information Science, with a concentration in Archives Administration), Simmons College (2001).

3 Communication Mechanisms

This chapter outlines the communication mechanisms used by DURAARK project partners. The overall strategy is introduced and detailed mechanisms and tools are explained in order to ensure fluent and transparent communication throughout the project. Particularly functional for successful communications and synchronization among DURAARK partners are: (i) the daily utilize of the mailing lists; (ii) the frequent use of the collaboration platform; (iii) the weekly use of Flashmeetings internally into each Work Package; (iv) the monthly use of the Flashmeetings for consortium updates and discussion.

3.1 Communication Strategy

As Project Coordinator, the Leibniz University of Hannover (LUH) acts on behalf of the consortium as far as the communication with the European Commission is concerned. Reports, information requests and any kind of updates from the partner organizations are centralized and forwarded through LUH to the European Commission project officer as appropriate.

The Project Coordinator is also responsible to represent the consortium towards all external entities for networking and collaboration purposes. Partner organizations wishing to create such collaborations with external organizations or groups do so in close cooperation with the Coordinator, in order to maintain the project's high quality standards. The Coordinator will take care that all appropriate links are established in order to strengthen the project and enhance its quality.

The Project Coordinator (LUH) and the WP Leaders communicate horizontally for handling strategic, technical and contractual issues of the project, whereas the WP Leaders manage contacts with partners for the day-to-day management and coordination of activities within the Work Packages. The main means for communication within the consortium are described in the following chapters.

DURAARK is a project with many different partners, whose workload is articulated in several different parts that are complementary but different in nature. The richness of this project can also prove to be a challenge when it comes to organizing workflow or ensuring the correct functioning of the project. Therefore, to avoid any potential pitfalls, the Project Coordinator ensures that communication channels are open at all times with the partners, so that they are informed at all times of the progress of the work.

Work Package leaders are responsible for updating the Project Coordinator about any

development or change in the work to be carried out. All partners must also ensure that they have a clear view of the main issues and activities in the project, by contacting the leader of their Work Package when they are in need of any clarification. The coordinator will ensure that the WP Leaders and project partners are consulted whenever necessary, so that transparency and excellence can be maintained throughout the project lifetime.
Day-to-day communication between partners of DURAARK take the form of e-mails (private and through mailing lists), describing the status and any potential issues, phone calls (when bilateral discussions are needed) or conference calls using Skype or Flashmeeting. Different collaboration possibilities will be made available to all consortium partners in order to build a management information service and to allow efficient functionality in distributed work groups.
The main collaboration space for project partners is available through wiki pages hosted on LUH's servers. Finally SVN - a software versioning and revision control system distributed as free software under the Apache License - is used to maintain current and historical versions of files such as source code, web pages, and documentation. SVN is hosted on LUH's servers at https://svn.l3s.uni-hannover.de/duraark.

3.2 DURAARK Mailing Lists

The coordinator (LUH) sets up mailing lists open to all participants in the project, dealing with day-to-day technical or administrative issues and distributing information. The mailing lists are regularly used for important announcements as well as for daily interaction. Almost all communications are triggered via the following mailing lists:

- duraark-mgmt@L3S.de

The general DURAARK mailing list including all the project partners. Topics that concern the whole consortium will be discussed here.

- duraark-wpleaders@L3S.de

The mailing list of WP Leaders of DURAARK. Issues regarding project coordination and steering are discussed here.

- duraark-wp2@L3S.de

The mailing list for the WP2 partners: System Specification and Integration

- duraark-wp3@L3S.de

The mailing list for the WP3 partners: Semantic Metadata Management and Enrichment

- duraark-wp4@L3S.de

The mailing list for the WP4 partners: Documenting the changing State of built Architecture

- duraark-wp5@L3S.de

The mailing list for the WP5 partners: Recognition of Architecturally Meaningful structures and Shapes

- duraark-wp6@L3S.de

The mailing list for the WP6 partners: Long-term Preservation

- duraark-wp7@L3S.de

The mailing list for the WP7 partners: Data acquisition, Evaluation and Test

- duraark-wp8@L3S.de

The mailing list for the WP8 partners: Dissemination and Exploitation

Additionally we will consider mailing lists for focused topics: technical, community etc. Partners of the consortium are free to give suggestions for further lists.

3.3 Collaboration Platform

In order to ensure centralized collaboration, an online collaborative space is available to all participants via the Internet, which is used to store and retrieve documents and files related to the project by using a standard web browser. This internal space is based on the open source project management tool "Wiki" and can be accessed through restricted access at https://www.l3s.de/wiki/doku.php?id=duraark:duraark. A wiki is usually a web application which allows users to add, modify, or delete content in collaboration

Figure 2: **A screenshot of the DURAARK Wiki.**

with others. The screenshot in Figure 2 shows the homepage of the DURAARK Wiki, administered by LUH and used by all the partners.
The collaboration platform has workspaces for each WP as well as for "Project management", which includes shared project activities among all partners. The internal space "Wiki" has several functions to ensure visibility and improved collaboration between the partners. The functionality in each workspace includes:

- Sharing and retrieving files. Each partner is to save relevant WP related documents (deliverables, meeting minutes etc.) to the workspace where they can be accessed by interested WP partners. This space enhances accessibility to required information and promotes a shared understanding of the progress towards achieving the goals of the project.

- Calendar for upcoming DURAARK events, e.g, GA meetings, scheduled teleconferences, etc. In order to promote collaboration between different workpackages, all upcoming events are indicated on the DURAARK Calendar as shown in the Figure 3, thus ensuring that interested partners are fully aware of scheduled teleconferences and meetings, for discussion and deliberation.

- Sharing WP related discussions.

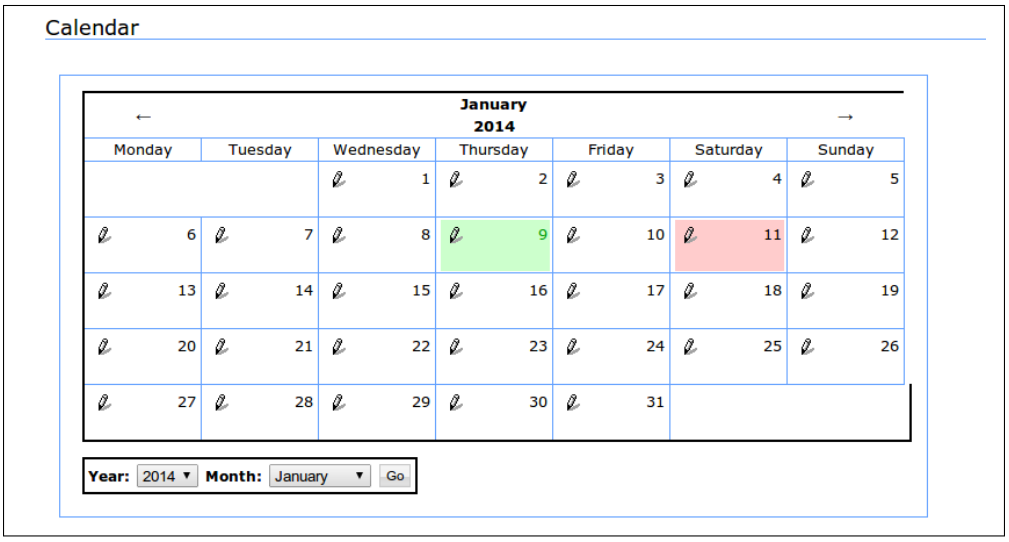


Figure 3: **A screenshot of the DURAARK Calendar.**

This internal space will be improved and maintained during the lifecycle of the project. The collaboration platform is maintained by the Project Coordinator (LUH).

3.4 Flashmeetings

The WP Leaders agreed during the kickoff meeting to meet electronically every month to exchange information about the project's activities. This very frequent communication can prove important in avoiding risks and managing unexpected delays in the time plan. These will be in the form of video-conferencing and will be organized via Flashmeeting technology. The meetings will be recorded for future reference and any decisions taken during the discussion will be later circulated for easy access by all partners.
The WP Leaders will plan and arrange Flashmeetings within their Work Packages when necessary. Particularly, depending on the issues, WP Leaders organize weekly, bi-weekly,

or monthly meeting with the partners involved in the WP. The Project Coordinator (LUH) provides the infrastructure and ensures no one misses the meetings and all partners are made aware of upcoming Flashmeetings.
In the following, we report the DURAARK General Assembly Flashmeetings organized by the Project Coordinator:

- 2014 February 4
- 2014 January 7
- 2013 December 3
- 2013 November 5
- 2013 October 7
- 2013 September 3
- 2013 August
- 2013 July 5
- 2013 June 4
- 2013 May 7
- 2013 April 2
- 2013 March 5
- 2013 February 5
- 2013 January 22
- 2012 November 29

3.5 Conflict Management

Regarding conflict resolution, the consortium will follow a collaborative approach for avoiding conflicts. In the case of conflict it will be addressed according to what reported in the Consortium Agreement for what concerns voting rules and veto rights, hereafter reported. So far, we did not experience conflicts within DURAARK.

Voting rules and quorum

For conflict management within the DURAARK Project we will carry out the following rules that are presented in the Consortium agreement:

- Each Consortium Body shall not deliberate and decide validly unless two-thirds (2/3) of its Members are present or represented (quorum).
- Each Member of a Consortium Body present or represented in the meeting shall have one vote.
- Defaulting Parties may not vote. Decisions shall be taken by a majority of two-thirds (2/3) of the votes.

Veto rights

A Member which can show that its own work, time for performance, costs, liabilities, intellectual property rights or other legitimate interests would be severely affected by a decision of a Consortium Body may exercise a veto with respect to the corresponding decision or relevant part of the decision.
When the decision is foreseen on the original agenda, a Member may veto such a decision during the meeting only.
When a decision has been taken on a new item added to the agenda before or during the meeting, a Member may veto such decision during the meeting and within 15 days after the draft minutes of the meeting are sent.
In case of exercise of veto, the Members of the related Consortium Body shall make every effort to resolve the matter which occasioned the veto to the general satisfaction of all its Members.
A Party may not veto decisions relating to its identification as a Defaulting Party. The Defaulting Party may not veto decisions relating to its participation and termination in the Consortium or the consequences of them.
A Party requesting to leave the Consortium may not veto decisions relating thereto.

3.6 Face to Face Meetings

Face to face meetings offer a good forum for people to discuss and exchange best practices. For each meeting there should be one contact person who is responsible for the

organization, an aim, a date and duration of the meeting, a place, a list of invitees, and an agenda. When organizing a meeting, the responsible organizer should take into account several things before, during and after the meeting.
In the following, we report the DURAARK General Assembly Meetings organized by the Project Coordinator:

- 2013 October 17-18: DURAARK GA Meeting (Eindhoven, The Netherlands)
- 2013 June 25-26: DURAARK GA Meeting (Bonn, Germany)
- 2013 March 20-22: DURAARK Kickoff Meeting (Hanover, Germany)

Preparing the meeting

The Project Coordinator (LUH) gives notice in writing of a meeting to each Member as soon as possible and within at least 14 calendar days preceding an ordinary meeting and 7 calendar days preceding an extraordinary meeting. The Coordinator shall send each Member a written original agenda (with clear intended outcomes) within at least 14 calendar days preceding the meeting. It is recommended to have a family-friendly meeting schedule which means that the organizers should try to avoid travel schedules for weekends. Before the meeting, the organizers have to decide who the contact person is, what the aims are, the place and date and the list of invitees.
When the invitation to the participants has been sent and a list of attendees has been completed, the responsible organizer should inform the Coordinator about the meeting giving the following information:

- The name and contact details of the person responsible for the organization
- The aim
- The date and duration
- The place including travel information and maps
- The list of attendees
- The preliminary agenda

During the meeting

Meetings in work-packages as well as the General Assembly are crucial for the project success and shall be organized in the most efficient way for all participants. The organization hosting a meeting should provide the following preparations and facilities:

- Preparation material on the venue and travelling information
- Hotel recommendations and travel advice
- Maps and supporting information
- Rooms for plenary and workshops
- Projectors and presentation computers
- Workshop materials (flip charts, markers, etc.)
- Health and safety arrangements (e.g. cater for possible food allergies of the attendees, etc.)

During the meeting it is crucial to involve people to participate. It is also advisable to provide a free Internet connection. Coffee breaks should be included because break-out sessions serve as a good ground for bilateral meetings. Coordination with other meetings or related conferences is advisable. Attendances should be registered and a list of attendees should be produced. The most crucial task is to take notes even if it is not the responsible organizer's task to take the minutes.

After the meeting

The Coordinator or the Partner organizer produces written minutes of each Consortium meeting which shall be the formal record of all decisions taken. He shall send the draft to all of its members within 10 calendar days of the meeting. For additional meetings the production of the meeting minutes will be individually decided for each meeting. The minutes shall be considered as accepted if, within 15 calendar days from sending, no member has objected in writing to the Project Coordinator (LUH) with respect to the accuracy of the draft of the minutes. The accepted minutes shall be sent to all of the members of the Consortium and to the Coordinator. The person responsible for the meeting minutes shall additionally upload and store the minutes and additional documents relevant to the meeting in the collaborative space of DURAARK.

4 Deliverable Quality Standards and Evaluation Process

In this section, we present a jointly agreed criteria and procedures for DURAARK deliverables such that the highest level of quality will be guaranteed. We detail the quality standards of deliverables and their acceptance criteria; the standardization of the deliverables on the basis of the above criteria; in-house measures that will ensure that the project is developing in such a way that the above criteria will be satisfied; definition of the quality-sensitive parameters and their monitoring procedures; the control mechanisms internal and/or external of the deliverables; the corrective mechanisms.

A deliverable in a project generally aims to provide information concerning the work outcomes, the general progress and procedures and intermediate or final results. Each and every deliverable should thus be carefully drafted with rich content, a clear structure and a professional presentation. All project deliverables together should comprise a set of informative material with continuity and clear interfacing, and be free of information overlaps or gaps. Deliverables inform the follow-up activities within the project, enable cross-WP collaboration and represent important tangible outcomes for dissemination activities.

It is therefore important to ensure standardization in the presentation and structure of the deliverables and adopt common standards for the development of their contents. At the same time, it is important that the information is provided in a timely fashion relative to the particular phase of the project's development, in order to allow for the smooth development of subsequent work and deliverables that depend on previously provided information.

In summary, the four basic quality criteria to assess:

1. Scientific and technical soundness,
2. Scope and relevance,
3. Readability,
4. Appearance and structure.

The proposed QA procedure will particularly address the aspects of the aforementioned concepts.

4.1 Quality Criteria

The responsibility for the content of each deliverable is always with the author(s), in particular the deliverable lead as defined in the DoW. Nevertheless, the deliverables should always meet a set of requirements, based on the three aspects for quality of information namely: correctness, completeness, depth, appearance and structure, and punctuality.

These requirements result in a set of quality criteria for project deliverables, which are detailed below.

Correctness. Information provided in the deliverable, must be evidence-based. This means that all factual information used in the deliverables should be supported by relevant and up-to-date references. Furthermore, summaries of the information and extrapolations from the information should be written in a clear and unambiguous fashion so that misinterpretation is avoided.

Completeness. Information must address all aspects related to the purpose for which the information is produced. On the other hand, a redundancy of information must be avoided, as it may obscure the clarity of the deliverables.

Relevance. Information used in the deliverable should be focused on the key issues and be written in a way that takes into consideration its target audience.

Depth. All information used should be provided to the depth needed for the purpose of the deliverable.

Adherence to uniform appearance and structure. Although deliverables will be authored by different partners within DURAARK, it is important that deliverables are prepared with uniform appearance and structure. It is therefore necessary to observe a common set of standards that specifies the structure, organization of content, layout and appearance of project deliverables. Within the DURAARK project, a template (with appropriate instructions) was made available to all partners in the consortium and this will form the basis for achieving a uniform deliverable appearance and structure.

Punctuality. The information must be provided in relation to the particular phase of the project's development and according to the project plan as defined in the DoW.

The above criteria shall be observed by authors when drafting any project deliverable. They also form the basic standard against which deliverables will be evaluated during the project's internal evaluation procedures.

Note that **scientific work** documented in the deliverable should be a compilation of

peer-reviewed publications in high-quality conferences or journals. The deliverable should provide an overview and summary of the relevant scientific publications produced, clearly stating the main contributions, the outcome of the experimental results, and conclusions in connection to the project and in the scope of the deliverable.
The deliverable must include the corresponding references to the scientific papers produced, and if applicable, can also include the manuscripts as annex.

4.2 Quality Indicators

The set of criteria mentioned above will need to be transformed into a set of parameters that can be measured and clearly identified within any deliverable undergoing evaluation. Such parameters will comprise a set of the project's *Quality Indicators* (QI). It is furthermore necessary to adopt a ranking system, which will be used to demonstrate the significance and seriousness of the non-conformities identified in the text, during the review. Annex I of this deliverable provides a set of QIs captured in DURAARK's *Deliverable Review Form*.
Deadlines of deliverables are strict. Therefore, it is important to rank the significance of requested changes, so as to prioritize further work. The significance ranking will guide not only the focus on the work that needs to be done by the authors, but also steer the discussion in meetings between reviewers and authors to the most significant issues that need to be done before moving on to less important changes, as documented in the *Deliverable Review Form*.
The scale of the significance ranking is as follows:

[+++] high priority [++] medium priority [+] low priority

4.3 Quality Assurance of Work plan

This section addresses issues related to the performance of the consortium progress and the way the project planning and monitoring is performed, e.g., Work Packages, Tasks, Internal Progress Reports.
The project work plan is divided into Work Packages (WP) and each WP is further divided into tasks, which have internal or formal technical deliverables. The project work planning is overall presented in the DoW as a GANTT chart. The work planning includes:

- the WP and respective tasks,
- the duration, start and end dates for each action and the WP as whole,
- the respective deliverables: formal (that means the deliverables mentioned in Annex I of the Grant Agreement) and internal.
- the Leader of each WP and the man months allocated by each partner in each WP.

While the project work plan is a part of the contractual obligations of all partners, adherence to the DoW is mandatory for all beneficiaries. Any modification - change which does not affect the overall course of the project in the work plan - needs approval by the Project Coordinator, who in turn will request approval from the Project Officer in case of actual deviations from the work plan. The Project Consortium is collectively responsible for the successful implementation of the project work plan.
Each WP Leader is responsible for: (a) resolving day-to-day administrative, technical and resource problems within his/her Work Package (being responsible for all the tasks included in the Work Package), (b) allocating the required human resources (in any case the responsibility of the elaboration of all tasks rests with the WP Leader), (c) disseminating information relating to all aspects of the work to the other Work Package leaders for ensuring smooth coordination of Work Package activities, and (d) reporting to the upper levels of the project's management.
The role and responsibilities of each partner are described in detail in the Grant Agreement while participation in specific tasks and deliverables is defined in the DoW and decided during the meetings and related official communication. All partners should take all the necessary measures and provide all necessary resources for the timely and smooth elaboration of the project, as stated in DURAARK's Consortium Agreement.

4.4 Progress Monitoring

Quarterly reports. Every 3 months an internal progress report will be prepared by each project partner to summarize the work progress and costs incurred in the reporting period. Internal progress reports will be communicated through informal email exchanges from each project partner to the Project Manager.
Internal reports will be incorporated into annual reports to the European Commission (that is in month 12, 24, and 36).

4.5 Deliverable Production Process

Project deliverables must be submitted in due time and must meet the quality criteria described earlier. Project schedules are generally tight; as a result, should a final deliverable review result in major revisions, it would most probably result in a delayed submission. In order to minimize this possibility, the production process of every deliverable is performed in three distinct stages. Each stage is followed by a review and a approval is required before the next stage is undertaken, as follows:

1. Production of an outline
2. Review of the outline
3. Production of the first draft
4. Review of the first draft
5. Production of the final deliverable
6. Review of the final deliverable

In this way, potential problems are detected at an early stage and the possibility of having to perform drastic changes in the written deliverable is minimized. In addition, exchange of opinions on the outline, stimulates contact between the authors and the reviewers and promotes a better and more efficient cooperation.

4.6 Deliverable Evaluation Process

The proposed deliverable evaluation process called "the review-procedure" will be executed in parallel to the deliverable's production process. This evaluation-procedure forms the key mechanism for monitoring compliance with the quality criteria. The degree of compliance is characterized by assessing the indicators which relate to the defects or points that require amendments in the text. The quality indicators are documented in DURAARK's review form, which is included as an annex to this deliverable (Annex I). These indicators are identified, together with their significance rank, during deliverable evaluation.

Nomination of Reviewers

One to three reviewers – according to the nature of the deliverable in question – are defined by the consortium during regular meetings; they are selected on the basis of their expertise and experience on the subject treated in the deliverable. Reviewers are meant to not have been involved personally in the deliverable production. Reviewers are contacted by the author in due time and their availability is confirmed.

The Review Procedure

All deliverables have to be submitted and quality-controlled in time.
All deliverables have to be submitted internally, 1 month before the official submission deadline. Coordination, production and assurance of timeliness of deliverables is the responsibility of each WP Leader.
Each WP Leader should suggest possible reviewers for the WP deliverables, as specified in the previous section. LUH as Coordinator will appoint the reviewers. The assigned internal reviewer then has one week for the review.
Two weeks remain for the final changes; the scientific and technical management committee has to decide that the quality of the deliverable is sufficient and ready for submission.
T_0 is the last day of the month in which the deliverable is due.

1. (T_0 - 4 weeks) : WP Leader or Technical Manager nominates reviewer and sends deliverable review form to main Author of the Deliverable
2. (T_0 - 3 weeks) : Author of the Deliverable sends the final draft to reviewer & WP Leader and uploads the document to the wiki
3. (T_0 - 2 weeks) : First reviews available on the wiki
4. (T_0 - 4 days) : End of cycle of corrections and further reviews (if necessary)
5. (T_0 - 2 days) Final version uploaded on the wiki by WP Leader after final quality check
6. T_0 Deliverable submitted to the Commission

Format and Naming: For the draft and review phase, the format suggested is either Microsoft Word Format (.doc), OpenDocument Format (.odf), or Portable Document Format (.pdf).

For the *final version* a PDF document is required for the official submission, as well as the document sources (.doc, .odf, or .tex (LaTeX)) and required images including any other input file or resources necessary to produce the final version of the PDF document. Both, the final version of the deliverable in PDF and the required sources, should be made available on the wiki by the WP Leader after the final quality check, and not later than (T_0 - 2 days).
The naming convention is as follows:

- For the draft phase: "duraark_dx_draft_vy.{doc, odf, pdf}"
- For the review phase: "duraark_dx_review_vy.{doc, odf, pdf}"
- For the final version: "duraark_dx.pdf"

where x and y are the deliverable number and version number, respectively.

Note that deliverables of type **prototype** are to be internally released 4 weeks ahead of the above specified deadlines.

4.7 Submitted Deliverables

During the first year, the following deliverable were submitted or are under submission.

ID	Title	WP	Lead Partner	Delivery Date
D 1.1.1	Project collaboration & communication infrastructure	1	LUH	1(2)
D 1.1.2	Quality Assurance & Risk Management Plan v1	1	LUH	1(2)
D 1.1.3	IPR management plan V1	1	LUH	1(2)
D 1.1.4	Quality Assurance & Risk Management Plan v2	1	LUH	12
D 1.1.5	IPR management plan v2	1	LUH	12
D 2.2.1	Requirement document	2	LUH	6
D 2.2.2	System architecture & specification v1	2	FhA	6

ID	Title	WP	Lead Partner	Delivery Date
D 2.2.3	System architecture & specification v2	2	FhA	12
D 3.3.1	Meta data schema extension for archival systems	3	TUE	12
D 3.3.2	Ontological framework for semantic digital archive for building components	3	TUE	12
D 4.4.1	Documenting the Changing State of Built Architecture - Software prototype v1	4	UBO	12
D 5.5.1	Recognition of meaningful shapes – point cloud compression – IFC storage prototype v1	5	UBO	12
D 6.6.1	Current state of 3D object digital preservation and gap-analysis report	6	LUH	12
D 7.7.1	Current state of 3D object processing in research and practice	7	CITA	12
D 8.8.1	DuraArK public web site	8	LTU	1
D 8.8.2	Dissemination Master Plan and Publicity Material v1	8	LTU	6
D 8.8.3	Dissemination report Year 1	8	LTU	12

Table 1: **First year deliverables production**

5 General Risk Management Strategy

The identification and assessment of significant risks and the development of contingency plans for the case in which the risk occurs, is a primordial part of any project with the ambition and size of DURAARK. We plan to continuously:

- Identify the risks of any nature that might occur in the project,
- Assess the likely severity of each risk and its potential impact on the project,
- Assess the potential probability of the risk,
- Identify the measures that may be necessary, if relevant, to offset or prevent the occurrence of that risk,
- Identify the measures that may be necessary, if relevant, to minimize the impact of the risk should it nevertheless occur.

To this end, we have established a general risk management strategy with the following components:

- A set of internal QA processes for the project's outcome documented in the deliverables (Section 4).
- A stratified structure for the assessment of risk at different levels, as detailed below:
  (i) **Project level** by Coordinator and Technical Manager
  (ii) **WP level** by WP Leaders
  (iii) **Deliverable level** by deliverable leader and authors
- An **Advisory Board** of experts in the field, whose primary role will be the one of external quality assessors for the activities undertaken in DURAARK. Particularly, the Advisory Board of experts is responsible to provide external quality assessors for the activities undertaken in DURAARK. During the first year of the project, DURAARK consortium had the possibility to meet the Advisory Board two times: (i) during the kick-off meeting in Hannover, March 2013; (ii) during the face to face meeting in Eindhoven, October 2013. The constructive feedbacks from the Advisory Board members were collected on the internal collaborative space "Wiki" and addressed and taken under consideration during the monthly Flashmeetings.

6 Identified Risks

In Table 2, we report important risks that have already been collected and assessed, together with actions to be taken for preventing and dealing with them. The accuracy of identified risks will be reviewed quarterly and the plan will be improved and completed accordingly.

#	**Risk Description**	**Risk Assessment**	**Contingency Solution**	**1st Year Relevance**
1	Unforeseen technical problems may not be resolved with the assigned resources	**Impact**: Medium; **Probability**: Medium. Since the DURAARK work plan contains various demanding research challenges, this risk has to be considered. The risk is not too high, since the consortium members bring the required experience and expertise to judge the viability of the research topics within the planned project resources.	In case this risk occurs, the partners are committed to invest a certain amount of additional own resources, since most of the addressed topics are also of high personal interest for them as researchers. In case this is not sufficient, the situation will be assessed by the governing board of the project, in collaboration with the involved WP Leaders to decide about adequate re-planning actions that reassure the overall project result.	Low (Not occurred)

#	Risk Description	Risk Assessment	Contingency Solution	1st Year Relevance
2	Technology planned in DURAARK becomes available from a third party	**Impact:** High; **Probability:** Medium. This is a general risk for a three years research project; the probability is not too high. Even related efforts exist or may appear, DURAARK is quite unique in the addressed fields and combinations of objectives.	The consortium will perform regular technology watch activities in all relevant areas to ensure that the DURAARK team is aware, when this risk shows up. If competing technology becomes available, this will be evaluated. Where appropriate, such technology will be incorporated, exploited and extended in the project.	Low (Not occurred)
3	Lack of consensus within consortium	**Impact:** High; **Probability:** Low. The good collaboration climate and the mutual understanding of the partners make this very improbable.	Within the implementation plan management procedures have been established for enabling effective decision making. The Project Coordinator and the members of the governing board have the necessary skills to resolve such conflicts by adequate negotiation as well as the means required to avoid a blocking of the project by a management decision.	Low (Not occurred)

#	Risk Description	Risk Assessment	Contingency Solution	1st Year Relevance
4	Quality Assurance & Risk Management failed	**Impact:** High; **Probability:** Low. The quality assurance and risk management methodology is based on established methodologies that have been successfully used in many European projects in the past years. The regular reviewing of the quality of the results and potential risks, allows identifying any possible problems/risks at an early stage so that solutions can be elaborated in time. In addition, the consortium partners are very interested and committed to the project. That reduces the risk of low quality results and failures of the risk management.	In case this risk occurs, the reason for a failure of the methodology needs to be identified. The situation will be assessed by the governing board of the project, in collaboration with the involved WP Leaders, to decide about adequate actions that assure the overall project result.	Low (Not occurred)

#	Risk Description	Risk Assessment	Contingency Solution	1st Year Relevance
5	Project Partner leaves the consortium	**Impact:** High; **Probability:** Low. All consortium partners are very interested and committed to the project results. This makes the probability of one partner leaving the consortium very low.	In case a partner leaves the consortium, the missing contributions from this partner are assessed. Further steps depend on the result of this assessment. Typically, some of the missing contributions can be assigned to other partners and/or a new partner with adequate competences has to be identified. The consortium members have a sufficient professional network to identify an adequate new partner. The occurrence of this risk in each case requires a local replanning of the project. As a further result of the assessment and the planned transfer of tasks, IPR issues might have to be settled (if not yet covered by the general agreements in the project). Furthermore, the transfer of tasks might also have implications on the budget.	Low (Not occurred)

#	Risk Description	Risk Assessment	Contingency Solution	1st Year Relevance
6	Technology developed by different partners cannot be integrated	**Impact:** Medium; **Probability:** Low. A certain degree of separate development is required due to the variety in technology and approaches and in order to increase productivity; this holds the risk that developed technologies do not fit together, when they are integrated into a common middleware.	A separate integration WP (WP2) has been foreseen for the system specification, to handle integration and to raise awareness for the need of integration. A mid-project integration stage is foreseen (Month 18), where the different developed technologies come together already in an early phase of the project. Furthermore, integrated prototypes have been planned, where the developed technologies are integrated and delivered, to identify arising incompatibilities early within the project and to enable technology adaptation to overcome the integration problems.	Low (Not occurred)

#	Risk Description	Risk Assessment	Contingency Solution	1st Year Relevance
7	Research directions and challenges do not align with envisioned applications	**Impact:** Medium; **Probability:** Medium. DURAARK involves research in several challenging and important research areas. The results of this research should serve and be demonstrated through two use case scenarios. However, practical application needs and requirements are not always easily and sufficiently communicated to research and technical partners, and vice versa research results are not always fully exploited.	In DURAARK, WP 2 has been proposed to better drive and align the research directions in the project with the application requirements. Together with the development of an early prototype and evaluation methods in WP 7, this will ensure that the research achievements are fully exploited to enable and facilitate the foreseen application scenarios.	Low (Not occurred)

#	Risk Description	Risk Assessment	Contingency Solution	1st Year Relevance
8	Lack of sufficient data for experimentation with technologies produced in DURAARK	**Impact:** Medium; **Probability:** Low. DURAARK partners already provided a substantial amount of relevant data for the project; which will be expanded throughout the project. In addition, a dedicated task (T7.1) aims at gathering use cases as well as data to be used throughout the project.	Should a need for additional data arise, DURAARK will consider and exploit publicly available data pools and, in addition, reach out to related organizations and research projects to broaden the outreach and enable scientific collaboration on shared datasets.	Low (Not occurred)

#	Risk Description	Risk Assessment	Contingency Solution	1st Year Relevance
9	Digital preservation community recommends other format as best-practice archival standard for 3D objects.	**Impact:** Low; **Probability:** Medium. Various players in the digital preservation community publish best-practise recommendations for archival formats. The DPC "Preserving CAD" Report was released in June 2013 and explicitly recommended STEP family file formats such as IFC as a viable preservation format. No format has yet been recommended for point-clouds. While the risk is a general one for a three years research project, the probability is not too high, as very few instituitions currently deal with long-term storage of 3D objects.	The consortium will perform regular technology and community watch activities to ensure that the DURAARK team is ware, when the risk arises. If other archival standards for 3D objects should come into existence, a format comparison and migration option will be dealt with, as a part of the sample preservation planning for 3D objects in WP6.	Low (Not occurred)

#	Risk Description	Risk Assessment	Contingency Solution	1st Year Relevance
10	Promotion does not reach all types of stakeholders.	**Impact:** Medium; **Probability:** Low. Promotion is ineffective: the project covers several technical areas but some stakeholders could perceive the long-term preservation as a stronger and main focus of the project. This could cause a problem reaching all sorts of stakeholders.	The dissemination WP leader (LTU in WP8) will tightly monitor the effectiveness of promotion activities. Collaboration with EU projects will be exploited in order to increase synergies and visibilities. Also, activities to disseminate the main goals of DURAARK will be launched. Monthly WP meetings are held where the coverage of stakeholders will be examined and decisions for further actions taken.	Low (Not occurred)

#	Risk Description	Risk Assessment	Contingency Solution	1st Year Relevance
11	DURAARK personnel is leaving the project or can not be acquired according to schedule.	**Impact:** High; **Probability:** Medium. This is a general risk for a three years research project in academic environments where staff isoften operating on short-term contracts.	Acquiring personnel from internal staff pools. Increasing hiring efforts and dissemination of position openings.	Medium Three partners had deviations from their resource planning, where either staff was leaving unexpectedly or personnel could be provided only with unexpected delays. As contingency action, the consortium has supported partners in the hiring process, internal staff was placed on DURAARK temporarily and hiring efforts were addressed with increased persistence.

Table 2: **Important risks identified and assessed.**

7 Conclusion

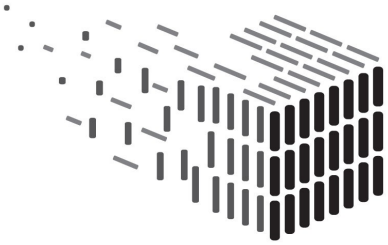
We presented the second version of the Quality Assurance & Risk Management Plan (QA&RM).

The quality assurance and risk management plan for DURAARK have been established, revised, and will serve as a reference for the consortium during the execution of the project. Future versions of the QA&RM plan will update risk management procedures during the course of the project.

References

[1] I. O. for Standardization. *ISO 10006: Quality Management – Guidelines to Quality in Project Management*. ISO, 2003.

[2] PMI. *A Guide to the Project Management Body of Knowledge (PMBOK Guide), 5th Edition.* Project Management Institute, 2013.



Deliverable Review Form

Please complete all sections on following pages:

Part I Responsibilities and Deadlines (by WP Leader)
Part II Nomination of Reviewer (by WP Leader)
Part III Assessment & Comments (by Reviewer)
Part IV Follow-up Actions (by main Author of Deliverable / WP Leader)
Part V Final version Accepted by (WP Leader and Project Coordinator)

Part I- Responsibilities & Deadlines

Deliverable name	
Deliverable number	
Lead participant *(institution short name)*	
Other participants *(institution short names)*	
Deliverable Author Name(s)	
Reviewer Name	
WP Leader Name	
Month Due	
Deliverable Due date (= T0)	

#	Action	Deadline	Deadline date (1300 CET)	Actual date sent	Sent by (name)
1	WP Leader or Technical Manager nominates Reviewer sends deliverable review form to main Author of the Deliverable (Parts I & II)	T0 - 4 weeks			
2	Author of the Deliverable sends final draft to Reviewer \& WP Leader and uploads the document to the wiki	T0 - 3 weeks			
3	First reviews available on wiki (Part III)	T0 - 2 weeks			
4	End of cycle of corrections and further reviews (if necessary) (Part IV)	T0 - 4 days			
5	Final version uploaded on the wiki by WP leader after final quality check (Part V)	T0 - 2 days			
6	Deliverable submitted to the Commission	T0			

Part II –Nomination of Reviewer

(to be completed by Work Package Leader - i.e. after reviewer's agreement to participate is obtained)

A	**Summary of the Purpose of the Deliverable**	
B	**Nominated Reviewer**	
C	**Justification for choice of Reviewer**	

Part III – Reviewer Assessment

QI #	Quality Indicator	1	2	3	4	priority
	Check as appropriate	Excellent	Minor modifications	Minor modifications	Significant modifications	[+++] high [++] medium [+] low
	Example	*No changes*	*Spelling, grammar*	*Content revision*	*Section rewrite*	+++
1	Overall quality					
2	Appropriateness for audience					
3a	Research question and motivation clearly expressed					
3b	Methods of investigation					
3c	Conclusions, contributions, implications, future work					
3d	References – completeness					
4a	Presentation – spelling, grammar					
4b	Quality – tables, figures, graphics, TOC					
	Prototype Deliverables					
5a	Installation					
5b	Description					

Detailed Comments

Point No:	Elaborate on your rating above (if applicable) *[add rows as necessary]*	[+++] high [++] medium [+] low

Part IV - Follow-up Actions

Point No:	Action taken *[add rows as necessary]*	Date	Name

Part V: Final version accepted by:

	Name	**Date**
WP Leader		
QA Coordinator		