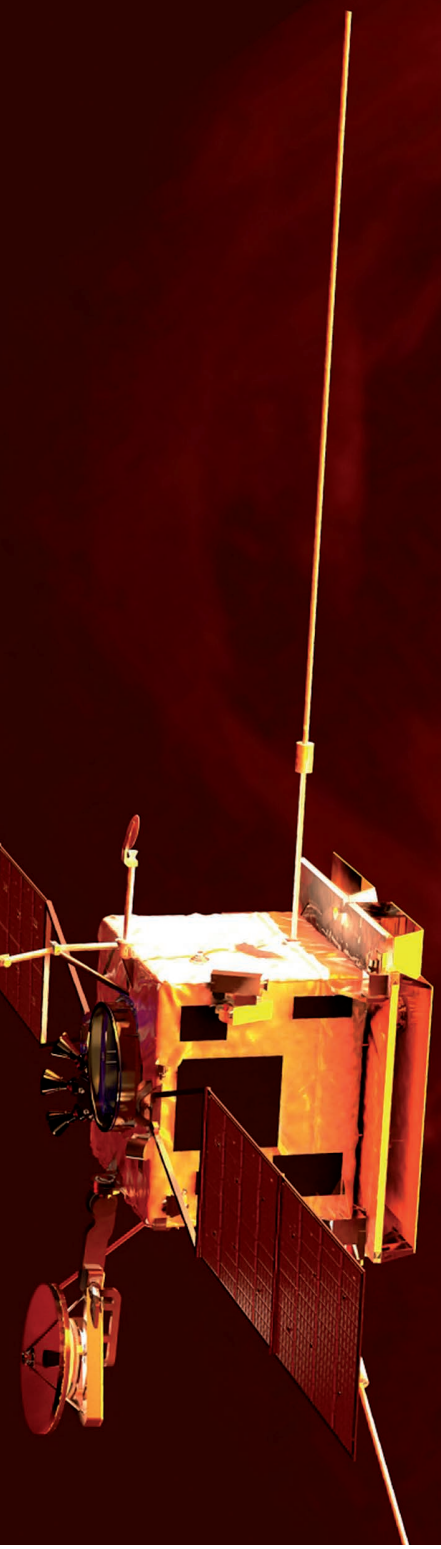

ISSUE 11

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Earth Observation:
Environment & marine monitoring services in Europe
Monitoring Coastal Archaeological sites
Waste Earth Observation Services

Interoperability & SDI:
Geographic open data & interoperability
The INSPIRE Geoportal
Towards geographic linked open data

Government, Planning & business solutions:
Preciso® Family
Cart@net 2014
Civil and Construction Workflows with EO data
Fleets monitoring and smart cities

Space:
From On Board Payload Data Processing, to the Cosmic Exploration. The satellite ground segment. SHIRA, the first Italian 'user oriented' satellite mission

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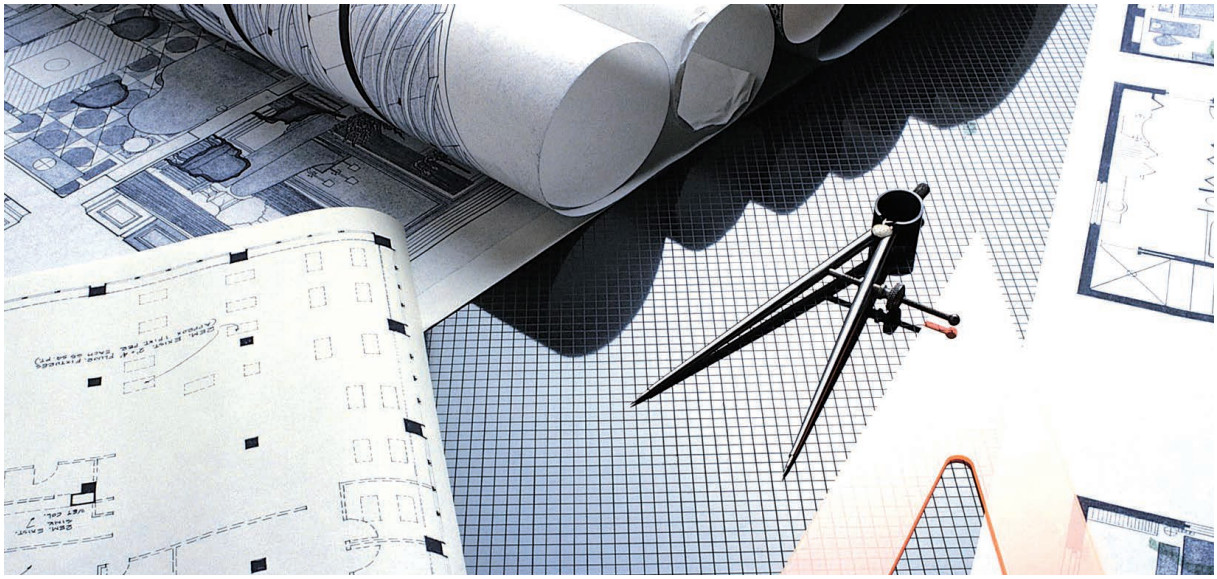


Improving Civil and Construction Workflows with EO data

How remote sensing products and services can help the development of infrastructures

When an engineering company approaches the phases of planning and design of an on-shore or off-shore infrastructure, from railways to pipelines, from highways to dams, it must take care of the environment it will serve, considering different points of view. Updated cartographic and topographic information like land use and coverage, soil composition and orography set up the bases for a modern design. The use of these instruments gives architects and engineers the possibility to evaluate the morphology of the area, the impact of construction activities on environmental dynamics, the possible future coexistence between works and neighbouring areas. All of these activities contribute towards the achievement of many correlated purposes: reducing the impact on the environment, optimizing investments, limiting maintenance and management duties.

The availability of this kind of information, updated and accurate, is not always guaranteed in difficult to reach areas. Operating in this area, performing ground surveys or using aerial sensors can be costly and difficult to realize.

The analysis of satellite remote sensed images proposes itself as a new frontier in the field of design and environmental monitoring support. Cooperating with other technologies based on aerial/UAV/lidar surveys and measurement campaigns of environmental and cartographic features, satellites allow for the improvement in the relationship between performances and costs, reducing the time needed

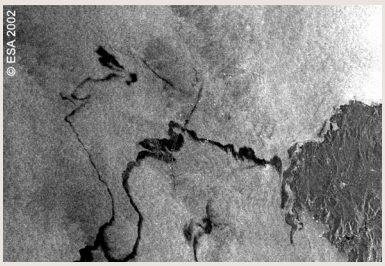
Preciso® zeta

to acquire the information.
Modern satellite sensors, capable of acquiring Earth data quickly worldwide, give the chance to obtain updated pictures of the environmental situation with resolutions, accuracies and costs that can vary according to the project's requirements.
Satellite image datasets can be used not only as a reference layer for environmental assessments and preliminary infrastructure design, but also to create added value services and data, obtained by merging different sources through automatic and photo-interpretation processing techniques, useful for supporting engineering companies in their activities. This is done using their radiometric content, in terms of reflected energy from the ground, and their spatial content, in terms of distribution and shape of the objects positioned on the ground.
An example of added value data obtained from satellite imagery is a digital elevation model, commonly referred to as DEM, which reproduce the orography of an area in digital formats, thus allowing virtual 3D representations to be adopted for direct, impressive and visual renderings. This type of data can be considered a valid support to simplify the understanding of reality, through simple picture and motion representations of different environments. Moreover, they represent the optimal solution for fast data procurement in all situations in which it is essential to have accurate orographic data quickly for studies and projects, even in remote areas.
DEMs are created by mappers in different ways. The fastest and most practical involves the use of remote sensing methods. One of the most powerful techniques for extraction, DEM makes use of stereo pair satellite images, i.e. images of the same area acquired according to some constraints, which involve the position of the satellite in space and related to the ground. Considering some well-known photogrammetric principles and algorithms, a process of digital image correlation applied to the stereo images permits a direct height measurement from the ground, with results that can be considered very promising, taking into account the high level of automation. The obtained resolutions are comparable to the ones obtained from traditional aerial surveys.
Data processing systems can be used to extract a great quantity of information from a DEM. For example, it is possible to evaluate the shape and distribution of shadows knowing the sun's position; to estimate the possible impact of flooding on a valley or a town; to quantify digging activities during works and excavations; to calculate isolines; to model mass movements; to simulate flights and disaster recognitions, and much more.
Every above-mentioned example shows how this kind of data can greatly support engineering companies in a variety of activities, which cover preliminary and feasibility studies, infrastructure design and monitoring, and the study of transformations in the environment.
The innovation represented by satellites and the information they are capable of providing must be seen as an opportunity for an engineering company to improve its daily activities. Considering the high capacity to be used and manipulated in a GIS and CAD environment and the various standard formats in which these data can be supplied, satellite remote sensed products, services and instruments can be easily included into robust workflows, making them more efficient, in exchange for short efforts in terms of integration and learning.

More resources:
www.planetek.it/eng/preciso_zeta

Earth Observation and Oil Spill Monitoring

The exploration of seas and oceans, searching for possible hydrocarbons spills, defined as "Oil Spills", is a very important topic. It involves both International Institutions, in marine environment protection and in ecological disaster prevention, and Oil&Gas companies, for the control and monitoring of existing infrastructures and the search for new offshore oil fields.
These activities can be effectively supported by satellite technologies and, among these, by Radar SAR (Synthetic Aperture Radar) sensors. The technical principles that make SAR valuable for such activities are very simple. The presence of hydrocarbons on the water surface damps the motion of the waves causing the reflection of electromagnetic energy emitted from the satellite sensor in the specular direction. In this way, the measured reflected energy is minimal and the areas interested by oil spills appear on the radar datasets as dark patches, which can be identified with automated algorithms and characterized by a certain confidence level, assigned from an expert operator.



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