High-fidelity simulation and modelling

Achieve mission success with simulators of satellite subsystems, ground stations, orbits for mission preparation, validation & training.

CGI assures the success of space missions through a range of simulators that model all satellite subsystems, ground stations, orbits and the environment to support mission operations preparation, validation & training. These are brought together in comprehensive operational simulators that model all aspects of the spacecraft mission.

CGI helped develop the EAGLE-SETM software including tools and blocks for modelling and simulating spacecraft entry descent and landing systems in the Mars, Moon or Earth environment.

CGI has been involved in the development of sophisticated models for the following:

- Entry Descent & Landing

- Interferometer Constellation Deployment and Control

- Lunar Lander

- Mars Planetary Ascent Vehicle

Key benefits

- Develop and test the actual flight code months or years earlier

- Multiply your productivity: use many setups under one licence rather than depend solely on your flat sat

- Get full control, reproducibility and inspect-ability to optimize debugging activities

- Minimize integration with the final satellite platform build

CGI assures the success of space missions through a range of simulators.

CGI

Accelerate your Flight Software development even before your satellite is built

CGI has developed its expertise and products over the decades, delivering high fidelity simulators to space agencies that emulate every component and subsystem.

- Develop and test the actual flight code months or years earlier

- Multiply your productivity: use many setups under one licence and have different configurations running concurrently

- Get full control, reproduction and inspection to optimise debugging activities

- Minimise integration with the final satellite platform build

Fine-tuning and Performance Optimisation

Will your mission algorithms cope with all scenarios and customer demands? Will your mission perform as efficiently and cost-effectively as possible?

CGI's high fidelity simulators can incorporate any GNC, payload or service-providing/enabling algorithms as software-in-the-loop so that you know exactly how it will perform before launch. Access to every parameter and detail of your mission system, inject unexpected failures and put your mission software to the test!
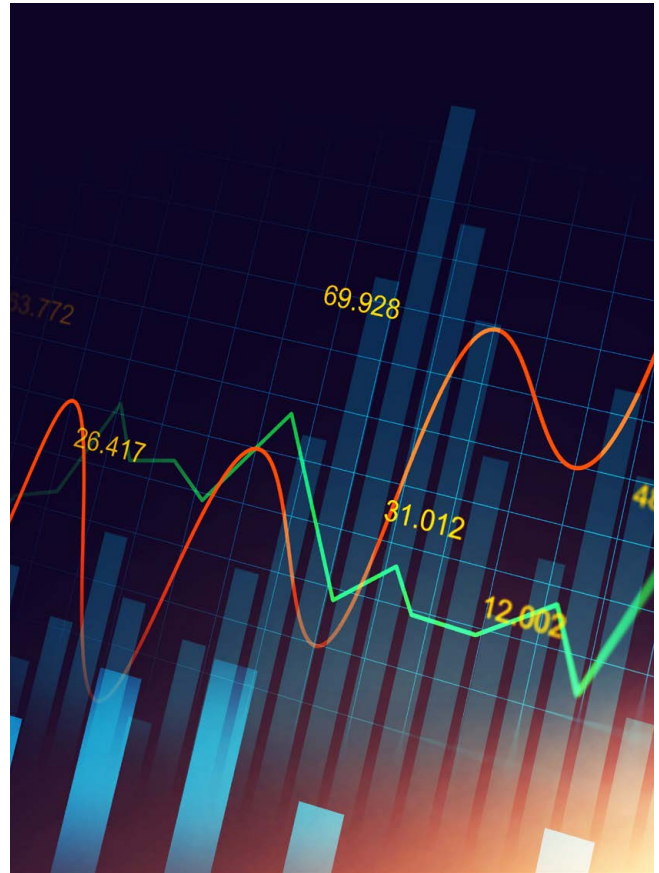
Digital Twin

Unable to see what is going on? Mission operations are made harder if you cannot visualise the situation surrounding your satellites on orbit. Simplify your situational awareness using your own eyes.

CGI delivers simulators that faithfully reproduce your satellites' behaviour in a digital 3D environment, i.e. Digital Twinning, allowing your operations team to interpret your spacecraft telemetry and mission status in the most contextualised and humanly intuitive fashion.

Access to every parameter and detail of your mission system.

Prepare your team for the challenge

Readiness is the key to operational success. Make sure that first-time encounters of any failure or anomalous behaviours happen in a safe and controlled environment. Your team will never be surprised and will have all the experience and knowledge of your satellites needed to tackle any problem before they even launch.

CGI has extensive experience creating simulated environments perfect for guaranteeing operational team preparedness:

- **Perfect Simulation of Satellite Behaviour:** By modelling all spacecraft subsystems and running them with the actual flight software binary, an accurate simulation of all environmental, physical and mission elements is created that is indistinguishable from the real spacecraft.

- **Failure Injection on any Subsystem and Mission Stage:** Full control of all parameters of every subsystem and mission element, allows operators to be put in the middle of any recovery scenario imaginable, ensuring their readiness through experience in a safe environment.

- **Procedure Verification, Validation and Familiarisation:** The full replication of the satellite and mission systems behaviour makes the simulator the perfect tool to test and validate all operational procedures in any set of circumstances and offer a realistic environment for all operators to become acquainted with every procedure and their applicable scenarios.

CGI delivers high fidelity, complex simulators that allow all your mission control and automation algorithms to be put through the most rigorous campaigns of tests and demonstrations to help you prove your ability and their safety. With accurate and flexible space simulations, any licensing regulator's concerns can be cost-effectively addressed to help expedite your license's issue.

About CGI

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 21 industry sectors in 400 locations worldwide, our 76,000 professionals provide comprehensive, scalable and sustainable IT and business consulting services that are informed globally and delivered locally.

We are an IT Systems Integrator working to advise, build and operate bespoke, technically complex, mission-critical information systems. Bringing innovation to our clients using proven and emerging technologies, agile delivery processes and our expertise across space, defence, intelligence, aerospace and maritime, all underpinned by our end-to-end cyber capability.

For more information about CGI, visit cgi.com/uk/space, or email us at enquiry.UK@cgi.com