



REMOTE SENSING IN CIVIL WORKS

Large engineering projects are carried out anywhere in the world. In many countries it is difficult to find updated mapping information.

In these cases, remote sensing becomes an essential tool to face the projects.

From satellite images we can obtain both **altimetry** (Digital Elevation Models), and **planimetry** (roads, hidrography and land uses) from anywhere in the world.

Since 1999 several Very High Resolution (VHR) satellites have been launched providing satellite images with resolutions of up to 50 cm, which is equivalent to 1:2,500 working scale.

Main Features

- Images of any part of the world.
- VHR imagery archive since 1999.
- Customized programming of satellites (user chooses *how*, *when* and *where*).
- Images available for working scales up to 1:2,500.
- Multispectral Information. Satellite images capture the spectral response of earth surface not only in the visible region of the spectrum, but also in the infrared, thermal and microwaves
- Extraction of Digital Elevation Models, to know land variables like gradient, slope or orientation.
- Good Cost / Information relation versus traditional techniques, like aerial photography or topography.
- Objective and reliable information that can be used as evidence in legal proceedings.
- Integrable into GIS.

Monitoring of civil works



Altimetry Mapping

There are several satellites that provide altimetry data as Digital Elevation Model (DEM).

Missions like SRTM (*Shuttle Radar Topography Mission*) or ASTER (*Advanced Spaceborne Thermal Emission and Reflection Radiometer*) provides complete coverage of elevation data, with spatial resolutions from 90 to 15 meters.

Furthermore, satellites like TerraSAR-X (2007) and TanDEM-X (2010), provides DEMs with spatial resolution of 5 meters.

In 2014, TanDEM-X mission will be generated a Digital Elevation Model with an unprecedented quality and accuracy (3 meters) and a complete coverage.

From these DEMs by digital image process, relief components can be obtained: **gradient**, **slope** and **orientation**, as well as longitudinal profiles, **intervisibility analysis** and **viewshed**.

In hydrological analysis, it can obtaine **flow lines** and **river basin dimensions**.

Also, DEMs provide **shadow maps**, **irradiance** and **insolation models** and **three-dimensional views**.



Digital Elevation Model obtained by TanDEM-X of volcano in Bolivia (copyright DLR).

Planimetry Mapping



Satellite images allow to obtaine mapping of an area or updating the existing maps.

Images are geometrically corrected, adapting them to the desired map projection and making them compatible and integrated with other information sources obtained in situ.

"The Remote Sensing' World is the World".

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