SCHEDULE TRAINING PROGRAM
- OPENING CEREMONY -

TIME	AGENDA	RESOURCES PERSON
MONDAY, 17 JUNE 2019		
09.00 - 09.10	Speech by the Directorate of Water Resources Development, Directorate General of Water Resources-Ministry of Public Works and Housing	Ir. Edy Juharsyah, M.Tech, Director of Water Resources Development
09.10 - 09.20	Introduction Capacity Building of Earth Observation Product ESA to Support the Enhanced Water Security Investment Project (EWSIP) and the Emergency Assistance for Rehabilitation and Reconstruction (EARR)	Paolo Manunta, European Space Agency-Asian Development Bank
09.20 - 09.30	Keynote and Opening Remark from Head of Remote Sensing Application (LAPAN), and Granting the License of *Geohazard Exploitation Platform* (GEP) to the government of Indonesia	Dr. M. Rokhis Khomarudin. M,Si, Head of Remote Sensing Application (National Aeronautics and Space Agency/LAPAN)

Geoinformational Support

Geo4**IRBM**
for Integrated River Basins Management

disaster risk reduction
eo4sd

Project partners:

GEOSYSTEMS.PL | topologic CONSULTING | IGiK | brgm *Geoscience for a sustainable Earth* | planetek italia | indra

SCHEDULE TRAINING PROGRAM
INTERNATIONAL TRAINING OF CAPACITY BUILDING OF EARTH OBSERVATION PRODUCTS TO SUPPORT THE ENHANCED WATER SECURITY INVESTMENT PROJECT (EWSIP)

MONDAY, 17 JUNE 2019
Geo4IRBM project partners introduction; Copernicus program; Geo4IRBM Products and Services scope and means of data and information provision

TIME	AGENDA
09.30 – 10.00	**Introduction of Geoinformational support for Integrated River Basins Management - Geo4IRBM project** **by Przemyslaw Turos (TOPOLOGIC)** ▪ Identification and documentation of ADB requirements ▪ Area of interest Geoinformational products and services scope
10.00 – 10.30	**Operational applications of Geo4IRBM products in ADB practice** **by Enhanced Water Security Investment Project (EWSIP) Team** ▪ Introduction of applications of Sediment Yield maps in Raw Water supply subprojects (Bahasa) ▪ Introduction of applications of Water Extent, Subsidence and Land Use Products Flood Risk management subprojects (Bahasa)
10.30 – 10.45	*Coffee Break*
10.45 – 11.30	**Copernicus - Earth Observation Program** **by Przemyslaw Turos (TOPOLOGIC)** ▪ Copernicus space segment (operational and planned satellites of Sentinel constellation, ▪ Elements of ground segment (examples of Collaborative Ground Segments and cloud infrastructures of Data and Information Access Services – DIAS), ▪ Copernicus geoinformational services.
11.30 – 12.00	**Geo4IRBM Land Cover Mapping** **by Przemyslaw Turos (TOPOLOGIC)** Products and services description, means of data and information
12:00 – 13:00	**Lunch Break (ISHOMA)**
13:00 – 13:30	**Geo4IRBM Land Cover Changes Mapping** **by R. Dabrowski (GEOSYSTEMS)** Products and services description, means of data and information
13:30 - 14:00	**Geo4IRBM Cropping Intensity Mapping** **by Przemyslaw Turos (TOPOLOGIC)** Products and services description, means of data and information

TIME	AGENDA
14:00 - 14:30	**Geo4IRBM Surface Water Monitoring** **by Przemyslaw Turos (TOPOLOGIC)** Products and services description, means of data and information
14:30 - 15:00	**Geo4IRBM Surface Deformations Monitoring** **by D. Ziolkowski (IGiK)** Products and services description, means of data and information
15:00-15:30	**Coffee break**
15:30 - 15:45	**Geo4IRBM Surface Potential Erosion and Sediment Yield Modelling** **by Przemyslaw Turos (TOPOLOGIC)** Products and services description, means of data and information
15:45 - 16:00	**Geo4IRBM Coastline Changes Mapping** **by Przemyslaw Turos (TOPOLOGIC)** Products and services description, means of data and information
16:00 - 16:15	**Geo4IRBM Long-term Surface Water Coverage Mapping** **by Przemyslaw Turos (TOPOLOGIC)** Products and services description, means of data and information
16:15- 16:30	**Geo4IRBM Ecosystems and Biodiversity Mapping and Monitoring** **by Przemyslaw Turos (TOPOLOGIC)** Products and services description, means of data and information

TUESSDAY, 18 JUNE 2019

Products and services - applied methods of EO data processing and analysis, achieved results, products and services application fields.

TIME	AGENDA
09.00 – 10.00	**Geo4IRBM Land Cover Mapping** **by Przemyslaw Turos (TOPOLOGIC)** Main and auxiliary input data sources, selection of valuable satellite scenes, advantages of continuous satellite monitoring, seasonal variations, ▪ Methods of image classification, preprocessing, application of methods of machine learning and multitemporal classification, methods of data integration, selection valuable auxiliary datasets and objects types, ▪ Limitations induced by high cloud coverage, topography and land use and land cover types patchwork, ▪ Final products specification and introduction of results, ▪ Potential fields of products and services applications including generation of other products in the project, analysis in the context of water resources, settlement distribution, crisis management, environment impact analysis, floods modelling.
10.00 - 10.30	**Coffee break**
10:30 - 11:30	**Geo4IRBM Land Cover Changes Mapping** **by R. Dabrowski (GEOSYSTEMS)** ▪ Main and auxiliary input data sources, selection of valuable satellite scenes, advantages of continuous satellite monitoring, historical data accessibility, ▪ Methods of image classification, preprocessing, application of methods of machine learning and multitemporal classification, methods of data integration, selection valuable auxiliary datasets and objects types, ▪ Limitations of the data sources, ▪ Final products specification and introduction of results, ▪ Potential fields of products and services applications including generation of other products in the project, analysis in the context of water resources, , environment impact analysis, urban sprawling.
11:30 - 12:00	**Geo4IRBM Cropping Intensity Mapping** **by Przemyslaw Turos (TOPOLOGIC)** ▪ Assumptions of products scope and accuracies, ▪ Reference data needs, potential data sources, applicability of land cover data, ▪ Selection of multitemporal SAR scenes, analysis of yields cycles, multitemporal SAR imageries analysis methods, ▪ Methods of MODIS (moderate resolution optical sensor) products integration and applications, ▪ Final products specification and introduction of results, ▪ Potential fields of products and services applications.
12:00 -13:00	**Lunch Break (ISHOMA)**

TIME	AGENDA
13:00 - 14:00	**Geo4IRBM Surface Water Monitoring**
	by Przemyslaw Turos (TOPOLOGIC)

- Introduction of assumptions of the service and general overview of the surface water monitoring system, applications in water management and flood protection,
- Selection of satellite SAR data sources, advantages of long term, continuous monitoring,
- Analysis of historical data sources archives, historical surface water monitoring,
- Application of cloud computing environment,
- Issues of integration of multitemporal information,
- Limitations of data sources and the techniques applied, influence of land cover, topography, intervals of observations,
- Final products specification and introduction of results, including web environment allowing for accessing and viewing continuously provided services,
- Potential fields of products and services applications including water management, water resources mapping, agriculture monitoring, floods and inundation monitoring, crisis management, costal monitoring.

14:00 - 15:00	**Geo4IRBM Surface Deformations Monitoring**
	by D. Ziolkowski (IGiK)

- Theoretical background of interferometric data analysis,
- Characteristic of the input data sets and characteristic of the study area in the context of applicability of interferometric techniques,
- Main steps of interferometric data analysis, basic problems during the data processing in the context of particular study area,
- Analysis of first preliminary deformation maps; velocities, spatial extent possible origins of deformation,
- Possibility of monitoring of various types of deformation (landslides, soil erosion, subsidence, tectonic faults, earthquakes etc.) in the context of spatial distribution and quality of measurements points for various land cover types within the study area,
- Possibility of continuous service provision over the large areas in the context of the first results of data analysis,
- The need and possibilities of product validation using measurements from permanent GNSS stations.

15.00 - 15.30	**Coffee break**
15:30 - 16:30	**Geo4IRBM Environmental analysis (P. Turos, Topologic)**

- Geo4IRBM Surface Potential Erosion and Sediment Yield Modelling
- Geo4IRBM Coastline Changes Mapping
- Geo4IRBM Long-term Surface Water Coverage Mapping
- Geo4IRBM Ecosystems and Biodiversity Mapping and Monitoring
- Main and auxiliary data sources,

TIME	AGENDA		
	▪ Techniques applied in integration and modelling aiming at provision of the following mapping and analytical products,		
	▪ Final products specification and introduction of results,		
	▪ Potential fields of products and services applications.		

SCHEDULE TRAINING PROGRAM

INTERNATIONAL TRAINING OF CAPACITY BUILDING OF EARTH OBSERVATION PRODUCTS
TO SUPPORT THE EMERGENCY ASSISTANCE FOR REHABILITATION AND RECONSTRUCTION (EARR)

WEDNESDAY, 19 JUNE 2019

TIME	AGENDA
09.00 – 09.30	**EO4SD in support to Disaster Risk Reduction** **(Intro by Paolo Manunta (ESA-ADB) and Alberto Lorenzo Alonso (INDRA))** Manunta: ESA and ADB partnership. EO4SD program.
09.30 – 10.00	**EO4SD DRR in support to risk and recovery in Central Sulawesi** **by Alberto Lorenzo Alonso (INDRA)** ▪ General presentation of EO4SD DRR. Support to Sulawesi recovery. The web tool. ▪ General presentation of the EO4SD DRR project. How the project was "activated" for supporting Central Sulawesi Recovery. Identification of needs and translation into technical requirements. Summary of the products produced and showcasing in the web mapping application.
10.00 – 10.30	**Coffee Break. Poster session**
10.30 – 11.15	**Brief introduction to theory of Synthetic Aperture Radar (SAR) for ground motion monitoring** **by Vicenzo Massimi (PLANETEK)** ▪ Introduction to SAR: Synthetic Aperture Radar, SAR Interferometry (InSAR) and DInSAR. ▪ Working principles, applicability requirements, and main error sources of SAR techniques covering all relevant theoretical concepts. ▪ Theory of Persistent Scatterers and Distributed Scatterers technique to carry out the displacement time series measurements.
11:15 – 12:00	▪ **Feedback session with open questions and filling-up forms** ▪ **Breaking session** **by Vicenzo Massimi (PLANETEK)**
12:00 – 13:00	**Lunch Break (ISHOMA)**
13:00 – 13:45	**Engineering applications of Multi-Temporal DInSaR (MT-DInSAR) through the Rheticus® platform. Examples with Use- Cases.** **by Vicenzo Massimi (PLANETEK)** ▪ Example of engineering applications based on Multi-Temporal DInSAR (MT-DInSAR). ▪ Use cases related to the monitoring of natural phenomena like landslides, subsidence and infrastructures stability (buildings, roads, railways, dams, mining area etc).

TIME	AGENDA
13:45 – 15:00	**Elevator pitch** **by Vicenzo Massimi (PLANETEK)** Short interviews with the three experts
15.00 – 15.30	**Coffee Break**
15:30 – 16:30	**Analysis of the MTI results on Central Sulawesi (ex-ante & ex-post)** **by Vicenzo Massimi (PLANETEK)** ▪ Rheticus® Displacement service presentation. ▪ Presentation and discussion of the results of the MT-DInSAR data processing (PS/DS map), ex-ante and ex-post Palu earthquake, based on the Sentinel-1 data and performed using the Rheticus® Displacement processing chain. **Added value to the PSI result. Buildings motion measurements layer** Presentation and discussion on examples of vertical monitoring applications based on PS/DS maps for infrastructures and built-up areas, with focus on the buildings motion measurements layer produced over Palu area (ex-ante & ex-post).
16:30 – 17:00	**Hands on experience in a software environment** **by Vicenzo Massimi (PLANETEK)**

THURSDAY, 20 JUNE 2019

TIME	AGENDA
09.00 – 09.45	**The Copernicus Sentinel & ESA Earth Observation programmes** **by Michail Foumelis (BRGM -French Geological Survey)** ▪ Sentinel missions' overview and status ▪ Sentinel operational products and data access ▪ ESA heritage SAR missions and new mission concepts ▪ Scientific exploitation and achievements ▪ SentiNel Application Platform (SNAP)
09:45 –10:00	**Feedback session with open questions and filling-up forms** **by Michail Foumelis (BRGM -French Geological Survey)**
10.00 – 10.30	**Coffee Break. Poster session**
10.30 – 11.00	**ESA Geohazard Exploitation Platform (GEP)** **by Michail Foumelis (BRGM -French Geological Survey)** ▪ Background ▪ Thematic Apps and Services ▪ Community platform and e-collaboration ▪ The Early Adopters programme
11.00 – 12.00	**Hands-on session / Q&A** **by Michail Foumelis (BRGM -French Geological Survey)**
12:00 – 13:00	**Lunch Break (ISHOMA)**
12:00 – 13:00	**Theoretical Background on SAR, InSAR and Optical Remote sensing** **by Michail Foumelis (BRGM -French Geological Survey)** ▪ Basic principles of SAR and Optical remote sensing for geohazards applications ▪ SAR interferometry - From processing to interpretation ▪ Monitoring geohazards with multiple resources
13:00 – 13:30	**Theoretical Background on SAR, InSAR and Optical Remote sensing** **by Michail Foumelis (BRGM -French Geological Survey)** ▪ Basic principles of SAR and Optical remote sensing for geohazards applications ▪ SAR interferometry - From processing to interpretation ▪ Monitoring geohazards with multiple resources
13:30 – 15:00	**Building Experience with GEP services** **by Michail Foumelis (BRGM -French Geological Survey)** ▪ Familiarizing with GEP environment & Satellite Image Screening ▪ SAR Interferometry chains for earthquake and volcano deformation ▪ Optical Image Correlation chains for mapping ground displacements ▪ Change Detection for geohazards mapping
15.00 – 15.30	**Coffee Break**
15:30 – 17:00	**Breaking session**

FRIDAY, 21 JUNE 2019

TIME	AGENDA
09.00 – 09.45	**Presentation of the flood susceptibility: automatic extraction of flood events using satellite imagery. Geomorphic approach for flood hazard modelling. Semi-automatic approaches.** **by Alberto Lorenzo Alonso (INDRA)** ▪ Presentation of different approaches to measure flood hazard. Hydrological models, models of flood susceptibility using DEMs and time series analysis of flood events. Pros and cons. ▪ Use of DEMs to extract flood-prone areas. Sources, techniques, results and limitations. ▪ Time series analysis: methods to extract water information from optical and SAR satellite images. Sources of information, processing issues and limitations. The specific case of urban areas. ▪ The need of semiautomatic approaches in a context of dynamic river morphology.
09.45 – 10.00	**Feedback session with open questions and filling-up forms** **by Alberto Lorenzo Alonso (INDRA)**
10.00 – 10.30	**Coffee Break. Poster session**
10.30 – 11.00	**Breaking session** **by Alberto Lorenzo Alonso (INDRA)**
11.00 – 11.45	**Exposure mapping: Presentation of the Land Use Land Cover product.** **by Alberto Lorenzo Alonso (INDRA)** ▪ Exposure mapping types. Land cover (including built up area), population and value of assets. ▪ Land Use, Land cover and LULC changes. ▪ Input data: satellite imagery (preparation) and open-free ancillary datasets ▪ LULC generation: automatic vs manual approach, pros and cons. ▪ Different scales for different purposes: 1:50000, 1:10000, 1:5000.
11.45 – 12.00	**Elevator pitch** **Short interviews with the three experts** **by Alberto Lorenzo Alonso (INDRA)**
12:00 – 13:00	**Lunch Break (ISHOMA)**
13:00 – 13:45	**Risk mapping. End to end services. Products in a user context.** **by Alberto Lorenzo Alonso (INDRA)** ▪ Extracting valuable information form hazard and exposure mapping. ▪ Risk Mapping as the final result of the disaster risk assessment process. ▪ Additional supporting services for different phases in the DRM cycle: Reference Mapping, Situation Mapping, Reconstruction Monitoring. End to end services. Putting the products in the user context.
13:45 – 15:00	**Hands on experience in a software environment** **by Alberto Lorenzo Alonso (INDRA)**

TIME	AGENDA
15.00 – 15.30	**Coffee Break**
15.30 – 16.30	**Next steps for cooperation** **by Alberto Lorenzo Alonso (INDRA)** ▪ Further cooperation for the rehabilitation/ reconstruction of Palu ▪ Long-term cooperation for the uptake of EO products and service in the frame of ESA-ADB agreement ▪ Financing schemes: Multilateral Development Banks and Official Development Assistance

Project partners: