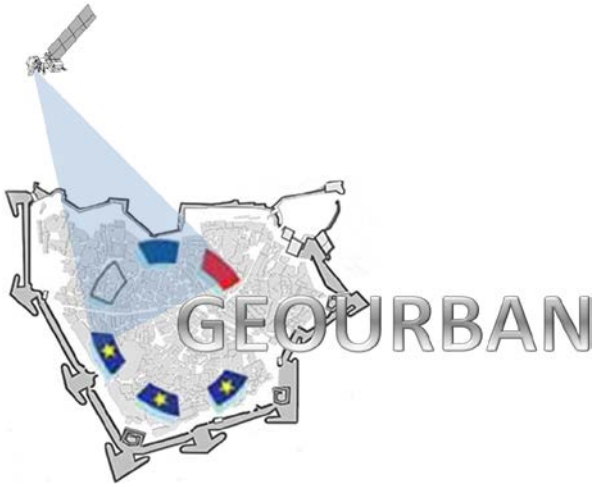
SEVENTH FRAMEWORK PROGRAMME

CAPACITIES - ERA.Net RUS: Linking Russia to the ERA

Contract for: **Innovation Project**

D.5.1

EO Products Database (HR)



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GEOURBAN

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1. WORKPACKAGE OVERVIEW

WP5 includes the **local and regional applications** in GEOURBAN case studies. As in the case of VHR data, previous research projects already addressed the use of high spatial resolution (HR) EO data in local scale applications such as land cover mapping and change detection, as well as the use of low spatial resolution (LR) EO in regional scale applications such aerosol concentration estimation. WP5 represents a unique attempt to collect and to analyze an integrated EO dataset suitable for the evaluation of a subset of the EO-based indicators developed in WP3. As in WP4, the development of EO data analysis techniques is beyond the scope of GEOURBAN, therefore state of the art methods will be used to derive specific products from raw EO datasets. Both HR (Landsat/SPOT type) and LR (MERIS/AATSR type) satellite data will be used in GEOURBAN case studies. In case of regional scale where EO derived products are already available online (i.e. MODIS Level 2 products) these products will be directly used. The output of this WP is a set of products to be used as inputs for indicator evaluation and a report on both the techniques used to derive these products from raw EO data and the location of the online available EO-derived products (deliverable D.5.2).

WP5 also involves the description of the **Earth Observation Products Database** for GEOURBAN case studies. The ability to design associated applications is critical to the success of the database. Identification of requirements and specifications related to the use of EO products provides the users with a high-level understanding of the GEOURBAN products. Hence, WP5 together with WP4 provide a design of database for a better sharing of GEOURBAN outputs. A conceptual database design is presented which involves modeling the relations between the raw EO data, EO-based indicators and EO products obtained from processing of VHR, HR and LR resolution EO raw data.

1.1. Purpose of the document

This document is the **Earth Observation Product Database** of the GEOURBAN Project. It contains description of the conceptual database design for GEOURBAN product database.

1.2. Definitions and acronyms

Acronyms

Primary Key (PK)
Foreign Key (FK)

1.3. Document references

GEOURBAN D.1.1 Project Management Plan, 30/03/2012

GEOURBAN D.2 Urban planning requirements 04/10/2012

GEOURBAN D.4.1 EO products database (VHR) 30/10/2012

2. DESCRIPTION OF EO DATA AND PRODUCTS

The EO data and related products involve mainly the raw EO satellite images and their processed outputs which are obtained by using various image processing algorithms. The processed images of EO data form the basis of indicators to be used in the GEOURBAN framework. These products are obtained for the case studies Basel, Tyumen and Tel Aviv according to available EO data in various spatial resolutions. Table 1 indicates the available data and obtained products.

Available EO data	Spatial resolution		Spectral resolution or product	Processed products
Landsat TM (ETM+)	VIS B G R NIR SWIR Thermal Panchromatic (ETM+ only)	30 m 120 m (60 m) 15 m	0.485 μm 0.560 μm 0.660 μm 0.830 μm 1.650 μm 2.220 μm 11.450 μm 0.7199 μm	Land cover/Land use (LULC), land surface temperature and emissivity, broadband albedo
MODIS		1000 m	MOD/MYD11 A2	LST day, LST night
MODIS		500 m	MCD12	Land cover
MERIS/AATSR		1000 m	To be processed by FORTH	Aerosol optical thickness AOT

Table 1. HR-LR EO data and products for GEOURBAN case studies

As it can be seen from Table 1 the EO products are mainly land use land cover classes as well as surface features of urban areas, which are in the form of raster images. All the raster EO products are provided in Geotiff format with WGS84 datum. Moreover the algorithms used for obtaining EO products as well as related indicators are described in GEOURBAN deliverables:

1. D.2-Urban Planning Requirements relative to EO
2. D.3-EO-based Indicators Development
3. D.5.2- EO Data Analysis Protocol (HR-LR)

Therefore they are also considered to be a part of the data to be included in the database.

3. DESIGN FOR EO PRODUCTS DATABASE

For the data types mentioned in the previous section a relational database is considered. For practical reasons, this database is identical with the database for VHR data (deliverable D.4.1). The data tables with their relations are given in Fig. 1. Eight tables, namely image properties, algorithm, product, satellite, city, image band, raw image and deliverable are implemented. Primary key (PK) and foreign key (FK) attributes of the eight tables with their attributes are also listed in Fig. 1. For a detailed description of Table attributes refer to deliverable D.4.1.

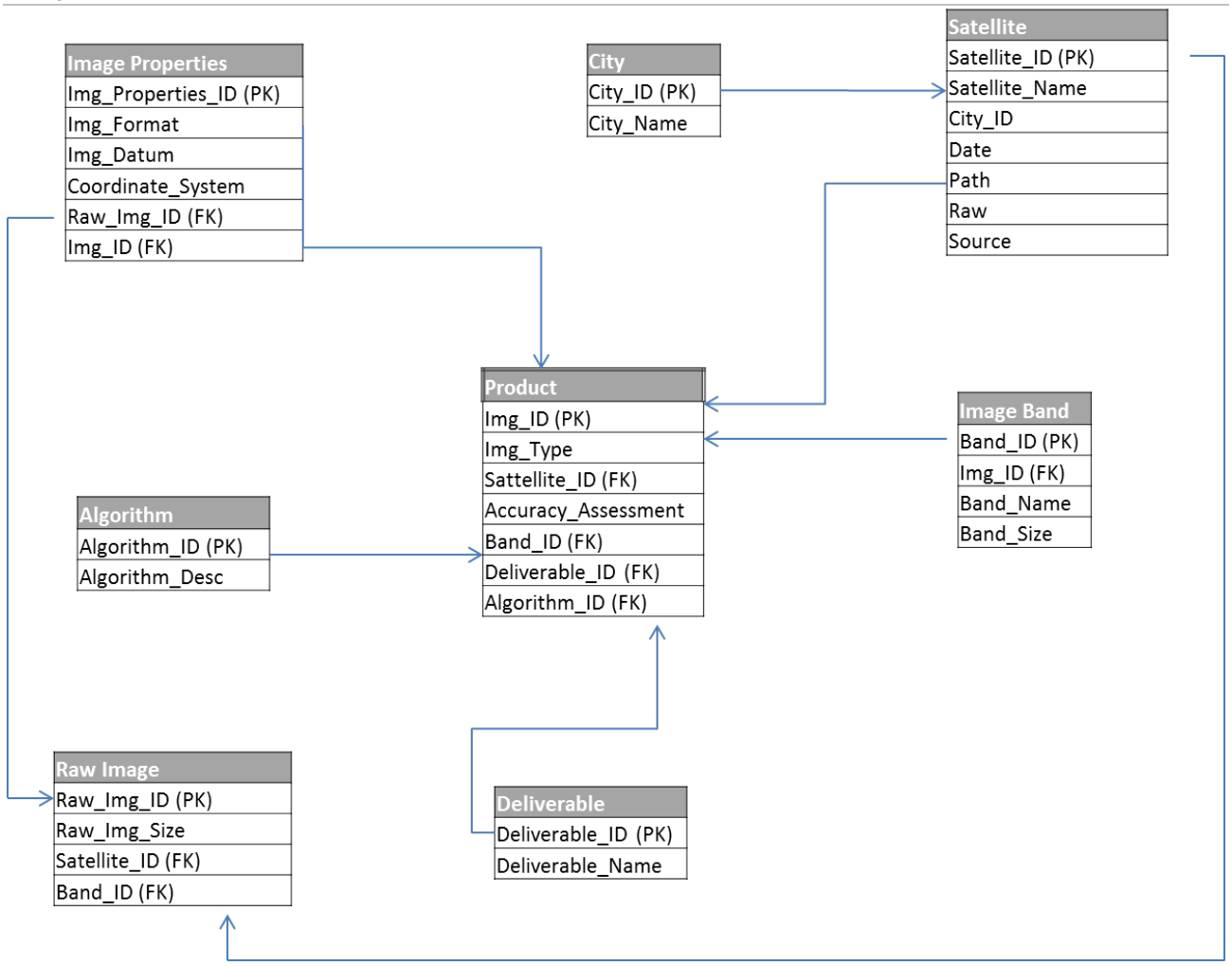

Figure 1. The Database Design for VHR-HR-LR EO Products.