



# CGI in Space

Providing secure,  
mission-critical solutions



# At CGI, we deliver secure, mission-critical space systems to commercial and government organizations looking to accelerate their digital transformation.

Since completing our first space project in 1974, we have developed advanced systems and software for government, military, scientific, academic and commercial space initiatives. We supported the missions of more than 1,000 space satellites and our 2,500 experts in space and related industries help our clients build strategies and solutions that achieve tangible outcomes.

Increasingly, space data-enabled solutions are part of daily life. Location-based services, weather forecasting and navigation systems, available on almost every mobile device, are just a few examples. The opportunities to use space data to help government and industry address key challenges such as climate change, environmental sustainability and net-zero continue to expand, along with evolving security and privacy requirements.

Our capabilities in earth observation, satellite communications, satellite navigation, satellite operations, space applications and space cybersecurity include data processing and exploitation, robotics, command and control, on-board software, modeling and simulations, ground segment engineering, and situational awareness.



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## 2,500

experts in space and related industries

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## 1,000+

satellite missions supported by our software

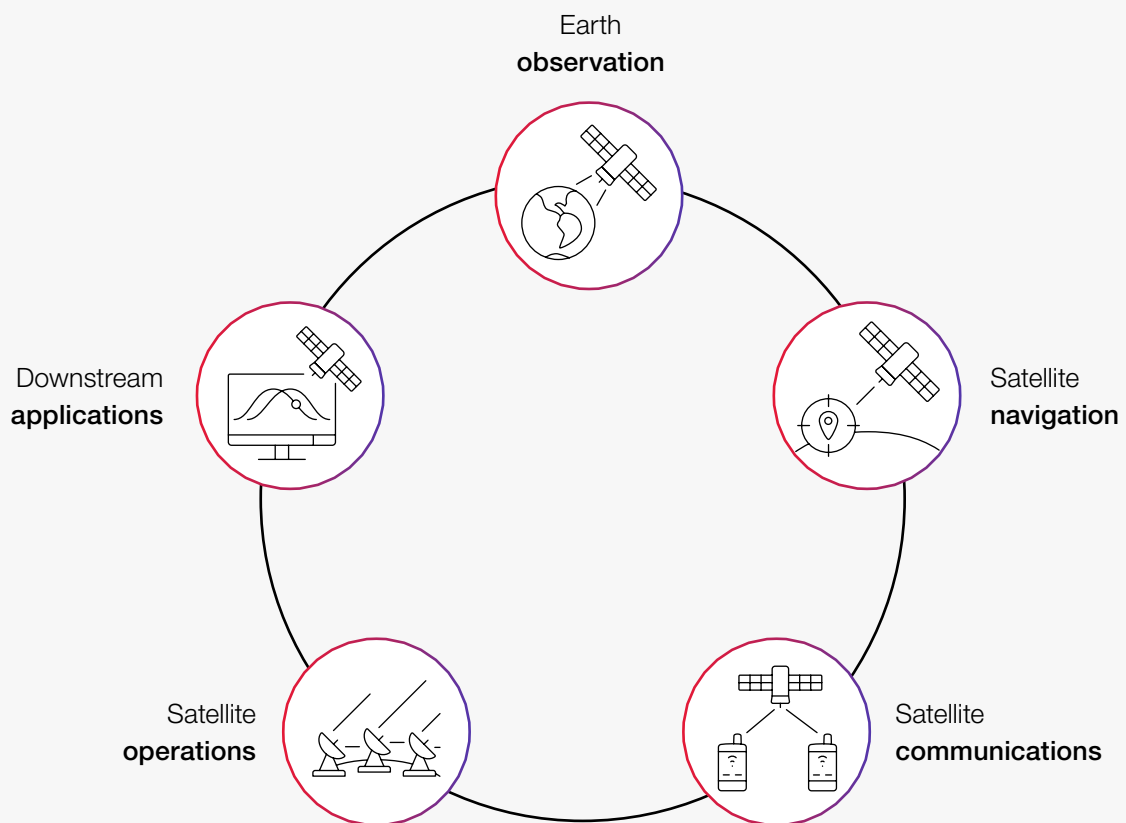
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## 3 billion

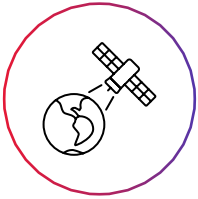
people have benefitted from CGI systems producing weather information and data

# Our space experience and expertise

Since 1974, CGI has delivered complex, secure, reliable, mission-critical systems and world-respected space expertise



# Earth observation



## Turning Earth observation into trusted, actionable information

We deliver unique insights from Earth observation satellites to clients across a wide range of sectors and geographies. Our space-enabled applications and services are used in health, transportation, the public sector, farming, maritime, oil and gas, utilities, trading, finance and insurance. In most use cases, satellite data is blended with terrestrial data. We have one of the largest industrial groups specializing in data processing and developing data-enabled services.

Our Earth-observation solutions include satellite-based vegetation management—the monitoring and timely removal of vegetation that could pose a risk to infrastructure such as railways or transmission lines. Using event and weather-independent space data creates a continuous data source, including historical and non-visible data without boundary

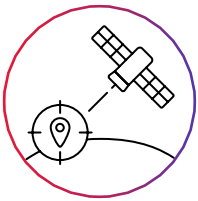


limitations, and provides valuable services to the horticulture and insurance industries. Governments, weather forecasters, military organizations and others use our advanced meteorology solution 2met—a multi-mission, Earth-observation solution for the real-time acquisition, processing, visualization and distribution of meteorological satellite data. For governments and other clients, our Waterway Monitoring Service digitizes the inspection of waterways, using satellite data to map out large areas and a machine-learning model to assess their status automatically.

### **Improving greenhouse sustainability and performance**

CGI's Greenhouse Early Warning Service helps farmers operate with a satellite-based data service that provides insights into the condition of their greenhouses, enhancing sustainability and performance.

# Satellite navigation



## Delivering secure, reliable, fit-for-purpose satellite navigation systems

Navigating our cars. Tracking our assets around the globe. Monitoring our exercise activities. Synchronizing time-critical systems. All of these are examples of how we benefit from global navigation satellite systems in everyday life. It is impossible to imagine a world without free, global, precise positioning and timing technologies.

Galileo is Europe's global navigation satellite system (GNSS), providing a highly accurate, guaranteed global positioning service under civilian control. We have supported Galileo since 1999 and secured the project's ground control and mission segments. We are the largest supplier of security systems for Galileo and co-designed and operate its test bench, which verifies and validates their security functions.

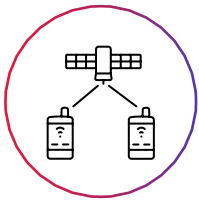


EGNOS is a satellite-based augmentation system (SBAS) that improves the accuracy and reliability of GNSS positioning and timing information across Europe. For the second version of EGNOS, we were involved in building the test bed used for verification of safety-critical functions, with faster than real-time simulations. We also contributed to the design of the initial phases of EGNOS V3, including security and safety elements.

### **Ensuring reliable positioning of people and goods**

CGI's S-TrackS delivers the reliable positioning evidence of people and goods to meet commercial, security or judicial requirements. It uses Galileo's Public Regulated Service (PRS), which is only available to European government-authorized users, such as the police. For these users, S-TrackS validates and authenticates captured signals in a secure central server.

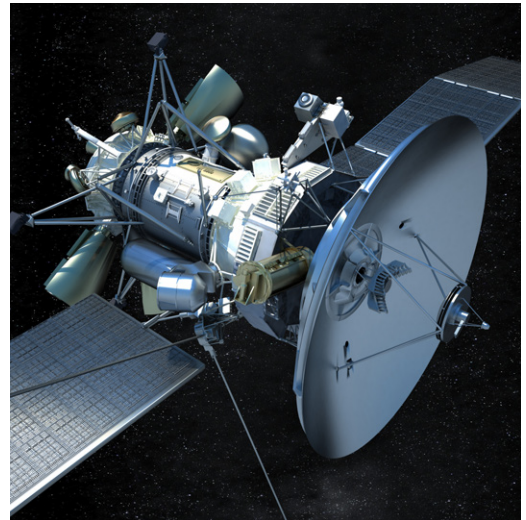
# Satellite communications



## Providing mission-critical solutions for the satellite communications industry

We help satellite communications operators develop new strategies, applications and services while understanding satellite communications' distinct role in an integrated communications solution. Our focus is to design and deliver systems for clients including the ESA and others in industries such as aviation, maritime, transportation, defense, intelligence, emergency services, utilities, communications, media and financial services.

Planning and delivering mega-satellite constellations is another key capability. For example, we support OneWeb to help make internet access available and affordable for all. We also support the German satellite Heinrich Hertz (H2SAT), which is testing



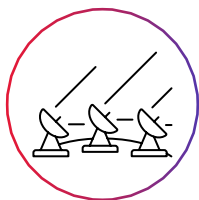
new technologies while in geostationary orbit. We provide all ground support for the mission, which also serves as an important communications asset for the German military.

We bring together fixed-network and satellite planning for 5G rollouts. With our new planning tool CGI CarnotSat—developed with the ESA—5G connectivity can become a reality for everyone, everywhere and help network operators plan and deploy combined terrestrial and satellite networks.

### **Increasing connectivity for governments, businesses and communities**

We have supported OneWeb since 2017, enabling critical mission-planning and network control software for their program to launch a 650-strong fleet of low Earth orbit (LEO) satellites and build 40 ground stations.

# Satellite operations



## Building management and control systems for space programs

For decades, we have consistently delivered mission-critical management and control systems for space programs. Our satellite mission software suite can handle all aspects of a spacecraft mission, from planning to implementation to operation.

We design and manage ground infrastructure using complex, software-intensive systems to ensure timely and on-budget deployments and assure the success of missions through high-fidelity simulation and modeling solutions that model satellite subsystems, ground stations, orbits and the environment. These tools together help with preparation, validation, training and space mission operations. Our simulators faithfully reproduce satellite behavior in a digital 3D environment—i.e., digital twinning, the digital replication of a real-world system.

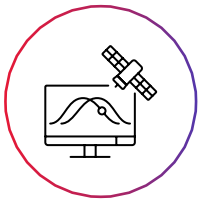


Digital-twin Earths will enable us to visualize, monitor and forecast natural and human activity on the planet. Simulating Earth's interconnected systems with human behavior, will give numerous industries and sectors a better understanding of how policies, actions and projects will impact the planet.

### **Improving understanding of global food systems**

We're working on the Digital Twin Earth Precursor project, alongside ESA, Oxford University and the International Institute for Applied Systems Analysis, to develop a food systems digital twin focused on the Earth's biosphere, atmosphere and hydrosphere. The project will incorporate socio-economic and physical measurements to help create more accurate predictions.

# Space applications and services



## Producing innovative, space-based solutions for business challenges

Today's organizations use satellites to deliver faster, better services at lower costs. Our space applications and services extract information from satellite data—including weather, navigation, telecommunications, and geographical information. Such platforms and space enabled services and applications are used in health, transportation, government, agriculture, maritime, oil and gas, trading, finance and insurance.

Developing an application or service often brings together many technologies and systems. One example, our railroad crossing safety solution, SAT-LX, is a low-cost advisory warning system that can be easily deployed at remote railroad crossing sites to provide users with timely information about approaching trains. It can



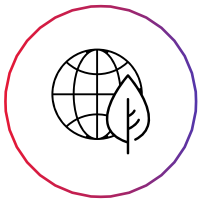
be combined with existing railroad crossing solutions or serve as a complete solution for improving safety in rural areas.

Our applications and services meet the highest safety-critical standards, operating reliably around-the-clock, resolving the toughest technical issues and enabling clients to achieve maximum performance from their space assets. We offer a proven track record and reliable managed services to host our solutions, and our EO4SD Lab portal gives free access to a range of EO data, tools and services.

### **Mapping and monitoring wildfires**

Alongside the University of Leicester, we're working on a project that combines Earth observation, artificial intelligence and cloud computing to better map and monitor wildfires. The AI4EO Wildfires project allows our pilot users, such as Geoscience Australia and ONF France, to monitor and track fires and help with the remediation of fire-damaged areas. The AI-enabled wildfire mapping service is also available to the wider environmental community.





## Sustainability: Using space data to help build a sustainable future

New ways that space can help us manage our changing environment are emerging all the time—from real-time weather monitoring to helping first responders tackle wildfires to providing long-term strategic information that helps preserve coastal ecosystems.

Space data also can help drive a wide variety of innovative sustainability initiatives, from reducing the energy requirements of greenhouses, to enabling more eco-friendly forestry management solutions.

Working alongside organizations like the European Space Agency (ESA), the European Organisation for the Exploitation of Meteorological Satellites and the UK Space Agency, we deliver secure, mission-critical space systems, including data processing, satellite communications, modeling and simulations. The technologies we create enable scientists to monitor essential climate variables (ECVs). Monitoring ECVs gives us a better understanding of climate drivers and how



they interact, as well as fluctuations in energy, water and carbon.

On another front, current methods for calculating rooftop solar power potential are overly simplistic, ignoring some fundamental factors. Such calculations are time consuming, as assessments are done on a case-by-case basis, manually and on-site. CGI's knowledge of space, geospatial and energy domains has been combined with remote sensing data and existing topographic and geospatial information to enable energy and utilities providers to calculate the real potential of solar power generation.

### **Monitoring seagrass ecosystems**

Seagrass is one of the UK's most promising carbon sinks, as well as being crucial for biodiversity and food supply. We joined forces with the Project Seagrass maritime conservation charity, using data from our Earth observation platform to locate, map and monitor seagrass ecosystems.

# Space security



## Combating ever-growing security threats against space assets and information

We understand that space systems need security in much the same way business systems do, but they also face several unique security challenges. They are subject to radio interference, hacking, spoofing, viruses, eavesdropping, physical attack, etc. Our security practice operates around the world and works for many sectors—from banking and telecom, to space and defense. All security consultants and developers are part of a single security community sharing approaches, experiences and solutions with each other. This collaboration enables the space security team to identify tools and initiatives from other sectors that would benefit the space market.



We ensure that complex networks and systems are safe from interference and disruption. Our business-risk tools help space organizations control and track their operations, and we use advanced and predictive analytics to minimize risks, ensuring resiliency and security.

CGI has helped shape the growing area of space security for many years.

### **A leader in protecting space assets and data**

We have contributed security expertise to major European space programs including Skynet 5, Copernicus, Galileo and EGNOS. Our space-specific security capabilities include deep knowledge to address the complete security needs of space agencies, operators, regulators, manufacturers, service providers and users.

# How can we help strengthen your end-to-end digital value chain?

Our expertise and deep portfolio in the space industry can help strengthen your end-to-end digital value chain—improving how you operate, deliver goods and services and create value. Whether insuring your space assets perform perfectly or delivering accurate data and winning downstream applications for your terrestrial

endeavors, we stand ready to help with our decades of space expertise and a unique delivery model that combines global resources with local insight and accessibility. [Contact us](#) to learn how our space experts can help you.





# 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.

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