

# Network of Platforms Architecture & Implementation

## *Request for Information*

# EO Exploitation Platform

## Heterogeneity of Scenarios



Parameter	Dimension
<b>user community distribution</b>	large number of distributed users vs. small number of users with homogeneous requirements
<b>scales and coverage of analyses</b>	few longer length scales vs. multiple length scales
<b>in-situ data access</b>	Needs for space data vs. non-space data
<b>EO data access - volume</b>	large volumes of data from fewer sources vs. smaller volumes of data from many sources
<b>EO data access - time</b>	historical time series vs. use of recent data only
<b>analysis activity - spatial heterogeneity</b>	wide area homogeneous coverage vs. distributed multiple area heterogeneous coverage
<b>analysis activity - temporal heterogeneity</b>	long term integration vs. multiple snap shots
<b>analysis activity - information content consistency</b>	regular analysis with similar content vs. variable highly customized information requirements
<b>analysis activity - complexity of analysis</b>	aggregation into few information layers vs. complex analysis of multiple information layers
<b>processing</b>	standard highly automated extraction vs. customized/ad-hoc/supervised extraction

# EO Exploitation Platform Architectural Drivers



- ❑ The infrastructure shall guarantee a **secure (e.g. sustained, protecting IPR)** resource for **scientific and commercial** data exploitation.
- ❑ The architecture shall assist players whose main asset is EO-specific application expertise to **sustain the “long tail of science”**, i.e. move from research up to full sustainable and scalable operations (in minimum time with minimum cost).
- ❑ The architecture shall allow sharing of infrastructure elements to support sustainability for the **widest range of applications**, in particular also with minimum revenue margin.
- ❑ The high-level architecture shall **support a dynamic and changing offering** at the sustaining infrastructure level (to foster competitive offering and create robustness against commercial policy changes and business initiative failures)

# Network of Platforms Architecture



## NETWORK OF PLATFORMS

## Scientific/Business Exploitation

**Interoperable Marketplace**

**Geospatial Marketplace Layer**

**Community-oriented Platform Layer**  
Community Marketplace (e.g. thematic/regional),  
Language, Knowledge Base, Tools,  
Datacube, non-space data

**Geospatial Resource Business Interop. Layer**

**Geospatial Interoperability Layer**

**Data-driven Platform Layer:**  
*e.g. linked to a mission or measurement type*  
Orchestration, Tools, Sensor Know-How

**Cloud Resource Business Interop. Layer**

**Federated Cloud Interoperability Layer**

**Infrastructure layer:**  
standard ICT Cloud Resources  
Generic ICT tools

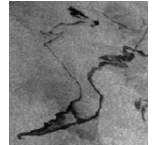
**Data Access Business Interop. Layer**

**Data Access Tech. Interoperability Layer**

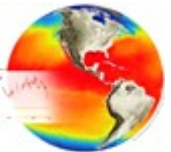
**Data layer (DaaS)**



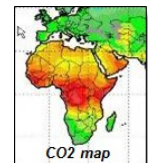
Applications/Users using community platform data/processing/tools/know-how, focussing on the specific "business case" only



Applications/Users working with remote data/processing/ tools/know-how integrating problem-specific data, tools and know-how

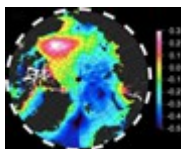


Applications/Users working with remote data/processing using their own tools/know-how



Applications/Users working in traditional mode

(download & process with local resources/tools/ know-how)



European Space Agency

# Network of Platforms Implementation

## On-Boarding of Partners



- ❑ Open Call mechanism for stakeholders who wish to incorporate capabilities into the network of platforms.
- ❑ Examples of capabilities: Data, Big Data IaaS, National Mission Exploitation Platforms, Tools (e.g. offered as SaaS)
- ❑ Sponsoring by TEPs desirable
- ❑ Offered for free/subscription/pay-per-use/revenue sharing
- ❑ Administrative onboarding -> “Charter of Values”
- ❑ Technical onboarding: Verification of standard interface support
- ❑ ESA support for reuse of “Exploitation Platform out-of-a-box”
- ❑ Shared funding principle
- ❑ ESA funding for integration with TEPs
- ❑ ESA funding to provide minimum level of pre-paid service to TEPs

# Network of Platforms Implementation

## Data Layer



- ❑ Coordinate data discovery and access activities with European mission operators
  - Address technical interoperability via OGC standards
  - Involve European mission operators into OGC testbed activities
- ❑ Invest into technologies allowing “virtual mounting” of data volumes to VMs in the cloud (i.e. on-the-fly streaming, avoiding cost and lock-in risk of physical storage with cloud providers)
- ❑ Procure prepaid commercial data resources for use by ESA science and business development projects ...
- ❑ In addition to “pay-per-use”, promote revenue share business models
- ❑ Enhance accounting interfaces to cover new business models
- ❑ Harmonize terms and conditions within the ecosystem, providing B2B interfaces for terms & conditions acceptance on behalf of the user
- ❑ Provide B2B interfaces to allow verification of data access restrictions

# Network of Platforms Implementation Infrastructure Layer



- ❑ Trade-off existing Cloud interoperability standards to select a mandatory set for use by the network of platforms.
- ❑ Give priority to standards promoted by EC DG CNECT projects and establish a project relationship for further enhancements. Plan only minimal seed funding for engagement with DG CNECT projects and implementation of specific functions.
- ❑ Procure prepaid processing resources for use by ESA science and business development projects ...
- ❑ Share procurements with other space customers forming a purchase group
- ❑ Ensure a competitive framework for ICT resource provisioning, applying mechanisms to avoid ICT provider lock-in.
- ❑ Federate single sign-on framework down to ICT resources to ease accounting.
- ❑ In addition to “pay-per-use”, promote “revenue share” business models
- ❑ Enhance accounting interfaces to cover data/tool pay-per-use/revenue sharing

# Network of Platforms Implementation

## Data-driven Platform Layer



- ❑ Coordinate the reference architecture with European mission operators, including identification of required standards within the OGC framework
- ❑ Implement a set of reusable open source components, allowing data owners or platform operators to assemble a Mission Exploitation Platform at minimum cost.
- ❑ Progress on standardization within the OGC framework to achieve practical validation in OGC testbeds, coordination with non-European activities and promotion to the geospatial community.
- ❑ OPTION: Involve European mission owners into the open source development ...
- ❑ Foster the use of entities that provide a common service across multiple data providers as operational implementation of the interoperability layer.
- ❑ Federate single sign-on framework to data provider platforms to allow seamless service provision.
- ❑ Promote subscription, “pay-per-use” and revenue share business models
- ❑ Reuse ICT accounting interfaces to cover data/tool pay-per-use/revenue sharing



# Network of Platforms Implementation

## Community-driven Platform Layer



- ❑ Invest into new disruptive technologies, provided as software or as service, providing mechanisms allowing industry to be propositive (e.g. open call).
- ❑ Continuously enhance TEPs/REPs with new capabilities (data, IaaS, tools, ...) ...
- ❑ Develop additional thematic or regional platforms on an opportunity-basis
- ❑ Address security issues, like IPR protection of algorithms, impossibility to download a copy of all data, trustability of data use accounting, privacy of user data
- ❑ Don't operate TEPs/REPs, which instead shall become self-sustainable, attracting funding from other sources to sustain operational cost
- ❑ Act as anchor tenant for TEPs/REPs, procuring services for ESA research and business development projects.
- ❑ Publish results of ESA research and business development projects on the relevant TEPs and REPs, using them as marketplace with community focus
- ❑ Support creation of an industrial entity that coordinates the marketplace... (see also EARSC MAEOS vision)

# Network of Platforms Architecture & Implementation

## *Request for Information*

# Network of Platforms Architecture RFI Workplan & Schedule



<b>7 June 2016</b>	Information day to present the RFI and the draft framework architecture
<b>8 June 2016</b>	RFI open / announcement on EMITS News <b><i>ANSWER = Compilation of a structured Questionnaire</i></b>
<b>End June 2016</b>	Submission deadline to <b>request funding for contribution</b>
<b>15 July 2016</b>	Notification of funded contributions
<b>End August 2016</b>	RFI closure
<b>25 October 2016</b>	<b>Workshop</b> to discuss RFI feedback and finalise recommendations for architecture and implementation
<b>Nov/Dec 2016</b>	Presentation of consolidated architecture framework

# Network of Platforms Architecture RFI Funded Contributions



ESA is aware that it might be difficult for small entities to afford the effort and travel cost for the workshop: **but your contribution is important !!!!**

- ❑ **40 funded contributions**
- ❑ Priority to smallest size entities (lowest number of staff)
- ❑ Mechanisms to ensure
  - Customer contributions
  - Research/Value-Adding Industry contributions
  - Member state coverage
- ❑ **Submit request by end June** (first page of RFI Questionnaire) !!!
- ❑ Notification by mid-July

# Network of Platforms Architecture RFI

## Important Issues



You have an important idea, consideration, issue, etc., that you don't find covered?

It is also important to us:

**Add it in the email when you return the questionnaire**