

Earth observation

Using satellite data to solve complex challenges

Earth observation (EO) satellite data provides business and government organizations with valuable information to solve complex challenges, such as monitoring our planet's environment and weather.

Developing, deploying and updating information systems that use EO data can be a huge challenge. We have developed valuable space-enabled applications and services in finance, health, horticulture, insurance, maritime, oil and gas, utilities, trading and transportation, as well as across the public sector.

Advancing environmental sustainability

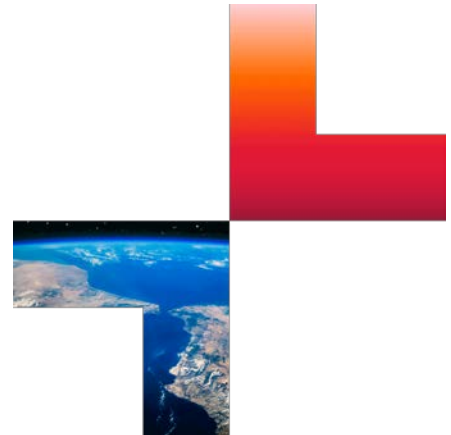
Space increasingly provides the information needed to keep people safe from the effects of climate change. Armed with remote sensing technologies and imaging devices placed on satellites that orbit the Earth continuously, EO missions gather information about the Earth's physical, chemical and biological systems. These assessments can then be used to inform our climate knowledge, science, monitoring and early warning systems, guiding policy change and practical action.

We create technologies that enable scientists to monitor Essential Climate Variables (ECVs) that make critical contributions to the formulation of Earth's climate. Monitoring ECVs gives us a better understanding of climate drivers and how they interact, as well as fluxes in energy, water and carbon.

Following are examples of how we are helping clients use space data to advance sustainability, from improving our understanding of food systems to conserving carbon sinks to monitoring deforestation.

Carbon sink preservation

- Seagrass is one of the world's most promising carbon sinks and crucial for biodiversity and food supply. We support Project Seagrass to identify healthy seagrass meadows and raise awareness of their role in reducing carbon footprints. We use EO data to develop a seagrass identification algorithm that can locate and quantify seagrass meadows across the UK.



Our Earth observation clients include

- European Organisation for the Exploitation of Meteorological Satellites
- European Centre for Medium-Range Weather Forecasts
- European Space Agency (ESA)—specifically ESRIN, the ESA's EO facility
- U.S. National Oceanic and Atmospheric Administration

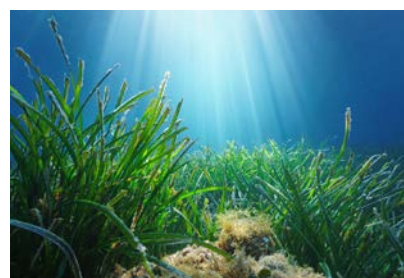
- Peatlands are another efficient carbon sink. Covering 3% of the Earth's surface, they also help provide clean drinking water, prevent flooding and sustain biodiversity. In Malaysia and Indonesia, our PASSES (Peatland Assessment in Southeast Asia by Satellite) project uses data from the Sentinel satellite fleet to monitor peatlands and create up-to-date maps used to preserve peat.
- We support Finland's Forestry Thematic Exploitation Program, which uses EO data for forest management and carbon sequestration, and the UK's Forestry Commission, which uses our CGI GeoApp platform to enable the preservation and sustainable use of woodlands and other natural resources.

Climate change measurement

- Accurately, thoroughly, and continuously measuring the amount of radiation that Earth absorbs and emits is vital to the measurement and attribution of climate change. In-flight calibration of EO satellites can drive this accuracy. TRUTHS (Traceable Underpinning Terrestrial and Helio-Studies) is an important climate mission involving CGI, the UKSA, Airbus UK and the ESA, which aims to ensure more accurate radiation monitoring.

Disaster management

- The threat of coastal flooding is increasing, propelled by factors such as population growth, beach erosion, and rising sea levels due to climate change. We led the delivery of the eSurge project for the European Space Agency (ESA). eSurge uses satellite data to help predict coastal surges and create more efficient warning systems to better protect people and property, and design better long-term flood defense systems.
- The advance of climate change has made wildfires more intense and unpredictable. We lead the Artificial Intelligence for Earth Observation (AI4EO) Wildfires project consortium for the ESA. The project and demonstration service combine EO, AI and cloud computing to help monitor and track wildfires and better plan future land management.
- Rapid response to an oil spill is critical to minimizing the environmental impact and access to near-real-time satellite data is a pivotal part of informing critical decision-making. Our Oil and Gas Earth Observation Response Portal (OGEO-ReP) for the ESA uses satellite data to track and predict the impact of oil spills, delivering actionable data to enable a faster, more effective response during critical situations.



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Food systems and agriculture

- We're working on the Digital Twin Earth Precursor project, alongside the ESA, Oxford University, Trillium and IIASA, to develop a Food Systems Digital Twin, focused on the biosphere, atmosphere and hydrosphere systems. The project will incorporate socio-economic as well as physical measurements to help create more accurate predictions and modeling for organizations creating policies that deal with the climate, food production and sustainability.
- Greenhouse horticulture is growing to meet the world's increasing food needs. Our Greenhouse Early Warning Service provides farmers with satellite-based data to enable early detection of problems like broken glass, flooding and inefficient irrigation to reduce crop damage, lost profits and needless environmental impact

Renewable energy management

- EO data will be critical in future forecasting models for wind and solar production, to help manage a consistent flow of green energy. We help Estonian clients calculate the full potential of solar power generation by combining our knowledge of space, geospatial and utilities domains, remote sensing data, and existing topographic and geospatial information.

Transportation management

- We are exploring how space-based EO data can be used to identify optimum routes for the shipping industry by identifying ocean circulation currents and eddies. Close planning helps operators save time and conserve fuel when a ship enters a tidal current and more accurate estimates of when a ship will arrive can cut emissions by reducing the time ships spend anchored offshore waiting for port slots.

Turning space data into actionable information

Our EO solutions often blend satellite and terrestrial data. By calibrating and combining the two data sources, our data specialists turn vast data into usable information.

Risk management

- One example is our solution monitoring and managing vegetation that could pose a risk to infrastructure such as railways or transmission lines. Using event and weather-independent data, the solution creates a continuous information source that provides a valuable service to the horticulture and insurance industries.
- We help leading insurers use satellite imagery to assess risks and damage caused by hurricanes, floods and storms. CGI EnvironmentMonitor360 provides an early-warning service to farmers about the condition of their crops, while insurers use its data for "before and after" comparisons to help verify claims.



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Weather forecasting

- Since the first European weather satellites (Meteostat) were launched more than 40 years ago, meteorologists have relied on our software to extract weather information from images produced by those satellites.
- Additionally, governments, weather forecasters and military organizations use our advanced meteorology solution, 2met, for real-time acquisition, processing, visualization and distribution of meteorological satellite data.

Waterway monitoring and navigation

- Our Waterway Monitoring Service digitizes the inspection of waterways, using satellite data to map large areas and a machine-learning model to assess their status automatically. As a result, physical inspections can be limited to problem areas, saving time and money.
- We worked with the UK Hydrographic Office (UKHO) to research congested maritime environments using space data, including optical and radar imagery. Mining large amounts of EO data from satellites provides a fuller picture of maritime traffic patterns in those areas.

Leveraging broad space experience and expertise to deliver results

Our end-to-end capabilities give us a unique position in the EO world—from the upstream work of launching, navigating and operating satellites, to building and running the ground segment, which receives and processes space data, to the downstream field of space applications and services, which turn data into information that helps clients save money, improve reliability and create new opportunities.

We have more than 45 years of experience in the space industry and one of the largest industrial groups specializing in data-processing and creating data-enabled solutions.

Featured solutions

- CGI GeoData360 is our state-of-the-art data processing platform for geospatial data and satellite imagery.
- CGI GeoApp delivers all of the essential tools an organization needs to successfully take advantage of location-based data and intelligence.
- EO4SD Lab supports global, sustainable development activities—using cloud-based platforms and big data visualization to provide awareness of, and access to, vital EO information and tools to help more users exploit that data.

About CGI

Insights you can act on

Founded in 1976, CGI is among the largest IT and business consulting services firms in the world.

We are insights-driven and outcomes-based to help accelerate returns on your investments. Across hundreds of locations worldwide, we provide comprehensive, scalable and sustainable IT and business consulting services that are informed globally and delivered locally.

For more information

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