# Space
# Earth Observation

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The Earth Observation (EO) world is complex. Satellite data is used by different people for many purposes. As well as helping us monitor our planet's environment and weather systems, EO can also be used for decision making and to locate resources. For example, a scientist may use it for applied research, a commander to allocate military resources, a meteorologist to forecast the weather, or a prospector to look for oil.

## THE CHALLENGE

Developing, deploying and updating the information systems that use EO data is a huge challenge.

One of the main EO constellations in Europe is called Copernicus (formerly known as GMES, or Global Monitoring for Environment and Security). It is a joint programme between the European Space Agency (ESA) and the European Commission (EC), which is aimed at linking the data with the information providers and the users so that they understand each others' shared needs. This will allow environmental and security related information to be available to the people who need it through enhanced or new services. It uses existing assets (satellites, sensors and ground facilities) and these are being supplemented by new satellites called Sentinels.

The Sentinels are being designed and built now, but that's only part of the EO challenge. There's also the entire systems architecture underpinning it to be created, and a consistent set of data formats and interfaces to be agreed that will work for its diverse set of users. Also, under the EC 's 7th Framework Programme (FP7), some services are being introduced early, before the Sentinels are launched, using data from the existing space and ground assets.

## OUR APPROACH

### Copernicus (formerly GMES)

For the EC, we are leading a programme of work to engage with end-users across Europe to ensure strong uptake of the Copernicus data products as they become available. For ESA, CGI has implemented the system that will manage calibration of EO data from ESA and other satellites, and has assisted the UK National Physical Laboratory to define quality control standards for multiple missions in the Copernicus era. ESA chose us to define the entire data security policy and implementation plan for Copernicus. We're the top provider of secure data systems to government in UK and Netherlands. We looked at everything from the security of the sensors on the satellites, to how the information flows to the end user.

## KEY BENEFITS

- Over 35 years experience in satellite systems with defence and civil agencies worldwide
- Flexible and innovative approach, based on understanding our clients' needs
- Data reception, calibration, processing, archiving and dissemination
- Systems integration, verification and validation
- Independent from hardware and software vendors
- We have delivered the systems that produce the weather satellite images and data for Europe, Africa, East Asia, Australasia and the Pacific and Indian oceans, covering a population of over 3 billion people

## Advanced Product Generation

For over 25 years, since the very first European weather satellites, Europe's meteorologists have relied on CGI software to extract weather information from the images produced by the Meteosat weather satellites. Building on this experience we delivered the image processing systems for Japan's weather satellite series (MTSAT). Our MTSAT-1R system went operational in March 2005, and our MTSAT-2 system has been supporting the satellite since its first test images were broadcast on 11 May 2006. We have continued to support MTSAT-2 during its operational phase since 2010.

## Ground Systems for EO Data Processing

We are one of the leading providers of operational support for ESA's EO data processing activities, leading the analysis, design and verification of major evolutions of their processing systems and providing support to their daily operations. We are now leading the implementation of ESA's ground system for the Landsat Data Continuity Mission (LDCM). We combined our EO and satellite navigation expertise to implement the satellite-to-satellite tracking instrument processing software for the ESA GOCE (Gravity field and steady-state Ocean Circulation Explorer) mission, to provide the necessary high precision satellite tracking.

## Earth Imagery and Geographic Information System (GIS)

We don't just implement GIS technology for space. We also do it for telecommunications (to help network planning), utilities (for asset management), and also for government, transport, insurance and defence. We use GIS technologies to combine EO imagery with environmental, socio-economic, tactical and topographic data. We are involved in EO applications in tourism, hydrographic charting, Earth systems science, civil and military security and environmental risk management. For example, we led the ESA GlobWave project which provides an easy to use web portal for ocean wave information derived from satellite and in-situ sources.

## WHY CGI?

We pride ourselves on having a special position in the EO world, because we cover the complete chain from the upstream on board the satellites, the ground segment which receives and processes the data, and the downstream which turns the data into valuable, usable information.

We're able to do this because our space business is over 35 years old, so we already work closely with the Agencies and satellite manufacturers and operators. We also have this same deep knowledge in the downstream sectors like insurance, oil and gas, banking, government and defence, which means that we can help them extract value from space data.

What is more we've got one of the largest industrial groups in Europe specialising in signal/image processing and geospatial data systems. We specialise in 24x7 operational end-to-end EO ground system solutions, and in developing applications and services to exploit EO data. Our areas of expertise extend from user and system requirements analysis through to design, development, integration and support. We also provide consultancy on market requirements and how to address them commercially, technically, organisationally and legally.

### ABOUT CGI

With over 68,000 professionals in 40 countries, CGI fosters local accountability for client success while bringing global delivery capabilities to clients' front doors.

Founded in 1976, CGI applies a disciplined delivery approach that has achieved an industry-leading track record of on-time, on-budget projects.

For over 35 years we have worked in the Space industry delivering complex, mission-critical space systems. Our solutions are secure, often in complex technical environments, proven to work first time, every time, ultra-reliable and delivered on time to avoid costly delays.

We work on the major European navigation, communication and earth observation programmes and are specialists in space security and ground control systems. We share innovative uses of space and satellite technology with commercial organisations to help them solve their business problems effectively. Our software has supported the missions of more than 200 satellites.

Our high-quality business consulting, systems integration and outsourcing services help clients leverage current investments while adopting new technology and business strategies that achieve top and bottom line results.

As a demonstration of our commitment, our average client satisfaction score for the past 10 years has measured consistently higher than 9 out of 10.

For more information about CGI, visit
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Photo: ESA