

DELIVERABLE

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Statement of originality:

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

EXECUTIVE SUMMARY

PREFORMA (PREservation FORMAts for culture information/e-archives) is a Pre-Commercial Procurement (PCP) project co-funded by the European Commission under its FP7-ICT Programme. The main objective of the project is to give memory institutions full control of the process for testing the conformity of files to be ingested into their archives.

This shall be obtained by developing a set of tools which will enable the testing process to happen within an iteration that is under full control of the memory institutions. Research and development will be done by suppliers selected in a procurement process that follows the rules for tenders in public sector.

This deliverable provides an overall roadmap for the preparation of the request for tender and the selection of the technology suppliers that will be invited to take part in the project. It offers an overview of the legal and operational procedures and describes the process for gathering, analysing and defining the functional and technical specifications to be used in the Invitation to Tender. Furthermore, it gives guidelines for the tender procedure.

A separate section concludes with a general review of the main results in this deliverable.

1. INTRODUCTION

1.1 STRUCTURE OF THE DOCUMENT

This deliverable presents a roadmap for the preparation of the request for tender and the selection of the technology suppliers that will be invited to take part in the research and development phase of the PREFORMA project. The deliverable is organised as follows:

Section 1 - sets out the structure of the document and the objectives of the deliverable; it also explains the relationships with other deliverables and tasks, the open source approach, and the project's open dialogue and market considerations.

Section 2 - offers an overview of the legal and operational procedures;

Section 3 - describes the functional and technical specifications for gathering, analysing and defining the functional and technical specifications to be included in the Invitation to tender;

Section 4 - gives guidelines for the tender procedure;

Section 5 - summarize the results in previous sections;

Appendix 1 – brings up the compliance check of companies;

Appendix 2 – lists the members of the PREFORMA Consortium;

1.2 OBJECTIVES OF THE DELIVERABLE

Memory institutions, in Europe and elsewhere, are facing a situation when transfers of electronic documents or other electronic media content for long term preservation are continuously increasing. Data are normally stored in specific file formats for documents, images, sound, video etc. that are produced by software from different providers. This software is controlled neither by the institution that produces the files, nor by the institution that holds the archive. There is a risk that data objects meant for preservation, passing through an uncontrolled generative process, can jeopardise the whole preservation exercise.

PREFORMA (PREservation FORMAts for culture information/e-archives) is a Pre Commercial Procurement (PCP) project co-funded by the European Commission under its FP7-ICT Programme. The main objective is to give memory institutions full control of the process for testing the conformity of files to be ingested into their archives. This shall be obtained by developing a set of tools which will enable the testing process to happen within an iteration that is under full control of the institutions.

The procurement, following the rules for tenders in public sector, will match the memory institutions professional knowledge and the supplier's skills in development and promotion of products.

The objective of this deliverable is to provide a roadmap for operational and legal procedures, functional and technical specifications, and submission guidelines for the tender procedure.

1.3 RELATIONSHIP WITH OTHER TASKS/DELIVERABLES

This deliverable is produced by PREFORMA Work Package 2 (Requirements & Assessment) and it's Task T2.1 (Tender preparation, pre-announcement, publication, closing and

contracting). This task manages the formal preparation of the tender, which involves defining the operational, financial and legal terms under which technology suppliers can participate in the research and development phase.

The specification of the functional requirements and the development of the overall technical specifications and performance criteria will be handled by two other tasks in Work Package 2 (Task 2.2 and Task 2.3) and presented in deliverable D2.2 Tender Specifications.

Task 2.1 will also handle the negotiation with the suppliers and the contracting, but a fourth task in Work package 2 (Task 2.4) will take care of the selection of suppliers.

1.4 THE PREFORMA OPEN SOURCE PROJECTS

The PREFORMA project addresses longevity of digital assets by means of establishing a set of Open Source projects. By the term project we refer specifically to Open Source projects which are hosted on an open platform. Such projects will be established during, and will also be active, after the end of the PREFORMA project.

Each PREFORMA Open Source project will be hosted on an open platform commonly used for hosting such projects (e.g. GitHub or equivalent) from the start of the design phase and will utilise best practices from community based Open Source projects. Consequently, the PREFORMA project expects that each Open Source project utilises such best practices, which include: iterative development with frequent releases (“nightly builds”); proactive involvement in OSS communities (respecting values); provision of executables for download (beyond usage via web); feedback and bug reports on forums, user mailing lists, etc.; and that several concurrent releases are kept on the platform, including: development version, stable version, and deployed (LTS) version. Requirements for use of such best practices will be included in the tender specification.

Use of best practices for community based Open Source projects, with early establishment of each Open Source project on an open platform is important for creating awareness amongst all potentially interested stakeholders and potential contributors, and constitutes a prerequisite for establishing a vibrant long-term sustainable business community related to each Open Source project.

Each Open Source project focuses on one file format and all developments of software, and associated digital assets, related to the project (e.g. roadmaps, instructions, issues, email communication, forum dialogues, documentation, synthetic test files related to the file format handled by the project, etc.) will be available on the open platform. Further, early establishment of each Open Source project is also fundamental for establishing effective processes for interaction with the organisation that controls the specific file format, which is to be implemented in the Open Source project. The contracted company is expected to establish a proactive approach for establishing effective processes for interaction with the organisation that controls the file format.

This includes reporting issues (e.g. filing issues in issue tracker related to the interpretation of the file format that may need clarification and improvements etc.) and engaging in resolving issues in the specification of the file format, in order to prevent further files to be generated in an incorrect way (as a consequence of weaknesses in the technical specification of the file format that is used by software providers to produce files that are, eventually, to be handled by memory institutions). This feedback may also utilise established processes for providing continuous feedback and experience reports from use of the developed software (by means of a process established for providing feedback from use of the conformance checker at memory institutions and in other contexts, via the Open Source project to the organisation that maintains the file format). The

overall goal of this is to improve the quality of the file format, as the conformance checker may otherwise not be effective for the long-term goals of memory institutions.

All software developed in each Open Source project will be provided under two specific Open Source licenses (www.opensource.org), namely: both Mozilla Public License “MPL v2.0 or later” *and* under GNU General Public license 3.0 “GPLv3 or later”. Further, related to each Open Source project, all digital assets, associated with the Open Source project, including all synthetic files developed for the file format, will be provided under the Creative Commons (CC) license Attribution- ShareAlike 4.0 International (CC BY-SA 4.0) and hosted on the open platform.

For effective development of Open Source software in PREFORMA, it is essential that all developments (and experiences from use) of synthetic test files related to the specific file format will be provided on the open platform. Therefore, experiences from use (i.e. outputs from use of the conformance checker) will also be hosted on the open platform. During the design phase, synthetically developed test files will be iteratively developed and hosted on the open platform. This is a very important aspect of the approach taken in PREFORMA, and it is central for promotion of external interest for the conformance checker to be developed on the open platform. The open source approach has the potential to provide participating suppliers with a number of business opportunities (see section 1.5.3).

In addition, additional files for testing the developed software may also be provided by memory institutions, PREFORMA partners, and other stakeholders interested in development in the open source project provided on the open platform. It is important to include files which are perceived to be correct and files which are perceived to be incorrect in the process of developing software. Scrutiny of files is an important enabler for improving quality of developed software and the quality of the technical specification of the file format.

1.5 OPEN DIALOGUE AND MARKET CONSIDERATIONS

1.5.1 Open dialogue

PREFORMA aims to ensure the establishment of a process of open dialogue between memory institutions and technology providers in order to contribute to the development of requirements and specifications of the tender. The PREFORMA partners will then define the functional requirements of the tender based on the outcome of the open dialogue.

This process, which will lead up to the publication of the tender in May 2014, is still ongoing and will continue in the coming months. It is implemented mostly online, through the website, but also through the creation of an ad-hoc mailing list that includes the addresses of all the persons who expressed an interest to be kept informed about the project, and through the organization of a series of workshops and networking events. Examples of these activities include:

- The establishment of a task force composed by partners’ representatives that will produce papers for discussion, shared online and/or within the mailing list, to build consensus on the preservation formats that will be validated by the PREFORMA toolset.
- An open consultation about the tender to get an understanding of the needs of the individual memory institutions as to conformance checking. This includes:
 - a series of open questions, posed to the participants to the physical events organised by PREFORMA, about the way memory institutions acquire digital objects, their policy as to receiving and preserving digital objects, the resources

they can dispose of and the digital objects they might be able to share with the PREFORMA partners for training and testing;

- interviews to memory institutions, both partners of the PREFORMA project and other institutions who express their interest to participate to this investigation, to discuss the usage scenario for the conformance checker to be developed for the single institutions.

All the collected usage scenarios have been merged into one joint user model, integrating all individual requirements in a concise set of generic use cases.

- The organization of a workshop in Brussels on the 5th of March 2014 targeted to the memory institutions to agree on the functional requirements and technical specifications of the reference implementation tools to be developed in PREFORMA.
- The organisation of a public Information Event in Brussels on the 4th of April 2014 to present the PREFORMA call for tender, with a special session dedicated to bilateral meetings for exchange and consultation with potential suppliers.
- The organisation of a networking session at the EGI Community Forum in Helsinki on the 21st of May 2014 as an additional opportunity to collect feedback from the people attending the event.
- The creation of a dedicated living page on the PREFORMA blog, linked to the website, where the progress and the outcomes of this process are published and constantly updated. Potential suppliers and any other interested person who wants to obtain more information on the procurement can ask for any specific questions and provide their feedback through this page.

1.5.2 Market considerations and business opportunities

PREFORMA will serve through the PCP mechanism a well-defined public need, i.e. to purchase an open source solution to give to memory institutions the full control over the implementation of the standard formats of their archive.

The availability of such open source project will open a new area of added-value services. The European service and technology providers will then be able to serve this market with more competitive products, thanks both to the results of the procurement, which will be available within the open source community, and to the coordination actions put in place by the project, which will continue to be a reference point through the network of common interest established by PREFORMA. In particular, the suppliers and the members of the open source project will be able to offer support services, consultancy, etc. to the memory institutions, for future the adaptation, improvements, integration and deployment of the PREFORMA tools into their legacy systems and into their networked environments.

PREFORMA will target three groups of stakeholders in the exploitation of the core component and modules:

- *Research organisations.* PREFORMA will target research organisation with a scientific interest in identification, validation and normalisation of digital files and who may provide technical and expert advice to cultural stakeholders.
- *Developers.* PREFORMA will target all enterprises contributing code to the PREFORMA tools and developing services based on these tools, first and foremost the enterprises participating in the tender but subsequently also other developers that are interested to contribute to the code. Enterprises and public sector organisations may dispose of

practical tools to facilitate the production of documents aligned with the preservation demands of the memory institutions archiving their content.

- *Memory institutions.* PREFORMA will target memory institutions deploying the core components and modules in their digitisation and preservation workflows. The main expected impact of PREFORMA is to reduce curation and preservation costs and to improve curation and preservation capacity and competences in public organisations, including small archives.

PREFORMA will advocate a number of business opportunities for the companies which will be selected, all in line with presently used Open Source software models:

- **Combinations with other software offerings**

Technology providers are invited to use the open source software developed in PREFORMA as a complement to commercial software products in their portfolio, e.g.

- in combination with text, image or moving image editors, facilitating the production of preservation files
- in combination with digital repositories, facilitating assessment of files being ingested and processed by a Trusted Digital Repository.
- in combination with transcoding software, facilitating validation when migrating files.

- **Selling optional proprietary extensions**

Technology providers are invited to develop extensions to the open source software and sell them using a closed license. This may include:

- Additional conformance checkers for other preservation formats that plug into the same environment/ecosystem
- Additional reporter modules that facilitate integration of the open-source software in other proprietary software products

- **Selling professional services**

Technology providers are invited to provide services for deploying the open source software at memory institutions, e.g. providing

- Consulting
- Customization
- Technical support

2. OPERATIONAL AND LEGAL PROCEDURES

2.1 OPERATIONAL PROCEDURES

2.1.1 The Preparation of the Tender Documents

The preparation of the tender documents that will be used by PREFORMA is guided and informed by a series of PCP-templates generated by another Pre-Commercial Procurement (PCP) project under the European Commissions FP7-ICT Programme. This project is named SILVER (Supporting Independent LiVing for the Elderly through Robotics) and has already conducted a call for tenders.¹

The SILVER templates include the following documents:

- Invitation to Tender
- Challenge Brief
- Guidance document
- Tender Form
- Questions & Answers
- Framework Agreement

Like in all procurement projects, it is important that PREFORMA manages to provide the tenderers with the information they need in order to participate in the procurement.

The challenge of the PREFORMA R&D project will be presented in a *Challenge Brief*. This brief contains the background of the PCP carried out. It provides details on the functional and technical requirements, the desired outcomes and the scope of the PCP. It also outlines very briefly and succinctly the Tender Process as a whole. Tenderers are expected to accept the requirements in the challenge brief and conduct their work based on those throughout the whole duration of the project

Made available to tenderers is also a *Guidance document*, which enables them to fill out the *Tender Form* of the procurement. It explains the terms of the procurement, and the pieces of information which the PREFORMA Evaluation Committee needs in order to carry out its assessment work.

The *Tender Form* to be used in the PREFORMA PCP is organized in a number of sections, beginning with a description of the tender as such, and then followed by:

- Tenderer Details
- Contact Details
- Impact on the Challenge
- Technical Approach

¹ See www.silverpcp.eu

- Project plan and Methodology
- Project Management
- Resources
- Risk Management
- Potential Price
- Professional Secrecy
- Project Abstract
- Fixed Price Breakdown and
- Declaration followed by signatures of the Managing Director, and other authorized persons.

Included in the information package provided to tenderers, is also a *Questions and Answers Document*. It brings up the most common PCP-related questions such as who might apply, when the tender must be submitted and how, whether one company/or university/other entity might submit several tenders or just one and so on.

Most importantly, an *Invitation to Tender* will be presented. It will be organized according to the following headlines:

- An Introduction to the PCP
- Administrative Instructions
- Exclusion Criteria
- Minimum requirements
- Assessment of Tenders
- Confidentiality, publicity and information about the project
- Distributions of IPR resulting from the project
- Judicial review
- List of documents
- Scoring Model

The tenderers will also be presented with the Framework Agreement, so that they can know beforehand the terms and the obligations set forth by Riksarkivet (the National Archives). During the Spring of 2014, this Agreement will be elaborated upon by jurists at Riksarkivet. It is based upon a template Framework Agreement which has already been used successfully by other EU-funded PCP-projects like SILVER (see above).

The Tender Documents will be prepared within PREFORMA Work Package 2. Essential to the process are internal and external paper reviews, which will be organized within the WP. The most important goal of these reviews is to reduce the risks associated with procurement. The reviews also serve the purpose of adapting the templates which have been used by the SILVER and CHARM PCPs.

It is vital to PREFORMA that the procurement process is oriented to the market and its stakeholders. To facilitate this, a short *Market Study* will be carried out in Spring under the auspices of the WP2. One of the purposes of this activity is to be able to inform potential suppliers of the Call for Tenders. It will be carried out in a straight-forward fashion by making use of existing networks and channels.

2.1.2 Dissemination

Dissemination of the PREFORMA-PCP is of vital importance, to inform potential suppliers of the Call for Tenders. Several dissemination activities take place during Spring of 2014 in order to facilitate an interest on the market for what the PREFORMA-PCP will have to offer.

The *PREFORMA Website* is already set up, and it provides a communications platform for the project as a whole. On the website, a declaration is found stating that “PREFORMA is open to collaborate with experts, organizations, institutions and other projects to find synergies and discuss opportunities for cooperation.” Several groups are identified as being of interest to the R&D project, and welcomed to be part of the PREFORMA community:

- Memory institutions
- Developers
- Research organizations
- Standardization bodies
- Funding agencies
- Best practice networks
- Other projects on digital culture

The content of the *Invitation to Tender* will be pre-announced on the project website. Pieces of information that will be published, under a specific headline, includes the project’s budget, deadline date, status of the tender and so forth.

Another form of pre-announcement will be carried out on the *Tender Electronic Daily (TED)*, which is the Internet version of the Supplement to the Official Journal of the European Communities. TED is a data base of European calls for tenders. It diffuses calls for tenders relating to public procurements for works, services, supplies etc. It enables suppliers to seek out contract notices by using a search engine. The pre-announcement presents the following sections of information to suppliers, and other interested parties:

- Contracting Authority
- Object of the contract, including information about the Framework Agreement, type of contract and place of delivery or of performance, the scheduled date for start of award procedures etc.
- Legal, economic, financial and technical information
- Complementary information

This pre-announcement will be made two months before the Call for Tenders is published. It has important functions, especially by reaching those IT-companies which already operate on public sector markets and are accustomed to cooperating with government agencies. An official pre-announcement does not cover all of the potential suppliers though, which is why members of the PREFORMA group have begun disseminating information about the PCP through other venues as well. According to the PREFORMA news blog, the project is currently being presented at a number of *Venues* in Spring 2014.

- Networking at FOSSDEM 2014, Brussels 1-2 February 2014
- PREFORMA Network Session at the EGI Community Forum 2014, Helsinki, 21 May 2014

The Market Study carried out in Spring (see above) will further identify potential suppliers that have not been reached and identify the networks and channels through which they can be informed most effectively.

An *Information Day* in Brussels is also vital to the dissemination of the PREFORMA-PCP. It will be held on April 4th with the purpose of presenting the Call for Tenders. Participation is open to everybody who is interested in participating to become a PREFORMA supplier. A detailed agenda of the Information Day is already available through a link at the project website.

2.1.3 Publication and Closing

To ensure EU wide publication, the Call for Tenders will be published at least in English, and through the Official Journal of the European Union, by using the TED (Tender Electronic Daily) web. This is preceded by a pre-announcement which will be published on the TED also. The call will remain open for two months. After this, the tender will be closed. Contracts with the winning suppliers will be signed in month 10 (October 2014).

To facilitate participation from as many suppliers as possible, dissemination activities will be carried out after the Call for Tenders is published on the TED. This will be done informally by making use of networks and other channels used by the companies which PREFORMA has defined as its main target groups.

2.1.4 Evaluation

Evaluation is an activity carried out throughout the whole project, since the project selects winners in three phases. The goal of the tender evaluation activities is to select suppliers from those that participate in the procurement. This involves the following tasks, to be carried out in WP 2: s Task 2.4 Supplier Selection:²

- Defining the evaluation criteria for the received tenders, based on the Challenge Brief, and the weighting of the individual criteria in preparing the ranking,
- Evaluation of the received tenders as to the technical, economic, and organizational feasibility of the company's proposal,
- Preparing a ranking of the tenders based on how the proposals meet the overall evaluation criteria.

The evaluation activities will be carried out in an experts-to-experts fashion. Substantial technical expertise regarding the open source approach used in the R&D project is at hand through the participation of researchers. This expertise is of pivotal importance so that proper judgments are made based on the proposals submitted in the initial procurement. It will also be essential when the selected companies make their bids to take part in the project's phase 2 and 3.

² See PREFORMA Description of Work

The supplier selection will be done in a way which is inspired by methods commonly used within the EC when evaluating proposals. It will be done by an Evaluation Committee, which is chaired by the Project Coordinator, and composed by one representative from each partner, and two external experts. Evaluation of tenders will be performed using a three-step model: a) Compliance check b) Individual evaluation of each offer by at least two experts who are members of the Committee and c) Consensus Meeting.

The compliance check consists of a check to make sure that tenders passed the following criteria: a) Is the tender subject to any of the exclusion criteria? b) Are the requirements in the administrative instructions met? and c) Are the minimum requirements set forth in the Invitation to Tender met?

In the individual evaluations process each tender is evaluated by at least three experts belonging to the Evaluation Committee. Based on the experts' assessments, the preliminary ranking is made, discussed and agreed upon during the Consensus Meeting between all the Members of the Evaluation Committee, to be sure that the assessments of all tenders are consistent and equal. The Evaluation Committee decides which companies will be awarded the R&D contracts. The PREFORMA PCP uses a scoring model based on the following main evaluation criteria:

- Impact on the Challenge
- Quality of the Tender
- Price

Each of these broad criteria are broken down into subsets of items, allowing the panel to make quantitative estimations as to the tenders performed with respect to price, quality of the tender and their impact on the overall challenge.

Interestingly, this very same model has been used by the ongoing Pre-Commercial Procurement project CHARM as well.³ This evaluation model has many advantages. Firstly, it provides structure to the work of the evaluation committee. Secondly, evaluation can be carried out in a precise and transparent manner. Thirdly, there is opportunity to connect, and be subject to, the other ongoing, EU-funded PCP-projects.

2.1.5 Award Decision

After tenders have been evaluated, Riksarkivet as Coordinator and Contracting Authority sends an award decision to all of the participating companies. It will be signed by the Coordinator.

Enclosed with the contract award decision, is a protocol explaining how the selection of the winning suppliers was reached. The scores from the evaluation will be presented, as well as the arguments of the committee, including information about who participated. With these documents in hand, companies can decide for themselves whether they want to initiate a legal review. It is therefore customary to allow for a stand still period of ten days, from the decision date, before contracts are sent to the winning contenders.

³ In section 2.2.3 the CHARM project is presented.

2.1.6 Contracting

The procurement process within PREFORMA will make use of a Framework Agreement which has been authored and produced by the Swedish Governmental Agency for Innovation Systems as part of the ongoing SILVER project. It outlines the terms and obligations between on the one hand the Contracting Authority, and the suppliers on the other. It is organized into a number of sections, subdivided into clauses:

- Section 1: Form of Agreement
- Section 2: Terms and Conditions
- Section 3: Project
- Section 4: Key Staff
- Section 5: Documents
- Sections 6-9: Work Orders for Phases 1, 2 and 3

The *Framework Agreement* regulates terms and conditions with regard to the central issues of the PREFORMA project, such as intellectual property rights, rights to data and exploration of IPR. This means that the *Framework Agreement* is judicially related to the other agreements which make up the legal and normative framework of the R&D project. This is especially true with regard to the Consortium Agreement of PREFORMA, and its section 8: “Foreground”. The Grant Agreement between the European Union, represented by the Commission, and the Coordinator Riksarkivet also make a vital part of the regulatory framework of the project. Despite of its regulatory status, it does not have referential importance to the formulation of the *Framework Agreement* between Riksarkivet and the selected suppliers.

Contracting as a process is closely connected to the formulation of the *Invitation to Tender* in fact this document and the *Framework Agreement* are fully complementary, and will be presented to suppliers at an early stage.

The selected suppliers will not be given opportunity to negotiate the *Framework Agreement*. In fact, by submitting a Tender, the bidder is asked to accept to be bound by the conditions set forth in the Agreement.

Riksarkivet is responsible for the formulation of both the *Invitation to Tender* and the *Framework Agreement*. The preparatory work will be carried out within the judicial unit of the Coordinators Administrative Department, and by making use of both internal and external advisors.

2.2 LEGAL PROCEDURES

2.2.1 Identification of the PCP approach

Pre-Commercial Procurement (PCP) is a competition-like procurement method, which enables public sector bodies to engage with innovative businesses and other interested parties in development projects to arrive at innovative solutions that address specific public sector challenges and needs. The new innovative solutions are created through a phased procurement of development contracts to reduce risk.

Pre-Commercial Procurement is becoming more and more common within the public sectors of the European Union. In Sweden, pre-commercial procurements are not just carried out by

government agencies but also by municipalities, usually within innovation centered networks, and by municipal associations.

The PREFORMA-PCP expresses an ambition to facilitate triple-helix collaboration between the project partners from academia and memory institutions, and industrial suppliers of solutions. This is essential, since the area of ensuring correct implementation and use of long-term sustainable file formats requires research on which formats to use, how to ensure that software for using them will be available for the future. At the same time, only the suppliers have detailed knowledge concerning resources needed for development of effective solutions that satisfy requirements for long-term archiving of digital assets as requested by PREFORMA.

The PCP method is suited to tenderers of all sizes, including small and medium sized ones, as the contracts operate on short timescales and concern development of Open Source software that implements open standards for three different types of open file formats, something which do not discriminate against small companies. IT spin-offs from technical universities, for instance, might possess the technical prowess needed for the PREFORMA PCP, while being small enterprises.

In a PCP, R&D services are procured. R&D can cover activities such as solution exploration, design and prototyping, up to the original development of a limited volume of first products or services in the form of a test series. R&D does not include development activities such as quantity production, customization, incremental adaptations and improvements to existing products or processes.

The goal of the PREFORMA PCP is to create a triple helix collaboration which will benefit all those that are involved. Prior to the Call for Tenders, a Requirements Survey will be important to define the requirements from memory institutions which suppliers will have to take into consideration in developing the PREFORMA software application.

For the suppliers, this reduces fragmentation for their market, enabling them to develop single solutions for a big market, and still to be more aware and carry out their work closer to the actual demand of their customers.

For the memory institutions, this collaboration creates opportunities to pool resources in obtaining tools for checking proper file format compliance at the time when data collections are to be ingested into archives.

For the researchers, this creates clear focuses on recommended file formats that can be analysed with regards to openness, sustainability and other important principles which are necessary for ensuring successful long-term digital preservation.

In the PREFORMA-PCP, tenders will be selected by an open competition like procurement process, and awarded research and development contracts. The selected winners of the PCP will work together with the consortium for the whole duration of the project.

2.2.2 Establishment of a legal basis

To begin with, it must be stated that a PCP aiming at R&D contracts falls outside the scope of the Public Sector Directive as well as the Utilities Directive 2004/17/EC. This means that Government Agencies wishing to carry out a pre-commercial procurement operate under degrees of freedom with regard to procedure, than what had been the case otherwise.

Still, a PCP must take into consideration the fundamental principles of all public procurement. These are specified in Chapter 1, article 9 of LOU and apply to all forms of procurement, whether it be pre-commercial procurement or otherwise. The principles are:

1. The principle of non-discrimination

The principle of non-discrimination means that it is prohibited to discriminate suppliers on grounds of nationality.

2. The principle of equal treatment

The principle of equal treatment means that all suppliers should be treated equally, and be placed on an equal footing with the contracting Authority. All suppliers must, for instance, have access to the same information at the same time.

3. The principle of transparency

The principle of transparency means an obligation for the contracting Authority to create transparency by providing information about the procurement procedure and how it will be conducted. In order for tenderers to be afforded the same opportunities for the submission of tenders, contract documents must be plain and contain all the requirements regarding the subject matter of the contract.

4. The principle of proportionality

The principle of proportionality means that requirements for the supplier and requirements in the technical specification must have an obvious link with and be proportionate in relation to the subject matter of the contract. The requirements imposed must be both appropriate and necessary to achieve the aim of the public procurement.

5. The principle of mutual recognition

The principle of mutual recognition means that diplomas and certificates issued by authorities issued by an EU Member State shall also apply in other EU countries.

Secondly, a PCP must be carried out in a procurement process where each step is delineated, and made separate from the others. PCPs should be characterized by the same steps as can be found in other procurements. These are:

- Planning: A phase where needs analysis is made, and contract documents are written.
- The procurement process: a) Beginning with a publication of a contract notice, b) The collection of tenders, followed by c) Evaluation of tenders with respect to the requirements presented in the Invitation to Tender, d) The issuing of an award decision, based on the evaluation.
- The signing of a contract
- The commencement of a stand still period, under which contracts cannot be signed. This is done in order for companies to be able to initiate a legal review of the decision.

Thirdly, and very plainly, a PCP must take into consideration the common features of all procurement.

- **Contract documents** should be written in a plain way, and in such a way that is useful for those suppliers that wish to participate. Contract documents shall contain at least: a) requirements for the suppliers, b) a requirement specification or description of the assignment (a technical specification), c) grounds for evaluation with regard to price, and

other incumbent factors, d) the commercial conditions that are to be applied during the period of the agreement, e) the administrative provisions for the procurement.

- **Technical Specifications** should be written as accurately and precisely as possible. This makes the procurement easier and provides greater clarity and an increased understanding of the technical requirements. Technical specifications should also take into consideration any standard in the area in question.
- **Principles for evaluation** should either be based on the tender that has the lowest price, or the tender that is the most economically advantageous for the Authority. If the contracting Authority makes use of the second general form of evaluation, it must state very clearly which evaluation criteria it will take into account during the evaluation.

2.2.3 Benchmarking other PCP projects

Early on in the preparatory process of the procurement, PREFORMA was given information about two current, on-going PCP-projects: SILVER, and CHARM. These projects are funded by the European Commission under the Seventh Framework Programme for research and technological development (FP7), and aim at finding innovative solutions to important societal challenges.

The SILVER project

SILVER (Supporting Independent LiVing for the Elderly through Robotics) is a development project, which started in January 2012. It will run for 56 months. In total, 2 150 000 Euros is reserved for the PCP contracts. It makes use of the PCP approach, believing that the PCP has so far been an under-utilized tool for promoting innovation. One of the aims of the project is to demonstrate the effectiveness of this approach to address societal and governmental needs.

The background of the SILVER project is explained in the following way: on the project web site “As people get older, they face increasing risk of some severe condition that will affect their ability to continue living independently at home. The SILVER project searches for new technologies to assist elderly people in their everyday lives. By the use of new robotics based technologies, the elderly can continue independent living at home even if they have physical or cognitive disabilities”.⁴

In the Invitation to Tender, the main goal of the SILVER challenge is described as developing new, innovative robotic solutions that target assisting the elderly and those caring for them with personal activities of daily living. These solutions are not yet on the market, according to the SILVER ITT, but can be developed and tested within the PCP period of 2-3 years. These robotics solutions will be able to take over all of or part of the work of care givers, according to the Invitation to Tender.

The first objective of the project is to establish, and execute, an agreed PCP process to run a cross-border PCP call for tender. This generic process should also form a basis for national PCP calls designed outside of the SILVER project. The aim is that in the future, public organizations in the participating countries should be familiar with the PCP process and tools

⁴ <http://www.silverpcp.eu/project-overview/>

and use them to meet their needs. The second objective is to use the PCP process developed in the project to identify new technologies and services to support the independent living of the elderly.

The SILVER project is divided into seven work packages. One of the aims of the WP 2 in SILVER, "Creation of a Generic PCP Process", was to generate required documents for PCP and templates suitable for further use of cross-national PCP calls. These PCP templates have been submitted to the PREFORMA participants, and a decision has been made by the project management team to use them for the pre-commercial procurement in Spring 14. They are written in English, but versions in Swedish have also been produced. Responsible for this WP is the Swedish Agency for Innovation Systems, VINNOVA. During early winter of 2014, PREFORMA has been in contact with VINNOVA about the production and use of the PCP-templates.

Seven tenderers entered the phase 1 of SILVER. This phase is a feasibility study during which successful tenderers are expected to verify the technical, economic and organizational feasibility of their ideas. It will last for 6 months, ending on the 31st of March of 2014.

The CHARM project

The CHARM Pre-Commercial Procurement project intends to stimulate innovations to improve traffic management centers, promoting safe, fast and reliable road mobility.⁵ The PCP is part of a larger programme, the CHARM Programme, of which the PCP is the development branch. It was initiated by national road operators from England (The Highways Agency), and the Netherlands (Rijkswaterstaat). These road operators have worked together since 2011 to renovate their traffic message channels.

The Flanders Department of Mobility and Public Works is a partner of the consortium. The UK-based Technology Strategy Board and the Netherlands Enterprise Agency are also supporting the consortium with their expertise in procurement and innovation projects.

The CHARM PCP is funded by the European Commission, and has a budget of 2 880 000 Euro. The consortium intends to help development of the market for traffic management centres. It also tries to reduce the cost of ownership and create a more flexible and adaptable traffic management system.

Building on this perspective, three separate PCP-challenges have been proposed to achieve substantial improvement of traffic management services:

- Challenge 1: Advanced distributed network management. The goal of this challenge is to realize a module that provides automated support for management of large traffic networks.

⁵ https://www.innovateuk.org/competition-display-page/-/asset_publisher/RqEt2AKmEBhi/content/charm-pcp?p_p_auth=FWPxdS6j

- Challenge 2: Detection and prediction of Incidents. The goal here is to realize a module that provides early identification and prediction of near future events on the network (accidents, queues etc.).
- Challenge 3: Support of Cooperative Intelligent Transport System Functions. The goal here is to realize a module that supports the implementation of cooperative system services which require a participation of intelligent infrastructure, in order to optimize the performance of the road network.

According to the CHARM Invitation to Tender, these three challenges form part of the overarching challenge for the PCP shared by the CHARM traffic management authorities to achieve improvements in traffic management services.

Benchmarking the SILVER and CHARM PCPs: Conclusions

1. A similar structure of Tender Documents

According to the Invitation to Tender of CHARM and SILVER, the following documents were used to procure the R&D services needed to complete the challenges of each project:

- a. Invitation to Tender
- b. Challenge Brief
- c. Guidance for Applicants
- d. Tender Form
- e. Questions & Answers
- f. Framework Agreement

The CHARM project also provided a Guidance document for Assessors. The technical specifications of the CHARM PCP were organized in a functional specification document. The documents a-f are designed and structured in the same way, tailored after the PCP-templates which were generated by the SILVER PCP. A decision has been made by the PREFORMA management team to structure the coming procurement by using the same PCP-templates.

2. Extensive use of the project websites to administer tenders

According to the SILVER Invitation to Tender, tenderers entered into the SILVER competition by registering via the competition website. This triggered an e-mail containing a username and password for the secure upload facility, along with a unique SILVER Tender Form, and number. CHARM used a similar approach, according to their ITT. The full competition documentation could be reached only after tenderers had registered on the competition registration web page. A deadline, before which tenderers must register, was also included in the overall timetable of the procurement.

3. Budgetary concerns and IPR

According to the European Commission, public procurers tend to opt for a so called exclusive development meaning that they reserve all of the benefits and results of the development, including intellectual property rights (IPR). This will be normally reflected in a higher price. It is also a fact that such a solution might hamper innovation, since it takes away some of the incentives for companies to invest in further commercialization, according to the European Commission. The SILVER PCP mentions in the Invitation to Tender that risks and benefits will be shared between the Authority and contractors in such a way that all parties have an incentive

to pursue wide commercialization and take up the new solutions. The CHARM Invitation to Tender contains a much similar declaration.

Both projects are organized in three phases, whereas the CHARM PCP is divided into lots, something which is not done in SILVER.

2.2.4 Obtaining council from authorities and law firms

The Swedish Governmental Agency for Innovation Systems

For many years, the Swedish Governmental Agency for Innovation Systems, VINNOVA, has had various tasks to perform with respect to pre-commercial procurement. Firstly, it co-funds PCP-projects. One example of this, found on the VINNOVA website, regards pre-commercial procurement of re-use centers in the South of Sweden. This project is conducted by a consortium of municipality waste companies, and aims to develop purchasers' competence and understanding of innovation processes while stimulating R&D and growth in the clean tech industry. The idea is to perform pre-commercial procurement of a new system for re-use that can replace or complement the community recycling centers in use today. The project will be implemented in four phases: a) Feasibility studies, b) Invitation and exploration of solutions, c) Pilot plants and d) Basis for commercial public procurement.

A second task of VINNOVA, is to monitor the PCP development in Sweden, and to provide information to interested parties. One prominent project that is ongoing is the innovation competition ITS Innovation Stockholm-Kista, which aims to stimulate the development of new solutions for a more efficient use of transport infrastructure. The project was launched in autumn of 2012 as Sweden's first pre-commercial procurement. It is led by the City of Stockholm, the Swedish Transport Administration, Stockholm Public Transport and Kista Science. The total development budget, from which the winning contributions are funded, is 360 000€. 14 companies initially tendered and 6 of those were awarded contracts in phase 1. During autumn 2013, three companies were selected to further develop their solutions in phase 2. Launch and commercialization of the finished solutions is planned for autumn 2014.

Thirdly, VINNOVA seeks to facilitate other government agencies, and municipalities, in their PCP endeavors. For this purpose, VINNOVA has produced a handbook for those who seek to perform PCPs: "Pre-commercial Procurement: A Handbook to perform R&D procurements". The handbook is supplemented by a number of PCP-templates, in Swedish, that originally were produced within the SILVER PCP, in which VINNOVA is a partner of the consortium.

The VINNOVA Handbook

In its handbook, VINNOVA suggests that PCPs are carried out under a different legal basis than public procurements generally are. The reason is that a PCP which aims at contracts for R&D falls outside the scope of the EU procurement directives, therefore allowing government agencies "greater degrees of freedom". A precaution is made, however, stating that agencies should be careful to make sure that the PCP process is in line with the fundamental principles of public procurement.

VINNOVA emphasizes the need to prepare a PCP carefully. Government agencies are advised to carry out needs- and market analyses to arrive at a point where they can determine whether it is conducive to carry out a pre-commercial procurement.

Another issue raised by VINNOVA is the importance of a clearly defined challenge. Defining the challenge is vital to the success of a pre-commercial procurement. It should be suited for the needs of the project's stakeholders and end-users. The challenge should be formulated in a way that can make companies interested in proposing the very solutions which can generate the desired benefits of the project. VINNOVA suggests that the PCP challenge should be made as functional as possible, in order to allow companies to reach their highest innovation potential.

A differentiation is made in the handbook between challenges that are broad in scope, from those that are narrow.

A broadly defined challenge has the potential of attracting suppliers in greater number. A higher number of tenders will probably contain some innovative proposals, perhaps even some unconventional solutions. A broader scope to the challenge, resulting in more tenders, can however create some top-heavy administration in a PCP project, according to VINNOVA. The opposite choice would be to go for a more narrow approach. This may make the Call for Tenders less attractive. It can decrease the probability of the procurer to receive some innovative solutions.

On the other hand, a narrow scope to the PCP challenge makes it easier for the procuring agency to analyse what is considered state of the art on the market, which enables a more precise gap analysis between needs and market supply. Further, it is easier to administrate and considered by VINNOVA to be formulated in such a way that makes the R&D approach to the project very clear.

The handbook also contains pointers that provide succinct judicial advice for the Tender Procedure:

a) To make sure that the PCP is in line with applicable EU legislation, the procurer should:

- Make sure that the procedure ascertains an open competition.
- Ask tenderers for a fixed price, exclusive of VAT, but inclusive of all relevant costs.
- Include a contract clause which gives the procurer right to detailed information about the proposed project, and the services to be delivered.
- Determine and communicate very clearly how IPR-issues will be handled.

b) To make sure that the PCP follows the norms of public procurement, the procurer should:

- Determine which legal entities are qualified to partake in the PCP. It is not allowed to limit the opportunities for legal entities to participate. This means that a contract can be awarded both to single entities and to consortia.
- Make sure that sub-contracting is possible.
- Use commonly agreed upon exclusion criteria.
- Avoid such requirements which might exclude, or hinder, SMEs from participation. Practically speaking, this means that requirements regarding size, turnover, prior experience etc should be outruled.

The PREFORMA project has been in touch with VINNOVA at certain stages while preparing for the PCP. The most significant assistance provided by VINNOVA to PREFORMA regards the PCP-templates for Invitation to Tender, and Framework Agreement along with the other associated documents. Since these documents have been developed by a Government Agency, during the course of a year, they provide a good foundation for the practical execution of the PREFORMA PCP in Spring 2014.

Law firms and Procurement Specialists

External council to the PREFORMA PCP comes from law firms and procurement specialists as well. The main purpose of obtaining this particular kind of council is to safeguard the PCP-documents from a judicial point of view before they will be published on the TED.

2.3 TENDER PLANNING

The PREFORMA PCP procures R&D work for three different media types: text, image and audiovisual content. Suppliers are invited to make a proposal for R&D work addressing one, two or all three media types, depending on their in-house expertise or the expertise they may bring together in a consortium. A Supplier must address the PREFORMA challenge, i.e. developing a conformance checker and establishing an ecosystem around a reference implementation, for at least one media type.

The evaluation of the tender will take into account both quality and price of the proposal within a value-for-money approach.

This means that the evaluation criteria and the framework contract take into account the ratio between the cost of the R&D work against the number of media types addressed:

- If a provider proposes a solution for only 1 format, it is eligible, but naturally it is expected to cost less than a solution that is good for 2 or even for all the 3 formats.
- If a provider proposes a solution for 2 formats, it is eligible, but naturally it is expected to cost less than a solution that is good for all the 3 formats.
- If a provider proposes a solution for all the 3 formats, it is expected to cost more than a solution that covers just 1 or 2 formats.

The evaluation criteria and the framework contract will assess the quality of the R&D work for each individual media type and require that when addressing multiple media types quality should be equally high.

The supplier selection will be based on a single set of evaluation criteria, comparing solutions for one or more different formats. This set of criteria must ensure an equal and objective evaluation for all bids. These evaluation criteria will be defined in D2.2 Tender specifications.

3. FUNCTIONAL AND TECHNICAL SPECIFICATIONS

The functional and technical specifications for the PREFORMA PCP are developed by Task 2.2 and 2.3 in Work Package 2. They are presented in deliverable D2.2 Tender Specifications and included in two procurement documents discussed above:

- The Challenge Brief will include the overall functional and technical requirements for the conformance checker to be developed by PREFORMA. These requirements reflect the concrete needs of the memory institutions regarding the deployment of a conformance checking procedure for their digital collections. It should be emphasized that these requirements do not define an evaluation model as such for the PREFORMA tender. They have to be agreed upon as a whole by the supplier to engage in the necessary research and development work.
- The minimal requirements will include and further exemplify a subset of requirements from the Challenge Brief to ensure that suppliers fully commit to the overall scope and approach of the PREFORMA PCP. i.e.:
 - an open-source approach to the development, availability and documentation of the conformance checker,
 - facilitating the process of conformance checking in different stages of the life-cycle of the preservation file.
 - a modular and interoperable architecture that ensures easy deployment in a various set of deployment contexts.

3.1 REQUIREMENTS GATHERING

Actions for gathering requirements from the memory institutions have been performed within the scope of Task 2.2 and 2.3 in months 2 and 3 (February and March 2014) of the project. The objective was to gather in this limited time frame as much information as possible about the practical needs of memory institutions regarding the conformance checking procedures deployed by their institution. This information served various purposes within the scope of the project:

- to make the commitment of the memory institutions in the triple helix academic research-industry-memory institutions concrete, by providing the detailed information on the users,
- to perform a reality check of the concept of conformance checking that had been developed in the Description of Work,
- to ensure that the end result of the PREFORMA project will address a substantial user base among memory institutions, and
- to prioritize the needs and requirements from the perspective of the memory institutions.

Requirements gathering have been facilitated through five concrete actions: (1) Conducting a survey, (2) Drafting usage scenarios, (3) Creating a joint user model, and (4) A sustainability analysis of file formats, 5) Defining training and test data sets.

3.1.1 Survey

A survey has been performed among the nine memory institutions which participate in the PREFORMA project. This survey was not conceived as a checklist, producing statistical information about conformance checking at memory institutions, rather it functioned as an open questionnaire.

The survey consisted of five sections, discussing following topics:

- Digital library: How does your organisation manage ingest, retention of and access to digital objects?
- Policy: What is the legal and institutional framework in which the digital library of your institution operates?
- Agents: Which human and software agents are involved in the conformance checking procedure at your institution?
- Conformance checking: How does your organisation currently perform conformance checks? How would you like to do conformance checking in the future?
- Data sets: Can you provide data sets for testing training and demonstration of the tools developed in PREFORMA.

The survey has been performed using an online document editor and by conducting online telephone conferences. This allowed memory institutions to work on the mix of policy and technical questions in the survey. The answers have been discussed twice for each memory institution to solve questions and eventual inconsistencies.

The survey results included nine documents which contain rich information about the local digital preservation practice that provided input to the usage scenarios.

The survey results will be made available as part of the open dialogue process in PREFORMA at a later stage, when WP2 has verified which information they would like to share with the other partners and the general public.

3.1.2 Usage scenarios

Based on the findings in the survey, Task 2.2 has drafted nine usage scenarios that represent the individual needs and expectations as to the PREFORMA conformance checker from each of the institutions.

This set of usage scenarios should not be conceived as a comprehensive overview of all possible conformance checking procedures in the nine memory institutions. Due to the limited time frame for the requirements gathering, this was not feasible. However, it was agreed in the Requirements Workshop (see section 3.2 below) that the list is representative for the current needs at memory institutions. It should be emphasized as well that these scenarios provide the initial input for the design phase, where functional and technical requirements will be further detailed.

Three usage scenarios deal with conformance checking of audiovisual content:

- Greek Film Center, Athens: “Quality control of preservation files delivered by cinematographers.”
- Kungliga Biblioteket, Stockholm: “Normalisation of moving image files deposited at a national library.”
- Sound & Vision, Hilversum: “Quality control on ingested broadcast files.”

Two usage scenarios deal with conformance checking of text content:

- National Archives, Sweden: “Monitoring PDF/A requirements for transferred digital documents at pre ingest time.”
- Ministry of Culture, Estonia: “Automated validation of PDF/A files in a digital repository.”

Four usage scenarios deal with conformance checking of image content:

- Institute for Museum Research, Berlin: “Elementary conformance checking of image files with a stand-alone tool for non-expert users.”
- Royal Institute for Cultural Heritage, Brussels: “Quality control of digital representations of cultural heritage objects.”
- Royal Institute for Cultural Heritage, Brussels: “Normalisation of photographic documentation of cultural heritage objects.”
- SGDAP, Girona: “Complete and comprehensive quality control of image files from text and image digitization.”

3.1.3 Joint user model

Based on the findings in the nine usage scenarios, Task 2.3 has identified a set of common requirements that create a basis for a joint user model for development of the PREFORMA conformance checker.

Task 2.3 identified a set of four general use cases that describe the conformance checking in four different stages of the life cycle of a preservation file:

- Conformance checking at Creation time: checking conformance of files by the producer before transfer to the memory institution (cf. government agencies producing public documents)
- Conformance checking at Transfer time: checking conformance of files by the memory institution when ingested in a digital repository (cf. libraries monitoring the preservation status of publications deposited in their repository)
- Conformance checking at Digitisation time: checking conformance as quality control of files delivered by a digitisation company or by staff. (cf. museums that perform quality control on the digital representations and documentation they produce)
- Conformance checking at Migration time: checking conformance of files after migration to a new preservation format.

Memory institutions have different roles and responsibilities in each of these four use cases. These will be further detailed as part of the open dialogue process, and in the design phase of the PREFORMA PCP. Further, Task 2.3 identified a set of five general deployment contexts that describe the typical infrastructures and agents in which deployment of the PREFORMA conformance checker should be possible. They include deployment as required by the DoW, and deployment as expected by the nine memory institutions:

- Website: The PREFORMA toolset will be deployed at the website where you can upload files and have them checked. The website demonstrates the functionalities of the tool and will be used by the PREFORMA project to show the tool to the EC.
- Evaluation framework: The PREFORMA toolset will be deployed in the DIRECT evaluation infrastructure. This deployment allows for testing the tools in the PREFORMA project.

- **Stand-alone:** The PREFORMA toolset should allow for deployment as an executable to be downloaded and installed on a workstation. This ensures that the tool can be used by institutions and producers without any central IT infrastructure.
- **Client-server:** The PREFORMA toolset should allow for deployment on a server that enables sharing the use of the tool via multiple workstations. This enables a scalable use of the tool in digital repositories.
- **Integration in legacy systems:** The PREFORMA toolset should allow for integration into proprietary legacy systems, adding functionality for conformance checking.

It should be emphasized that deployment of the PREFORMA toolset at the memory institutions is deliberately outside the scope of the PREFORMA PCP. Use cases and deployment scenarios are considered here as a necessary source for functional and technical requirements to be included in the Invitation to Tender.

Due to the limited time frame assigned to the survey, these deployment contexts basically identify different types of infrastructures, but contain few technical details that may provide input to the selected suppliers. Therefore these deployment contexts will be further developed as part of the open dialogue process and in the design phase of the PREFORMA PCP.

3.1.4 Sustainability analysis file formats (phase 1)

Based on the findings of the usage scenarios and research on best practices at major heritage collections WP2 drafted the following table that lists all (1) formats used by the PREFORMA stakeholders, (2) archive formats endorsed by the industry, and (3) open licensed formats.

For the selection of the preservation file format to be addressed in PREFORMA, four criteria have been used:

- Is the format acknowledged a proper preservation format by digital preservationists?
- Is the format actually used by PREFORMA stakeholders?
- Is the format actually used by service providers?
- Is the format available under an open license?

For none of the media types there is a format for which all four questions were positive. Hence the identified formats are a compromise for the four parameters.

WP2 presented a selection of nine preservation file formats at the Requirements Workshop on 5 March 2014 in Brussels. This selection can be found in the last row and the retained used, industry and open standards have been made bold:

	Audiovisual			text	image
	Broadcast industry	Film industry	Consumer industry		
PREFORMA	MXF/MPEG-IMX	DPX DCP	MOV/MPEG2 or MPEG4/PCM	PDF 1.4	TIFF 6.0

stakeholders	MXF/XDCAM	(MXF/JPEG2000/LPCM)	AVI/MPEG2 or MPEG4/PCM MPEG/MPEG2/MPEG1 AudioLayer III MPEG4/AVC/AAC	PDF/A1	JPG JPEG2000 RAW
Industry standards	AS-07 (MXF/MPEG-IMX or JPEG2000) FIMS (MXF/MPEG) AXF	DCDM (TIFF 6.0) DCP (MXF/JPEG2000/LPCM) IMF (MXF/JPEG2000/MPEG)	MPEG-AP	PDF	JPEG2000 TIFF
Open standards	MKV / FFV1 OGG / Dirac	PNG	WebM / VP8 Ogg / Theora	PDF/A1,A2,A3	PNG
PREFORMA	MXF / JPEG2000 / LPCM MKV / FFV1 / LPCM OGG / Dirac / LPCM			PDF/A	TIFF 6.0

The selection of nine preservation file formats has been based on the following compromise:

- TIFF 6.0 is acknowledged as a proper preservation format, used by PREFORMA stakeholders, and has considerable support among service providers. However, it is not available under an open license.
- PDF/A is acknowledged as a proper preservation format, an open standard, and has considerable support among service providers. However, it has limited use among PREFORMA stakeholders.
- For the audiovisual format, there is no consensus on a commonly acknowledged proper preservation format and none of the PREFORMA stakeholders is currently using a suitable candidate reference implementation. Moreover, the main audio-visual domains broadcast, film and consumers use different formats. Therefore, WP2 suggested to provide three options for R&D on an audio visual format.
 - MXF/JPEG2000/LPCM, an industry related format which addresses preservation of broadcast and film material
 - MKV/FFV1/LPCM an open source related format which addresses preservation of broadcast and consumer material
 - OGG/Dirac/LPCM an open source related format which addresses preservation of broadcast material.

The consequence of this compromise is that when PREFORMA stakeholders implement any of the PREFORMA conformance checkers for checking their current digital assets, in most cases they will be forced to perform a migration of their content to a new preservation format.

3.1.5. Provision and use of training and test data

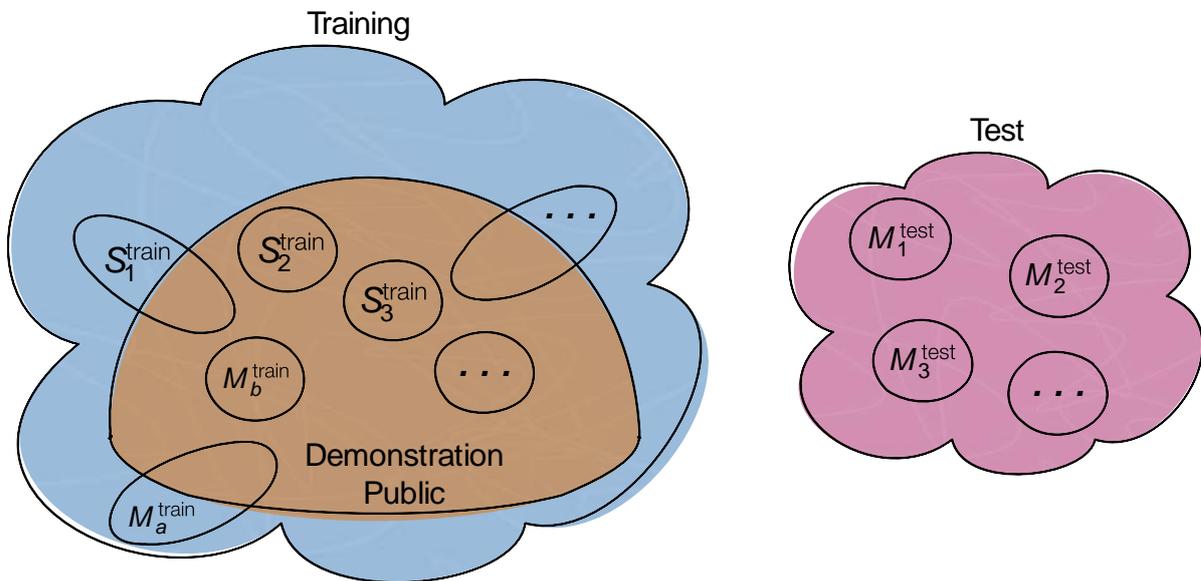


Figure 1: PREFORMA datasets.

Figure 1 shows the main data set which will be used and made available during the lifetime of the project.

The main distinction is between:

- **training dataset:** aimed at driving and facilitating the design and development of supplier systems as well as show casing their functionalities.
- **test dataset:** aimed at evaluating and testing the supplier systems in order to score and subsequently select the best of them.

Test and training datasets are two distinct datasets in order to avoid evaluating supplier system on datasets on datasets (training ones) they are over fitted and to ensure fair and unbiased assessment of them.

Both training and test dataset will be associated with ground-truth specifying which files are to be considered correct, which ones are incorrect and, possibly, why. The ground-truth associated with the test data set will not be shared ahead, because it is needed for carrying out the final testing phase in an unbiased way.

More in detail, the test dataset is constituted by representative test data M_j^{test} provided by memory institutions that can be either partners of the PREFORMA consortium or members of the PREFORMA network of memory institutions. During the execution of the PREFORMA project, this dataset is private and it will be shared only within the consortium to test the supplier systems. After the end of the PREFORMA project, memory institutions may decide to make (part of) it public to favor the PREFORMA ecosystem and open source community.

The training dataset is constituted by: (i) representative training data M_k^{train} provided by memory institutions that can be either partners of the PREFORMA consortium or members of the

PREFORMA network of memory institutions; (ii) representative training data S_h^{train} provided by the suppliers participating in the project.

The training dataset is constituted by two parts: a demonstration one, which is public and serves the purpose of showing the suppliers systems both to the other suppliers and to the memory institutions; a private part, which is used internally by each supplier for designing, developing, and testing its own system.

Data provided by memory institutions and suppliers which are in the demonstration dataset are accessible and shared also with the other suppliers participating in the tender, besides the general public.

The purpose of the demonstration dataset is to trigger and facilitate the growth and development of the PREFORMA ecosystem, the open source community, the communication with standardization bodies and, if properly fed, will represent a strategic asset for suppliers in order to sustain their own business plans.

All the training data provided by the suppliers in the private part have to be accessible and shared with the PREFORMA consortium in order to allow the consortium to verify any claim suppliers make on their systems based on their own training datasets.

An orthogonal distinction on the datasets is between synthetic and real data, where the former are data created with the specific purpose of pinpointing some specific compliance problem or critical issue for a given preservation format whereas the latter are data actually managed by memory institutions for their preservation duties.

It is intended that both the training and the test datasets will be comprised by both synthetic and real data.

3.2 REQUIREMENTS WORKSHOP

WP2 organized a requirement workshop for the memory institutions participating in PREFORMA on Wednesday 5 March 2014 in Brussels. This workshop was conducted to verify some of the initial conclusions of the survey, usage scenarios and sustainability analysis of the formats.

The workshop was used to establish agreement on some issues that were relevant to continue drafting the technical and functional requirements to be included in the Invitation to Tender.

The requirement workshop established agreement on the following two issues:

- Agreement was reached on the sets of use cases and deployment contexts described above, as representative for the current and future practice of conformance checking at the memory institutions.
- Agreement was reached on the preservation formats to be researched by PREFORMA. These formats included:
 - PDF/A-1a, PDF/A-2 and PDF/A-3 for text media
 - TIFF 6.0 Part 1: Baseline Uncompressed for image media
 - And the following set of containers and video encodings for audiovisual media:

Containers:	<ul style="list-style-type: none"> • MXF OP1a: SMPTE 378M-2004, • Matroska: http://www.matroska.org/technical/index.html • OGG: https://xiph.org/vorbis/doc/
Video encoding:	<ul style="list-style-type: none"> • Dirac (lossless): http://diracvideo.org/download/specification/dirac-spec-latest.pdf • JPEG2000 (lossless): ISO/IEC 15444-1:2004 • FFV1 (lossless): http://www.ffmpeg.org/~michael/ffv1.html

WP2 continued to list all formal standard documents to be obtained by the selected suppliers. Regarding the audiovisual formats, WP2 continued analyzing the sustainability of each of the six standards listed in more detail and make a proposal on how to tender them in PREFORMA.

3.3 SUSTAINABILITY ANALYSIS OF FILE FORMATS (PHASE 2)

While preparing the Challenge Brief and the Minimal Requirements, WP2 continued with the sustainability analysis of file formats agreed upon at the Requirements Workshop. The research particularly focused on the availability of standard specification documents under an open license and the cost for obtaining and implementing the standard specification.

3.3.1 Open standards

Following the PREFORMA DoW, all digital assets developed during the PREFORMA project shall be provided in open file formats. WP2 researched whether the identified standard specifications allow for making all digital assets available under an open licence.

The following table provides an overview of:

- the available standard specification documents,
- the organisations that maintain the standard specification documents, and
- the licence conditions under which these standard specifications can be implemented:

name	maintained by	standard specification	license conditions
PDF/A	ISO	ISO 19005-1:2005 ISO 19005-2:2011 ISO 19005-3:2012	Licensed by Adobe on a royalty-free, non-exclusive basis
TIFF 6.0	Adobe	TIFF 6.0 Part 1 Baseline	RAND (not exploited)
MXF	SMPTE	SMPTE ST 377-1:2011 SMPTE ST 378:2004	RAND

OP1a		SMPTE ST 379-1:2009	
JPEG2000	JPEG	ISO/IEC 15444-1:2004	Intended as license and royalty free
MKV	Matroska.org	http://matroska.org/technical/index.html	License and royalty free Matroska Trademark policy applicable
FFV1	FFMPEG	http://www.ffmpeg.org/~michael/ffv1.html	License and royalty free
OGG	XIPH.org	http://xiph.org/ogg/doc/rfc3533.txt	License and royalty free
Dirac	BBC	http://diracvideo.org/download/specification/dirac-spec-latest.pdf	License and royalty free

WP2 identified the following issues regarding the availability of the standard specification under an open license:

- TIFF 6.0: the specification is available under RAND conditions, it seems to be “not exploited” by Adobe because the format is widely supported by open source software. Another sign that the specification is “not exploited” is that the original TIFF 6.0 specification has not been updated since 1992. When procuring research and development for this format, contacts with Adobe have to be established to clarify the future strategy of the company for this file format.
- MXF OP1a: Commercial re-use comes at a cost for SME’s and precise license conditions are unclear. Both issues complicate the procurement of research and development for this format.
- MKV: The maintainer of the standard specification has a trademark policy, requiring Matroska.org to verify implementations before they are commercially available. When procuring research and development for this format, contacts with Matroska.org have to be established to clarify the use of the Matroska trademark in the PREFORMA project.

3.3.2 Cost

The PREFORMA project has to consider two principles regarding the costs related to standard specifications. First, the use of open standards requires that standard specification documents are available for free or at nominal cost. Secondly, the principle of proportionality as set forth by the Swedish Procurement Act (LOU) requires that investments and measures must be proportional with respect to the services being procured.

Hence, WP2 researched the different costs related to using the identified standard specification in the PREFORMA project, including the costs for:

- obtaining the standard specification documents
- membership of the standardisation committee that maintains the standard specification document.

name	standard specification	purchase/license fee	membership fee
PDF/A	ISO 19005-1:2005 ISO 19005-2:2011 ISO 19005-3:2012	138 CHF 158 CHF 158 CHF	ISO/TC 171/SC 2 full membership fee
TIFF 6.0	TIFF 6.0 Part 1 Baseline	free	n/a
MXF OP1a	SMPTE ST 377-1:2011 SMPTE ST 378:2004 SMPTE ST 379-1:2009	<p>SMPTE Digital Library <u>annual</u> fees:</p> <p>SMPTE standard access: \$4750 for 1-2 users \$8500 for 3-5 users</p> <p>SMPTE full members standard access:</p> <p>\$2850 for 1-2 users \$ 5100 for 3-5 users</p> <p>The default license document at the subscription site for standard access only allows academic research.</p> <p>Commercial re-use of the specification requires an additional license:</p> <p>SMPTE Diamond Level Sustaining Member: \$15.000 (free access)</p>	<p>SMPTE <u>annual</u> membership fee:</p> <p>SMPTE professional 1 year membership: \$145</p> <p>SMPTE Standards supplement: \$250/year > for monitor or participate in standards activities</p> <p>SMPTE Non-members Standards Supplement: \$450/year</p> <p>SMPTE Supporting Level Sustaining Member: \$975 + joining the Standard Community: \$425 > \$1400</p>
JPEG2000	ISO/IEC 15444-1:2004	138 CHF	ISO/JTC 1/SC 29 full membership fee
MKV	http://matroska.org/technical/index.html	free	n/a
FFV1	http://www.ffmpeg.org/~michael/ffv1.html	free	n/a
OGG	http://xiph.org/ogg/doc/rfc3533.txt	free	n/a
Dirac	http://diracvideo.org/download/specification/dirac-spec-latest.pdf	free	n/a

The analysis of cost revealed that the costs for obtaining and participating in the standardization process of MXF-OP1a do not meet the requirements for including it in the PREFORMA PCP. The standard specifications documents required for implementation in a conformance checker are available at an annual cost of 15.000 euro (SMPTE Diamond Level Sustaining Member) and membership fee of the related standardisation committee cost 1.400 euro annually.

Both costs have been considered not proportional with respect to the services SMEs tender for. This statement has been confirmed by the National Procurement Services at the Kammarkollegiet Authority in Stockholm⁶. Therefore, it was decided to exclude the MXF-OP1a container format from the PREFORMA PCP.

3.3.3 Procuring reference implementations

After the analysis of cost and license conditions, the following list of preservation file formats has been considered for including them in the minimal requirements and challenge brief of the PREFORMA PCP:

- PDF/A
- TIFF 6.0
- MKV
- OGG
- JPEG2000
- FFV1
- Dirac
- LPCM

PREFORMA PCP allows for tendering for three different media types. Hence each media type has to be linked with the corresponding file formats and its subsequent standard specification documents:

For **text**, the preservation format is PDF/A. The challenge brief and the minimal requirements will refer to the following standard specification documents:

- ISO (2005). Document management -- Electronic document file format for long-term preservation -- Part 1: Use of PDF 1.4 (PDF/A-1). ISO/TC 171/SC 2, ISO 19005-1:2005.
- ISO (2008). Document management -- Portable document format -- Part 1: PDF 1.7. ISO/TC 171/SC 2, ISO 32000-1:2008.
- ISO (2011). Document management -- Electronic document file format for long-term preservation -- Part 2: Use of ISO 32000-1 (PDF/A-2). ISO/TC 171/SC 2, ISO 19005-2:2011.

⁶ Letter from the National Procurement Services at the Kammarkollegiet Authority in Stockholm, dated 2014-05-07, in reply to Riksarkivet's request for advice and a clear word regarding the appropriateness of procuring IT-development services within the MXF file format.

- ISO (2012). Document management -- Electronic document file format for long-term preservation -- Part 3: Use of ISO 32000-1 with support for embedded files (PDF/A-3). ISO/TC 171/SC 2, ISO 19005-3:2012.

For **image**, the preservation format is TIFF 6.0. Since this specification is not available as an open standard, the PREFORMA PCP will refer to two alternative ISO maintained standards that include the TIFF 6.0 specifications. The challenge brief and the minimal requirements will refer to the following standard specification documents:

- ISO (2001). Electronic still-picture imaging — Removable memory — Part 2: TIFF/EP image data format. ISO/TC 42, ISO 12234-2:2001
- ISO (2004). Graphic Technology -- Prepress digital data exchange -- Tag image file format for image technology (TIFF/IT). ISO/TC 130. ISO 12369:2004.

For the **audiovisual** preservation format, the situation is much more complicated, since WP2 identified a set of 6 standard specifications that can be used for developing a reference implementation. As a result of the lack of consensus on an appropriate preservation file format for audiovisual content, the open source project on audiovisual media will basically develop a new audiovisual profile, specifically for long-term preservation, using the 6 standard specifications agreed upon at the PREFORMA requirements workshop.

WP2 has researched the following three options for including this set of standard specifications in the minimal requirements and the challenge brief.

Option 1. Two preferred combinations

The minimal requirements and challenge brief will refer to two preferred combinations of standards:

- OGG/Dirac/LPCM
- MKV/FFV1/LPCM

These combinations are based on existing implementations⁷.

This option would exclude JPEG2000 from the PREFORMA PCP, which is a widely adopted standard specification in digital cinema.

Option 2. An audiovisual profile built from a pool of 6 standards

The minimal requirements and challenge brief will refer to the set of 6 standard specifications as a whole: MKV, OGG, JPEG2000, FFV1, Dirac and LPCM.

Technology provider can propose a combination of a container, video and audio encoding based on their own expertise.

⁷ For reference: The MKV/FFV1/LPCM profile has been implemented as part of the Archivematica open source digital preservation system. cf. <https://www.archivematica.org/wiki/Video>
The Ogg/Dirac profile has been implemented by BBC and the specifications for encapsulating Dirac in Ogg have been published. Cf. <http://diracvideo.org/download/mapping-specs/dirac-mapping-ogg-latest.pdf>
The profile has been implemented by the Schroedinger codec: <http://diracvideo.org/>

Option 3. Requirements only

The minimal requirements and challenge brief will not refer explicitly to one of the 6 identified standard specifications. Tenderers are invited to propose a combination of a container, video and audio encoding, based on their own expertise. To ensure the reference implementation meets the requirements for use as a preservation format, the minimal requirements and the challenge brief will include a reference to two sets of requirements:

- the standard specifications must be available as an open standard, i.e.:
 - the standard is adopted and will be maintained by a not-for-profit organization, and its ongoing development occurs on the basis of an open decision-making procedure available to all interested parties (consensus or majority decision etc.);
 - the standard has been published and the standard specification document is available either freely or at a nominal charge. It must be permissible to all to copy, distribute and use it for no fee or at a nominal fee;
 - the intellectual property - i.e. patents possibly present - of (parts of) the standard is made irrevocably available on a royalty-free basis;
 - there are no constraints on the re-use of the standard.
- the standard specifications must allow for:
 - capturing uncompressed or mathematically lossless compressed audio- and video- or image streams;
 - preserving the image and sound properties of the original audiovisual resource;
 - capturing time code and subtitle information;
 - capturing a comprehensive set of preservation data;

these four functionalities will be made more concrete by including a detailed list of technical specifications for the audiovisual object to be accommodated by the reference implementation

After having considered the needs and requirements and the advice from external legal experts and of the EC reviewers, WP2 has opted for the 2nd strategy of procuring development of a new an audiovisual profile for long term preservation using the following 6 standards: FFV1, Dirac or JPEG2000 for encoding video/moving image, LPCM for encoding sound and MKV or OGG for wrapping video and audio streams into one file.

This option allows PREFORMA to retain the interest of digital cinema collections in the PREFORMA project and to ensure that the audiovisual open source project is in line with the audiovisual preservation standards identified agreed upon at the requirements workshop,

3.4 CHALLENGE BRIEF

After the requirement workshop, WP2 started drafting the Challenge Brief. It will contain the overall challenge that the PREFORMA R&D will address, as well as details on the functional and technical requirements, the desired outcomes and the scope of the PCP.

The Challenge brief has been presented at the PREFORMA Information Day in Brussels on Friday 4 April 2014.

The Challenge brief includes the following sections, referring to the previous paragraphs:

- A comprehensive description of the PREFORMA challenge, i.e. the establishment of a set of tools and procedures for gaining control over the technical specifications of digital content intended for long-term preservation by memory institutions.
- A description and listing of the formal standard specifications to be addressed.
- A description of the use cases, deployment contexts and components of the PREFORMA conformance checker.
- A comprehensive description of the sustainable and viable ecosystem for adoption and improvement of the reference implementation of the addressed file formats PREFORMA should establish.
- A comprehensive description of the open-source approach, which is considered fundamental for participating in the PREFORMA PCP.

3.5 MINIMAL REQUIREMENTS

After the requirement workshop, WP2 also started drafting the minimal requirements to be included in the Invitation to Tender. These requirements will be derived from the Challenge brief and the detailed feedback from the Requirements workshop, and they will be included in D2.2 Tender Specification. We would like to emphasize, however, that integration into legacy systems is beyond the scope of PREFORMA, and therefore not covered in the tender.

3.6 BENCHMARKING TECHNICAL REQUIREMENTS

Another issue of importance for the PCP is whether the functional and technical requirements of the tool to be developed have to be languaged, and/or organized in a particular way in the Invitation to Tender and its associated documents. Traditionally, open procurements of regular services often contain detailed descriptions of the particular functional requirements which the procuring agency has deemed to be mandatory, meaning that they must be fulfilled, and requirements considered as providing added value to the end-result. Companies are then evaluated with respect to how well they match up to these either mandatory or wished for functional requirements. Is this how functional and technical requirements are formulated in other PCPs? The challenge document/the technical regulation document should clearly distinguish between:

- the aims of the PCP (broad description of what memory institutes aim to achieve),
- the minimum functional requirements (which would need to be addressed by the proposals pending exclusion of the proposal; they can also be used to evaluate the deliverables of PCP Phase I), and
- the award criteria.

When a particular feature/function/requirement adds value to the proposal but is not considered crucial by the procuring entity, this should not be formulated as minimum requirement, but as award (sub-)criterion; addressing convincingly such a requirement in the proposal would add to the score received by a proposal. The award criteria should be clearly formulated in the tender notice/tender regulation, while the sub-criteria could be refined after Phase I, depending on the results of the R&D efforts. This possibility should be explicitly mentioned in the procurement documentation.

Since the PREFORMA component will be integrated in the software systems used by the memory institutions, it is quite obvious that the suppliers must be presented with sufficient technical information upfront, preferably as early as possible, for instance when they download the Invitation to Tender and its associated documents, including the presentation of the challenge as such. But what kind of information is optimal for the pre-commercial procurement project? This issue will be addressed in section 4.4, “EU Relevance”.

The CHARM PCP

First, we will have a look at the CHARM PCP. In this particular EU-funded PCP, suppliers were provided with a Functional Specification, and a Business Specification, with the former being based on the latter.

The purpose of the Functional Specification of CHARM is to define functions, data stores and data flows required to support the CHARM business processes described in the CHARM business specification. Functions were defined as entities that transform data in some way, i.e. taking inputs and creating an output. The Functional Specification serves as a basis for defining the Application Specification – the application components to implement functions, data stores and data flows in the CHARM solution.

The method and steps used to define the CHARM functions and datastores were inspired by and based on a particular methodology: ITS FRAME Architecture. To derive the CHARM functions, data stores and data flows the following steps were taken:

- User needs were defined
- Scoping of selected user need were performed and
- Functions, data stores and data flows were derived and selected.

A major part of the Functional Specification is made up of the CHARM Functional Model. Firstly, the CHARM functions are grouped into functional areas. The functions in a functional area have in common the type of functionality they provide.

These functional areas are:

- External Interaction
- Data Storage and Retrieval
- Event Detection and Handling
- Prediction
- Scenarios
- Demand and
- Performance

The Functional Specification was produced under the requirements and architecture activity, or tranche, of the CHARM PCP. The so called tranche for procurement, Procurement Strategy, used the Functional Specification to inform recommendations for options to produce the application components. The FS was also perceived by the PM of CHARM as informing the market research activity of the PCP as well.

The CHARM Business Specification was prepared with a twofold purpose in mind: a) To inform internal and external stakeholders of the scope of CHARM, b) to act as a foundation for further solution design and procurement of the required IT and supporting services. It is split into three parts, describing the scope, common business model of Highways Agency and Rijkswaterstaat,

the two procuring agencies, and business requirements for CHARM. Both the functional and business specification were presented to suppliers, after they had registered on the project web site, and were considered as being part of the overall Invitation to Tender.

The two documents are comprehensive, outlining in detail the technical requirements of the PCP for suppliers. Requirements are charted carefully, both with respect to their relations to internal and external stakeholders of CHARM. They are also linked to the actual procurement, by informing recommendations for options to produce the application components. But the technical requirements are not, however, linked to the evaluation of tenders, in the sense that they were organized and languaged as being either mandatory, or wished for requirements that might bring added value to the end-result for procuring agencies. The documents provide a description of the assignment at hand, which suppliers must use as a point of departure in their planning, and design of their proposed solutions to the CHARM challenge.

The CHARM PCP evaluated tenders in stages, using a panel of experts. In the first stage, the tender was checked for compliance with respect to factors mentioned earlier in this chapter. Secondly, the impact and quality of the tenders were judged, based wholly on the contents of the tender submission. Lastly, financial scores and the overall tender score were calculated by the scoring model described in the Invitation to Tender.

The SILVER PCP

Interestingly, the SILVER PCP did not provide any technical specifications to suppliers. This was done to stimulate, the possibility of more radical approaches being proposed. Therefore, the SILVER challenge is phrased as an open challenge. SILVER did not present any detailed specification of a product or service being sought, instead relying on the description of the challenge needing to be addressed and the desired outcome. An open competition was run to find solutions to the challenge of supporting independent living for the elderly through the use of robotics. The challenge in the call for tenders was specified to fit the scope of an R&D service, with at least 50% of the contract relating to such services. Tenders that offered the best solution at an appropriate risk and cost level were favored, according to project website.

The SILVER PCP spent considerable resources on market consultation. This was considered to be an essential part of the preparation of the SILVER PCP challenge. The purpose was to get insight into the market, the state of the art and further developments of robotics in elderly care in order prepare an adequate procurement with right and feasible scope. According to the project website, the output of the market consultation gave a full insight into the current state of the art of robotics. It allowed contributors to give feedback on how the current robotics definition could be modified making the SILVER desired outcome clearer. Additional feedback also allowed the consortia to take into account comments regarding the number of prototypes that would be created for testing through the final phase.

Benchmarking Technical Requirements: Conclusions

1. PCPs use different strategies to compile and present technical requirements.
2. Technical requirements were not explicitly linked to the evaluation of tenders. CHARM and SILVER both used the same scoring model, encompassing the broad areas of impact and quality of the tender, after a compliance check of companies had been made.

4. GUIDELINES FOR THE TENDER PROCEDURE

4.1 RISKS OF THE PROCUREMENT PROCESS

1. Tenders are too few in number

Safeguarding:

- A high level of participation among partners in the consortium in various activities of dissemination.
- A clearly stated challenge, which presents the innovation gaps supposed to be filled, and PREFORMA's particular niche. Broad challenges attract more potential suppliers than narrowly stated ones.
- A set of requirements which do not exclude SMEs based on size, turnover, and prior experience.

2. Tenders are not qualitative enough

Safeguarding:

- The General Assembly of PREFORMA can decide to renounce a media type of the Call, given that the quality of the responses is not good enough.
- Bidders receive proper guidance and practical how-to information so they can fill in the tender form accordingly.
- Tenderers receive answers to their most basic questions by consulting the specifically authored Q&A document.

3. Companies hesitate to apply because of a lack of information about procedure

Safeguarding:

- Provide easy-to-understand practical information on the project website, which might guide potential suppliers through the different steps of the procurement procedure.
- Provide companies with sufficient answers to their procedural questions via e-mail.

4. Lack of consensus regarding the selection of companies

Safeguarding:

- Transparent evaluation criteria used throughout.
- The work of the evaluation committee is structured and facilitated by an easy-to-understand scoring model.

4.2 MARKET ORIENTATION

In this section, four distinct market-related activities within the PREFORMA PCP are brought up: a) Market Study, b) Means of External Communication, c) Advice regarding publication and information to the market, and d) Market Incentives.

4.2.1 Market Study

A market study is planned, and prepared at Riksarkivet for Spring 2014. The purposes of this activity are several: a) To delineate, and make clear, what the target groups on the market are, b) To collect company related information which may facilitate external communication, and c) To establish further foundation for the formulation of procurement requirements. It will be carried out as a desk study, making use of the already established networks and channels related to those IT-companies whose core business include the development of solutions by using open source software.

4.2.2 Means of External Communication

External communication is of vital importance to the success of the PREFORMA PCP. In the overall project planning, WP 4 “Dissemination and Communication” is responsible for those activities which may enhance the promotion of the upcoming Call for Tenders. The objective of WP 4 is to ensure that the information gathered by the project, is made available to the widest possible audience. To support this objective, it supports means of communication such as a project website (already launched and fully working); brochures, posters, guidelines and recommendations. WP 4 is also responsible for the coordination of efforts in which the partners participate in third party events to promote PREFORMA. All of the above mentioned activities have positive effects in the promotion of the upcoming call.

A Project Handbook of PREFORMA has been prepared by WP1 (Project Management) and distributed to the partners of the consortium. One chapter of the Handbook contains guidelines for external communication. It states that the dissemination and promotion of a project like PREFORMA requires a high degree of cooperation and coordination among the consortium members. To make sure that the promotional activities are done in a consistent manner, the Handbook has outlined some directives with regard to external communication. One guideline concerns the use of project presentations as a means to communicate the PREFORMA challenge. Another guideline regards a uniform event reporting form. The purpose is keep track of every formal, or informal, occasion of dissemination that each PREFORMA partner will have, and to have it shared with the rest of the consortium.

The need to communicate with the market in various ways, including stakeholders, was very clear in the SILVER PCP. In fact, SILVER purposely withdrew from presenting elaborate technical requirements to enable the widest possible outreach to suppliers, and to make sure that the proposed solutions would be truly innovative. One means of communication that SILVER used was a Market Consultation. This consultation was perceived by as a measure taken to prepare the PCP even further.

As part of the market consultation, an online questionnaire was open for a limited period of time in order for the SILVER consortium to gain insights in areas such as:

- What is currently on the market (state of art)
- What are current developments?
- Whether the challenge and the scope are feasible, given the time frame and budget, and if not, what could be changed to make it more feasible?
- What companies need to respond adequately to the challenge?
- Which companies might apply?

It's well worth noting the substantial emphasis the SILVER consortium placed on external communication, as a means of preparing the PCP

4.2.3 Advice Regarding Publication and Information to the Market

In the VINNOVA Handbook for Pre-Commercial Procurement, some advice is presented for procuring agencies with regard to the need to orient the Call to the market:

a) Information prior to the publication of the Call

- Pre-Announcement of the Call on the TED.
- Prepare, and carry out an Information Day regarding the upcoming Call.
- Create a task force to carry out these activities.

b) During the period in which the Call is open, VINNOVA provides the following advice:

- Publish the Invitation to Tender on the project website, and/or at the Procuring Agency's home page. VINNOVA wishes that procuring agencies would consider the possibility to condition their potential suppliers to first register on the project website, before being able to download the tender documents.
- Make sure that the time table, and schedule of the procurement is easily accessible on the project web site.
- Publish a press release and use all available channels to reach out to potential suppliers (e-mailing lists, incubator networks, innovation clusters and so on).
- Make sure that the partners of the consortium are involved in the promotion of the Call.

4.2.4 Market Incentives

What are companies looking for when they browse through an Invitation to Tender? Firstly, what funds are budgeted? Secondly, what kind of effects might the participating in this project have on the bottom line of the company?

Two considerations come into place here, both of them related to how the PREFORMA challenge is expressed through the different means of external communication. For companies it is probably vital to:

- Receive clear, easy-to-understand, information about the overall business case/model of PREFORMA (stated for instance in the Consortium Agreement, ch. 9.8 "Specific Provisions for Access Rights to Software").
- Understand how the commercial advantage of copyleft licensed works differs from traditional commercial advantage of IPR, and receive information about these business opportunities are regulated by the project.

4.3 CO-OPERATION WITHIN THE PREFORMA CONTEXT

In this section, four aspects are highlighted: a) how cooperation is facilitated in PREFORMA, b) the procurement related cooperation, including dependencies on the work in other tasks, c) scheduling and planning, and d) budgetary issues.

4.3.1 How Cooperation is Facilitated

PREFORMA is subdivided into eight WPs, and the procurement related work is carried out in the WP2, “Requirements and Assessment”. This particular WP is then broken down into four different tasks, all of them with a strong bearing on the procurement process:

- T2.1 Tender Preparation, pre-announcement, publication, closing and contracting. RA is task leader.
- T2.2 Functional Requirements. PACKED is task leader.
- T2.3 Technical Specifications. HS is task leader.
- T2.4 Supplier selection. RA is task leader.

A good, fully working cooperation among the task leaders within WP2 is essential, and is facilitated by internal communication. The PREFORMA Handbook outlines a number of ways in which this communication takes place, with face-to-face and virtual meetings as the main channel to be used. The Handbook also mentions the fact that the four tasks share in a common knowledge base, and various collaborative tools including a shared calendar, as well as the project repository. The overall purpose of this cooperation is to produce a market oriented and judicially viable Invitation to Tender, with its associated documents, including the Framework Agreement, and preceded by a public pre-announcement. As of now, all of these activities are under way.

4.3.2 The Procurement Related Coordination

Various operational and legal procedures have been outlined thus far in the report, and in the following the progress of these will be analysed with respect to four aspects: a) persons that are responsible for the action, b) the timing of the action, c) dependencies on resources or work from other tasks, and d) potential issues to be solved.

1. The preparation of the tender documents

The procurement manager at Riksarkivet is responsible for the preparation of all of the tender documents: the Invitation to Tender, the Framework Agreement and the various supplementary documents (Technical Specifications, Challenge Brief, Guidance for Applicants, Tender Form and the Q&A document). Instrumental to the preparation is the activities carried out in Task 2.2 and Task 2.3. Jurists at the RA are provided assistance in the preparation by safeguarding the documents from a judicial point of view. The SILVER Templates will be used throughout. A first version of the Invitation to Tender and the Framework Agreement will be at hand in April. Dependencies on the work and resources of the tasks within WP2 are many, especially with regard to the formulation of functional and technical requirements. There are also a number of detailed questions which have to be solved as the various documents take form and are adapted to the context of the PREFORMA PCP. Problem solving relating to specifics will be done in ad hoc manner, based on the active involvement of all responsible persons.

2. Dissemination

The procurement manager at Riksarkivet is responsible for the public pre-announcement of the PCP on the TED. It will be done in March.

3. Publication and Closing

The procurement manager at Riksarkivet is responsible for publishing the ITT on the TED. Pre-announcement and publication are routinely done procurement activities, and enabled by Riksarkivet's supplier of tender notification services.

4. Evaluation

The work of WP2:s Task 2.4 weaves in with the work of its Task 2.1, since the establishment of evaluation criteria is an essential part of the preparation of the Invitation to Tender. The project coordinator will head the evaluation committee and the procurement manager is responsible for presenting a usable, easy-to-understand evaluation model. The SILVER and CHARM PCPs made use of the same evaluation and scoring model, and the PREFORMA PCP has much to gain by adopting it, of course after sufficient adjustments and adaptations. Dependencies of the work and resources of other tasks within WP 2 are few, if any with regard to evaluation. RA will decide on which evaluation model will be used.

5. Contract Award and 6. Decision and Contracting

During Spring 2014, a Framework Agreement is prepared simultaneously to the Invitation to Tender. It is of absolute necessity that the Invitation to Tender, the Framework Agreement and all associated documents mirror each other, by presenting the same criteria and the same requirements. Contracting with the selected suppliers will take place only after a contract award decision has been sent to the participating companies, followed by a short stand still period.

6. The legal procedures

A legal framework has been established by consulting with the EC, Vinnova and other PCP projects. Jurists at the Riksarkivet have agreed to assist in the internal safeguarding of the Invitation to Tender. A law firm will be engaged to facilitate external safeguarding of the procurement documents before they are published.

7. Market study

PREFORMA has initiated a market study (cf. 4.2). Involved in it are the partners Riksarkivet and PACKED.

4.3.3 Scheduling and planning

The tasks of WP 2 are planned to be in operation during the following months, according to the project planning in the PREFORMA Handbook:

- Task 2.1 begins in Month 1, ending in Month 10, when the initial negotiation process with the selected companies commences.
- Task 2.2 begins in Month 1, ending in Month 3, when the results of the Requirements Workshop are presented to the consortium.
- Task 2.3 begins in Month 1, and ends in Month 5 in close conjunction to the publication of the Invitation to Tender.
- Task 2.4 begins in Month 1, and is ongoing until Month 5 when the procurement process ends by the publication of the ITT and its associated documents.

According to the milestones listed for the PREFORMA project, a number of milestones are related to the procurement process in Spring:

- Pre-Announcement of the Call for tenders, expected to be carried out in March 2014.
- Publication of the ITT and its associated documents: deadline set to May 2014.
- The procurement will be closed in July, giving suppliers two months to prepare their bids.

4.3.4 Budgetary issues

- The total costs of the procurement amounts to 2,805,000 euro. This amount is budgeted to cover the following R&D work:
 - the first design phase;
 - the second phase that includes: first prototyping, second design, second prototyping;
 - the third phase, corresponding to the final testing with real data sets provided by the memory institutions.
- The tender will be called for the whole procurement that includes: first, second and third phases.
- The maximum amount available for all projects in the design phase is 390,000 euro.
- The indicative amount available for all projects in the prototyping and testing phases is 2,415,000 euro.
- The PREFORMA consortium considers that proposals that cost in the order of 65,000 euro for the design phase, 700,000 euro for the prototyping and 105,000 euro for the testing phase would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

4.4 EU RELEVANCE

The manual "A Practical Guide for PCP. Implementation for Progr East Pilots", published in December 2013 by the Progr East Project⁸, shows how an EU-funded PCP project managed to set up a PCP which obliged to EUs norms. In the report this is done through a number of bullet points, suggesting what other procuring agencies should be aware of:

About the PCP Approach

- PCP is essentially an approach to procuring R&D services. It is triggered by the procurer identifying a need to find a solution to a specification problem of public interest for which they cannot yet find commercially ready or nearly-ready solutions on the market and which requires significant amount of R&D investment to get the solution developed.
- Everything starts with a 'need'. If a need can be met with products and/or services on the open market, then the procurer should opt for traditional procurement; however, if a

⁸ <http://www.progreast.eu/>

product and/or service is not available on the open market and R&D is required, then it might be possible to use PCP to develop a solution to meet the need. Successful outputs from PCP are then able to enter the open market and be bought via traditional procurement.

- Pre-commercial procurement essentially refers to the procurement of R&D services that seek to explore, test and develop new solutions to specific needs that may ultimately lead to the development of new products or services.
- Risks represent the possibility that things will not go as expected. Such a possibility is inherent in any project – whether PCP or not. The level of risk is exacerbated by factors such as the size, the complexity, the novelty and the type of project, the cost and the length.

Concerning PCP Procurement

- As a general rule, advertisement of public contracts should be done as widely as potentially interested suppliers can be expected to be located.
- The procurer must publish the award criteria and details of the evaluation process to interested parties accordingly so that they know how many parties are expected to be awarded a PCP contract and on what basis parties will be evaluated.
- In inviting bidders to submit tenders, the Procurer must make available to them relevant information, such as the issues which they would need to address in their tenders, the terms and conditions on the basis of which the Contracting Authority would wish to contract, and the award criteria on the basis of which tenders will be assessed.
- The way in which the specifications are drawn up is of crucial importance, since this has an influence on the variety and the quality of the offers. The Contracting Authority has to give suppliers freedom to come up with innovative solutions so that they can serve the procurer's needs in the best possible manner. Therefore, using a high degree of technical details in the requirements will likely prevent innovative companies from submitting original proposals. At the same time, however, the specifications must be precise enough to permit the award of the contract in accordance with the rules governing the procedures. The best way to reconcile both aspects is to specify the procurer's needs by reference to performance or functional requirements.
- Technical specifications can be more precise, and elaborated upon, for Phase 2.

5. CONCLUSIONS

5.1 BENCHMARKING THE ACTORS OF THE PCP GAME IS ESSENTIAL

For the work of designing the PREFORMA PCP, we have found that benchmarking the actors of the PCP game is essential. As for operational and legal procedures, PREFORMA follows closely in the tracks of other PCPs, receives advice from authorities with responsibilities in the area, as well as the law firms which have facilitated PCPs. The benchmarking has led to the following conclusions.

1. *The European Commission*

- The Commission asserts that pre-commercial procurement can drive innovation to ensure high quality public services
- The EC asserts that organizing the pre-commercial procurement process in a way that ensures competition, transparency, fairness and pricing at market conditions enables the public procurer to identify the best possible solutions the market can offer.
- Competitive development is reached, when a PCP is carried out in phases: 0) curiosity driven research and preparation, 1) solution exploration/design, 2) prototyping, 3) development of a limited volume of first products/services.
- The bringing together of partners from sectors such as government, academia and other institutions to cooperate with suppliers in a R&D project creates triple helix like dynamics.

2. *The CHARM and SILVER PCPs*

- A clear challenge must be presented. It is interesting to note the importance which SILVER placed on its challenge. Described not just as an innovation, or development of existing products on the market, companies were encouraged to design something new which might complete the purpose of the project, even welcomed to employ “out of the box” thinking in doing so.
- A compliance check of companies must be done.
- There are no norms, or set standards with regard to how technical requirements are presented to suppliers. This means that the PREFORMA PCP has considerable freedom of action with regard to the amount of information presented to suppliers.
 - The SILVER PCP chose not to present detailed technical information to suppliers, instead relying on the effectiveness of a market consultation process, and the market’s interest in the challenge they presented. The CHARM PCP, however, did the opposite by presenting comprehensive technical documentation, supplementing their ITT. Based on this benchmarking, it is safe to conclude that the PCPs employ various strategies with regard to how they complied, and presented the technical requirements to be met by suppliers. Since the PREFORMA challenge is about the development of solutions which will be integrated into existing software systems owned by the memory institutions, it is obvious that suppliers need technical information. We suggest that this information is compiled in a separate document, and that it will supplement the Invitation to Tender, with other associated documents.

- The importance of using templates for the procurement process. SILVER and CHARM were both using the same templates for carrying out their respective, very different PCPs.

3. *Other PCPs*

- The ProgrEast PCP (see section 4.4) provided advice for the procurement process, such as:
 - The way in which the specifications are drawn up is of crucial importance, since this has an influence on the variety and the quality of the offers. The Contracting Authority must give suppliers freedom to come up with innovative solutions so that they can serve the procurer's needs in the best possible manner. Therefore, using a high degree of technical details in the requirements will most likely prevent companies from submitting original, innovative proposals. At the same time, the technical specifications must be precise enough to permit the award of the contract in accordance with the rules governing the procedures. The best way to reconcile both aspects is, according to the ProgEast PCP, to specify the procurer's needs by reference to performance, or functional requirements
 - Technical specifications can be more precise and elaborated further, as part of the selection of suppliers for Phase 2.

4. *VINNOVA*

- The importance of publication and information to the market.
- The importance of establishing a legal framework, or basis.

5. *Law firms*

Law firms come into play by safeguarding the tender documents from a legal point of view, and can also provide process support.

5.2 DEVELOPING PROCUREMENT STRATEGIES IS ESSENTIAL

1. *Open Competition*

- A PCP with a budget such as PREFORMA, should be carried out in an open procurement like process, where each phase in the procurement process is delineated from the others. It should follow suit with the norms of the open procurement process, in that it should present an ITT, base its evaluation of incoming bids on clearly stated evaluation criteria, award the contract based on those, offer a stand still period which may allow for companies to initiate procurement process reviews, and contract suppliers in accordance with terms and obligations already stated in the ITT.

2. *Risk minimisation*

- Internal safeguarding by consulting with jurists at the Riksarkivet.
- External safeguarding by consulting with law firms and procurement specialists.

3. *Operations within the Fundamental Principles for Procurement*

- These principles should guide the operational and legal activities having to do with the procurement.

4. Transparent Evaluation

- An easy to understand scoring model.
- Judgments and considerations made in the evaluation process will be carried out by experts, in an experts-to-experts fashion.

5. Benchmarking Good Examples

- By establishing contacts with PCP which have had success in their endeavors, and by studying their processes.

6. Creating a Market Interest

- It is of importance that the ITT is market oriented, meaning that it takes the interests of companies and stakeholders into consideration.
 - Making sure that SMEs are not excluded by looking over requirements.
 - Informing companies by setting up a basic Q&A document.
 - Providing easy to understand information about the PCP on the project web site.
 - Appealing to companies by clearly stating the innovation gaps which the project is supposed to fill.

5.3 PRESENTING THE PREFORMA CHALLENGE

- The challenge has technical content
- The challenge can contain the PREFORMA business model, which might outline the opportunities that are at hand for IT-companies under copyleft conditions.
- The PREFORMA challenge is an instrument which can be used to carry out external communication, coordinated by WP 4.

APPENDIX 1: THE COMPLIANCE CHECK OF COMPANIES

The tenders will be evaluated in a two step model, with a compliance check of companies as the first step. This compliance check will take a number of administrative issues into consideration.

1. Tender submission

Riksarkivet as the contracting Authority will provide applicants with an Invitation to Tender, and a number of other associated documents to facilitate proper tender submission. The Invitation to Tender will contain administrative instructions, and if tenders do not comply with those, it is fair to exclude companies from further participation in the PCP.

Firstly, tenders must be submitted in accordance with the directions on the PREFORMA website. Procurement related documents can be provided in a specific competition area of the website: a) Guidance for Applicants, a document which helps bidders to understand the procurement process b) Tender Form, and c) Questions and Answers. Tenderers are advised to read these documents before filling out the Tender Form.

Secondly, tenderers must use the assigned reference number of the PCP. One way to assure this is by assigning a reference numbers to bidders as a response to a mandatory registration at the project website. This method has been used by recent PCPs. Proper identification of the tender can also be achieved by asking bidders to use the procurement's registration number when filling out the Tender Form. This method is used generally in the Swedish public sector, but a registration number is general, and does not identify individual tenders other than through obvious facts such as name of organization, name of the bid manager etc. In the case of SILVER PCP, companies were not able to reach the tender documents unless it had received a unique login and password, and were thus not able to participate in the competition without proper registration. If PREFORMA chooses a model whereby companies must register as bidders on the project website, they must not do so later than the set deadline.

Thirdly, tenderers must submit all the required information. This includes all mandatory fields of the Tender Form. A failure to complete these fields will result in a rejection of the tender on the grounds that it is incomplete.

Fourthly, tenderers must not send their completed tenders by post or any other means than as directed.

2. Companies must accept the terms of the Framework Agreement

An agreement will be entered into by means of a written contract, signed by both parties. By submitting a tender, the tenderer accepts to be bound by the undertaking and conditions of the PREFORMA Framework Agreement. The tender may not contain any reservation in relation to the conditions of the Agreement. Tenders shall be based on the conditions contained in the Framework Agreement and the other associated documents. Companies are not allowed to negotiate any of the terms stated.

3. Companies must state which parts of the scope of the procurement contract, if any, they intend to subcontract other suppliers or contractors for

A tenderer that wishes to rely on the resources of any subcontractor for the fulfillment of the requirements for participation in the PCP should demonstrate that these resources are available to him. One way of demonstrating this, is to submit a written commitment from such a subcontractor showing that the resources of the subcontractor will be at the tenderer's disposal for the full duration of the contract.

4. Exclusion Criteria

A tenderer will be excluded from further participation in the PREFORMA PCP if it or any subcontractor, on whose resources it relies upon in the procurement:

- Is bankrupt, or is under compulsory administration, or has stopped its payments or is subject to a prohibition on conducting business,
- Is the subject of proceedings for a declaration of bankruptcy,
- Has been convicted by a judgment for an offence relating to professional practice,
- Has been guilty of grave professional misconduct and the procuring agency can prove this,
- Has not fulfilled its obligations relating to social insurance charges or tax in its own country,
- In some material respect has failed to provide information requested or provided incorrect information required pursuant to the Invitation to Tender document.

Tenderers must assure that they are not subject to any of these exclusion criteria (1-5) above. The Tender Form allows for such an assurance by a signature of the executive person.

If the Contracting Authority (Riksarkivet) becomes aware that a tenderer, or a representative of the tenderer, or sub-contractor, is under a judgment that has entered into final legal force, or has been sentenced for a criminal offence listed below, it will be excluded from the PCP. The areas relevant to the procurement are offences such as:

- a) Offences related to the combating of organized crime
- b) Corruption
- c) Fraud
- d) Money laundering

5. Minimum requirements

Firstly, the services offered by the tender must be within the scope of the definition of R&D services. Secondly, the research, development and testing must be compliant with national requirements concerning safety, ethics, and healthcare regulation. Thirdly, it is an absolute requirement that the tenderer proposes an R&D service that results in a solution that meets requirements as mentioned in the Challenge Brief. Failure to attain to this requirement makes up ground for exclusion. Fourthly, it is an absolute requirement that the tenderer takes ethical aspects into account with his proposed solution.

APPENDIX 2: PARTNERS OF THE PREFORMA CONSORTIUM:

Name	Short name	Country
RIKSARKIVET	RA	Sweden
PACKED EXPERTISECENTRUM DIGITAAL ERFGOED VZW	PACKED	Belgium
PROMOTER SRL	PROMOTER	Italy
FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V	FRAUNHOFER	Germany
HOGSKOLAN I SKOVDE	HS	Sweden
UNIVERSITA DEGLI STUDI DI PADOVA	UNIPD	Italy
STICHTING NEDERLANDS INSTITUUT VOOR BEELD EN GELUID	BEELD EN GELUID	Netherlands
KONINKLIJK INSTITUUT VOOR HET KUNSTPATRIMONIUM	KIK-IRPA	Belgium
GREEK FILM CENTRE AE	GFC	Greece
LOCAL GOVERNMENT MANAGEMENT AGENCY-AN GHNIOMHAIREACHT BAINISTIOCHTA RIALTAIS AITIUIL LGMA LGMA		Ireland
STIFTUNG PREUSSISCHER KULTURBESITZ	SPK	Germany
AYUNTAMIENTO DE GIRONA	AJGI	Spain
Eesti Vabariigi Kultuuriministeerium	EVKM	Estonia
KUNGLIGA BIBLIOTEKET	KB	Sweden