

= Svalbard Satellite Station =

Svalbard Satellite Station (Norwegian : Svalbard satellittstasjon) or SvalSat is a satellite ground station located on Platåberget near Longyearbyen in Svalbard , Norway . Opened in 1997 , it is operated by Kongsberg Satellite Services (KSAT) , a joint venture between Kongsberg Defence & Aerospace and the Norwegian Space Centre (NSC) . SvalSat and KSAT 's Troll Satellite Station (TrollSat) in Antarctica are the only ground stations that can see a low altitude polar orbiting satellite (e.g. , in sun @-@ synchronous orbit) on every revolution as the earth rotates . The facility consists of 31 multi @-@ mission and customer @-@ dedicated antennas which operate in the C , L , S and X bands . The station provides ground services to more satellites than any other facility in the world .

Customers with their own installations include the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) , the National Aeronautics and Space Administration (NASA) , the European Space Agency (ESA) and the National Oceanic and Atmospheric Administration (NOAA) . The station also reads and distributes data from the Japanese Hinode solar research satellite . The facility has seen a large increase in smaller customers after 2004 , when the Svalbard Undersea Cable System started providing a fiber Internet connection . Concessions for downloading are only issued to civilian satellites , yet some data has been indirectly used by armed forces . There is a disagreement as to whether this constitutes a breach of the Svalbard Treaty .

= = History = =

The European Space Research Organization (ESRO) established Kongsfjord Telemetry Station in Ny @-@ Ålesund as one of its four initial European Space Tracking Network stations . The facility remained in use from 1967 to 1974 , but was closed as it was not suitable for ESRO 's second generation of satellites . During the planning of the station , Longyearbyen had been proposed as a location , and it was largely political concerns by Norwegian authorities to create permanent activity in Ny @-@ Ålesund which lead ESRO to accept the location .

In the 1990s , NSC operated Tromsø Satellite Station (TSS) , which was used as a ground station for a limited number of satellites . After Rolf Skår was appointed director of NSC , plans were launched to try to win the ground station contract for NASA 's planned Earth Observing System (EOS) . NASA was considering locating the ground station in Greenland , at McMurdo Station in Antarctica or at Esrange in Sweden . Skår invited a NASA delegation to visit Svalbard , and from 1996 NSC and NASA started negotiating a contract to establish a ground station at Longyearbyen .

Svalbard was chosen because of its high latitude from which every polar @-@ orbiting satellite above 500 kilometers (310 mi) can be seen on every revolution as the earth rotates within its orbital plane . For the EOS program , Svalbard was supplemented by Poker Flat Research Range in Fairbanks , Alaska . Construction of the road up to Platåberget started in 1996 and a relay station was built to send the data to Isfjord Radio before being sent onwards to a geostationary satellite . The first installation was an 11 @-@ meter (36 ft) parabolic antenna with S and X band capability .

The first satellite to use SvalSat was Landsat 7 , which was launched on 15 April 1999 . It was followed up by three other EOS satellites : Terra , Aqua and QuikSCAT . To ensure a sustainable financing of operations , NSC started negotiating with other potential customers . However , the project was rejected by the Indian Space Research Organisation . Instead , a cooperation was made with Kongsberg Aerospace and Defence and Lockheed Martin , who built the second antenna as a joint venture . In 2001 , a German research group applied for permission to establish a ground station in Ny @-@ Ålesund . NSC feared that the competition could undermine the financial capabilities of SvalSat . However , no facility in Ny @-@ Ålesund was built .

In 2002 , ownership and operations of the facility were consolidated and taken over by the newly created Kongsberg Satellite Services . Lockheed Martin was no longer interested in owning a share of the facility , and sold their shares . NSC and Kongsberg merged their interests in the new company , which also took over TSS . By 2004 , six antennas , between 9 and 13 meters (30 and

43 ft) in diameter , had been installed .

Northrop Grumman and Raytheon decided in 2002 to locate its ground station for National Polar-orbiting Operational Environmental Satellite System , the successor of EOS , to Helsinki , Finland , instead of Svalbard . The reason was lack of optical fiber cable connection to the archipelago . NSC took initiative to build such a cable in July 2002 and gained interest from NASA , NOAA and Telenor . The cable was financed by the satellite operators paying the same fee for the transmission of data as they would have to pay for a satellite connection until the cable was paid for . A 40 million United States dollar contract was signed with Tyco International for two cables between Harstad on the mainland and Longyearbyen . Construction started in June 2003 and was completed in January 2004 .

Starting in 2007 , SvalSat was expanded with 12 antennas . Five are used for Galileo , while the remaining are used for a large array of customers . In 2007 and 2008 , both Terra and Landsat 7 were hacked twice . The hackers were able to achieve all steps which would have been necessary to take control over the satellites , but did not actually take control . The operation commanded the satellites via SvalSat , which it was able to hack via the Internet connection .

In his 2011 book *Satellitkrigen* , Norwegian Broadcasting Corporation journalist Bård Wormdal argues that SvalSat is used for military intelligence and thus is violating the Svalbard Treaty . Specifically , Wormdal provides evidence that downloaded images of the earth are used for intelligence and military activities . For instance , a Landsat image taken during the Libyan Civil War was sold by the Italian company e-GEOS to the Italian Armed Forces . Similarly , an Technology Experiment Satellite image was sold to the United States Armed Forces during the War in Afghanistan and Arirang-2 images of North Korean installations have been sold to the United States . All three satellites use SvalSat as one of their ground stations . According to Governor Odd Olsen Ingerø , even if a military should indirectly use information downloaded from SvalSat , this would not be a breach of the treaty . A dissertation by Professor Geir Ulfstein concludes that even if a ground station was directly used for downloading military intelligence from military satellites , it would still be permitted by the treaty .

= = Operation = =

SvalSat is owned and operated by Kongsberg Satellite Services (KSAT) , which is again equally owned by the Kongsberg Defence and Aerospace and the Norwegian Space Centre , the latter which is again owned by the Ministry of Trade and Industry . Of KSAT 's 120 employees , 22 are stationed in Longyearbyen and work at SvalSat . KSAT is not tied to a particular operator of satellites and some of the antennas communicate with multiple satellites , thus reducing costs compared to dedicated ground stations . For a typical satellite , data is delivered to the end customer no more than 30 minutes after downloading .

All ground stations are connected to KSAT 's Tromsø Network Operation Center , which is also connected to the TSS and TrollSat . This allows for redundancy as also TSS and TrollSat can be used to communicate with the satellites . Some customers have direct access to their installations in Longyearbyen without having to route via the Tromsø Network Operation Center . The operation center is responsible for backup , scheduling and conflict resolution . The facility uses interoperability and shared ground services , such as a common protocol for communication and similar design of the antennas , to increase flexibility and reduce costs and risk .

KSAT operates two polar ground stations optimized for low Earth orbit (LEO) satellites , the other being TrollSat at Troll in Antarctica . These are the only two ground stations able to see a polar-orbiting satellite on every revolution . By using both stations , customers can communicate with a satellite twice per orbit .

All satellites which use SvalSat need a concession from the Norwegian Post and Telecommunications Authority . Such a concession is only awarded to satellites which would abide by the treaty and explicitly excludes any military satellites . However , this does not prevent information from dual-use satellites being sold to military organizations . The Governor of Svalbard inspects the station twice per year . This includes checking the logs of satellites SvalSat

has communicated with , but not the actual information transferred . All SvalSat employees need a security clearance from NATO and the Norwegian Armed Forces .

= = Facilities = =

SvalSat is located on Platåberget , a mountain plateau 400 to 500 meters (1 @, @ 300 to 1 @, @ 600 ft) above mean sea level just outside Longyearbyen on the island of Spitsbergen in Svalbard , Norway . The location on the 78th parallel north is favorable to communication with satellites in low polar orbits . The facility consists of 31 antenna systems , both multi @-@ mission and customer dedicated , making SvalSat the world 's largest commercial ground station . They are variously capable of communication in the C , L , S and X bands . SvalSat makes use of the Consultative Committee for Space Data Systems ' Space Link Extension protocols , an international standard for ground station to satellite communication . Most antennas use the S band for tracking , telemetry and commanding and the X band for high @-@ speed data download .

Originally , SvalSat used a combination of a 2 megabits per second (Mb / s) leased line , several Integrated Services Digital Network lines and a 55 Mbit / s satellite Internet access via Intelsat for data transmission off the island . From 2004 , the Svalbard Undersea Cable System gives two redundant fiber lines to the mainland , each providing 10 gigabits per second . The fiber connection is operated by Telenor . Power is supplied from Longyearbyen Power Station , In case of a power outage , the facility is equipped with an uninterruptible power supply and has a standby generator capable of supplying power for two weeks .

The facility consists of a 600 @-@ square @-@ meter (6 @, @ 500 sq ft) main operations building , a 70 @-@ square @-@ meter (750 sq ft) building for the emergency power supply , a transformer station , and a mobile research station , in addition to the radomes . The lot is located above Store Norske Spitsbergen Kulkompani 's Mine 3 and is leased to KSAT . The facility is connected to Longyearbyen via a 3 @. @ 5 @-@ kilometer (2 @. @ 2 mi) long private road . When the road is closed because of avalanches and land slides , helicopter transport is used . There is a road connecting all the antennas to ease maintenance . Installations at SvalSat not related to satellite communication include a measuring station for radioactive particles in the air operated by Norwegian Seismic Array , a telecommunications installation operated by Telenor , a weather station operated by the Norwegian Meteorological Institute , with information relayed to Svalbard Airport , Longyear , and a weather station operated by SvalSat .

Antennas are placed according to customer specifications , which normally involves a distance of 200 meters (660 ft) between antennas . This is to ensure that antennas do not shade each other and that their electromagnetic noise and radio noise do not interfere with each other . Locations are chosen to maximize satellite pass durations , view a calibration station on Hiorthhamnfjellet , provide visibility of the Clarke Belt for geostationary satellite antennas , or visibility to Isfjord Radio for terrestrial communications antennas .

= = Customers = =

SvalSat is part of NASA 's Near Earth Network . This includes support for the Earth Observing System , which includes satellites such as Aqua , Aura , Ice , Cloud and Land Elevation Satellite , and QuikSCAT , as well as the Small Explorer program which includes Galaxy Evolution Explorer , the Submillimeter Wave Astronomy Satellite , Swift Gamma @-@ Ray Burst Mission , Thermosphere Ionosphere Mesosphere Energetics and Dynamics , Interface Region Imaging Spectrograph , and Transition Region and Coronal Explorer . SvalSat and Poker Flat are collectively responsible for half of the network 's 140 daily passes . Satellites operated by the National Oceanic and Atmospheric Administration using SvalSat includes the Suomi National Polar @-@ Orbiting Partnership and the Defense Meteorological Satellite Program . Other American satellites include the United States Geological Survey 's Landsat 5 and Landsat 7 and the private Iridium Communications ' satellites .

The European Space Agency operates Svalbard @-@ 3 (SG @-@ 3) , a 13 @-@ meter (43 ft)

dish antenna which is able to transmit in the S band and receive in the S and X band . ESA uses the facility for tracking , telemetry , telecommand , radiometric measurements and system validation . Satellites include European Remote Sensing Satellite 2 and Envisat . The European Organisation for the Exploitation of Meteorological Satellites uses SvalSat as a ground station for its MetOp satellites , which allows communication with all MetOp orbits . SvalSat serves as one of five uplink stations and as a sensor station for Galileo . Five antennas are used for Galileo , including one with a 10 meter (33 ft) diameter and four at 4 meters (13 ft) .

The Norwegian Coastal Administration uses SvalSat to track ships ' Automatic Identification System in Norwegian waters via AISat 1 . The Japan Aerospace Exploration Agency uses SvalSat for its Hinode mission . Other customers include MacDonald , Dettwiler and Associates 's Radarsat 1 and Radarsat 2 , the Taiwanese National Space Organization 's Formosat 2 , the Korea Aerospace Research Institute of South Korea 's Arirang 2 , the Indian Space Research Organisation 's Technology Experiment Satellite , Cartosat 1 and Cartosat 2 , the German RapidEye constellation , the Italian Space Agency 's COSMO SkyMed and the German Aerospace Center 's TerraSAR X.