

A silhouette of a person stands on a dark, rounded hill in the foreground, looking up at a vast, star-filled night sky. The Milky Way galaxy is visible as a bright, pinkish-purple band of light stretching across the sky. The background is a deep blue and purple, filled with numerous stars.

**SSC IN SUMMARY**  
2021

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## ABOUT THIS REPORT

This is an English summary of Swedish Space Corporation's (SSC) 2021 Annual and Sustainability Report.

The Swedish report, available at our website, is the legally binding annual report.

The report summarizes the 2021 fiscal year and covers performance in the most important areas of SSC's ability to deliver value to stakeholders in a changing and complex business environment.

This summary serves as our United Nations Global Compact (UNGC) Communications on Progress.

More information about SSC's operations and sustainability work is available at: [www.sscspace.com](http://www.sscspace.com).

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# Swedish Space Corporation - SSC

## We Help Earth Benefit from Space

SSC offers advanced space services in the international space market and is established in 11 countries. SSC also owns and operates the Swedish space base Esrange Space Center near Kiruna in northern Sweden and is a Swedish limited liability company owned by the Swedish state.

### Our assignment

SSC has both a societal and a commercial assignment. The societal assignment consists of operating and developing Esrange Space Center and is measured against two objectives, utilization rate and quality index. The commercial assignment consists of offering advanced space services on a global market, measured against profitability target requirement from the owner.



# This is SSC



### Our business areas

**Science Services**  
 The Science Services division offers launch services of sounding rockets and stratospheric balloons with scientific or technical instruments for research and technological development. Since 1966, we have launched more than 570 sounding rockets and over 640 balloons from Esrange. Since 2020, two testbeds for rocket technology are also established at Esrange. The division also provides development of experiment payloads.

**Satellite Management Services**  
 SSC operates one of the world's largest civilian networks of ground stations, providing access to satellites in virtually any orbit. SSC's Ground Network comprises core SSC owned stations and collaborative partner satellite stations strategically located around the world. The ground stations operate 24 hours a day.

**Engineering Services**  
 The Engineering Services division provides engineering- and operations services to the international space market and supports all project phases, from designing and testing through to launch and operations. Covering the full mission range, SSC's expertise includes satellite operations and engineering, ground segment operations, space engineering and scientific services, simulations and training.

**New Ventures**  
 At the end of 2020, SSC established a new business category within space data analysis, GlobalTrust. In 2021, the new division, New Ventures, was formed together with a new business area, Data Services. GlobalTrust is the first business in this business area.

SSC Ground Stations	SSC Offices
Collaborative Stations	SSC Network Management Centers

**25**  
nationalities

**11**  
countries

**624**  
employees

# CEO statement

**W**e can look back on an intense and successful year. The space industry, like SSC, has been resilient to the effects of the Coronavirus pandemic and has in many respects developed positively. The growth that has characterized the industry in recent years has continued. SSC is contributing to this growth and can also this year report on several new services that have or are about to be realized. This is important for the further development of our delivery of sustainable values well into the future.

For our societal assignment at Eorange, the pandemic implied that rocket and balloon campaigns for various student and research projects had to be postponed. Instead, we continued to develop new services.

The test facility, inaugurated in 2020, is now in full operation. The next generation of European space rockets are tested here, important for long-term sustainable and competitive European space operations. At the same time, major steps have been taken to establish the ability to launch satellites from Eorange. By the end of 2022, Spaceport Eorange will be operational as the first spaceport in the EU. This is a large and important step, not only for Sweden but also for Europe.

Making more efficient use of the increasing amount of data from satellites is important to achieve the UN Sustainable Development Goals. From this perspective, the success of our newly formed

subsidiary GlobalTrust is important. The company started operations at the beginning of the year and is growing rapidly. The services the company offers help organizations use data from satellites to plan, implement and monitor operations and investments from a sustainability perspective. Growth is strong and we are still alone in offering fully customized services in this important area.

We have also expanded within traditional business areas by establishing [starting up] new businesses and by using new technology. Gratifying examples are the development of a new technical concept to streamline data reception from satellites, as well as the formation of SSC Space Thailand, which will increase business opportunities in the Asian market.

The organization has been streamlined, new skills have been added and we are about to reach a higher degree of digitalization. Implementation of the plans to achieve climate-neutral business operations has begun, along with a range of new innovative services aiming for new contributions to a more sustainable future for humanity on our fragile planet.

The pandemic and increasing geopolitical tensions have characterized the risk perspective of the business landscape. The 2020 decision, not to further develop business opportunities in some countries was necessary, but affects the short-term growth. Creating financial stability and balance a high rate of investment, still is and therefore has been a challenge during the past year.

A high level of security is necessary, and our efforts have continued in this important area. At the same time, it is more important than ever to contribute to the work of human rights and to a high level of business ethics. We remain members of the UN Global Compact and we have strengthened our way of working by further development of procedures and processes.

Looking back, I can see that we have, under the current circumstances, been successful. SSC is standing strong when facing a future with very good opportunities. The ambition is clearer than ever: SSC shall be a leading global provider of sustainable, advanced space services, today and tomorrow, be relevant to our customers and contribute to a sustainable world.

I would like to thank all employees, partners and customers for great efforts during a challenging year. Together, despite the pandemic, we have managed to deliver, grow and develop the business. It makes me proud and full of confidence.



Stefan Gardefjord

*” The ambition is clearer than ever: SSC will be a leading global provider of advanced space services, today and tomorrow, for a sustainable world. ”*



Stefan Gardefjord, CEO of SSC since 2012, looks forward to another exciting year within the rapidly growing space industry.

# The year in brief

## Multiple-year overview

MSEK	2021	2020	2019	2018	2017
Net sales	1 130	1 001	1 013	945	935
Operating profit before depreciation and amortization	116	115	153	140	80
<b>OPERATING PROFIT</b>	<b>-1</b>	<b>-10</b>	<b>30</b>	<b>47</b>	<b>-14</b>
PROFIT BEFORE TAX	-8	-23	23	36	-38
Taxes	-16	-13	-13	-21	-9
<b>PROFIT FOR THE YEAR</b>	<b>-24</b>	<b>-36</b>	<b>10</b>	<b>17</b>	<b>-47</b>
Cash flow from operations	223	153	195	134	97
Net investments	223	200	171	54	37
<b>KEY FIGURES</b>					
Return on operating capital	0%	-2%	5%	8%	-2%
Return on equity	-6%	-8%	2%	4%	-4%
Equity ratio	25%	30%	35%	40%	41%
Net debt/equity	0,62	0,57	0,40	0,17	0,32
<b>Net debt/Operating profit before depreciation (EBITDA)</b>	<b>2,11</b>	<b>2,04</b>	<b>1,24</b>	<b>0,57</b>	<b>1,85</b>

## The group objectives

SSC has an objective of achieving a return of at least 6 percent on operating capital. The Group also has a goal regarding capital structure: The net debt/equity ratio shall over time amount to a minimum of 0.3x and a maximum of 0.5x.

	2021	2020	2019
<b>Return on operating capital</b>	0%	-2%	5%
<b>Net debt/equity ratio</b>	0,62	0,57	0,40
<b>Dividend</b>	0	0	0

## Employees

	2021	2020	2019
<b>Average number of employees</b>			
Women	147	135	120
Men	429	395	368

## The impact of the corona pandemic

The pandemic has also had a negative impact on the economy in 2021, especially during the first quarter. Operations at Esrange Space Center have been gradually expanded during the year.

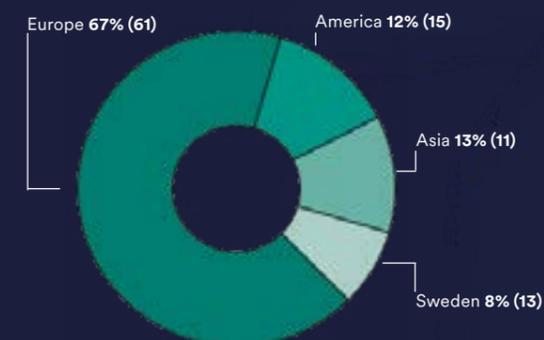
## Annual overview

- Revenue increased by 13%. Currency adjusted; revenue increased by 18%.
- Operating profit for 2021 amounted to SEK -1 million (-10). The operating margin was 0% (-1%).
- Eased pandemic restrictions have resulted in the gradual resumption of operations at Esrange Space Center during the year.
- During the year, a number of important orders were signed. Among other things, another agreement has been signed with OneWeb where SSC is now establishing itself in Mexico.
- A major fire occurred in connection with an engine test at Esrange Space Center, which has negatively impacted operating profit by SEK -4 million in 2021.
- The investments amounted to SEK 223 million, of which SEK 79 million related to investments for the development of Esrange.



## Net sales per market area

Previous year in brackets



## Market development

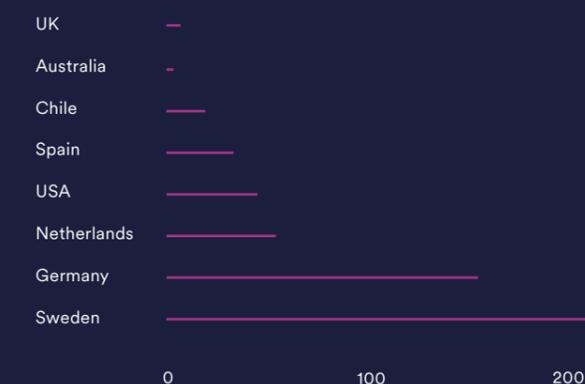
The space industry is growing at a rapid pace and change characterizes the market, an ongoing structural transformation that has begun in the US, by far the largest market. Technology development and new privately funded initiatives bring new methods and business models to the market, putting financial pressure on many institutional players.

However, the majority of all projects are still funded from states or state-funded institutional actors, directly or indirectly. For SSC, the development brings along both opportunities for new business and a broadened customer base, but also certain risks linked to price pressure, credit risks and technical development.

## SSC's public mission

The public mission includes the launch of rockets and balloons for different types of research and technology development and related services. These public mission activities are solely conducted within the company's division Science Services.

## Average number of employees per country



# 2021 in perspective

As in the previous year, 2021 was marked by the corona pandemic, but the company's activities worldwide adapted well to the circumstances and managed to maintain a good delivery and carry out several important development projects. A fire at the Esrange Space Center during the summer also showed that the organization has the ability to recover from serious incidents.

## Subsidiary in Thailand

To strengthen our presence in Asia, SSC established a subsidiary in Thailand at the end of 2020, which was commissioned in 2021. SSC Space Thailand offers market-leading services, for example ground station networks and engineering services.

## Growth for GlobalTrust

At the beginning of the year, our newly formed subsidiary GlobalTrust began delivering services that help customers use data from satellites to analyze, plan and follow up operations and investments from a sustainability perspective.

## The world's first spacecraft for space-cleaning

The first "cleaning craft" in the world, ELSA-d, was launched from Kazakhstan in March. SSC provided support throughout

the course during all critical maneuvers with the help of several ground stations. The ELSA-d program is run by Japanese Astroscale. The aim of the project was to test the technology to collect space debris in an orbit close to Earth.

## Launch of an SSA-program

In March, SSC launched a new space situational awareness (SSA) program. The goal is to contribute to safer and more sustainable space activities. The program consists of several initiatives such as tracking and identifying space objects created by humans, as well as processing, cataloging and analyzing SSA data. Through this programme, SSC contributes to the sustainable future use of space.

## Strengthened polar coverage

SSC strengthens its leading position in polar capacity through the addition of four new antennas at SSC's polar stations and takes another step in the company's global expansion to create a more qualitative and broader coverage for SSC's customers.

## Drop-test from Esrange

In June, the SSC and ESA ExoMars team conducted important parachute tests ahead of a Mars landing to be conducted in 2023. ExoMars, scheduled to be launched from Baikonur, Kazakhstan at the end of September 2022, will travel for 8.5 months, after which a vehicle is dropped on Mars. To ensure a soft landing on the surface of Mars, two parachutes will be used to slow the speed. The tests on Esrange simulated the extraction force of both parachutes and the vehicle during landing.

## Fire at Esrange

During the summer, a fire broke out at the Esrange Space Center in connection with a rocket engine test. Fortunately, no one was injured, however the damage was extensive. Through temporary solutions and intensive work, rocket operations were able to resume in November, just three months after the incident when the MAPHEUS 10 sounding rocket was launched on December 6.

## Storm hit office in Horsham

In August, a powerful storm hit the East Coast of the United States. For the town of Horsham, Pennsylvania, the storm caused devastation. SSC's offices and operations were also affected by damage to buildings and infrastructure. However, due to the great efforts by our staff on site, the impact on our business was limited.

## Balloon flights for climate research

In late summer, the French space agency CNES conducted a series of flights of climate research balloons from Esrange. Through four separate balloon flights, with a total of 17 different research instruments on board, the researchers measured the concentration of greenhouse gases at different levels in the atmosphere.

## Loan for Spaceport Esrange

As part of the expansion of Esrange, SSC signed a loan agreement with the Nordic Investment Bank (NIB) worth EUR 12 mil-

lion in October. The loan will finance the investments to complete the construction of a new spaceport on Esrange where satellites will be launched, and new reusable rockets tested. Spaceport Esrange is expected to be operational in 2022.

## The world's first global Ka-band network

To meet the growing capacity demand for Earth observation missions, SSC has upgraded its polar and equatorial ground stations with new functionality that enables SSC customers to use higher bandwidth and receive larger data volumes, increasing efficiency.

## The Government proposed a new Swedish space-law

In November, the Swedish government presented a proposal for a new space law. The law will replace the existing regulations that were developed more than 40 years ago. SSC welcomes the bill and believes that the timely regulatory framework will provide greater clarity for the industry to relate to.

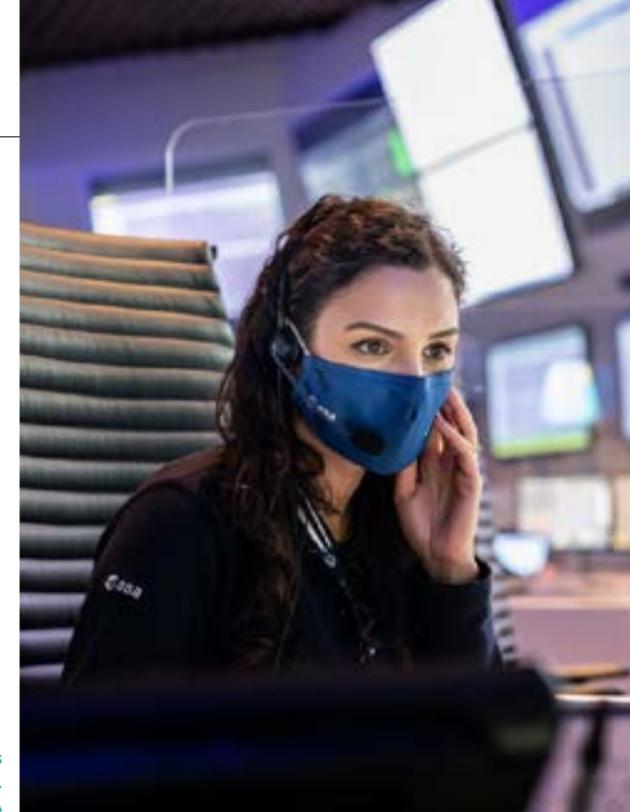
## Iconic Satellite MetOp-A retired

In November, the retirement of EUMETSAT's iconic MetOp-A satellite, which has been collecting meteorological data over the past fifteen years, began. From the control room at EUMETSAT, staff from SSC Engineering Services were there to support the ten-day mission – a final delivery of high-quality data was brought home followed by a finish where the satellite was navigated down into the Earth's atmosphere to burn up. MetOp-A was Europe's first polar-circling LEO satellite dedicated to meteorology.

## SSC team defied barriers in pandemic

The pandemic year 2021 has required a large measure of solution orientation. One example comes from the company's Chilean operations. When the pandemic put an end to travel, an intractable situation arose during the installation of 22 new antennas at SSC's station in Santiago. Due to the pandemic, SSC engineers in the US with extensive knowledge and experience in installing these types of antennas, were unable to enter Chile. The solution was that the American engineers remotely instructed and led the Chilean team throughout the process. Through strong collaboration, the teams managed to install 40 antennas in a period of four weeks.

Carla Careri works in ESA's control room in Darmstadt. Photo: ESA



## Impact of the pandemic

To get a clear picture of the situation during the pandemic, we held monthly management meetings, where each country where SSC has offices, reported on the development of the pandemic. An important part remains to ensure the working environment is safe in our offices to protect our employees and customers. Managers have followed up on the physical work environment in cases where employees have worked from home. Travel has been very limited during the year, which has resulted in savings and positive environmental effects.

## Covid survey in the spring

During the spring, a survey was conducted on the theme Covid-19. The results show that teleworking and the company's communication have worked well during the pandemic. Many are experiencing challenges in SSC's global organization where work takes place across other continents and different time zones. The majority of employees say that they partly want to continue working from home feeling that the work becomes more efficient.

## Healthy employees

Sick leave has been at low levels in all countries during the year and the company has only had a few isolated cases of Covid-19. Part of the explanation for this year's low sick leave is that the majority of employees have been able to switch to

work from home in a good way, which also means that sick leave can to some extent hide in the figures.

## New office in Kiruna C

The Esrange Space Center outside Kiruna is growing with the expansion of new testing operations. For the expansion, we see the opportunity in moving parts of the business from Esrange to the new Kiruna center, which is under construction due to the ongoing urban transformation of the city. A new office is planned for occupancy in 2023 and will be complementary to the workplaces at Esrange.

## Recruitment

During the year, focus has been on recruitment and growth activities throughout SSC. The company has hired about 100 new employees during the year. Recruitments are mainly made in Sweden, Germany, Netherlands, Spain, and the USA. Several employees have had the opportunity to change roles internally within the company, which has been seen as positive.

## Staff turnover

Staff turnover is stable in recent years with some variations between divisions. Space is traditionally a male-dominated industry. The distribution between men and women shows that the proportion of women has increased slightly in recent years. The average age of the company's staff remains 44 years, like previous year.

Preparation of MAPHEUS 10 launch from Esrange Space Center



# Global world and market outlook

The global space industry has continued to develop positively in 2021. The pace of development is high with strong growth. Although the industry was resilient during the pandemic, 2021 has been a year of economic recovery due to the Covid-19 effects of the year before. Nevertheless, the positive development trends that have characterized the industry in recent years are expected to persist.

The global market in 2021 was characterized by continued strong development. Long-term space-related investments continue to increase in many countries, both as part of a generally rapid high-tech development and as an important part of a green transition. Both private actors, international organizations and states are investing to increase high-tech competitiveness while contributing to a sustainable transition. 2021 was another year when venture capital investments in the space industry increased. Both private and institutional investments are expected to continue at a high level in the coming years.

The impact of the pandemic during the year has been characterized by economic recovery in many areas. Large government stimulus packages had global impacts that also contributes to the development of our industry. In particular, it concerns incentives for further development of space efforts as part of the green transition, where states and international organizations are increasingly recognizing the importance of well-developed space activities. The industry is characterized by a long-term perspective, however, still largely dependent on governmental funding even if commercial investments and assignments' are increasing, especially in certain basic parts of the value chain.

Space is currently used throughout society, including for security policy purposes. Increasing space investments with both civilian, security and defence policy objectives are driving positive market

development further, but also entail risks. Geopolitical contradictions, resulting in increased tension, are one such example that could affect SSC's business opportunities in some parts of the world.

An increasingly strong driver of market development is space's contribution to solving the climate change and meeting the UN's sustainable development goals. COP 26 in Glasgow gave clear examples and further increased focus. Space is also increasingly contributing to facilitating adaptation to climate change and to efficiency improvements in a wide range of societal segregations with a lower climate impact as a result.

In the US, the trend is that new businesses, driven by a combination of institutional and private investments, have stabilized and some consolidation is underway. In Europe, developments in key technical segments such as reusable launch technology and the use of satellite data have continued to strengthen. The EU's space programme is comprehensive with a focus on European independence, global competitiveness, and increased security, as well as on meeting global sustainability challenges. China's space programme includes vigorous efforts to become a leading space nation with a high degree of independence. This is also expected to affect the global market in the longer term, not least due to the current geopolitical tensions. The development in the Asian market is strong even outside of China, however business volumes are relatively smaller. Countries such as India and Japan offer good

potential, but countries such as Thailand, South Korea and Australia are also implementing new initiatives.

The rapid pace of development, where more of society's important functions require a functioning space operation, contributes to a long-term increasing market, with good stability in segments associated with that development. Overall, the number of satellites in orbit increases rapidly due to the current situation, an increase that is predicted to continue for a long time. This poses risks of collisions, both between active satellites and with end-of-life ones that remain in orbits in space. The need for a functioning international air traffic control system in space has grown, as has the need for the proper monitoring of space. Addressing this problem area is important, offering new service segments with high technical complexity and high growth potential. Investments have been initiated, both by multinational and national institutions, but also by companies.

In summary, the long-term global market development is positive. SSC is investing heavily in being even better positioned towards a broad international customer base as a provider of advanced high-quality space services. The rapid expansion of our unique space base Eorange gives us, together with a range of new services and a continuous modernization of the entire global service portfolio, very good conditions for success.

## How we create value

Society's dependence on space and the benefits of space activities have never been greater than today. Without space technology, important parts of society would not work. Data from space is the foundation of digital services that we use every day, everywhere in the world. Technological development is rapid and constantly creates new opportunities, not least for people's ability to develop societies where the UN's Global Sustainable Development Goals are met. This means that services offered by SSC are even more needed, and the demand for developing new ones is substantial. In recent years, SSC has taken several important initiatives to meet the development and thereby seize increased opportunities for deliveries of services of great value for customers and for society at large. Despite the pandemic, these initiatives have developed strongly during the year. With this, SSC can further strengthen the creation of value that is long-term, vital and sustainable.

### Launching satellites from Eorange

Over the next decade, the number of new satellites will increase heavily, estimated up to 100,000 satellites in 20 years. The market is growing strongly. Innovative technology makes satellites smaller, cheaper and at the same time more capable. They are used for various purposes, such as observation and measurements of climate, ocean, nature and human activities, but also for communication as well as for research in and about space. Launch capacity has been lacking for years, especially in Europe, completely without any launch capacity within Europe.

It is therefore very gratifying that in 2021, despite the pandemic, SSC has been able to drive the establishment of the ability to launch satellites so far that it can be operational as early as the end of 2022.

Sweden will then be one of the few states in the world that can launch satellites. The initiative will contribute to an increased attractiveness for Swedish high technology and space activities. It also provides growth, especially in the northern parts of Sweden (Norrbotten), and contributes to the realization of the EU's ambitions for independent European access to space. As more satellites enter orbit, the possibilities of observing earth, its landmass, oceans, and atmosphere as well as access to digital connectivity and communication increase. This also increases the world's ability to achieve the UN's Sustainable Development Goals.

### Sustainable use of space – Space Situation Awareness/Space Traffic Management

As space is increasingly used, the risk of collisions and thus space debris increases. Scrap in space cannot be picked up and continues to exist in uncontrolled orbits. A collision therefore increases the risk of more scrap, which risks destroying the possibilities of using space. Systematic traffic management in space is needed, based on clear rules for how and to what space can be used. In addition, it is necessary to monitor their compliance.

Great efforts are being made in this area, both at the negotiating table and in creating practical capability. Being able to identify and follow satellites is necessary. Needs are increasing rapidly as both institutional and commercial actors want to ensure that the risks associated with investments in space do not increase. Since a large part of the satellites orbit over the Earth's poles, areas close to these are particularly suitable to monitor. Eorange could therefore become an important node, supported by the establishment of abilities in the southern hemisphere.

The work of recent years has, for 2021 resulted in SSC being ready to launch a demonstrator business for space mode imaging, an important step on the road to full operational capability. Dialogues with Swedish authorities and international institutions such as the EU, ESA and UNOOSA (United Nations Office of Outer Space Affairs) have also continued, all with the aim of delivering another important service, this time to contribute to the long-term sustainable use of space. During the year, SSC has also been an important partner in a mission to retrieve debris from space.

### Next generation of satellite ground segments

The large amounts of data generated by a growing number of satellites have created the need to streamline the transmission of data from satellites in space to Earth and on to different types of end-user actors. The transmission of data traditionally takes place using radio frequencies. With sharply increasing data sets, the frequency space is simply not enough. The costs of transferring data also need to be reduced. New solutions must therefore be developed for the market to prosper. All in all, this puts new demands on us and other actors in the field. A higher degree of automation is necessary, as well as finding solutions that reduce the amount of data that needs to be transported without waste.

As one of the world's largest providers of ground station services, SSC needs and can be at the forefront of the new development. During the year, our UK subsidiary SSC Space UK has delivered a concept for the next generation of data transmission technology between satellites and the ground. The concept consists of several new solutions both on board the satellites, in the ground segment and in digital wireless data transmission over long distances. The work, which is another good example of the value of international cooperation in this high-tech industry, has taken place within the framework of an ESA contract won by the SSC in 2020 and in close collaboration with the UK Space Agency. The technology is important, as the sharply increasing amount of data from satellites needs to be used more cost-effectively, not least to achieve the Agenda 2030 Sustainability Development Goals.

### Testing of next generation rocket technology – Testbed Eorange

Satellite launches have so far been characterized by very high costs, with use of large rockets and cost-driven disposable technology. New technologies also provide entirely new opportunities in this area. Today, smaller systems are being developed where all or part of the rocket is usable. The development covers a variety of technical elements, such as new fuels, engines, and control systems. The need to test components and systems has therefore increased significantly.

Eorange has unique conditions for this type of testing operations, with over 50 years of experience in the rocket business. In October 2020, Minister for Space Ms. Matilda Ernkrans was able to inaugurate a state-of-the-art test facility for the purpose at Eorange. The first customers are already established for multi-year testing programmes. The first tests were conducted in spring 2021. The establishment, which was largely carried out during the pandemic, represents a milestone not only for Eorange but also for both Swedish and European space operations.

### GlobalTrust – a new company for services towards better sustainability – Global Watch/GlobalTrust

An increasing number of satellites with even more advanced sensors are delivering large amounts of data about the state of the planet. This presents new opportunities to meet the major global challenges that are facing the world. Today, however, only a limited portion of this data is used. With modern technology, very large amounts of data from satellites could be collected, processed, merged, and analyzed. Global, regional, and local situational images could be created in different subject areas and used to work more effectively with the Agenda 2030 Sustainability Development Goals, proactively and reactively manage different forms of crises or lay the foundation for as yet unknown applications to contribute to a better society.

SSC's Global Watch initiative, launched in 2018 in dialogue with the Swedish government and the UN, aims to gradually realize such a development. In 2020, an extensive study and development work supported by regional actors in Norrbotten, resulted in a collaboration with the UK's Satellite Applications Catapult, with leading expertise in the field. In 2021, a new company was set up for the delivery of services that use data from satellites to support customers' ambitions to solve different types of sustainability issues. SSC is so far alone in this new niche. Deliveries could be started on a small scale at the beginning of the year. Growth is strong, with a clientele consisting of authorities, companies, investors other organizations that use the service in planning, implementing, and monitoring operations, sustainability projects and investments.

Read more: [www.globaltrustgrp.com](http://www.globaltrustgrp.com)

# Agenda 2030 and the global sustainability goals

SSC supports the UN's Agenda 2030 Sustainable Development Goals as well as Sweden's ambition to be a leader in the implementation of the agenda. Below are the goals where SSC can contribute the most and examples of actual contributions in 2021.



*Description of the objective: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.*

## Resilient and reliable ground segment for the capture of space data for important societal functions.

*Example:* Investments have been made to improve and develop the existing network of ground stations. In 2021, SSC established four additional polar stations, two in Sweden and two in Canada.

## Cost-effective access to space through launch services.

*Example:* Together with ISAR Aerospace, SSC has built and inaugurated a test facility for rocket engines for micro launchers. It offers a platform for, among other things, the development of technology for reusable rockets and engines with less environmental impact.

## Ongoing modernization of basic segments and other infrastructure that increases the opportunities for humanity to use space technology to support global sustainable development.

*Example:* During 2021, SSC has continued work on a project, funded through ESA, that aims to develop ground network technologies and deliver a solution that addresses the bottlenecks faced by the new commercial space market. Through our SSA program, we have also prepared for the installation of an optical station in Australia, to be used to generate data that

can be used, among other things, for the purpose of contributing to a Swedish ability to create a space mode image including tracking of space debris.

## Develop new innovative service segments and partnerships that promote the Agenda 2030.

*Example:* Through the subsidiary Global-Trust, SSC has during the year contributed to the development of services that aim to measure and report how sustainable an organization or business actually is.

## Develop services that promote sustainable space use, for example in Space Traffic Management, Space Situational Awareness and sustainable use of frequencies.

*Example:* In 2021, SSC has started the development of space surveillance and tracking services, a new service segment for SSC, which includes tracking of space debris. An MOU has also been signed with Bradford ECAPS for commercial services to remove space debris from orbit.



*Description of the objective: Strengthen the means of implementation and revitalize the global partnership for sustainable development.*

## Make use of SSC's long-term relationships and partnerships with institutional clients such as ESA, NASA and other institutional players.

*Example:* With the help of funding through ESA, SSC develops a technical solution for

ground networks that address the bottlenecks faced by the new commercial space market.

## Increased collaboration with international organizations that promote sustainable use of space.

*Example:* In 2021, the SSC has deepened its relations with relevant Directorates of the European Commission through, several meetings and talks with the Director-General of, and other key members of, the new Directorate Defence and Space (DG DEFIS). Discussions have also been held with UNOOSA on how SSC can contribute to increased knowledge about space issues in parts of the Third World.

## Close cooperation with national, regional and local actors

*Example:* Continuous reconciliations in strategic areas have been carried out with the Swedish National Space Agency during the year. Close contacts have also been kept with region Norrbotten. SSC is an active partner of Luleå University of Technology in their centre for space technology CRT, RIT, S3P Space.

## Move on from existing trust in the industry and engage in strategic partnerships that advance the goals of the Agenda 2030.

*Example:* In 2021, SSC has been heavily involved in launching an interregional partnership, S3P Space, with the aim of contributing to independent and sustainable European access to space. We are also involved in ESERO, an ESA-run initiative that will contribute to the training of



Global Provider of Advanced Space Services

We Help Earth Benefit from Space



teachers, specifically in the space field.



*Description of the objective: Take urgent action to combat climate change and its impacts.*

## Launch of sounding rockets and stratospheric balloons to study the climate and atmosphere.

*Example:* Although restrictions due to the ongoing pandemic have hampered and at times made rocket launches and balloon release impossible, three sounding rockets have been launched during the year, carrying scientific experiments, while 16 stratospheric balloons were released, including those with experiments or measuring equipment on board. Several of these aimed to enable climate-related research, including by collecting different types of relevant data.

## Reception of data and support for key space missions to promote Earth observation data, atmospheric observations and critical weather data used to warn of natural disasters and other environmental crises.

*Example:* During the year, SSC has continued to be an important piece of the puzzle

in the use of satellite data to investigate how our Earth is doing, enable forecasts of the impact of climate change and monitor environmental disasters in real time, including by receiving weather and climate data from EUMETSAT weather missions and data from both the Copernicus programme sentinels as well as other Earth observation satellites.

## Development of launch capabilities for small satellites from the Esrange Space Center, to contribute to the use of space for activities that contribute to increased use of space in support of global sustainability.

*Example:* SSC and Sweden have come much closer to their own ability to launch satellites from the Esrange Space Center. The complex being built to enable SSC to offer launch of satellites into orbit has during the year begun to be completed with integration halls for rockets and satellites, expansion of planned fuel facility, launch ramps and surrounding technical ground systems.

## Introduce new services with a focus on increased use of space data in support of global sustainability initiatives.

*Example:* In 2020, SSC invested in Global-Trust, a company that will offer tools based on satellite data, to enable organizations

to develop sustainability strategies that include ethical practices in future decision-making.

## Increase knowledge about how space technology can be used to deal with climate change and its consequences.

*Example:* A number of projects aimed at demonstrating technologies relevant to future climate change measurements have been carried out onboard stratospheric balloons released from the Esrange Space Center.

## Work systematically to reduce our own climate impact.

*Example:* The situation caused by the pandemic has required that SSC in connection with rocket launches and balloon releases have changed its processes so that as much as possible of the researchers' and other external resources' work linked to the launches can be made off-site, which had the advantage that fewer individuals had to travel to Kiruna and Esrange Space Center, and climate impact could thus be reduced somewhat. This approach will be used as much as possible even as the situation surrounding the pandemic becomes less serious.

## Europe

SSC  
P.O. Box 4207  
SE-171 04 Solna  
Sweden  
Tel: +46 8 627 62 00

SSC  
Esrang Space-Center  
P.O. Box 802  
SE-981 28 Kiruna  
Sweden  
Tel: +46 980 72 000

SSC  
Stockholm Teleport  
Vidjävågen 15  
SE-123 52 Farsta  
Sweden  
Tel: +46 8 447 35 70

SSC  
LSE Space  
Friedrichshafener Str. 2  
D-82205 Gilching  
Germany  
Tel: +49 8105 777 404 0

SSC  
LSE Space  
Robert-Bosch-Strasse 16a  
D-64293 Darmstadt,  
Germany  
Tel: +49 6151 666 19 0

SSC  
Aurora Technology  
Zwarteweg 39  
2201 AA, Noordwijk,  
The Netherlands  
Tel: +31 715327141

SSC  
Atlas Building, Fermi Avenue,  
Harwell Campus, Didcot,  
Oxfordshire OX11-0XQ  
United Kingdom

SSC  
Global Trust  
Southgate Chambers, 37/39  
Southgate Street,  
Winchester, SO23 9EH  
United Kingdom

## America

SSC  
417 Caredean Drive  
Suite A  
Horsham, PA 19044  
USA  
Tel: +1-215-328-9130

SSC  
Autopista Los  
Libertadores Km 28,  
Colina  
Santiago  
Chile  
Tel: +56 2 2698 1702

SSC  
3425 2nd Avenue  
Lethbridge,  
AB T1J 4V1  
Canada  
Tel: +1 403 329-1562

## Asia and Australia

SSC  
Space Krenovation Park  
Room B05 88 Moo 9 Tambon  
ThungSukala,  
Amphoe Siracha, Chonburi  
20230 Thailand  
Tel: +66 871 486 006

SSC  
Western Australia Space Centre  
North Depot Hill Road  
Mingenew, WA 6522  
Australia  
Tel: +61 8 9929 1000

