Request for Information

“Implementation of Thematic Exploitation Platforms”
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1 INTRODUCTION

1.1 Scope and Purpose

This document describes the context, background, objectives, process, and requested feedback for the Request for Information (RFI) “Implementation of Thematic Exploitation Platforms”. The RFI is issued as part of the ESA EO Ground Segment Development (GSD) element of the ESA Earth Observation Envelope Program – 4th period (EOEP-4).

GSD activities have focused mainly on the maintenance and evolution of the components of the legacy Payload Data Ground Segment (PDGS) operations concepts, based to no small extent on the ESA EO Multi Mission Facility Infrastructure (MMFI), aimed at the processing and dissemination of ESA and Third Party Mission (TPM) data. The overall concept has traditionally been the processing of data to a certain level at ESA facilities, and the subsequent dissemination to users for further processing and exploitation elsewhere. This RFI corresponds to the intention to, in an R&D context, define and implement a complementary operations concept addressing present challenges and opportunities and more directly provide support to scientific data exploitation, based on the availability of Thematic Exploitation Platforms (TEPs), collocating data, processing capabilities, and ICT infrastructure, thus providing a complete work-environment for users performing scientific exploitation of EO data.

In this context we initiate a mutually beneficial exchange of information to assure potential bidders of our interest in their participation in and understanding of the ESA tendering process for the evolution of the ESA EO PDGS, and in particular in the establishment of Thematic Exploitation Platforms (TEPs). The purpose of this RFI is to gather information regarding potential themes and corresponding activities to be used as input to the preparation of a formal ESA Invitation To Tender (ITT), covering the time frame 2014-2017. It is anticipated that a number (e.g. 4-5) separate contracts aimed at the implementation of TEPs – each addressing a specific theme – could be started.

This RFI is not a competitive process leading to a contract but should rather been seen as a “consultation process” to provide ESA with input to support the formulation of the requirements of the ITT. However, each and every response will be considered when ESA formulates its’ future Earth Observation ground segment strategy and corresponding evolution activities for years 2014 and beyond. Therefore, potential contributors are strongly encouraged to take full advantage of this opportunity in order to register their interest, and signal all issues regarding evolution of exploitation platforms for which they see opportunities now, in the next three years, and beyond.

1.2 Contacts at ESA

For questions, requests for clarifications or meetings with ESA related to this RFI, contributors are invited to contact, by email:
Daniela Galgani (EOP-G): Daniela.Galgani@esa.int, or
Angela Lombardi (EOP-G): Angela.Lombardi@esa.int

1.3 Definitions

The following terms are used in this document with the following meanings:
Theme
Within the context of this RFI a “Theme” is defined as subject of current scientific, social or technological discussions, supported by EO data, unifying various methods, user communities, and scientific objectives.

Thematic Exploitation Platform
Within the context of this RFI, a “Thematic Exploitation Platform” refers to an environment providing a user community interested in a common Earth Science Topic with very fast access to (i) large volume of data (EO/non-space data), (ii) computing resources (e.g. hybrid cloud/grid), (iii) processing software (e.g. toolboxes, RTMs, retrieval baselines, visualization routines), and (iv) general platform capabilities (e.g. user management and access control, accounting, information portal, collaborative tools, social networks etc.). The platforms thus provide a complete work environment for its’ users, enabling them to effectively perform data-intensive research by running dedicated processing software close to the data, thereby avoiding moving large volumes of data through the network and spending non-research time on developing ICT tools, sourcing data, etc.

Infrastructure as a Service (IaaS)
“Infrastructure as a Service” is a standardized, highly automated offering, where computer resources, complemented by storage and networking capabilities are owned and hosted by a service provider and offered to customers on-demand. Customers are typically able to self-provision this infrastructure, using a Web-based graphical user interface that serves as an IT operations management console for the overall environment. Application Programming Interface (API) access to the infrastructure may also be offered as an option.

Platform as a Service (PaaS)
“Platform as a Service” provides users with the capabilities to deploy user-created or acquired applications developed using programming languages and tools supported by the provider onto an infrastructure, typically cloud-based. The user does not manage or control the underlying infrastructure, including network, servers, operating systems, or storage, but has control over the deployed applications and possibly application hosting environment configurations.

Software as a Service (SaaS)
“Software as a Service” is software that is owned, delivered and managed remotely by one or more providers. Typically the provider delivers software based on one set of common code and data definitions that is consumed in a one-to-many model by all contracted customers at anytime on a pay-for-use basis or as a subscription based on use metrics.

1.4 Acronyms

API       Application Programming Interface  
CEMS      Climate and Environment Monitoring from Space  
EO        Earth Observation  
EOEP      Earth Observation Envelope Programme  
EP4SM     Exploitation Platform for Soil Moisture  
EPOS      European Plate Observing System  
ERS       European Remote sensing Satellite  
ESA       European Space Agency  
eSAEP      earth Science Applications Exploitation Platform
1.5 References

Reference Documents


Web References

URL01 Virtual Archive http://eo-virtual-archive4.esa.int
URL02 G-POD http://gpod.eo.esa.int
URL03 Sensyf http://www.sensyf.eu
URL04 Helix Nebula http://www.helix-nebula.eu
URL05 RSS http://rssportal.esa.int/
URL06 SSEP http://ssep.eo.esa.int
URL07 CEMS http://sa.catapult.org.uk/cems/
2 BACKGROUND

Since more than 20 years, “Earth Observation” (EO) satellites developed or operated by ESA have provided a wealth of data on our planet. In the coming years, the next generation of environmental monitoring satellites, the Sentinel series, will further increase the amount of data describing the state of our planet.

The Sentinel missions, along with the Earth Explorers and other Copernicus contributing missions, will provide routine monitoring of our environment at the global scale, thereby delivering an unprecedented amount of data on the state of our planet. This expanding operational capability of global monitoring from space, combined with data from long-term EO archive (e.g. ERS, Envisat), in-situ networks and models will provide scientists with a unique and incredible insight into how our oceans, atmosphere, land and ice operate and interact as part of an interconnected Earth System.

While the availability of the growing volume of environmental data from space represents a unique opportunity for science, it also poses a major challenge to achieve its full potential in terms of scientific exploitation. Firstly, because the emergence of large volumes of data (Petabytes era), raises new issues in terms of discovery, access, exploitation, and visualization of “Big Data”, with profound implications on how we do “data-intensive” Earth Science (Jim Gray, 2009; Hey et al., 2009). Secondly, because the inherent growing diversity and complexity of data and users, whereby different communities - having different needs, methods, languages and protocols – need to collaborate to make sense of a wealth of data of different nature (e.g. EO, in-situ, model), structure, format and error budgets. These challenges are faced today in a series of European Research Infrastructures (RIs), exemplified by initiatives such as the European Plate Observing System (EPOS), bringing together GPS, seismic and EO data to address solid Earth science.

Responding to these technological and community challenges requires the development of new ways of working, capitalizing on Information and Communication Technology (ICT) developments to facilitate the exploitation, sharing, mining and visualization of massive EO data sets and high-level products within Europe and beyond.

In this context, this initiative aims to build an ecosystem of Thematic Exploitation Platforms capitalizing on ICT technologies to maximize the scientific exploitation of EO data from past and future missions.

The idea underpinning TEPs is simply to move the processing to the data, rather than the data to the users, thereby enabling ultra-fast data access and processing (i.e. transferring a few Megabytes of results rather than several Terra/Petabytes of raw data to the user). This idea is not new and has already been exploited with success in ESA within the Grid Processing on Demand (G-POD) environment, and will now be expanded to a cloud environment. Two precursor TEPs are currently being developed in ESA: The Super Site Exploitation Platform (SSEP) (http://ssep.eo.esa.int) addresses the Geohazard community in the framework of GEO and CEOS, and is a pilot project for the Helix Nebula initiative; see URL09. The “Exploitation Platform for Soil Moisture” (EP4SM, URL08) project addresses the water community, and will be running on the “Climate and Environmental Monitoring from Space” (CEMS, URL07) infrastructure.

The TEPs offer multiple advantages as they enable:
- Rapid data access by avoiding moving large amount of data on the network,
- Full focus on science as researchers do not spend time on ICT matters,
Synergistic use of different EO data sources
Community building by fostering a spirit of resource- and knowledge sharing,
Rapid prototyping and benchmarking of algorithms,
Fully automated data processing framework allowing generation of products for non sophisticated users,
Replicability of scientific results, and traceability of workflow and processes, paving the way towards the new generation of scientific publications,
Cost-effective approach for scalable ICT resources capitalizing on economy of scale through infrastructure pooling (generally cheaper than an ‘in-house” user investment),
Development of new business models, such as “data rental”, and new pricing models such as pay-per-use.

3 OBJECTIVES
The principal objective of this RFI is therefore to gather ideas for a set of TEPs in order to:

Develop an ecosystem of TEPs addressing a variety of EO-related scientific challenges,
Demonstrate the value of TEPs for scientific exploitation of EO data, community building, and rapid development and benchmarking of algorithms,
Explore innovative funding and business models to ensure sustainability,
Elaborate a vision for wider “smart” exploitation of EO data to maximize the scientific return of ESA missions.

Each TEP shall meet a series of cardinal requirements defined below. The “TEP ideas” will be gathered and then analyzed by ESA, and will form the cardinal inputs to the ITT aimed at the procurement of the TEPs.

Within this RFI and the ensuing ITT, the TEPs can address a wide variety of themes, such as:

Scientific topics, such as ice mass-balance, water cycle, earth radiation budget, or more applied research related to societal applications, such as water resource management, urban sprawling, mega-cities pollution, disaster risk management, forestry, desertification, etc.

Educational topics, such as e-learning and capacity building related to specific themes (e.g. development or developing countries) or communities,

Regional integrated topics addressing the different societal, scientific and economic aspects of an environmental issue (e.g. The Arctic Basin, Mediterranean Sea, Africa/Sahel).
4 CARDINAL REQUIREMENTS

The Cardinal Requirements to be met by each of the TEPs will be:

CR-1: Be Community & Impact driven.
Identify a user community and address a thematic area where EO data add significant value. As such the TEP should provide new practices or opportunities tailored to user needs, foster and animate the user community, bridge existing gaps where applicable, and complement existing offerings.

CR-2: Maximize exploitation of ESA EO sensors and their synergies.
The TEP should make maximum use of a wide range of EO data and exploit synergies across sensors. A particular focus will be on ESA missions, including the archives of ERS, Envisat, Earth Explorers, ESA TPM, and the upcoming Sentinel missions. It is worth noting that the e-infrastructure should address fundamental gaps and ensure rapid and timely access to and use of data from these missions.

CR-3: Deliver a smart ICT-based research test-bed in a user-friendly environment.
Provide users with tools and software (and associated licenses) suited to processing of large amount of data (e.g. parallelization), and portable to different ICT environments, in order to facilitate sharing of tools across different TEPs and communities. The platforms should be able to host a growing number of thematically similar applications using the same data and infrastructure.

CR-4: Enable Sustainability.
Ensure the long-term sustainability of the TEPs via co-alignment of additional national and European funding and commercial revenue. In this context, the TEP and selected theme should fit with European, national, and regional strategic objectives and funding priorities and could ensure sustainability through co-funding and possibly the development of new business models. Funding schemes may include public funding and commercial revenue, as well as models such as pay-per-use, etc.

CR-5: Enable Infrastructure Independence.
The architecture of the TEP should be as platform-independent and inter-operable as possible in order to allow for the sourcing of infrastructure independently, avoid vendor lock-in, and facilitate future evolution. It is therefore essential that the platforms and the applications implemented on them are to the maximum extent independent from the IaaS infrastructure that will host them, and that Open Source Software is employed where possible.

5 THEMATIC EXPLOITATION PLATFORMS EXPLAINED

The defining characteristics of a Thematic Exploitation Platform can be summarized as follows:

1. A TEP shall contain services allowing users to perform their EO data exploitation activities:
   - In a certain thematic area
   - Without leaving the platform
In accordance with common scientific process; i.e. discover-qualify-select data, process data, analyze/confront/visualize results, allow reviewers to re-produce results, and publish findings

2. A TEP shall include:
   - An initial service footprint containing services in line with previous requirement
   - A collaboration model for users to share and discuss their results, information, data and software on the platform
   - An evolution model by which TEP authorized users can deploy additional services to the platform (in the form of successive service footprints; PaaS)

3. The initial service footprint shall include a substantial and sound set of services and resources:
   - Thematically relevant EO and, possibly, in-situ data resources; and corresponding agreements with data providers
   - Access to large/sufficient pool of ICT resources (IaaS)
   - Relevant Tools/Software repositories and corresponding licenses (SaaS), predefined agreements with IPR holders
   - Information/Document resources and a technical user support service and portal

4. Service granularity in a TEP should be fine, so users make economical use of shared resources. In particular:
   - Data access shall be fine-grained, limiting to an absolute minimum the transfer and replication of large data
   - ICT resources should be provided through a "utility" or "cloud" model maximizing use of physical resources
   - Licensed software (SaaS) provided through floating licensing

5. A TEP shall be able to evolve with additional resources provided by TEP partners; e.g. new datasets, additional ICT resources, etc.

6. A TEP shall be able to evolve with additional services (SaaS) developed by users using the platform (PaaS); e.g. new "derived" EO products, new processors, new software tools, new web services etc.

7. Evolution of the TEP services shall take place on a well-defined governance model which:
   - Ensures alignment of TEP services to the needs of the user community
   - Fosters collaboration with main data and service providers on the specific thematic field
   - Promotes excellence among user initiatives willing to contribute to the TEP

8. A TEP shall support interfaces to external services in line with international standards and practices. In particular, the following standards shall be considered:
   - HMA for EO data accessibility
   - OGC for WxS services
   - SAML for authentication and authorization
   - OCCI for IaaS
9. A TEP shall be architected with clear distinction between those software components which are:

- **Common and public**: released as Open Source Software and, potentially, shared with other TEPs. Examples are standard functions such as user management and access control; catalogue services; portal functionalities, open source EO toolboxes like the ones provided by ESA, etc.
- **Other components**: released under different license and/or specific for a thematic area or application. An example could be a specific SAR Interferometry processor for a Geohazards theme.

The objectives of this initiative do not include the development of generic, common, ICT capabilities already available off the shelf. It should therefore be noted that ESA has the goal to collect and promote common and public components into a reference baseline for future TEPs. Therefore, architectures favoring Open Source Software and re-use for common components are preferred.

### 6 THE RFI/ITT PROCEDURE AND PRINCIPLES

#### 6.1 Calendar of Events

The following calendar of events has been defined for the Request for Information and the subsequent ITT:

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFI open / announcement</td>
<td>Early September 2013</td>
<td>on EMITS News</td>
</tr>
<tr>
<td>@ Living Planet Symposium</td>
<td>9-13 September 2013</td>
<td>ESA staff in charge of activity available for discussion at ESA booth</td>
</tr>
<tr>
<td>RFI close</td>
<td>End November 2013</td>
<td></td>
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<tr>
<td>TEPs ITT process</td>
<td>Q1 2014</td>
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#### 6.2 The RFI/ITT Procedure

In overview, the RFI/ITT process is organized in two steps:

1. **This Request for Information**, resulting in a set of 'TEP Ideas' from contributors
2. **An open, competitive ITT**, based on the inputs received in Step 1 and resulting in the award of a number of independent contracts (e.g. covering 4-5 thematic domains), each aimed at the implementation of a specific Thematic Exploitation Platform

**Step 1, the Request For Information**, is structured as follows:

- The information package is published on EMITS News, thus opening the RFI
- No later than the close of the RFI, contributors provide their TEP Ideas to ESA, according to specifications in Section 6.3 of this document
- As the RFI is for consultation only and consequently not part of a formal ITT process, contributors are invited to interact with ESA (c.f. Section 1.2) and potential partners during this phase

ESA will subsequently analyze the results of the RFI and use the inputs to consolidate the requirements and constraints of the ITT aimed at procuring the TEP projects. In line with the
consultative nature of the RFI process, ESA will not communicate the outcome of the analysis back to contributors.

Step 2, the ITT will:

Follow the standard ESA procurement process for open competitive tenders
Be open to consortia from member states participating in EOEP-4

Furthermore, it is anticipated that the approximate **average** budget per TEP action will be in the range of 500K€uro to 1M€uro, rough order of magnitude.

For general background information on the submission of proposals to ESA (relevant to the future ITT), new bidders are advised to consult “doing business with ESA” available at [http://emits.esa.int](http://emits.esa.int).

6.3 Responses to the RFI

The RFI procedure is defined explicitly to facilitate the response to this call for ideas. ESA invites contributors to provide the following inputs:

1. A narrative ‘TEP Idea Information Note’
2. A ‘TEP Idea Summary Form’

For information related to the structure and content of the TEP Idea Summary Form to be submitted in response to this RFI, responders are referred to the template that accompany this information note (c.f. Annex A). The TEP Idea Information Note is free form, but should not exceed 15 pages. Furthermore, contributors are strongly encouraged to review the points of particular interest to ESA, as well as the aspects against which these information notes will be analyzed (c.f. Section 6.4).

In line with the Cardinal Requirements listed above, contributors are invited to address the following points, on which ESA aims to gain insight, with particular attention:

**Describe a Thematic Exploitation Platform**

The response should briefly describe a proposed TEP, in terms of the defining characteristics listed in Section 4, also including thematic area, community and objectives, and the high level capabilities and services that will be made available to users after project completion.

**Address (and outline) scientific rather than only commercial objectives.**

The short-term actions shall be scoped to demonstrate the capabilities and benefits of the TEP to **scientific** user communities within the context of their exploitation work and related to a clearly identified scientific theme and related application objectives or opportunities. In addition, the TEP shall implement at least one end-to-end exploitation use case, which shall be available to users after implementation. Actions that carry out high-level market research, that focus only on the technical development of commercial EO services, on the technical development of general IT capabilities or infrastructure, that address only incremental evolution of existing systems, that do not provide an open platform with services available for users, or that result in a system with no end-to-end work-flow should be avoided within the scope of this RFI.
**Address a (wider) theme, rather than a (narrower) application.**
The TEP should address a theme (c.f. examples in Section 3) with several potential applications; rather than being limited to one or very few applications. The principal objective should therefore be to integrate/develop the platform itself, rather than the specific applications that will later populate it. The initial TEP implementation must however address at least one application or use case related to the specific theme, in order to demonstrate platform capabilities and promote platform adoption.

**Define data sourcing.**
While the TEP shall involve use of ESA missions’ data, it is recognized that scientific exploitation may require more than a single source of satellite, remote sensing (or in-situ) data. Contributors are encouraged to fully exploit also non-ESA data in conjunction with ESA data, to identify all data required, and to define a credible scenario for data sourcing; including the identification of agreements required with specific data providers.

**Address IPR and licensing.**
The TEPs may provide proprietary data, tools, and services to its’ users. Contributors shall therefore address issues, complexities, and solutions to IPR and licensing requirements and constraints for the specific TEP.

**Identify a Sustainable Scenario for Operations.**
ESA will not fund the operational use of the TEP beyond development and an early pre-operations phase aimed at demonstrating the TEP capabilities and promoting platform adoption. The contributor is therefore invited to define and substantiate a credible scenario for sustainable operations of the platform, including the identification of any public funding- and commercial revenue-sources required.

**Define a Strategy for Infrastructure Provisioning.**
In the scope of this initiative ESA can only cover ICT costs strictly related to the TEP set-up activities, and will therefore not fund investments on ICT infrastructure required for operations, including storage, connectivity, and processing. Contributors are therefore kindly invited to define and substantiate a credible scenario for IaaS infrastructure provisioning, and in this context to explore strategies such as pay-per-use for cloud ICT resources, platform pooling, (i.e. the sharing of infrastructure and data among several platforms), or the use of existing national or European (commercial or public) infrastructures.

**Explain Alignment with European, National, and/or Regional Objectives.**
The TEPs proposed can address scientific, industrial, and policy objectives aligned with regional, national, and/or European objectives. Contributors are therefore invited to illustrate their alignment with the objectives and policies of European stakeholders, if applicable.

**Engineering Considerations.**
In line with the TEP defining characteristics listed above, contributors are invited to consider any high level issues related to the integration and engineering of the TEP. Issues of particular interest are federation among TEPs, local vs. distributed processing, standardization,
collaboration- and evolution models, and issues around the reuse of Open Source Software common components.

**R&D Support to Copernicus Core Services.**

It should be noted that the six Copernicus Services (atmosphere, marine, security, land, climate, emergency) are neither targeted nor impacted in any way by the scope of this activity. However, as the evolution of the Core Services in the final instance depends on advances in science, algorithms, etc., clearly each TEP may enable scientific research (not services) applicable to the evolution of one or more Core Services, in terms of potentially providing the ‘place’ where R&D takes place and the findings may, if relevant, be made available to the services. Contributors are kindly invited to signal their relevance also on this topic, if applicable.

### 6.4 Analysis Criteria

In line with the cardinal requirements and content listed above, the TEP Ideas will be analyzed and their input will be taken into account for the definition of the subsequent ITT. In this context, ESA will focus in particular on the following aspects of each TEP Idea:

- Relevance of the proposed platform to the identified earth sciences theme and corresponding applications, identification of user communities, maturity of requirements, and impact in terms of capabilities and services available to the scientific community.
- Future growth/use potential of the proposed platforms and the applications that could be envisaged and implemented on them.
- Alignment with European, national, and/or regional strategic priorities.
- Ability to identify and leverage complementary funding in development, if required.
- A credible long-term funding/revenue scenario for sustainable operations.
- A well defined data provisioning strategy (in particular, for very large data sets), including the identification of required agreements with ESA and third-party data providers.
- A well defined infrastructure provisioning strategy, addressing also innovative models like platform-pooling, pay-per-use, or use of national infrastructures.
- Commitment to onwards data access and services provision to scientific communities.
- Commitment to the reuse of common platform components for generic capabilities of the TEP implementation.
- Commitment to the implementation of open source components for generic capabilities and where wider reuse across themes (and TEPs) can be expected.
- Likelihood to start (precursor) operations in the 2015-2016 timeframe.
- Likelihood of acceptance and adoption by user community.

### 6.5 Impact of the RFI on the Following ITT

It should be noted that:

- The TEPs addressed by the subsequent ITT will be theme-specific, and may explicitly address requirements from the ideas received.
- Providing a TEP idea contribution addressing a theme which is later addressed in the ITT in no way guarantees a successful outcome of the ITT.
6.6 Disclosure of Contents / Results

ESA considers all material provided in response to the call Commercial in Confidence and will not disclose its content to third parties. ESA however reserves the right to present the title, participating countries, thematic, principal objectives, user base, data needs, and target community of each TEP Idea to ESA programmatic bodies. In addition, ESA intends to use the contents of the TEP Ideas to formulate detailed requirements for the subsequent ITT.

7 TEP PROJECTS CONTEXT AND TENTATIVE ROADMAP 2014 – 2017

In the 2014-2017 period (EOEP-4 planning horizon) and within approved funds, three main tasks will be addressed in ESA under the umbrella of one initiative – the ‘earth Science Applications Exploitation Platforms or eSAEP’. This RFI and the ensuing ITT correspond to the implementation of Task 2 (TEPs Implementation; marked in green below) of the overall initiative. The eSAEP work plan, providing the context for the RFI and ITT, is described below:

Figure 1: Overall Project Context and WBS
In summary:

- **Task 1 (T1)** will cover the overall project setup and all horizontal activities such as continuous project management, coordination and outreach activities. The task is implemented internally in ESA, and is therefore **not in the scope of this RFI or the subsequent ITT**.

- **Task 2 (T2)** provides the integration, implementation, and deployment of a number of TEPs (e.g. 4-5 platforms). **T2 therefore corresponds exactly to the scope of this RFI and the subsequent ITT**.

- **Task 3 (T3)** provides the standardization and harmonization among platforms, implements common platform components that may be reused by the TEP projects, and manages the lifecycle of open source software components. It is implemented **outside the scope of this RFI and the following ITT**, mainly in the context of the ESA technology programmes TRP and GSTP.

The tentative Project Roadmap for the period 2014 – 2016 may be summarized as follows:

![Overall Project Roadmap](image)

- An initial setup phase prepares the RFI and places the ITT (in Task 1). The T2 project contracts are expected to start as from Q2 2014.

- From mid 2014 through 2016 the integration/implementation and deployment of the TEPs will take place (T2). The various TEP projects will follow their own release cycle as exemplified above, but will deploy the systems in operations (either pre-operations or full operations) at
release completion. It is however envisaged that all TEPs will be deployed in operational environments (with operational or pre-operational status), by Q4 2016.

- In parallel with the TEP projects, ESA will implement a set of technology activities (T3) aimed at providing common platform components to the TEP projects. Since T2 and T3 are executed in parallel, initial deployments of TEPs will be based on presently available common components from precursor activities (e.g. SSEP, EP4SM, SSO etc.), while subsequent deployments will be based on new/evolved components as T3 and the exploitation platform Reference Architecture evolve.
ANNEX A: TEMPLATE FOR THE ‘TEP IDEA SUMMARY FORM’

This annex describes the template to be used to submit a light “TEP Idea Summary”. Replies should be complete but concise. ESA does not expect more than 2-3 paragraphs per question.

<table>
<thead>
<tr>
<th>Proposed Activity</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title of Activity</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Date submitted</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Estimated total required funding for the development and pre-operations phase</strong></td>
<td><em>e.g. specify the total ROM cost, funding requested to ESA, funding provided by industry (contribution on capital, human resources) and other potential sources.</em></td>
</tr>
<tr>
<td><strong>Duration of TEP project</strong></td>
<td><em>e.g. estimated duration of a project that would address the implementation and pre-operations of the TEP</em></td>
</tr>
<tr>
<td><strong>Which thematic is addressed?</strong></td>
<td><em>e.g. Science, Applications, Education, Integrated Regional Theme...</em></td>
</tr>
<tr>
<td><strong>Which capabilities could be required for the TEP implementation, and which potential partners could provide them?</strong></td>
<td><em>e.g. Science, engineering, algorithms, outreach, ICT, etc.</em></td>
</tr>
<tr>
<td><strong>What are the main objectives of the platform?</strong></td>
<td></td>
</tr>
<tr>
<td><strong>What specific <em>problems</em> does the platform address?</strong></td>
<td><em>e.g. what current gaps in geo-information needs would the TEP address?</em></td>
</tr>
<tr>
<td><strong>What is the <em>innovation</em> content?</strong></td>
<td></td>
</tr>
<tr>
<td><strong>What application(s) could be envisioned for the first version of the TEP?</strong></td>
<td><em>e.g. what specific applications (such as InSAR) would be implemented in the initial TEP project</em></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>User Base</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>What is the target community?</strong></td>
<td><em>e.g. list of users, including e.g. any support letter in annex, high level description of the community</em></td>
</tr>
<tr>
<td><strong>What are their requirements for information?</strong></td>
<td><em>e.g. if available, reference to Requirement Document; otherwise high level description.</em></td>
</tr>
<tr>
<td><strong>What are their current practices to obtain the required information?</strong></td>
<td><em>e.g. describe practices, type of data used</em></td>
</tr>
<tr>
<td><strong>What benefits does the TEP provide to users?</strong></td>
<td><em>e.g. added value compared to traditional approaches. Strengths and weaknesses compared to other offering.</em></td>
</tr>
<tr>
<td><strong>What is the scope and role for new partnerships and new players?</strong></td>
<td><em>e.g. science, users, industry</em></td>
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<table>
<thead>
<tr>
<th>Sustainability</th>
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</thead>
<tbody>
<tr>
<td><strong>Why is ESA funding required?</strong></td>
<td><em>e.g. specify why not commercial, or other sources.</em></td>
</tr>
<tr>
<td>What are the sources of sustainability?</td>
<td>e.g. indicate complementary funding (and funding-potential), describe business models, discuss sources of funding for the operations phase, costing of service and potential revenue chain</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
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<tr>
<td>How does the TEP fit in regional, national, international information service and ground segment landscapes?</td>
<td>e.g. discuss how your idea fit with regional, national or European priorities, whether it contributes to a National Sentinel Collaborative Ground Segment.</td>
</tr>
<tr>
<td>How to support service expansion?</td>
<td>e.g. discuss possible scaling up of the service, new services, new partners, and new users</td>
</tr>
<tr>
<td>What are the principal risk elements and how can they be mitigated?</td>
<td></td>
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</tbody>
</table>

**Platform Infrastructure & Services**

| What type of ICT infrastructure is needed, and how could it be provisioned? | e.g. describe elements needed, the ones that exist, the ones to be developed, and if possible estimate the cost of operating |
| Which software and licenses could be made available | e.g. software for processing of data, available licenses, and their type, IPR issues |
| What tools could be made available? | e.g. tools for mapping, visualization of results, data analytics |
| How to ensure interoperability? | e.g. describe plan to inter-operate with heterogeneous data, with other platforms, standards, taxonomy, controlled vocabulary, protocols, and so on |
| What could be the interface to user? | e.g. describe type of web gis, other ICT environment, .. |
| What services to users could be envisioned in the first version? | e.g. description, reference of examples, commitment to customer, |
| How will users access the services? | e.g. protocols, user interface, helpdesk versus self-service |
| Any considerations regarding the engineering/integration of the TEP? | e.g. considerations on issues such as platform federation, local vs. distributed processing, standardization, open source software |

**Platform Evolution**

| What services to users could be envisioned for future evolution? | e.g. description, reference of examples, commitment to customer, |
| How will users / service providers be able to enrich the platform | e.g. deployment of "scientific products", new services, etc. |
| What is the vision for EO applications to be included on the TEP over the next 5 years? | e.g. applications that could reasonably be expected developed on the TEP over the next 5 years |
| Sketch the governance model for platform evolution | e.g. stakeholders, priorities, fairness |

**Data Needs**

<p>| Which satellite EO data are needed? | e.g. small procurement plan indicating the size of |</p>
<table>
<thead>
<tr>
<th>Volume? Licenses?</th>
<th>the problem and the type of sensors</th>
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<tbody>
<tr>
<td>Which non-satellite data are needed? Data Policy?</td>
<td>e.g. describe in-situ, model, ancillary data needs.</td>
</tr>
<tr>
<td>Data Cost?</td>
<td>e.g. describe estimate of commercial procurement if any,</td>
</tr>
<tr>
<td>Data Sourcing</td>
<td>e.g. what agreements are needed with which providers to ensure the data sourcing?</td>
</tr>
<tr>
<td>Data Access?</td>
<td>e.g. describe strategy to rapidly access the data through e.g. fast link</td>
</tr>
<tr>
<td><strong>Additional Comments</strong></td>
<td></td>
</tr>
<tr>
<td>Please provide any additional input</td>
<td>e.g. any additional input deemed useful for the refinement of the subsequent ITT, such as possible grounds for Direct Negotiation etc.</td>
</tr>
</tbody>
</table>