

= Troll Satellite Station =

Troll Satellite Station (Norwegian : Troll satellittstasjon) , commonly abbreviated TrollSat , is a satellite ground station located at Troll in Queen Maud Land , Antarctica . The earth station is owned by Kongsberg Satellite Services (KSAT) , a joint venture between the Kongsberg Group and the Norwegian Space Center . The radomes are located on top of Jutulssessen , a nunatak area next to the research station at Troll . The research station is operated by the Norwegian Polar Institute , which also maintains the earth station . TrollSat started operations on 1 March 2007 and was officially opened on 20 January 2008 .

The earth station serves low Earth orbit satellites and consists of a 7 @. @ 3 @-@ meter (24 ft) antenna capable of S band and X band reception . Information is relayed using a 4 @. @ 8 @-@ meter (16 ft) and a 7 @. @ 6 @-@ meter (25 ft) C band uplink . Operations control is carried out by KSAT in Tromsø , Norway . Satellites using TrollSat include Radarsat , GeoEye , WorldView and Galileo . The system is coordinated with Svalbard Satellite Station (SvalSat) in Longyearbyen , Norway , which combined offer downloading twice per orbit .

= = History = =

Troll was established as a research station by the Norwegian Polar Institute in 1990 . The station took its name from the surrounding jagged mountains , which resemble trolls of Norse mythology . Already at this time , there were proposals by the Norwegian Space Centre to establish an earth station at Troll , but the lack of all @-@ year activity stranded the plans . Instead , SvalSat was established to serve as an earth station for NASA 's Earth Observing System (EOS) . Longyearbyen was selected because of its high latitude , which allows all satellites with an orbit above 500 kilometers (300 mi) to use only a single ground station ? yet download from every orbit . The Svalbard facility opened on 15 April 1999 and was originally owned by the Norwegian Space Centre . Kongsberg Satellite Services was established in 2002 to jointly operate SvalSat and Tromsø Satellite Station (TSS) .

In 2003 , Norwegian authorities decided to extend its operations in Antarctica by establishing an all @-@ year research station . By then , Norway was the only country with a territorial claim to Antarctica to not have an all @-@ year research station on the continent . Construction was carried out from December 2004 through February 2005 . To ease logistics , Norway took the initiative to establish Dronning Maud Land Air Network (DROMLAN) , a cooperation between the countries with bases in Queen Maud Land to streamline transport costs . The permanent Troll Airfield was opened on 11 February 2005 .

The basis for TrollSat was an agreement signed in 2006 between the Norwegian Polar Institute , the Norwegian Space Centre and Kongsberg Satellite Services . It specified that the Space Centre would install a Kongsberg @-@ built radome , while the Polar Institute would provide power and undertake maintenance . In exchange , they could freely use the earth station for their own transmission needs . The commercial activities would be carried out by Kongsberg Satellite Services . A concern was raised regarding if satellite downloading would violate the Antarctic Treaty , but the Ministry of Foreign Affairs negated . The station started operations on 1 March 2007 and was officially opened by Prime Minister of Norway , Jens Stoltenberg .

= = Operation = =

SvalSat is owned and operated by Kongsberg Satellite Services (KSAT) , which is again equally owned by Kongsberg Defence and Aerospace and the Norwegian Space Centre , the latter which is again owned by the Ministry of Trade and Industry . KSAT is not tied to a particular operator of satellites and 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 thirty minutes after downloading .

KSAT operates two polar ground stations optimized for low Earth orbit (LEO) satellites , the other

being SvalSat at Longyearbyen in Svalbard , Norway . These are the only two ground stations able to communicate with all orbits of LEO satellites . By using both stations , customers can download data twice per orbit , twenty @-@ six times per day , with only a forty @-@ minute maximum delay .

The ground station is connected to KSAT 's Tromsø Network Operation Center , which is also connected to the TSS and SvalSat . This allows for redundancy as also TSS and TrollSat can be used to communicate with the satellites . 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 .

TrollSat sees only a fraction of the business of SvalSat . Troll is used for downloading from the Canadian Space Agency 's Radarsat @-@ 1 and Radarsat @-@ 2 , and the private GeoEye @-@ 1 , WorldView @-@ 1 and WorldView @-@ 2 . It will also be one of thirty ground stations for the European Space Agency (ESA) ' s satellite navigation system Galileo , and is Norway 's main contribution to the project . It further serves ESA 's Envisat and several National Aeronautics and Space Administration satellites .

= = Facilities = =

Troll is located in the eastern part of Princess Martha Coast in Queen Maud Land , on the nunatak bare ground area Jutulsessen , at 1 @,@ 270 meters (4 @,@ 170 ft) above mean sea level . Troll is completely surrounded by the Antarctic ice sheet and is 235 kilometers (146 mi) from the coast . The research station facilities are owned by the Government of Norway through the Norwegian Directorate of Public Construction and Property . Operation of the facility carried by another government agency , the Norwegian Polar Institute . The station has a cold and dry climate , being located in a desert . The annual mean temperature is ? 25 ° C (? 13 ° F) , with the summer temperature able to reach about 0 ° C (32 ° F) , and the lowest during the winter at ? 50 ° C (? 58 ° F) . Storms , which can occur throughout the year , can occasionally make outdoor activity impossible .

TrollSat targets satellites in a polar orbit and consists of a single radome with an 7 @.@ 3 @-@ meter (24 ft) low Earth orbit antenna capable of S band and X band reception . To relay the information , TrollSat has a 4 @.@ 8 @-@ meter (16 ft) and a 7 @.@ 6 @-@ meter (25 ft) C band uplink to provide 45 megabit per second broadband connection to Europe and North America .