



**YOUR PARTNER FOR
ADVANCED SPACE SERVICES**

sscspace.com



We help Earth benefit from space

SSC - the Swedish Space Corporation - is a leading global provider of advanced space services with more than fifty years of experience. Since our start pioneering scientific rocket launches in northern Sweden, we have grown into a renowned, full-service supplier of state-of-the-art space engineering, satellite and launch services to commercial and institutional customers worldwide.

Inspired by the exciting changes in the global space market, we remain at the forefront by continuously developing new capabilities in close cooperation with our customers. Our understanding of the emerging needs for accessible, flexible and affordable solutions enables us to tailor and deliver sustainable innovative services to many market segments.

We focus on three core areas:

- ◆ We provide rocket and balloon launch services at Esrange Space Center and develop experiment payloads. New testbed services and infrastructure, including the planned launch capabilities for small satellites, will enable us to continue to deliver unmatched services well into the future.

- ◆ As the operator of one of the world's largest civilian networks of ground stations, we provide reliable access to satellites in virtually any orbit. With a new set of satellite services, we are dedicated to meeting satellite owners' increasing need for capacity and flexible solutions.
- ◆ We also provide engineering services to customers' projects by bringing consulting expertise to all phases of their space programs.

Sincere engagement, close customer relations, and our skilled, devoted staff have taken us this far, and we continue to prepare for the future with great excitement. In everything we do, we strive to fulfill our core values: customer orientation, reliability and excellence.

Your satellite, our priority

We ensure satellite owners and operators can focus on mission objectives and rely on SSC to manage all necessary ground network services, operations and maintenance.

SSC provides communication links for satellite control, launch support, payload data services and teleports. Through SSC's global network of ground stations, we give customers access to their spacecraft in most orbit altitudes and inclinations for a wide variety of applications.

concept supported by our experienced in-house engineering and operations teams. Our approach is to always work closely with our customers to optimize and balance cost-efficiency and desired capability for every space-based mission and application.

Global connectivity

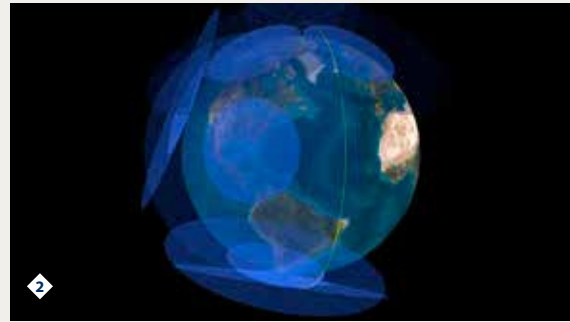
SSC's global network of ground stations includes our own stations as well as partner stations around the world, supported by reliable and secure terrestrial communications. Our Network Management Centers are at the core of the network, providing customers with a single-point interface to our worldwide services.

Exceptional mission assurance

Our ground system proficiency is enhanced through exceptional maintenance and operations programs on both SSC and customer-owned equipment. Reliability, resiliency, data integrity and security are built into all our services, making SSC the right choice for any mission-critical ground segment solution.

Our resources at your service

By utilizing SSC's ground station network services, our customers can leverage our substantial investment in global resources and benefit from our multi-mission operational



1,3,4. Through our expert on-site staff and global engineering and operations teams we can meet the needs of even the most demanding space application.

2. SSC provides highly reliable on-orbit services from an unparalleled network of worldwide locations.

Ground station services for every mission

- Launch support services
- On-orbit services
- Hosting services
- Data handling and processing
- Satellite and network operations
- Consulting and mission engineering
- Teleport and media services

1. Inspired by infinity.
2. Antenna installation at Esrange.
3. SSC Infinity is an excellent solution for operators of small satellites requiring sequential and frequent TT&C and data download at low latency.



SSC Infinity – full flexibility for small satellites

- Time and cost saving standardized interfaces and configurations
- Cloud integration for easy access
- Rapid full network resource scheduling
- High level of data integrity and security
- Resilient satellite operations



» SSC provides unmatched capabilities and experience in ground network support. We cover all orbits from LEO to Lunar and deep space, and all missions from Launch through LEOP all the way to EOL.

With ground stations at strategic locations around the globe, we can provide unmatched coverage that allows frequent satellite contacts for Telemetry, Tracking & Command and data download with low latency data recovery. Our capabilities and long experience provide you with best in class support stretching from LEOP to Lunar.

Our dynamic operational concept provides a high level of automation that enables rapid rescheduling within the whole ground network. This results in a high





level of resistance to failures due to single station outages, and provides high performance on a network level if required by the customer application.

SSC Infinity makes use of standard configurations for fast and reliable implementation of an automated ground network service adopted for the new generation of small satellites and large constellations. The service offers web-based and API customer interfaces for pass scheduling and is based on full motion antennas located around the globe.

SSC around the world





| | |
|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
|  SSC Ground Stations |  SSC Offices |
|  Collaborative Stations |  SSC Network Management Centers |

Our ground station network is continuously growing. For latest map over our stations and collaboration stations, please visit sscspace.com.

Expertise for successful space missions

SSC brings high quality expertise to customer projects and provides a wide range of engineering services. In many cases our engineers are an integral part of the customer team both at customer facilities and as fully outsourced operations.

Mission operations and training

Over the past 30 years we have gained a lot of experience supporting the European institutional and commercial space market in all types of space programs and mission phases. This includes manned space missions, Earth observation and geostationary telecommunications satellites, navigation constellations, interplanetary satellites and astronomy missions.

From mission concept to execution

Our engineers support customer projects at all stages of the satellite mission lifecycle. This includes studies and mission analysis, development of spacecraft and payload specifications, procurement and management tasks, implementation of satellite and ground segment procedures and the execution of tasks throughout the launch, early operations, commissioning and routine operations

phases, all the way through to the end of the mission. Our offer also includes tailored training courses covering all aspects of satellite operations.

Ground segment expertise

Based on customer requirements, SSC can provide tailored services and tools for ground segment systems and will also provide monitoring for procurement contracts. Our engineers are active in the specification, development, validation and maintenance of operation centers including satellite monitor and control systems, mission planning systems and data processing products.

We have extensive experience of taking full responsibility for the management, operation and maintenance of customers' ground facilities. This includes the establishment of systems for inventory and maintenance tracking, problem handling and staff management.



1. Control room at the German Aerospace Center, DLR, during the formation swap of satellites TerraSAR-X and TanDEM-X. (Image: DLR/Edith Maurer)
2. Tracking antenna at Kiruna (Image: ESA/S. Corvaja)
3. Europe's Columbus space laboratory pictured by ESA astronaut Luca Parmitano during a spacewalk. SSC provides ground operations and systems engineering services to the DLR Columbus Control Center. (Image: ESA/NASA)
4. Sentinel-2A mission control team in simulation training at the European Space Operations Center, ESOC. (Image: ESA/L. Guilpain)

Engineering services throughout the mission lifecycle

- Ground segment engineering
- Space segment engineering
- Operations engineering
- Systems engineering
- Spacecraft operations
- Ground facility operations
- Consultancy
- Training
- Aerospace test services

1. Integration of the ARLES experiment for the suborbital rocket M14, launched in June 2019. Photo: Kristine Dannenberg
2. Rocket payloads land with a parachute and are transported back to Esrange by helicopter. Photo: Dorian Hergarten, DLR MORABA



3. The Cryofenix rocket was launched for Air Liquide Advanced Technologies to test the behaviour of cryogenic liquids under microgravity conditions.
4. Balloons can be used for satellite validation. This balloon was launched from Esrange to validate atmospheric data from NASA's AURA satellite.

Cost-efficient and flexible access to space

- Scientific and technical missions using rockets, balloons, aircraft, unmanned space systems, retrievable drop capsules and space vehicles
- Full-service solutions; supporting all your mission needs, from development to launch and recovery



Our services

Your access to space

From rapid expansion of space applications to intensified demand for flexible access to space - we have the solutions.

SSC provides full-service solutions for customers to conduct scientific experiments and technical tests using suborbital rockets, balloons, aircraft, unmanned space systems, retrievable drop capsules and spacecraft.

Our extensive service portfolio covers the full range from early mission design to launch and recovery services, and includes development, verification and operation of supporting subsystems for your experiment or technical demonstrator.

Our launch services are conducted at the Esrange Space Center, where we offer land recovery of flown experiments, giving teams prompt access to their payload after flight.

Suborbital rockets

Through its SubOrbital Express program, SSC offers frequent suborbital flight services on a rideshare basis to the international scientific community, institutions, academia and commercial actors. The rockets take payloads to apogees ranging from 70 to 800 km. Our long experience covers experiments in many disciplines such as atmospheric and ionospheric research, material-, biology-, life- and fluid science in high quality microgravity environment as well as re-entry and technical in-flight tests and in-flight verification of space systems.

Whether you want to accommodate your experiment in a standard payload compartment or need engineering support to design and develop your experiment, SSC has the solution for you. Our skilled engineering team is mastering disciplines of mechanics, electronic and power design, analyses, advanced software engineering, experi-

ment system engineering, mission system engineering as well as integration and acceptance testing. The 24/7 on-site engineering team support at Esrange Space Center will ensure optimal results.

SSC's complete range of services also include launch services of customer-owned suborbital rockets.

Stratospheric balloon missions

Our complete range of balloon services includes payload design and manufacturing, launch services and flight operations that may last several weeks. Mission objectives include atmospheric research and astronomy using large telescopes as well as technical tests of re-entry capsules and unmanned aircraft. We use balloons capable of lifting multi-ton payloads to altitudes over 40 kilometers.

Parabolic flights

SSC provides support to parabolic aircraft flights for scientific and technological experiments in reduced gravity. This is a cost-efficient and flexible way to verify experiment functionality and parameter tuning before experiments are flown in space.

Student educational programs

By offering experiment flights on dedicated student rockets and balloons, SSC actively empowers student educational programs aimed at fostering new generations of scientists and engineers. At Esrange Space Center there are yearly launch campaigns dedicated to young innovative students from many countries.

Esrange Space Center - the versatile space center

Esrange Space Center is the launch and main operations facility of SSC, encompassing launch facilities for rockets and balloons, several scientific ground instruments, as well as one of the largest civilian satellite stations in the world.



Located 40 km from the town of Kiruna in the very north of Sweden, above the Arctic Circle, Esrange Space Center has access to a vast, unpopulated impact and recovery land area covering 5200 square kilometers. The facility has been operational since 1966 and is used by the international community for suborbital and near-space operations with suborbital rockets and high-altitude balloons for scientific, technical and commercial applications, as well as for tests of aerospace vehicles such as UAVs and high-altitude drop bodies. SSC's main satellite station with around 30 large communication antennas is also located here.

To support this, Esrange is equipped with large and modern facilities for preparation, integration and testing of payloads and all levels of flight systems such as integration halls, clean room facilities, laboratories, workshop, offices and meeting rooms, as well as onpremises hotel and restaurant facilities for up to 100 persons.

Being one of the most versatile space centers in the world, Esrange Space Center caters to all users, e.g. agencies, universities, institutes and commercial customers.



ESRANGE was originally used mainly for auroral research and still maintains these ties, as the latest Swedish auroral campaign was conducted in early 2020. This image shows the rocket launch area of ESRANGE under an aurora covering the whole sky. The conical launch building and illuminated mast visible in the image are hallmark structures of ESRANGE since the 60's.

1. PoGoLite payload, launched by a stratospheric balloon.
2. Launch of REXUS 20. (Image: DLR/Michael Becker)



Testbed ESRANGE and SmallSat Express – expanding the envelope

SSC offers possibilities for manufacturers of suborbital and orbital launchers to test their vehicles during development, including test launches.

ESRANGE incorporates test firing facilities for solid motors (horizontally) and liquid engines (vertically) as well as dedicated test facilities for reusable rockets, including tethered stage tests, hover tests and controlled landings.

A brand-new launch complex is established where test launches of unflown rockets safely can take place. At this launch complex SSC will provide facilities to support orbital launches from ESRANGE Space Center, including integration buildings, launch pads and systems for liquid fuels. SSC's upcoming orbital service, SmallSat Express, will use this facility for launch operations starting in 2022.

Orbital launch add-on services

As complements, SSC can provide mission planning, support for satellite design and procurement as well as automated and standardized ground network services for frequent, high capacity satellite data download and satellite tasking.



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