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Reference: Clarification Points for Negotiation

AO/1-8130/14/F/MOS Disaster Risk Reduction using innovative data exploitation methods and space assets

Dear Mrs. O'Sullivan,

Further to your fax dated 16th March 2015 regarding the points of clarification for negotiation of our proposal for the RFP AO/1-8130/14/F/MOS, please find enclosed a detailed response to Annex 1 as required.

Yours sincerely,

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CLARIFICATION POINTS

1. Concerning the list of processors, object of the trial cases, please describe in detail who owns them, the EO sources they can ingest and whether they are Open Source.

The following table provides the requested details for the processors that will be used in the project:

Processors	Ingested EO sources	License
DIAPASON	SAR data (all sensors supported)	Will be made available on the ESA GTEP
SPN + offset tracking	Interferograms generated with DIAPASON	Restricted – used in the project framework for map generation
PoSARpro	Quad- and dual-pol SAR data	Open source (GNU General Public License (GPL))
IDL routines + ENVI	Optical HR data (RapidEye, Spot 2)	Restricted – license acquired by CNR-IRPI (ENVI® and IDL® are registered trademarks of ITT Corporation)
Stereo Analyst® for ERDAS Imagine®	Optical HR data (RapidEye, Spot 2)	Restricted – license acquired by CNR-IRPI (ERDAS Imagine®)
Quantum GIS	EO and non EO-based georeferenced imagery	Open Source (ShareAlike 3.0 licence (CC BY-SA))
GRASS (Geographic Resources Analysis Support System)	EO and non EO-based georeferenced imagery	Open Source (GNU General Public License (GPL))
ArcGIS	EO and non EO-based georeferenced imagery	Restricted – licenses acquired by CNR-IRPI and ALTAMIRA INFORMATION (ESRI)

2. The four trial cases are clearly defined however for seismic hazards it is not clear how the planned trial case in Cephalonia & Zakynthos goes beyond the state of the art (the site was studied in various projects including Terrafirma and recently by INGV in the framework of the CEOS Seismic Pilot). This should be clarified.

The area of the Central Ionian Islands (Cephalonia/Zakynthos) has been chosen as a trial case in the seismic hazard study of this project for the following reasons:

– Previous projects (ie. Terrafirma) involved in the region were dealing with radar data (ERS & Envisat) up to 2008 (Cephalonia) and 2010 (Zakynthos). Up to 2014, there was not any significant seismic activity ($M > 5.5$) in this area. However, the occurrence (early 2014) of the two large events ($\sim M6$) in the western part of Cephalonia initiated a new chapter in the local and broader seismicity issue, which has to be studied in a detailed manner. The present project, therefore, will provide crucial information relating to (i) the post-seismic sequence (that is still in progress) and the associated ground deformation, and (ii) the stress transfer and its evolution in time not only to local/neighbouring faults, but also to regional tectonic zones, as the Cephalonia Transform Fault (CTF) that comprises a major regional tectonic feature.

– Reliable validation of the InSAR data will now be feasible to be carried out using ground truth data from the existent (since 2001) dense local GPS networks in these islands, as well as the availability of the data provided by the newly established (2014-2015) continuous GPS stations (four (4) in total in Cephalonia, and one (1) in Zakynthos), which did not exist previously in earlier projects. Recent campaign GPS data acquired after the early 2014 large magnitude events, as well as those in early 2015, together with the three (3) newly established continuous GPS stations along the southern part of Cephalonia belong to the NKUA that will be particularly available in this project.

– In any case, the proposed trial case area for seismic hazard (Cephalonia/Zakynthos, Greece) is the most seismically active area in Europe, with a complex seismotectonic regime, providing a unique geophysical laboratory for a short-term assessment and validation of the results of this project.

Beside of this INGV is currently involved in the CEOS Seismic Pilot. Cephalonia&Zakynthos is indeed one of the sites considered in this initiative which focuses up to now on the 2014 earthquakes.

3. The EO data sources and EO processing s/w for the intended trial cases need to be defined with sufficient detail in the form of a first/preliminary procurement plan. For instance what Optical data and associated VA s/w are intended to be exploited by CNR IRPI is not detailed enough. If VHRO is required the procurement plan should be indicated at least in the form of a draft.

SAR and optical data will be considered for the trial and extrapolation cases. In each of the demonstration case, ancillary data will be used to support the generation of hazard maps.

The table below lists the EO data that will be used within the project; EO processor are described as answer to the Point 1.

Case	EO Data	To be processed by	Comments
Demonstration sites			
LANDSLIDES Collazzone	ENVISAT	ALTA	Datastack provided by INGV
	S1	ALTA	
	RSAT 2 or ALOS-2	CNR	Polarimetric analysis for landslide detection (change detection)
	CSK or ALOS-2	ALTA	High Resolution PSI analysis CSK data provided to INGV with an ASI project – necessity of new proposal

	Rapid Eye	CNR	Landslide detection based on optical image analysis
	S2	CNR	
SEISMIC Tiber Valley	S1	ALTA	INGV has already processed ERS and ENVISAT stacks
Extrapolation sites			
	S1	ALTA	
LANDSLIDE Patras	RSAT2 or ALOS 2	ALTA	Polarimetric analysis for landslide detection (change detection) and High Resolution PSI analysis
	S2	CNR	Landslide detection based on optical image analysis
SEISMIC Cephallonia	S1	ALTA	

In the framework of the trial case, CNR-IRPI will also use associated data for the generation of landslide hazard maps. Those data are listed below.

Ancillary data (Non-EO)	Data		IPR
	Collazzone	Mont. di Vibio	
Stereoscopic aerial photographs	1941, 1954, 1977, 1985, 1997	1941, 1954, 1977, 1985, 1997	IRPI-CNR property
Geomorphological landslide inventory map	NA	NA	IRPI-CNR property
Multitemporal landslide inventory map	from 1941 to 1997	from 1941 to 1997	IRPI-CNR property
Event landslide inventory map	1997, 2004, 2005, 2010, 2013, 2014	1997, 2004, 2005, 2010, 2013, 2014	IRPI-CNR property
DEM	1997	1998	IRPI-CNR property
Land Use map	2000	1977	IRPI-CNR property
Geological map	2000	2009	IRPI-CNR property
Litological map	2000	2009	IRPI-CNR property
Structural domains map	2000	2009	IRPI-CNR property

An overall preliminary data procurement plan will be provided after the clarification/negotiation teleconference as annex to the project proposal. This document will consider all the demonstration sites (trial and extrapolation).

4. Explain how this activity is taking further the findings of the WAP over Greece that concerns the automated generation of terrain motion maps over wide extent area

During Terrafirma stage 3 & 4, the main developments for the WAP were carried out by DLR. In close technical cooperation with DLR, ALTA led those developments and coordinated the activities with the

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feedback of a group of experts in InSAR processing, in order to ensure the suitability of the produced WAP. The main outputs of these coordination work and investigations are technical notes, regular publications and presentations into workshops and congress.

In parallel of those activities, ALTA is from 2010 offering wide area processing deformation map to the private sector. The results of the investigations carried out together with DLR have been considered for the improving the processing chain, as for example the possibility of using external models for the compensation of the APS.

Further improvements carried out at ALTAMIRA concerns the high automation of the chain; the medium resolution processing is moreover carried out without any need of ancillary data (GPS).

In conclusion, in the framework of this project, ALTA is making available a tailored version of WAP processing chain for a thematic application which already accounts for the main outcomes of the WAP developments carried out during TF; improvements are moreover proposed.

5. Explain how open is the system behind the trial cases and if it is possible to use resources from outside the team (such as e.g. Helix nebula) in order to demonstrate the exploitability of an open and federated cloud platform. This is going further than simply doing a paper assessment of PICSE and HNX as presented in the proposal. That should reflect the IaaS for resource sharing that is described in the proposal; concerning precursor activities led by ESA, more clarifications are required on the platform(s) intended to be used to support the trial cases and whether the ESA precursor activities will be considered (GPOD, TEPs, etc.). For instance trial cases on geohazards could be executed on the Geohazards TEP (GEP) in the Validation activity that ESA is preparing (and similarly with the new Hydrology TEP for flood hazards), but it is retained by the Contractor that option needs to be assessed.

One of Terradue tasks is to demonstrate the exploitability of an open and federated cloud platform. Following the Agency's discretion they will procure resources within Helix Nebula to perform tests according to a pre-defined resource allocation strategy. One of the possible providers for this demonstration will be the European Grid Infrastructure (EGI). Terradue is in the process to become a EGI partner and this will allow us to enter their program for specific targeted groups.

Within the Consortium, Terradue has committed to use the same cloud technology for the trial cases than the one selected as baseline for the Geohazards and Hydrology TEP. This has been decided in order to ensure the migration of the trials to any of the preferred platforms. Nevertheless the schedule of the Geohazards TEP Validation activities does not corresponds to the project calendar and this may represent a risk for the successful execution of the demonstration cases. This is the reason why the Consortium would like to recommend to use in a first step the existing infrastructure at Terradue to prevent any issues linked to project scheduling and re-evaluate the possibility of an integration within ESA platform at a later stage.

6. The activity of Altamira and DLR in Task 5 does not seem to be well connected to the rest of the programme of work and it is unclear when they are implicated in the activity at a later stage. DLR staff are only involved in Task 5 and not at the start of the activity which implies a risk that they do not take input from the other activities. The role of DLR in the total programme of work should be clarified.

The main task to be developed by DLR is in WP5000. However, the attendance of DLR to review meetings and the user consultation workshop has been agreed in order to increase their involvement from an early

stage of the project. Likewise DLR will regularly be updated on the documentation produced and overall work progress of the project by the Prime.

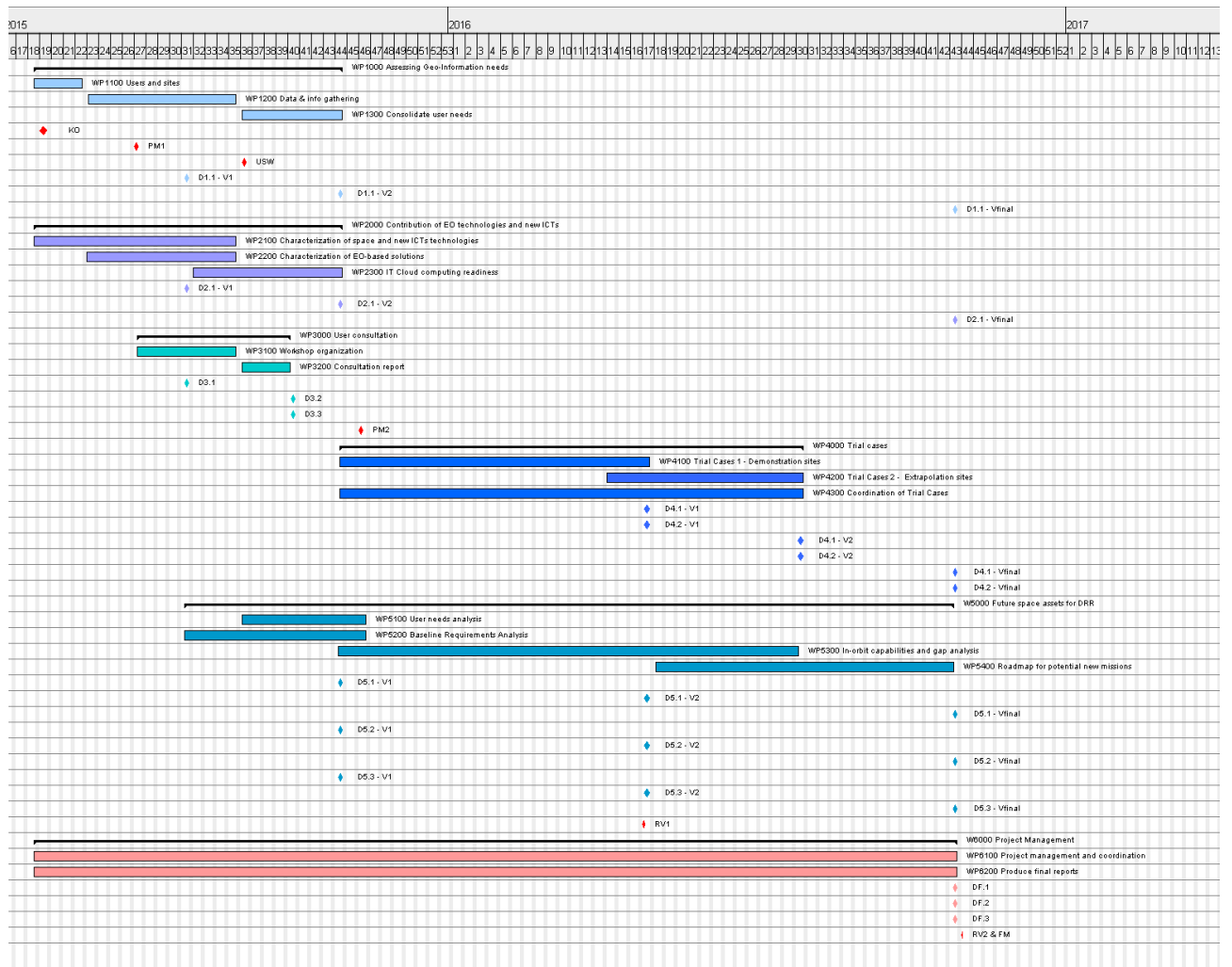
It will be important to discuss during the clarification/negotiation teleconference the possibility for DLR to be “physically” present at the user consultation meeting.

7. In WP3000 it is not clear how much effort is put on organising a user workshop. Please clarify the resources put so as to estimate if they are sufficient to achieve this goal.

The Table proposed in section 1.3.2.2.3 of our proposal provides a complete description of the activities that will compose the WP3000. As stated in the Statement of Work, the main objective of this WP is to support ESA in the organization of a workshop to consult with users, discuss and agree a plan to test technology with trial cases to demonstrate the value of space assets to DRM.

The WP will be led by ALTAMIRA INFORMATION and divided in two main tasks (see section 1.3.2.2.3 of the proposal); in particular WP3100 is dedicated to support ESA in the workshop organization (contact with users, preliminary consultation to get high level requirements, definition of meeting agenda and consultation plan....).

The Bar Chart proposed in section 2.2.2 has been expanded to better highlight the resources that will be dedicated to providing support to ESA for the user workshop organization.



8. In the Table in 4.1 it is unclear what is the impact on project deliverables i.e. whether there will be permission issues associated to deliverables.

Table in 4.1 lists the different EO data, Software, Additional data and documentation that will be used in the framework of the project. The Consortium has checked that all input data are available in order to prevent the existence of permission issues associated with the Project deliverables.

It is however important to highlight that input additional data are the property of the Consortium members; they will be available during the project but cannot be used for any other framework.

The table has been updated in the section 4.1 of the proposal and is provided in Point 10 of the present document.

9. The programme of work shall be complemented by an additional Workshop, not focused on users but specifically concerning Task 5 and that will be open to industry. ESA expects industrial organisations of the space sectors to have an interest in discussing the definition of EO missions to support DRM. ESA intends to host this Workshop and have it back to back with a progress meeting to be held at ESA premises. Please accommodate the proposal to integrate it and confirm your agreement.

The programme of work considers, according to the Statement of Work that at Month T0 +18, the final review meeting will be organized at ESRIN. This meeting should include a second review of trial case results and the Task 5 achievements presentations. The Consortium would propose to merge the Industry workshop with those meetings and organize a 3-day meeting. The second review meeting of trial case results could be held on the first day, followed by the Industry workshop on the second day and half of the third day. The last half-day will be dedicated to discussions between ESA and the Consortium on the overall project achievements and outlooks.

This point of clarification will be discussed together with ESA, and the proposal will be updated according to the decision taken after the clarification/negotiation meeting.

10. Please provide a complete list of the Background IPR which will be used for this activity.

The originally background IPR detailed in Table 4.1 of our proposal has been updated as follows. A new version of the proposal will be provided after the clarification/negotiation meeting and account for this new list.

Data	Used by	For use in	Property (conditions of use)
EO Software			
DIAPASON	ALTA	all sites	Available on the ESA GTEP
SPN + offset tracking	ALTA	all sites	Available only for use in the project
PolSARpro	ALTA	landslide sites	Open access
IDL routines + ENVI	CNR	landslides sites	Available only for use in the project
Stereo Analyst® for ERDAS Imagine®	CNR	landslides sites	Available only for use in the project
Quantum GIS	CNR and ALTA	all sites	Open access
Grass	CNR	landslides sites	Open access
ArcGIS	CNR and ALTA	all sites	Available only for use in the project
EO Data			
ENVISAT	ALTA	Demonstration site LANDSLIDES	
S1	ALTA	Demonstration site LANDSLIDES	
RSAT 2 or ALOS2	ALTA	Demonstration site LANDSLIDES	
CSK or ALOS2	ALTA	Demonstration site LANDSLIDES	
Rapid Eye	CNR	Demonstration site LANDSLIDES	
S2	CNR	Demonstration site LANDSLIDES	
S1	ALTA	Demonstration site SEISMIC	
S1	ALTA	Extrapolation site LANDSLIDES	
RSAT2	ALTA/CNR	Extrapolation site LANDSLIDES	
S2	CNR	Extrapolation site LANDSLIDES	
S1	ALTA	Extrapolation site SEISMIC	
Additional data			
Stereoscopic aerial photographs for Collazzone	CNR	Demonstration site LANDSLIDES	Available only for use in the project
Satellite images Collazzone	CNR	Demonstration site LANDSLIDES	Available only for use in the project
Geomorphological landslide inventory map	CNR	Demonstration site LANDSLIDES	Available only for use in the project
Multitemporal landslide inventory map	CNR	Demonstration site LANDSLIDES	Available only for use in the project
Event landslide inventory map	CNR	Demonstration site LANDSLIDES	Available only for use in the project
DEM	CNR	Demonstration site LANDSLIDES	Available only for use in the project
Land use map	CNR	Demonstration site LANDSLIDES	Available only for use in the project
Geological map	CNR	Demonstration site LANDSLIDES	Available only for use in the project
Litological map	CNR	Demonstration site LANDSLIDES	Available only for use in the project
Structural domains map	CNR	Demonstration site LANDSLIDES	Available only for use in the project
GPS data	INGV	Demonstration site SEISMIC	Available only for use in the project
Seismicity	INGV	Demonstration site SEISMIC	Available only for use in the project
Fault map	INGV	Demonstration site SEISMIC	Available only for use in the project
PSI derived historical deformation map (ERS & ENVISAT)	INGV	Demonstration site SEISMIC	Available only for use in the project
Geological map	INGV	Demonstration site SEISMIC	Available only for use in the project
Landslides geodatabase	IGME	Extrapolation site LANDSLIDES	Available only for use in the project
Landslides Technical Reports	IGME	Extrapolation site LANDSLIDES	Available only for use in the project
Geological maps	IGME	Extrapolation site LANDSLIDES	Available only for use in the project
GPS data	University Patras	Extrapolation site LANDSLIDES	Will be requested for use only in the project
Inclinometer measurements	University Patras	Extrapolation site LANDSLIDES	Will be requested for use only in the project
Geological map	NKUA	Extrapolation site SEISMIC	Open access
Digital elevation model	NKUA	Extrapolation site SEISMIC	Open access
Geotectonic Data (Faults, lineaments etc.)	NKUA	Extrapolation site SEISMIC	Open access
Seismic Data of the broader area (Revised Earthquake Catalogue)	NKUA	Extrapolation site SEISMIC	Open access
Focal Source Parameters of the M>4 seismic events during the last decade	NKUA	Extrapolation site SEISMIC	Open access
GPS Data from Continuous stations (TS)	NKUA	Extrapolation site SEISMIC	Open access
GPS from campaign data (deformation vectors, velocities)	NKUA	Extrapolation site SEISMIC	Available only for use in the project
GPS daily data 30s from the Continuous stations	NKUA	Extrapolation site SEISMIC	Open access
Revised Earthquake catalogue	NKUA	Extrapolation site SEISMIC	Open access
Source parameters of seismic events (M>4)	NKUA	Extrapolation site SEISMIC	Open access

REQUESTED CODES

CNR ESA Bidder Code: 6000001217

CNR ESA Vendor Code: 1000005458

IGME ESA Bidder Code: 63250

IGME does not own an ESA's Vendor Code yet. ESA notified them that it will be necessary and created only if the entity is awarded a contract.