

CONTINGENCY PLAN PREPARATION SERVICE CHAIN



INTRODUCTION

The Contingency Plan Preparation is a pilot service offered within G-MOSAIC under the 7th Framework Programme of the European Commission, as a service of the G-MOSAIC project.

The G-MOSAIC Collaborative Project aims at identifying and developing products, methodologies and pilot services for the provision of geospatial information in support of EU external relations policies and at contributing to define and demonstrate the sustainability of the GMEs global security perspective.

Within the services for this security dimension of G-MOSAIC, the Conflict Prevention and Crisis Management Support services aim at providing a global picture when a crisis is triggered and as it develops.

The "Contingency Plan Preparation" service provides geo-spatial information to support crisis prevention and intervention. It is designed for a situation of forthcoming crisis, addressing areas in which there is a need for imminent action.

A typical situation could be the evacuation of EU citizens from a hazardous city, with a monitoring service of the road network and certain critical assets - bridges, airports, city exit-ways. Upon the occurrence of a crisis, contingency plans are prepared and updated in the areas of interest, providing information for planning civil evacuation and preparing strategic military missions. Different maps for contingency planning are produced using optical and radar satellite image data. Compared to optical data, this image data type has the advantage that it can be acquired even with cloud cover, a situation in which optical sensors fail to provide information.

The service foresees the delivery of three products:

- > City maps in support of emergency planning
- > Multitemporal coherent analysis based on radar data image data
- > Detailed land cover and city map

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POINTS OF INTEREST

- > PREPAREDNESS AND UPDATING OF CONTINGENCY PLAN IN THE AREAS OF INTEREST
- > PROVISION OF INFORMATION FOR PLANNING CIVIL EVACUATION AND PREPARING STRATEGIC MILITARY MISSIONS
- > IMPROVING THE CAPACITY OF IDENTIFYING SECURITY ITEMS FROM EARTH OBSERVATION DATA



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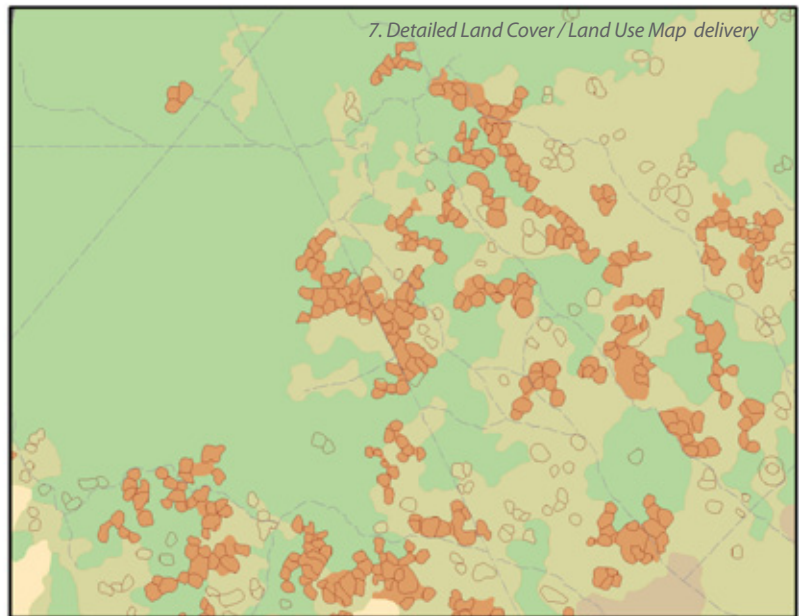
CORE PRODUCTS

DETAILED LAND COVER / LAND USE MAP

The product is composed by a base map derived from SAR images with geo-spatial information in support of emergency planning for evacuation and intervention for the greater city area. The product is updated, using data with a resolution from 1 to 5 m, all over the AOI in order to provide a map with specific features (e. g. roads, buildings) and to highlight changes which may have occurred in the meantime.

DETAILED LAND COVER / LAND USE MAP DELIVERY WORKFLOW

1. Selection of the AOI and data order
2. Definition of a GeoDatabase
3. Retrieving of non EO data
4. Orthorectification and coregistration of optical and SAR data
4. DSM extraction from Cosmo-SkyMed data

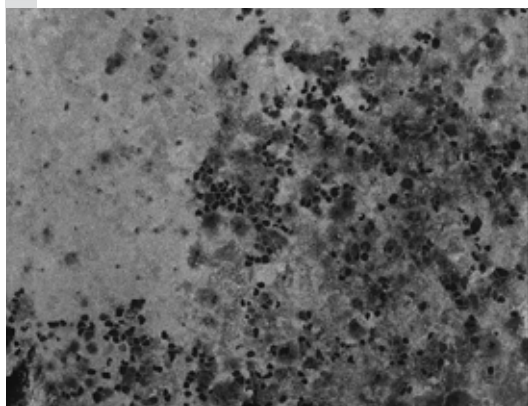


6. Feature Extraction

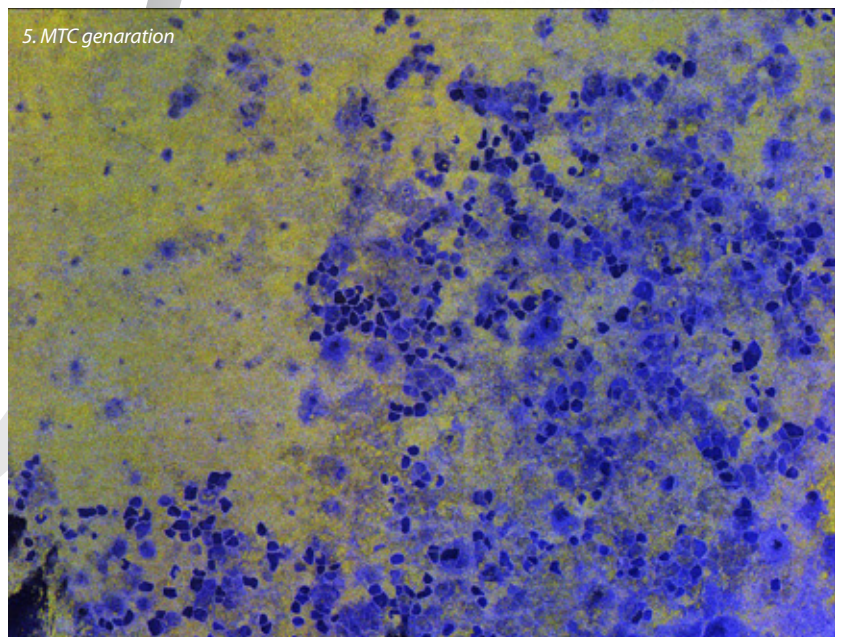


Legend

- Cart Track Line - LAP010
- Fence Line - LAL070
- Crop Land Area - AEA010
- Sand Dunes Area - ADB170
- Soil Surface Region Area - ADA010
- Thicket Area - AEB020 (Undergrowth Density 25)
- Thicket Area - AEB020 (Undergrowth Density 51)



5. MTC generation



MULTI TEMPORAL WITH INTERFEROMETRIC COHERENCE (MAP ANALYSIS)

The MTC product is a false colour composite image obtained from linear combination of the SAR detected interferometric coherence of two CSK images (GSDS 3m) acquired, with a temporal interval of about six months, in interferometric mode (i.e. same orbit pass), observation direction, incidence angle, polarization.

The MTC product is generated by the following combination:

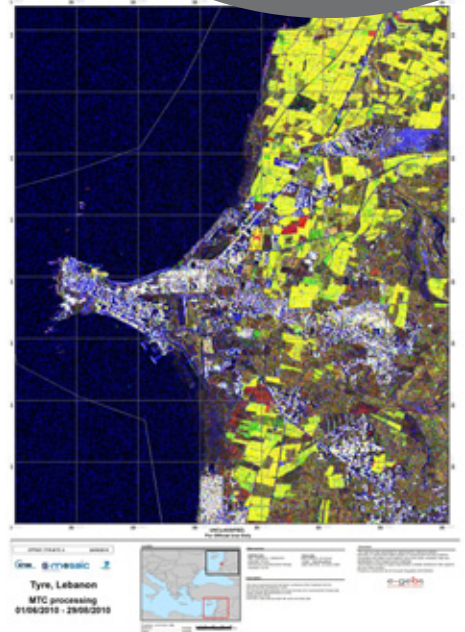
Red: SAR detected amplitude value of master image (1st acquisition)

Green: SAR detected amplitude value of slave image (2nd acquisition)

Blue: interferometric coherence

The product includes a report on the MTC Map analysis results focusing on land use/land cover changes.

Changes to features of interest are highlighted. The product is provided by the project's WebGIS (Common Portal) or in desktop GIS compatible format. The thematic layers which comprise the final products give information about hydrography, transport, population, industries, vegetation, physiography. Other possible combinations of SAR channels are the Interferometric Land Use (ILU) and the MTC (Multi Temporal with Interferometric Coherence) products, which are false colour composite images created through linear combinations of SAR detected amplitudes and interferometric coherence of two SAR images acquired the interferometric mode (i.e. same orbit pass, observation direction, incidence angle, polarization).



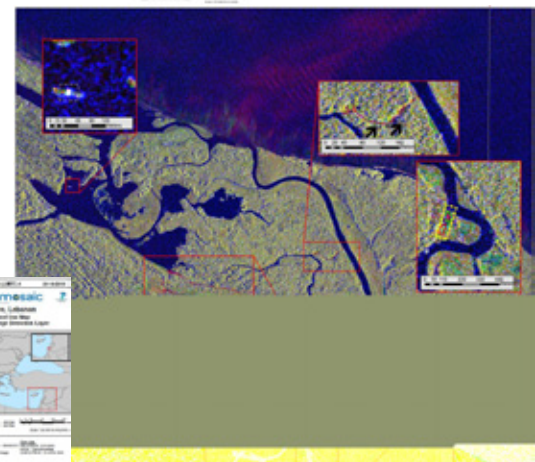
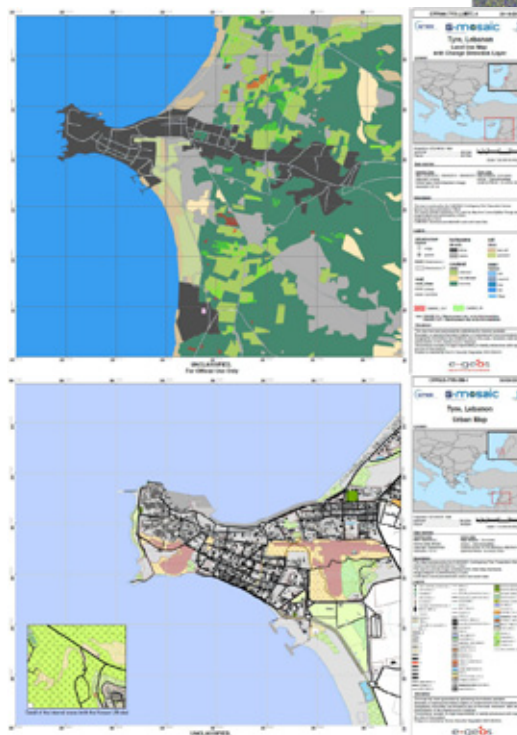
Detailed Land Use & Urban map: the reference standard adopted for feature extraction is based on the MGCP data model.

LAND USE FROM MTC AND URBAN MAP

The Land Use information derived from the MTC product is a thematic map with (land use/land cover) geospatial information in support of emergency planning for urban and sub-urban areas needed which is derived from SAR images and the MTC product.

The Urban map is produced from very high resolution satellite orthophotos in the infrared (IR) band at 50 cm spatial resolution. The IR band supports the photointerpretation of the vegetated areas and the evaluation of the status.

The product is updated using a set of multitemporal data with a resolution below 1 m on the urban area of interest. The result is a detailed map showing specific features that may have occurred in the time between image capture (using optical change detection procedures).



COSMO-SkyMed Multi Temporal Images with interferometric Coherence (MTC)
Red: The First COSMO-SkyMed acquisition
Green: The Second COSMO-SkyMed acquisition
Blue: Interferometric Coherence

Detailed Land Cover (COSMO SkyMed) of Tyre (Lebanon) and Urban Map (DigitalGlobe Worldview)

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MULTITEMPORAL COHERENT ANALYSIS

The object of this product is the generation of thematic map with detailed (land use/land cover) geo-spatial information in support of emergency planning for every urban and sub-urban area needed.

This map is produced from satellite very high resolution orthophotos, IR band, 50 cm spatial resolution (IR band supports the photointerpretation of the

vegetated areas and evaluation of the status).

The product is updated, using a set of multitemporal data with a resolution below 1m, on the urban area of interest, in order to provide a more detailed map with specific features and to highlight changes that occurred in the meantime (using optical change detection procedures).

REQUESTING THE SERVICE

G-MOSAIC provides the opportunity for Users to participate in the definition of the Contingency Plan Preparation services based on the application presented in this paper. Users can access the project team by contacting the project Coordination, the e-GEOS service point of contact or the EUSC.

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MORE INFORMATION AT WWW.GMES-GMOSAIC.EU



This service is coordinated by e-GEOS with the efforts of other partners inside the G-MOSAIC project: European Commission-Joint Research Centre, Joanneum Research, Astrium GEO-Information Services, INDRA, GISAT, GMV, Planetek Italia, GMVIS-SKYSOFT, S.A., European Union Satellite Centre. e-GEOS is a service provider of the G-MOSAIC project. As a coordinator of the Contingency Plan Preparation service, e-GEOS organizes the production of the above mentioned partners and ensures the quality of the product and the suitability to the user needs. e-GEOS is one of the main industrial players of the European Program GMES (Global Monitoring for Environment and Security) where it leads projects such as G-MOSAIC (Management of Operations, Situation Awareness and Intelligence for regional Crises), LIMES (Land and Sea Integrated Monitoring for Environment and Security) and MARISS (Maritime Security Services). The company is today a world leader in environmental and maritime monitoring services. In the framework of GMES program, in case of natural disaster, security and humanitarian crises, e-GEOS actively collaborates with EUSC (European Union Satellite Centre) and various UN organisations, providing rapid mapping services.



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