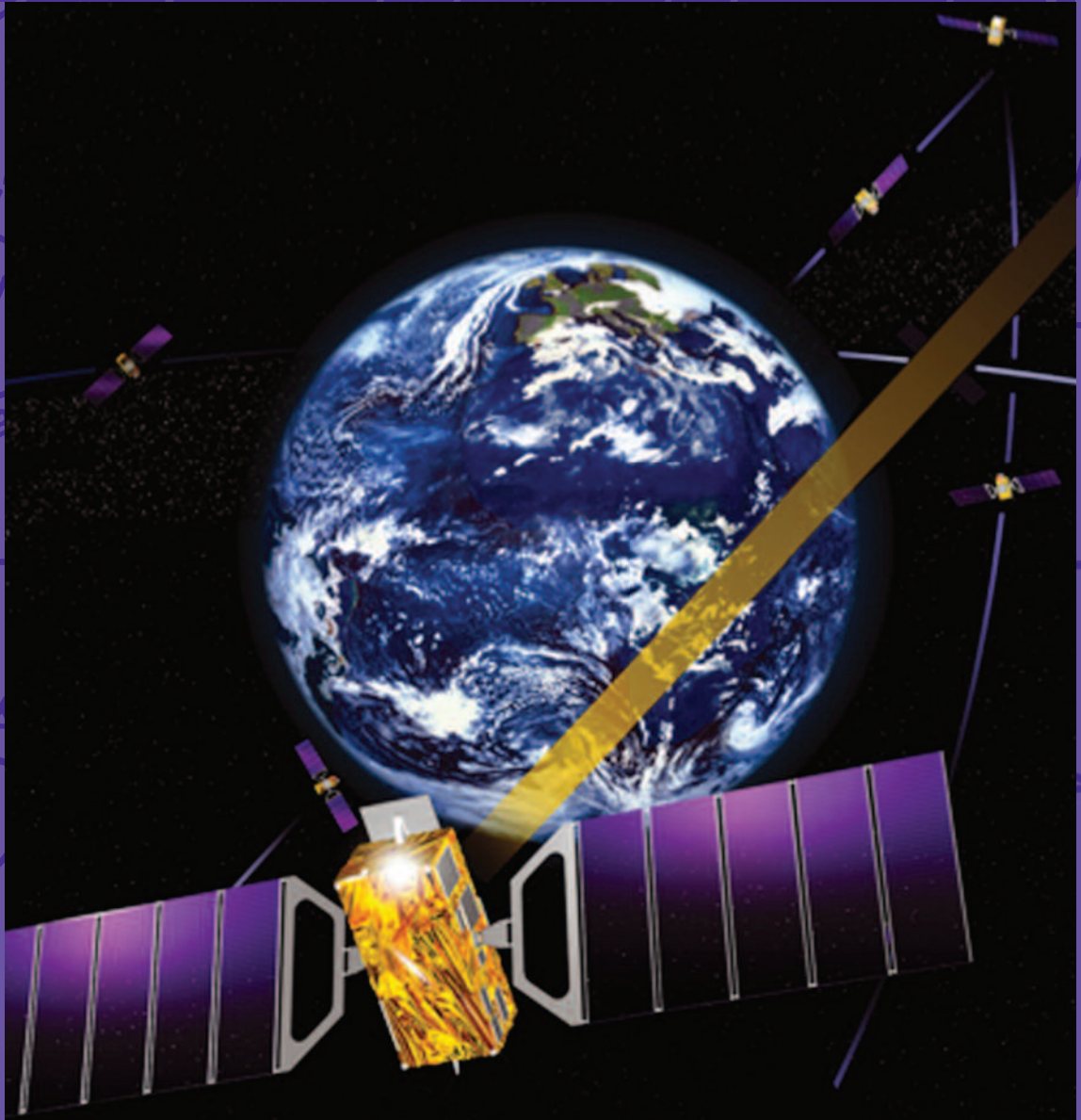


Annual Report 2007



Management 2007



*Suzanne Lacasse
Chairman*

Board

Suzanne Lacasse, Chairman
Erik Solhjell, Vice Chairman
Øyvind Stene
Jøran Moen
Inge Marie Holten

Deputy members:

Paul Narum
Elisabeth Tørstad



*Bo Nyborg Andersen
Managing Director*

Management

Bo Nyborg Andersen, Managing Director

Objectives

In accordance with governmental guidelines and in co-operation with and to benefit Norwegian industry, research, public-sector bodies and Norwegian interest in general, the objectives of the Norwegian Space Centre are to:

- promote the development and coordination of Norwegian space activities,
- co-ordinate the Ministerial interests and needs within space activities,
- prepare proposals for integrated long-term programmes for Norwegian space activities and submit these to the Ministry of Trade and Industry,
- manage Norwegian Space Centre resources and efficiently distribute funding from the Norwegian State and other sources,
- mind Norwegian interests in liaison with space sector organizations in other countries as well as international organizations and contribute to coordinating Norwegian space activities with those elsewhere,
- manage State holdings in space-related companies in the private sector,
- facilitate the meeting of user needs in the space sector

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From the Director

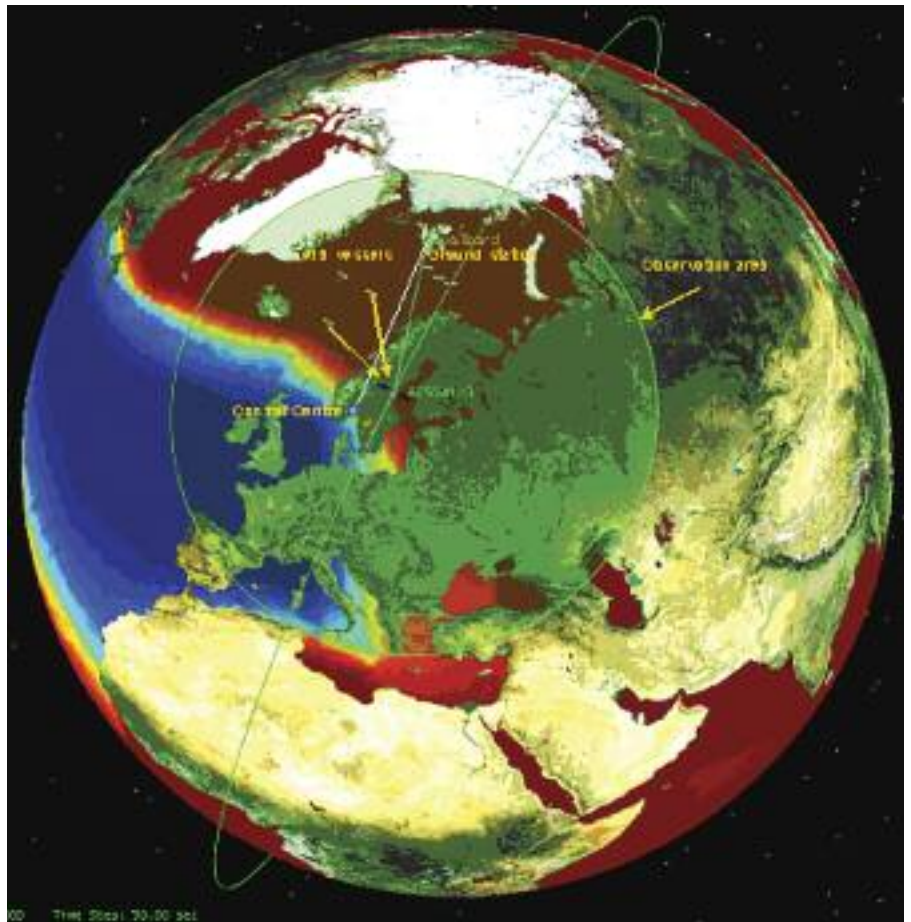
For the Norwegian Space Centre, 2007 was an exciting year, both nationally and in cooperation with the ESA and the EU. The Norwegian Space Centre Board and management work well together. Likewise, cooperation with the Ministry of Trade and Industry (NHD) functions well. We share a common understanding for furthering the Norwegian Space Centre vision and goals.

In our interrelation with ESA, we have seen the effect of the commitment at the Council of Ministers meeting of 2005, particularly in new technology programmes that provide exciting tasks for Norwegian firms and research groups. These tasks will improve competitiveness with an eye toward future ESA assignments as well as commercial projects. The Norwegian Space Centre has actively participated in various ESA boards and councils, and Norway has chaired the ESA Programme Board for Navigation.

Involvement with European Space Policy has resulted in liaison with and allocation of responsibilities between the ESA and the EU being set for forthcoming years. The Norwegian Space Centre and NHD took part in the preparations for the European space summit in Brussels, in which Norway and Switzerland participated, along with the 27 EU countries.

National participation was augmented in the course of 2007. We have used the national support scheme to ensure the development and strengthening of the Norwegian space industry and the development of nationally vital space services. With support from the Norwegian Space Centre, NHD worked assiduously for approval of the support scheme by the EFTA Surveillance Authority. Approval was received in early 2008.

The remit for the Norwegian Space Centre, an administrative agency, explicitly states that in space matters, NSC shall serve all Ministries and relevant agencies. In 2007, this work expanded, particularly in cooperation



The region shown in brown indicates that the AIS satellite will have good coverage of our high north areas. ©FFI

with the Ministry of Environment on international environmental monitoring and in support to the Ministry of Defence in its evaluation of a dedicated telecommunications satellite. Moreover, the Norwegian Space Centre assists the Ministry of Fisheries and Coastal Affairs in navigation policy.

The Norwegian Space Centre has compiled a baseline document on the potential for Norwegian participation on the EU implementation of the European satellite navigation system Galileo. The compilation was decisively supported by an expert brought in from the National Security Authority.

In 2007, the Norwegian Space Centre laid the basis for building a satellite to demonstrate reception of Automated

Identification Signals (AIS) from ships out of range of land-based receiver systems. The project is being conducted jointly with the Norwegian Defence Research Establishment and the Norwegian Coastal Administration. The satellite is expected to be launched within two years and will contribute to improve the monitoring of large sea areas.

A new Board was appointed, effective 2008. I wish to thank the outgoing Board for its years of dedicated efforts

Norwegian Space Centre, 31 May 2008

Bo Andersen

Bo Andersen

Report of the Board 2007

The Norwegian Space Centre is a government agency with distinctive responsibilities. The Norwegian Space Centre is under the Ministry of Trade and Industry and has an independent board appointed by the Ministry. The Norwegian Space Centre shall serve all public authorities and be an instrument of governmental industrial policy. A vision has been drawn up for space activities in Norway:

“In 2015, Norway shall be the country that benefits most from space.”

To realize that vision, the Norwegian Space Centre prioritizes its work according to five main objectives: create growth in national, high-tech industry, meet the needs of society, ensure that Norway plays a leading role in the global market for space-related ground structure, contribute to Norwegian research communities attaining prominent international positions in space research and ensuring that the public is well aware of Norwegian space activities.

Membership in the European Space Agency (ESA) is instrumental in attaining these goals. The Norwegian Space Centre supports Norwegian interests in ESA and coordinates national space activities.

The Norwegian Space Centre manages the national support scheme used to support development in Norwegian companies or institutes that seek to position themselves for future space deliveries or for uses of data from satellites. In addition, the support scheme is used to ensure infrastructure vital to society.

This Annual Report shall document how Norwegian Space Centre activities in 2007 have contributed to bringing Norway a step further in realizing our vision.

The evolution of space activities is instrumental in supporting the government's key priorities, including the High North Strategy and the Maritime Strategy initiatives. These initiatives cannot be brought about without an appreciable commitment in the fields of Earth observation, satellite navigation and satellite communication.

was some NOK 5.4 billion (€674 million), of which 71% were to export. This makes space activities a prominent sector on the national scene.

Satellite communications accounted for almost 80% of the space-related turnover in Norway, of which the greater part was in export of goods and services. Changes in ownership of the principal actors created challenge as well as possibilities for innovation, in developing new products and establishing new companies in user equipment and services.

Some smaller high-tech companies that arose in research communities as well as specialized defence and oil sector companies have successfully developed space sector niche products.

Further growth is contingent upon increased Norwegian commitment, both public and private. It's particularly important that the commitments in satellite communication and satellite navigation continue.

In 2007, Norwegian commercial deliveries to ESA programmes totalled about NOK 142 million (€18 million), as illustrated in Figure 1.

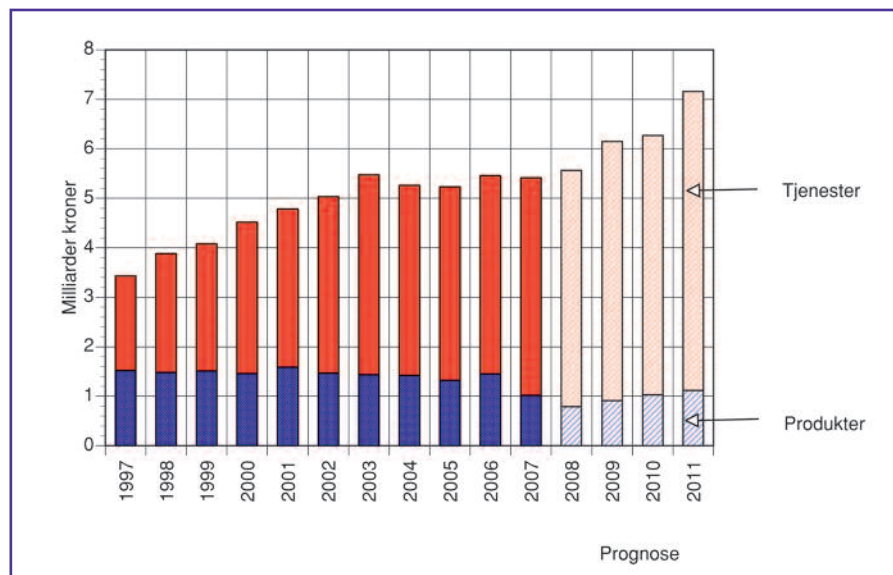
The Norwegian commitment at the 2005 ESA Council meeting at ministerial level in Berlin enables Norway to respond to calls from the General Support Technology Programme. As at 31 December 2007, contracts entered in

this programme totalled NOK 30 million (€3.7 million). Most of the contracts were project proposals that together entailed commercial co-financing for an additional NOK 20 million (€2.5 million). In 2007, the Norwegian Space Centre support scheme totalled NOK 37 million (€4.6 million), of which NOK 6 million (€749,000) was earmarked in the form of NOK 5 million (€624,000) for participation in Galileo and NOK 1 million (€125,000) for the Galileo infrastructure on Svalbard. NOK 15 million (€1.9 million) was allocated to industrial development, NOK 8 million (€998,000) to Earth observation and NOK 5 million (€624,000) to technological development and educational development.

In 2007, the spin-off effect factor continued to climb, up to 4.6, as shown in Figure 2. This means that for each million of governmental support through ESA or national support schemes, space-sector companies have on the average attained an additional turnover of 4.6 million.

In 2007, the Norwegian Space Centre continued to contribute to the positioning and further development of national actors in the international space market by arranging for and supporting participation in ESA bilateral and national development programmes. The national support scheme is essential to full benefit from the ESA commitment.

Figure 1. Turnover of Norwegian-produced goods and services, 1997-2007, with company forecasts up to 2011. Figure based on information provided by the Norwegian space sector and the Norwegian Space Centre.



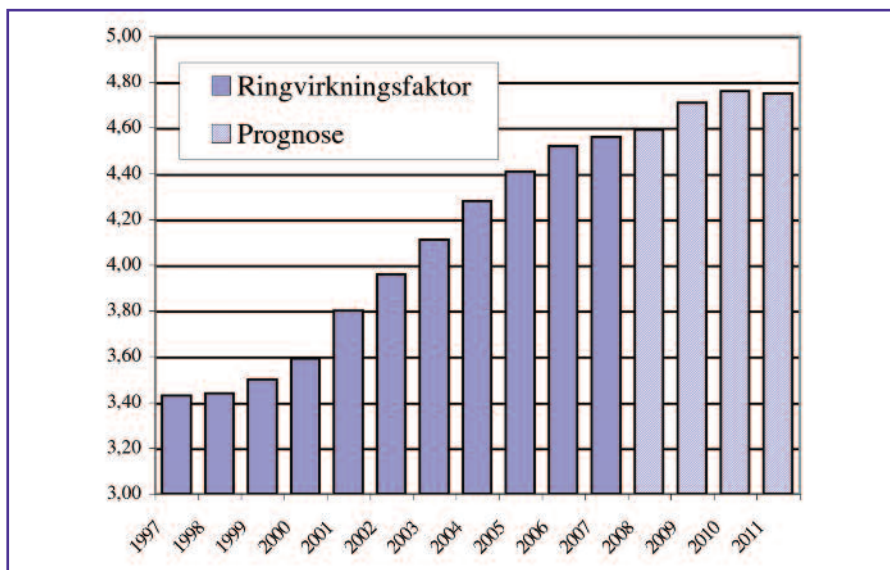


Figure 2. The spin-off factor is a measure of the effect of Norwegian space commitment through ESA and national support scheme. Figure based on information provided by 25 companies and institutes in Norway

The Space Centre is prepared for long-term development in cooperation with the actors, the ESA and other clients.

The international space station and space transport

The international space market has recovered after a decline in the early 2000s. This is particularly the case in satellite communication, with growth in the launch market. In 2007, there were six Ariane 5 launches, all successful. Norwegian subcontracting to Ariane 5 launch vehicles includes mechanical structures, thrusters and electronics for a total of NOK 8 million (€998,000) per launch.

Norwegian commercial participation in the evolution of the Space Station has been mostly in the fields of logistics and software development. In recent years, Norwegian companies have also taken part in the development of payload modules and technologies associated with uses of the Space Station.

Satellite communications

In 2007, satellite communications was the leading sector in Norwegian space activities, accounting for almost 80% of total turnover.

In the last two years, there have been major changes of ownership of Nera SatCom and of Telenor Satellite Services. Both companies now have foreign owners and have changed names, respectively to Thrane & Thrane and to

Vizada. In early 2008, Thrane & Thrane chose to phase out activities in Norway. Even though Telenor Satellite Services has been sold out, Telenor Satellite Broadcasting remains in Norwegian hands. Telenor seeks perpetuity in TV broadcasting and in broadband communications. A new satellite was launched in early 2008, and the next is scheduled for launch in 2010.

Other Norwegian actors have expanded. STM Norway has been made responsible for all STM Group development of broadband satellite systems. Ship Equip is among the world's leading vendors of marine satellite communications. In 2007, the company doubled both turnover and staff, to NOK 240 million (€30 million) and to 80 people.

The Space Centre met regularly with the satellite communications actors to coordinate Norwegian activities and provide input to ESA programmes. The contact has resulted in a solid basis for influencing the work of the ESA programme committee for telecommunications.

The changes of ownership and the company close-down have both brought uncertainty and created new possibilities. To meet the relevant challenges, the Norwegian Space Centre has strengthened its telecommunications staff. We have already seen indications that the sales of Nera and Telenor Satellite Services have brought about an era of innovation in the satellite

communications sector. Established as well as new companies have created activities based on expertise built up over several decades.

Satellite navigation

Galileo is the largest European joint infrastructure commitment and the largest ever EU space project. After a prolonged tug of war, in November 2007, the European Council decided to fully finance the implementation phase of Galileo with a total budget of €3.4 billion. According to plan, Galileo will be operational from 2013 on. The first invitations to tender will be announced in the autumn of 2008.

The implementation contracts will be according to EC Competition Policy. ESA will have the executive role as the principal contractor appointed by the EU. To date, Norway has no formal rights, neither in the implementation phase nor in the new management structure, and now is working to attain a cooperative agreement with the EU on Galileo. The Norwegian Space Centre Galileo Secretariat assists the Ministry of Trade and Industry and the Ministry of Foreign Affairs in this effort. The Secretariat also represents Norway in the European GNSS Supervisory Authority and on the Galileo Security Board, along with the National Security Authority.

Together with GPS, Galileo will be Norway's as well as Europe's primary system for positioning, timing and navigation. With considerable economic activity and management responsibility for extensive land and sea areas, Norway needs better, more reliable navigational aids. Satellite navigation is a reliable, cost-effective solution.

Greater parts of Norwegian Arctic waters are on the fringe of Galileo coverage delineated by the EU. Accordingly, Norway must be active in further EU work with Galileo to ensure coverage in Arctic waters equalling that of the rest of Europe. In addition to performance in the high north, it is essential that Norway be able to use other Galileo services, including the Public Regulated Service (PRS), which is an encrypted, secure service for governmental agencies in EU countries. Moreover, the competitive ability of Norwegian satellite navigation compan-

ies must be ensured by their having full access to tendering for Galileo contracts.

Galileo also supports the European Geostationary Navigation Overlay Service (EGNOS) that ensures the quality and reliability of satellite signals. As proposed by the Norwegian Space Centre, in 2006 ESA initiated a project for improving EGNOS in the high north. This resulted in the building of two reference stations, one on Svalbard and one on Jan Mayen. Tests to date indicate that EGNOS performance has improved in Norwegian areas of interest. The location of several stations is being evaluated. In 2007, several Ministries and their subordinate Agencies showed increased interest in Galileo and in EGNOS.

Earth observation

The Norwegian Space Centre's Earth observation activities support coverage of national user needs in research and within public administration. Access to better information on weather, the environment and climate has top priority.

ESA's ambitious Earth observation programme has been and will continue to be increasingly important for management and research communities in Norway.

The launch of the Canadian Radarsat-2 just before Christmas was a high point in 2007. Norway, via the Norwegian Space Centre, has owner interest in Radarsat-2. Data from Radarsat-2 will be in operational use from 2008 on, based on a bilateral agreement that the Norwegian Space Centre previously entered with Canada.

The Space Centre's SatHav programme coordinates the use of radar satellites over Norwegian waters. The SatRisk and SatLuft programmes are being implemented. The SatRisk programme aims to provide services for subsidence detection, avalanche warning and snow cover monitoring. The Geological Survey of Norway began using radar satellite images to detect new areas of avalanche hazards in Troms county.

The SatLuft cooperative work aims to use satellites to monitor and warn of air pollution. In 2007, the Space Centre supported NORUT Tromsø in a pre-project for the potential use of satellite images in pollen warning.

The Space Centre's efforts to increase the use of Earth observation data involves cooperation with governmental agencies, including the Norwegian Meteorological Institute, the Norwegian Coastal Administration, the Armed Forces, the Norwegian Polar Institute, the Geological Survey of Norway and the Norwegian Water Resources and Energy Directorate. In 2007, the Directorate for Nature Management used satellite data to carry out vegetation mapping across the country. The Directorate for Cultural Heritage has used satellite measurements in its work with cultural monuments.

The Space Centre seeks to be a hub for national multi uses of satellite data. Establishing routines that ensure rapid access to data for key users and attaining co-financing by the biggest users have been emphasized. But it has become obvious that coordinating local budgets for data purchase by individual agencies is difficult to attain and vulnerable to cuts, a problem not solved in 2007.

In 2007, Kongsberg Satellite Services AS (KSAT) continued to operate profitably. The company was awarded several international contracts on the strength of experience and expertise gained in national application programmes supported by the Space Centre. In 2007, KSAT had the main contract for European sea oil spill monitoring.

Research uses of space

The ESA Scientific Programme is a mandatory programme. In 2007, the ESA space exploration probes were technically and scientifically successful.

In 2008, two new, large ESA astronomical satellites, Herschel and Planck, are ready for launch. In 2007, the Norwegian Space Centre brought about development to strengthen Norwegian scientific uses of the Planck satellite. Moreover, ESA is financing Norwegian participation in one of the experiments on the Indian Chandrayaan 1 lunar orbiter and impactor, also due for launch in 2008. The Space Centre has cooperated with The Research Council of Norway to attain increased appropriations for research, but in 2007 again failed to increase the funding of space research. In 2007, the Norwegian Space Centre increased the support of

space research and technological development through the ESA PRODEX programme.

The insufficient financing of national space research projects has severely constrained sounding rocket activities, particularly those related to rocket technology, and has limited the relevant scientific activities. The Norwegian Space Centre has provided funds to ensure minimum continuity.

In the summer of 2007, with the support of the Norwegian Space Centre, a large Norwegian-German research rocket for studying meteor dust in the atmosphere was successfully launched from Andøya.

The Norwegian Space Centre plays a key role in connection with the download and distribution of data from Hinode, the Japanese satellite-based solar observatory. In 2007, Norway entered a bilateral cooperative work agreement with Japan for sounding rocket research.

In 2007, American and European astrobiologists tested Mars equipment on Svalbard. A ground-penetration radar developed in Norway is among the instruments that will be on the ExoMars space exploration probe, due for launch in 2013. The project is supported by the ESA and the Norwegian Space Centre.

The international User support and Operation Centre (N-USOC) at the Norwegian University of Science and Technology (NTNU) was fully operational in 2007. The NTNU Plant Biocentre conducted an experiment on the Space Station with extremely interesting scientific and technological results. The cooperation between the biologists in Trondheim and Prototech, a commercial firm in Bergen, has gained Norway international acclaim.

The Norwegian scientific uses of ESA Earth observation satellites had insufficient national financing in 2006 - 2007. ESA now is building five new Earth observation research satellites for launch in 2008-2012. This affords new possibilities for Norwegian research and most likely will lead to improved weather and environmental data as well as a more thorough understanding of the environment and climate of the Earth.

Information and education

In April, the Norwegian Space Centre hosted the visit of Christer Fuglesang and his co-astronauts from his Space Shuttle mission. More than 1100 listeners filled the Oslo City Hall to hear the astronauts talk about the mission. HRH Crown Princess Mette-Marit, Minister of Trade and Industry Dag Terje Andersen and Oslo Mayor Per Ditlev-Simonsen were among the guests. Media coverage of the visit was considerable.

Later in the year, the Norwegian Space Centre and the Norwegian Astronautical Society hosted a show at the Klingenberg Cinema in Oslo to celebrate the 50th anniversary of the launch of Sputnik 1 that triggered the space age. The future of Norwegian space activities was the theme when the NSC Board hosted "SpaceFocus" in connection with the 20th anniversary of the Norwegian Space Centre.

Norwegian Space Centre staff members are in demand as speakers across the country. Press coverage on astronomy and space on TV, radio, in newspapers and scientific journals was steady throughout 2007. More and more journalists contact the Norwegian Space Centre in reporting on space and space activities. The NSC conference facilities are increasingly well used.

The Space Centre's new student satellite programme was initiated in 2006 and is progressing favourably. Narvik University College students are now building the first satellite, due for launch in 2009. The second of three or four satellites now is being planned.

The goal is for students to attain practical and theoretical skills in the planning, construction, building and navigation of small satellites. The students then gain expertise and build an international network that subsequently will benefit Norwegian industry.

Managing State holdings in Norsk Romsenter Eiendom AS (NRSE) and Andøya Rocket Range AS (ARR)

The State, via the Ministry of Trade and Industry, owns all the shares in Norsk Romsenter Eiendom AS (NRSE) and 90% of the shares in the Andøya Rocket Range AS (ARR). The Norwegian Space Centre manages State interests in the Andøya Rocket Range AS and Norsk Romsenter Eiendom AS. The Space Centre Board is empowered to appoint the Boards of ARR and NRSE.

The Andøya Rocket Range activities are assured through 2010 via the EASP agreement between Germany, France, Switzerland, Sweden and Norway. In the autumn of 2007, Odd Roger Enoksen returned as ARR Director, after two years as Minister of Petroleum and Energy.

Norsk Romsenter Eiendom AS has no staff, and is administered by the Space Centre. The company's activities comprise ownership of the communications link via submarine cables between Harstad on the mainland and Longyearbyen on Svalbard. NRSE also owns half of Kongsberg Satellite Services AS, the other half being held by Kongsberg Defence & Aerospace. Attending the KSAT Board is the principal follow-up of these holdings.

For further information, see the ARR, NRSE and KSAT annual reports.

Administration and accounts

In 2007, the Norwegian Space Centre accounts showed a profit of NOK 1.4 million (€175,000). Programme activities showed a deficit of NOK 0.7 million (€87,000), whilst the management activities showed a profit of NOK 2.1 million (€262,000).

The management account profit is principally due to undercharging of wages and social costs brought about by understaffing in parts of the year,

reduced travel expenses and postponed start-up of the new electronic administrative processing and filing system.

Organization and personnel

As at 1 February 2008, the Norwegian Space Centre had a staff of 18 men and seven women. Management consists of five men and one woman.

One woman and one man were hired as trainees for one year starting 1 February 2008. A new web editor started on 1 April 2008. Two staff positions are vacant.

The Board gratefully acknowledges the achievements of the staff and the results attained.

Gender equality and the working environment

NSC aims to recruit more women to the staff. Increasing the proportion of the staff with minority background also is a goal.

The Space Centre aims to have a positive working environment in which women and men feel comfortable and can realize their potentials and interests. The average duration of employment is relatively long, for both women and men.

A working environment survey conducted by TNS-Gallup in 2007 showed that the quality of the working environment at the Norwegian Space Centre ranks it among the top 10% of the organizations surveyed. The conclusion is that the Space Centre working environment is an asset worth preserving. Accordingly, matters that can be improved will be addressed.

Board

In 2007, the Norwegian Space Centre Board held five meetings. Total Board remuneration was NOK 330,000 (€41,000).


Oslo, 31.12.2007 • 12.06.2008



Erik Solhjell




Jøran Moen




Suzanne Lacasse, Styreleder



Inger Marie Holtén



Øyvind Stene



Bo Andersen, Adm.dirktør

Figures from profit and loss account 2007

NOK 1000	2007	2006
PROGRAMME ACCOUNTS		
<i>Programme income:</i>		
Programme revenue from Ministry of Trade and Industry	401 400	298 005
Other revenues	13 234	9 820
<i>Total programme income</i>	<i>414 634</i>	<i>307 825</i>
<i>Programme expenses</i>		
ESA, Mandatory basic activities	31 221	30 251
ESA, CSG Kourou	9 246	9 441
ESA, Mandatory scientific programmes	67 772	66 581
ESA, Earth observation	34 240	44 936
ESA, Telecommunications	80 000	39 021
ESA, Navigation	52 714	10 049
ESA, Space station, Microgravity and Exploration	16 666	11 379
ESA, Space transportation	14 000	16 930
ESA, Technology development	42 172	23
ESA, Esrange Andøya Special Project	26 220	21 382
Radarsat	8 807	9 654
NSC, National support scheme	32 259	45 314
<i>Total programme expenses</i>	<i>415 317</i>	<i>304 961</i>
PROGRAMME RESULT	-683	2 864
OPERATING ACCOUNTS		
<i>Operating income:</i>		
Operating revenue from Ministry of Trade and Industry	33 000	29 600
Other operating revenues	40 536	33 964
<i>Total operating income</i>	<i>73 536</i>	<i>63 564</i>
<i>Operating expenses:</i>		
Salaries and social expenses	17 232	15 694
Other operating expenses	53 606	45 646
<i>Total operating expenses</i>	<i>70 838</i>	<i>61 340</i>
Depreciation	516	414
Operating profit	2 182	1 810
Net financial income	-85	-44
OPERATING RESULT	2 097	1 766
TOTAL RESULT	1 414	4 630

€1 = NOK 8.0153, 2007 average exchange rate published online by Norges Bank

Galileo

In November, the European Commission decided to finance the implementation of the Galileo navigation system, with the ESA as principal contractor. Galileo is a civilian system for navigation, and will be the largest ever EU infrastructure project. The system will comprise 30 satellites and will be operational in 2013. Galileo can be used together with GPS and will provide better coverage, especially for areas in the high north. The European Commission estimates that by 2025, the annual global turnover of goods and services associated with satellite navigation will be 450 billion Euros.

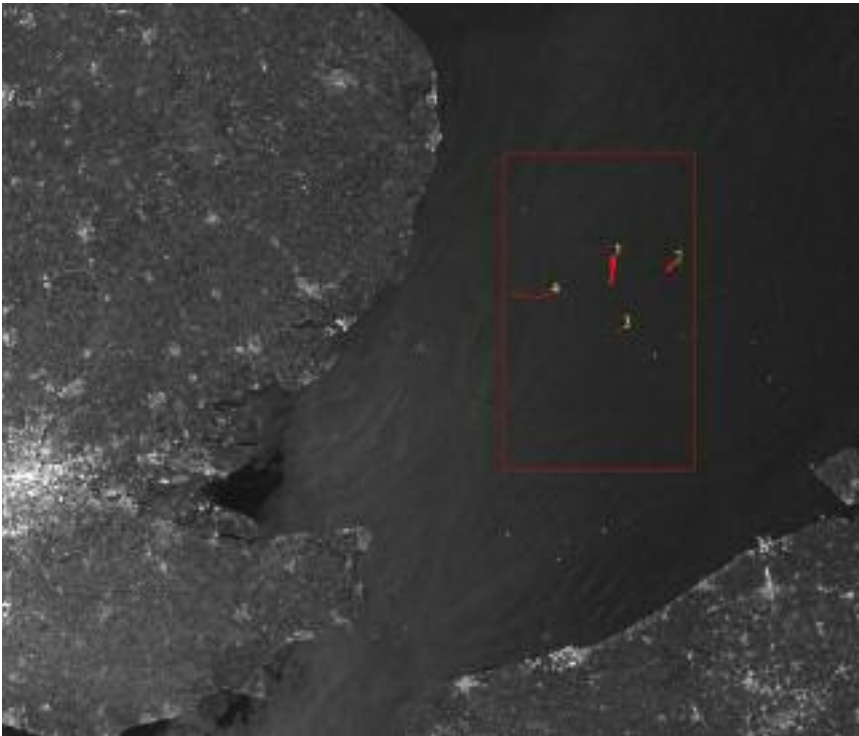
Building sensor stations

Kongsberg Seatex AS in Trondheim was awarded the contract to build the first 20 of 40 Galileo sensor stations. The stations will be located across the world, and their principal task will be to assess the quality of the signals transmitted by the 30 Galileo satellites. Two sensor stations will be located in Norwegian areas, one on Svalbard and one at the Troll Base in the Antarctic. The first stations will be delivered in 2009.

The second Galileo system test satellite being readied for launch by a Soyuz rocket on the pad at Baikonur, Kazakhstan on 26 April 2008. The Galileo In Orbit Validation Element B (GIOVE-B) satellite will test instruments for use on navigation satellites to be built for the system © ESA - S. Corvaja 2008



European oil spill monitoring

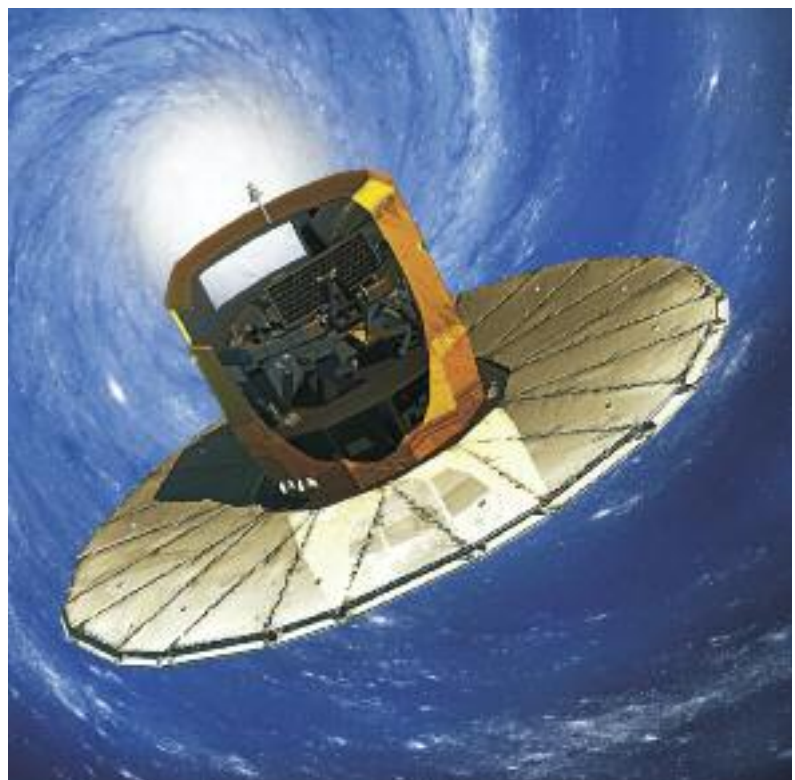


All European coastal states are obliged to monitor maritime traffic and oil spills along their coasts. Norway early used satellite data to warn of oil spills and consequently has built considerable expertise in the field. The European Maritime Safety Authority (EMSA) chose Kongsberg Satellite Services in Tromsø for the award of a contract for satellite-based oil spill warning. The company downloads satellite data at Longyearbyen, Tromsø and Grimstad and interprets the data with a view to oil spills. No more than 30 minutes later, images are sent to the EMSA headquarters in Lisbon, which then sends warnings of spills identified to national authorities.

On the first day of the service in 2007, KSAT identified a lesser oil spill in the English Channel. ©KSAT

Surveying stars

After it is launched in 2011, the Gaia space telescope will map more than a billion stars in our Galaxy. The goal is to chart a three-dimensional map of the Milky Way to study the evolution of the galaxy. ESA reckons that Gaia also will discover planets in other solar systems during its eight years of operation. Three sensitive cameras and two reflector telescopes ensure that the Gaia observations will be so precise that they can measure the length of a thumbnail of an astronaut on the Moon, as seen from the Earth. An instrument supplied by Kongsberg Defence & Aerospace will accurately measure the angle between the two telescopes and thereby contribute to the success of one of ESA's most ambitious astronomy projects.



The ESA Gaia space telescope will log the colour, brightness, position, chemical composition and direction of motion of a billion stars in the Milky Way. ©ESA

Charting avalanche hazards

Massive waves triggered by rock falls, have several times struck the fjords in western Norway and in Troms county. In 1934, the Langhammaren cliff fell into the Tafjord and created a flood wave that killed 41 people. Flood waves and rock falls continue to be a hazard to communities in many parts of the country. The Geological Survey of Norway (NGU) now uses satellite images to chart avalanche prone areas. By comparing images taken over time by the ESA Envisat environmental satellite, movements of as little as a few millimetres can be registered in the bedrock. In the summer of 2007, NGU identified newly unstable areas in Lyngen using the analytical method, developed jointly with Norut Tromsø.



Nordnesfjellet. The dashed line delineates unstable rock. ©NGU

If the unstable Nordnesfjellet loosens and falls in one piece into Lyngen, it can create a flood wave up to 45 metres high that within minutes will hit the Lyngseidet community centre. ©NGU



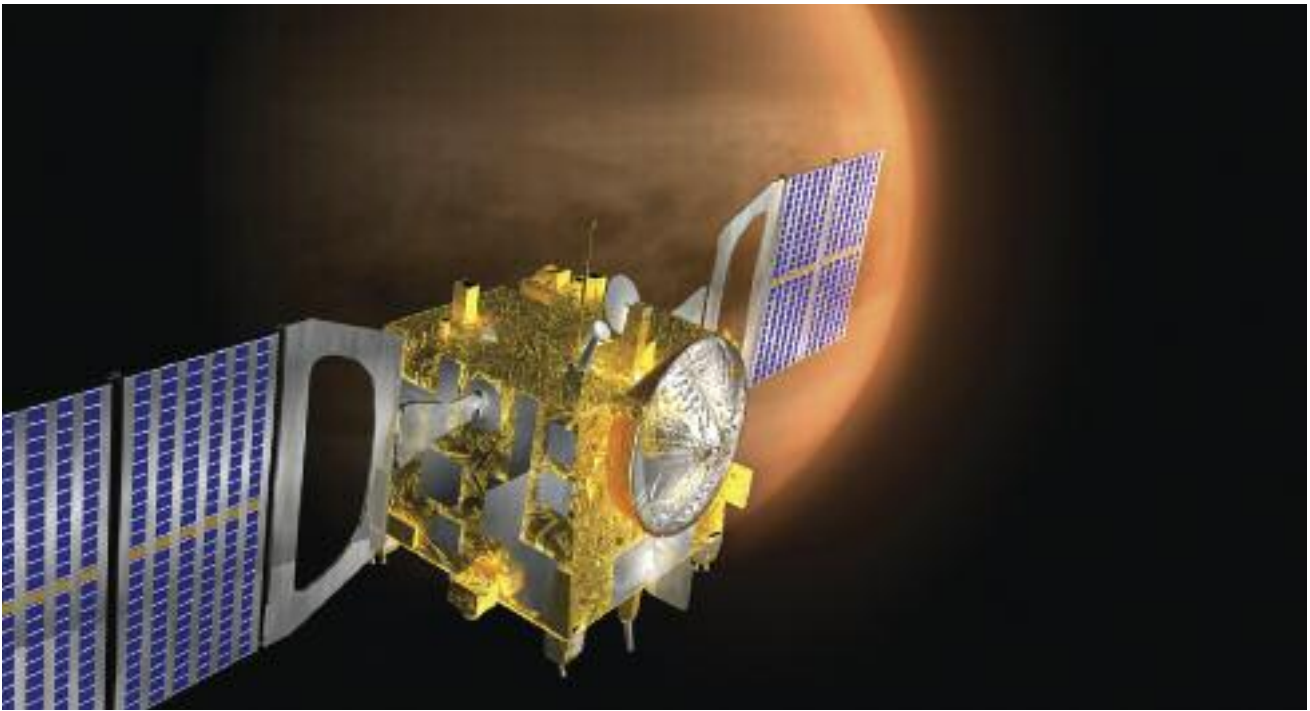
Norwegian seeds at the Space Station

Hundreds of Thale cress seeds in eight specially-made Norwegian flowerpots were on board the Endeavour space shuttle on its August mission to the Space Station. The experiment in space aimed to find if the seeds could sprout to plants that would grow, flower and produce seeds in a weightless environment. The Plant Biocentre at NTNU lead the trial and controlled watering and monitoring from the control centre in Trondheim. Sprouting was successful, but the 70-day experimental period was not long enough for the plants to mature and produce seeds. Plant experiments such as these are essential in developing species suitable for long space missions. Norwegian scientists are among the leaders in this field.

Astronaut Clayton Anderson was the local gardener for the Thale cress that sprouted in the European mini green house on board the Space Station. A new experiment with Norwegian seeds in space is scheduled for 2009 or 2010.



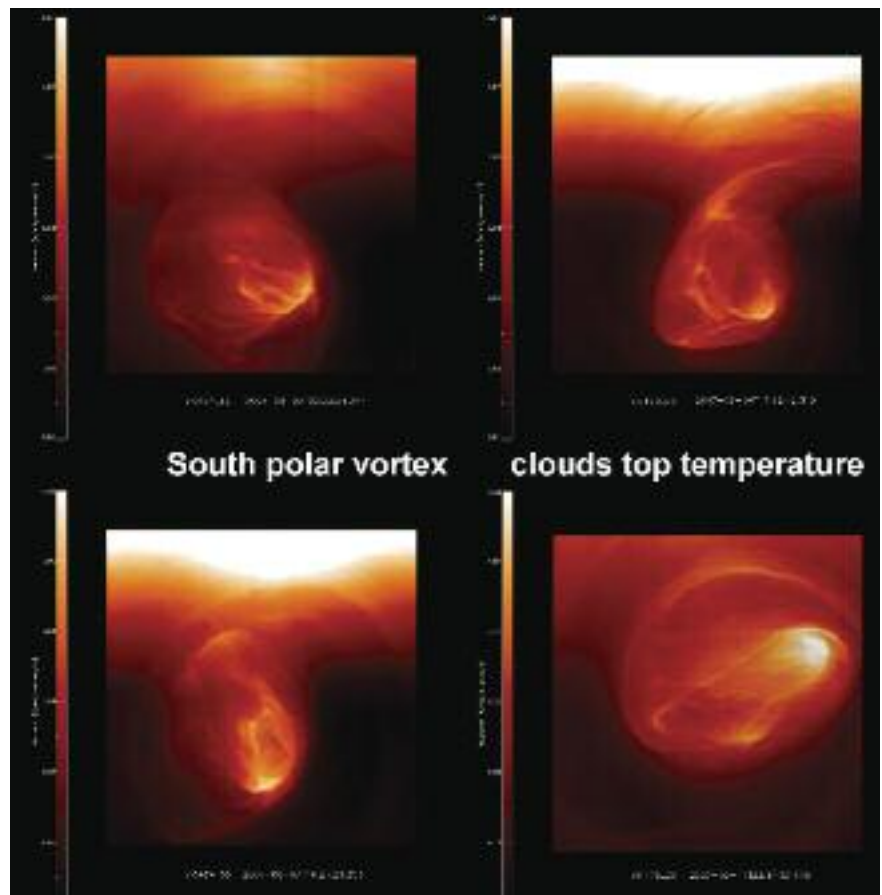
Venus Express



The ESA Venus Express probe was launched in 2005 and took eight months to reach Venus. The probe is in a long, narrow orbit, from 66,000 to 250 km above the surface of the planet. It measures the Venusian atmosphere. ©ESA

After having orbited Venus for a year, the Venus Express probe has revealed new aspects of the planet's atmosphere. Strong winds of speeds up to 500 km/h have been observed at an altitude of 100 km, while there's little air movement at ground level. There are rapidly rotating vortices above both poles. The part of the atmosphere facing the Sun is so intensely heated that it literally boils. The probe will continue to explore the Venusian atmosphere up to May 2009.

Infrared images of the vortex over the south pole of Venus show a dynamic system of strong winds. The vortex is 2700 km in diameter, about the size of Western Europe. ©ESA



Auroral research at Andøya



The aurora above Rauvatnet in Nordland county. ©Petter Hamnes

As a rule, the aurora is visible at night, on the side of the Earth away from the Sun. The aurora can also arise in daytime, but is difficult to see because it is swamped by sunlight. One of the few places where the dayside aurora can be observed is on Svalbard, during the polar night. In December, NASA observed the dayside aurora over Svalbard using two research rockets from the Andøya Rocket Range. On board instruments measured the aurora light spectrum, particle energies and changes in electric and magnetic fields. NASA scientists will use the measurement results to study the effects of interaction of the magnetic fields of the Sun and the Earth in the atmosphere.

In December, two research rockets were launched from Andøya to study the dayside aurora. The first attained an altitude of 1350 km in the atmosphere. Two minutes later, the second attained an altitude of 650 km. ©Kolbjørn Dahle, Andøya Rakettskytefelt.



EGNOS

The European Geostationary Navigation Overlay Service (EGNOS) is used to correct and thereby enhance the accuracy of GPS signals. The system also provides information on

the status and quality of the correction data, known as integrity data. The new EGNOS station on Jan Mayen was finished in 2007 and will be operational in 2008. Together with

a similar EGNOS facility on Svalbard, the Jan Mayen station will help improve the quality of GPS signals in the far north.



ESA's new EGNOS station is at Sørslaguna on Jan Mayen.

©O-M Pedersen.

Record low Arctic ice

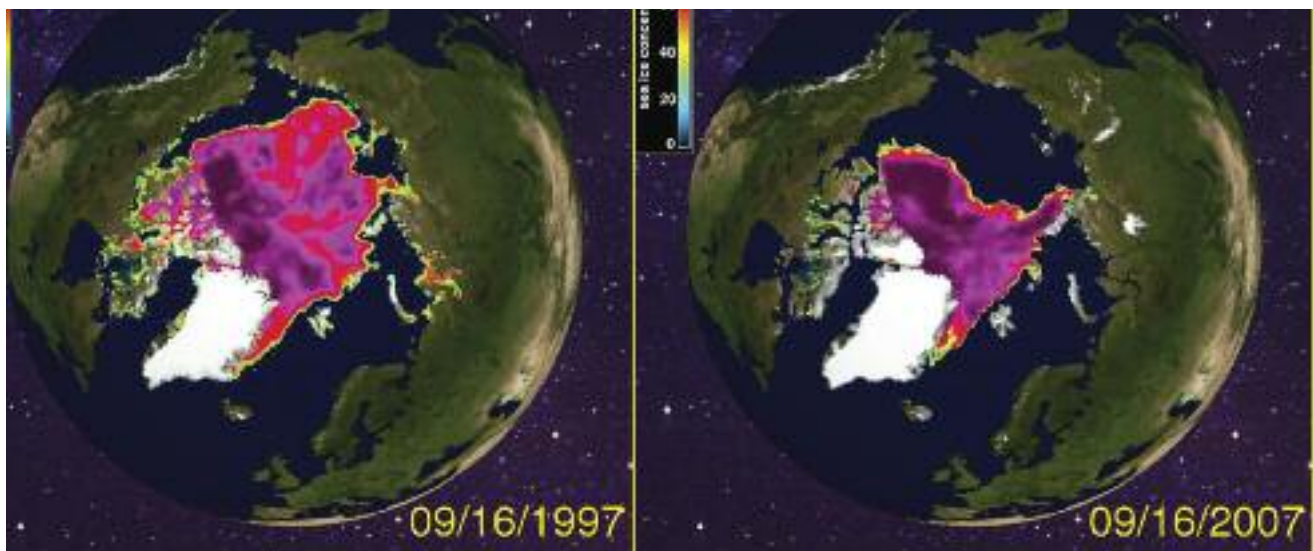
Over the last few decades, summer ice in the Arctic Ocean has dwindled, and in September 2007 it reached the lowest extent since satellite measurements began in 1997. The award of the 2007 Nobel Peace Prize to the Intergovernmental Panel on Climate

Change (IPCC) and Al Gore is a reminder that satellite observations have become essential in climate research. Measurements made over several years and larger areas are a prerequisite to charting global climate change. Computer modelling and

simulations of future climate depend on extensive data series from satellites.

In September 2007, the extent of Arctic ice was the lowest since satellite measurements began in 1979. The images show ice extent on the same date at an interval of ten years.

©University of Illinois Cryosphere Today.



Radarsat-2

The Canadian Radarsat-2 satellite was launched in December 2007. It is extremely useful for Norway because observations made by instruments on board include oil spills, wave heights, sea ice, snow cover and vegetation. Several years ago, the Norwegian Space Centre entered an agreement with the Canadian Space Agency (CSA) for the use of data from Radarsat-2 as well as from its predecessor, Radarsat-1.

The Nargis cyclone is the worst natural disaster to strike Burma in modern times. At least 90,000 people were killed when the cyclone hit coastal areas of the country on 2 May 2008. The Radarsat image was taken on 7 May and shows water depths on flooded areas west of Yangon, formerly Rangoon. ©CSA/MDA



Mars on Svalbard

For the fifth year in a row, researchers of the Arctic Mars Analog Svalbard Expedition (AMASE) went to the north coast of Svalbard to test technologies that can be used to search for life on Mars. AMASE exploits the similarities of northern Svalbard to Mars, with volcanism, ice and rare minerals. AMASE is a Norwegian initiative, and staff from NASA and ESA joined in the two-week voyage on the Lance research ship. They carried equipment including two instruments intended for the NASA Mars Science Laboratory probe to be launched in 2009. The technology for the planned ExoMars probe also was tested.

A rover that climbs steep inclines was tested on Svalbard. The JPL Cliffbot rover will be used to obtain rock samples from places inaccessible to astronauts.

©AMASE



Visit of the astronauts

In December 2006, Christer Fuglesang of Sweden became the first Scandinavian in space when he spent 14 days on board the Space Station. Both Sweden and Norway followed

the mission from minute to minute, and Fuglesang was given a hero's welcome on a brief visit to Stockholm two weeks later. In April 2007, Fuglesang visited Norway together

with the other mission crew members. The Norwegian Space Centre hosted the fully-packed meeting at the Oslo City Hall, where the astronauts spoke about their stay in space.

©Atle Abelsen



50 years in space



©NASA

The space age started with the Soviet launch of Sputnik-1 on 4 October 1957. Sputnik-1 was a metal sphere, half a metre in diameter and weighing 83 kg. It carried a radio transmitter and four antennas, so people on Earth could follow its orbiting. It orbited for three months before it gradually lost altitude and burned up in the atmosphere. A month later, a satellite was launched carrying Laika, a dog and the first animal in space. In 1961, Yuri Gagarin became the first human in space, and the USA initiated the Apollo programme that resulted in men landing on the Moon in 1969.

On 19 September 2007, space expert and engineer Erik Tandberg was made a Knight of the Royal Norwegian Order of St. Olav for his space educational efforts.

©Werner Juvik



In September, the Norwegian Space Centre and the Norwegian Astronautical Society hosted the 50th Anniversary of Space celebration at the Klingenberg Cinema in Oslo. ©Werner Juvik



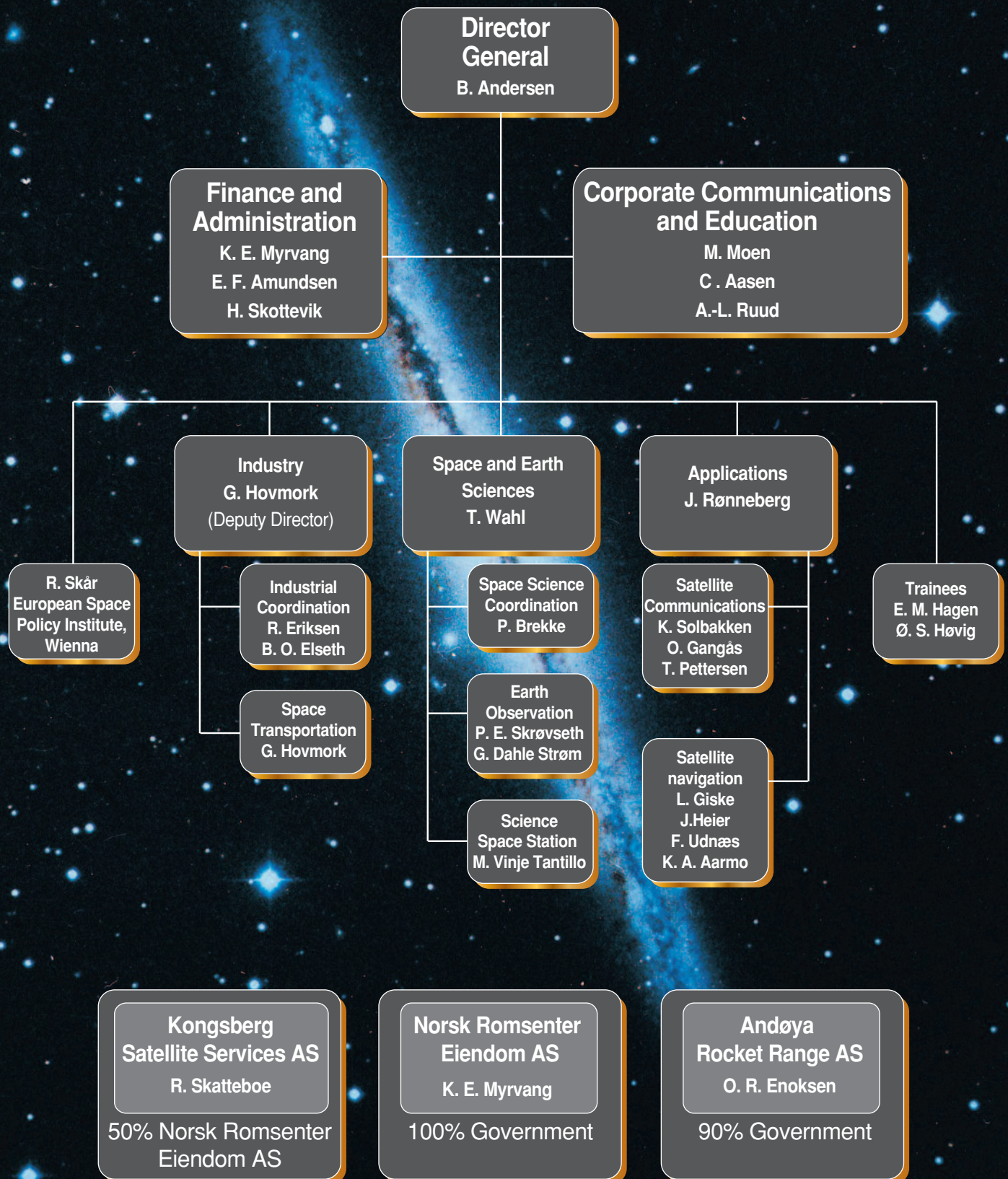
Norwegian Space Centre's 20th anniversary

In 1987, Norway became a member of the European Space Agency (ESA), and the Norwegian Space Centre was established as recommended in the Lied Committee report, Norwegian Space Activities, of 1986. The Space Centre was organized as a foundation under the Ministry of Industry and

was made responsible for coordinating Norwegian space activities. The 1987 budget was NOK 127 million (€16 million), of which NOK 91 million (€11 million) was earmarked for ESA participation. Today, 20 years later, the total budget has gone up to NOK 470 million (€59 million), of which NOK 400 million (€50 million) is allocated to the mandatory and voluntary ESA programmes.

As the Norwegian Space Centre Director, Bo Anderson was the first to get a slice of the anniversary cake. ©Norsk Romsenter

Organization of the Norwegian Space Centre (NSC) as per 1 May 2008





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