

Polar Satellite Services from Telenor

Reliable near real-time data delivery via satellite

The placing of a receiving station for satellite data at an island near the North Pole involves certain challenges related to communication of these data to the users elsewhere in the world. There is no terrestrial infrastructure connecting Svalbard to the Norwegian mainland or any other destination, and in addition particular technical solutions are required to enable communication via geo-stationary satellites from a position as far North as 78 degrees. In most of Europe, the elevation angle towards the geo-stationary satellites is between 30–45 degrees, while for communications with Svalbard it is barely above zero, only between two and three degrees. Adding an additional challenge in terms of increased disturbance of the signal as the radio signal passes through 120 km of the earth's atmosphere, most experts agreed that satellite communications to Svalbard was a lost case.



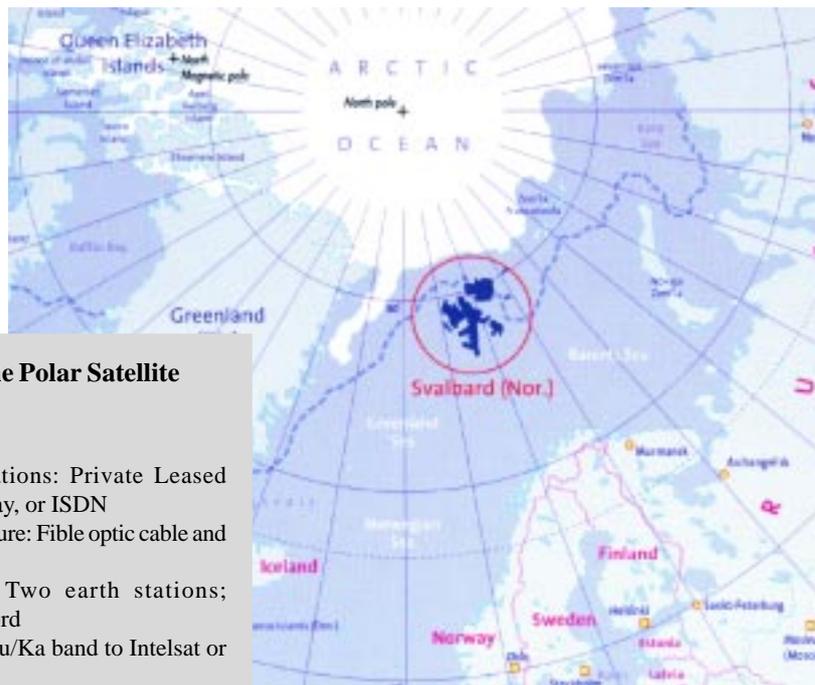
The main antenna is shown in the centre of the picture and on the left side, the spare antenna. Over the roof you catch a glimpse of the link antenna pointing towards the Svalsat station.

Since the late 60-ies, however, scientists working for Telenor - the largest Norwegian telecommunications company - argued that these technical problems could be solved. At the time, Telenor had already been present on Svalbard for over 50 years offering basic telegraphy to and from the Norwegian mainland. After several years of developing and testing of equipment for a satellite communications solution for Svalbard, the service was launched in 1979, providing national and international telephony. Since then, the service has been improved in step with the technological development, and Telenor can today provide the same communication services at Svalbard as for the rest of the Norwegian community.

All satellite communication with Svalbard goes via the ground station Isfjord Radio at Kapp Linnè furthest west of Spitzbergen, the largest island in the archipelago. This station was established in 1933, acting as an intermediary for traffic between Svalbard Radio in Longyear City and marine vessels in the waters around Svalbard. The placing of the station at Kapp Linne later proved to be ideal for communication with geo-stationary satellites and today the station is the main centre for all communications with the islands.

When the Norwegian Space Centre (NSC) in 1997 established their earth station facilities for operators of polar orbiting satellites - SvalSat - at a plateau near Longyear City, the need for an always-available communication link to the rest of the world was one of the cornerstones of the service. The infrastructure already established by Telenor became crucial for these operations. In recent years, Telenor has also built a redundant multi-link broadband network connecting the SvalSat facility to the Isfjord ground station at Kapp Linne, ensuring that an alternative route is always available, both on Svalbard and to the mainland, in the event of a link failure.

From the world's best location for communication with polar orbiting satellites, the NSC and Telenor provide reliable end-to-end solutions for the reception and global distribution of



The elements of the Polar Satellite Services offering:

- Network configurations: Private Leased Circuits, Frame Relay, or ISDN
- Terrestrial infrastructure: Fibre optic cable and microwave
- Satellite ground: Two earth stations; Platåberget and Isfjord
- Space segment: C/Ku/Ka band to Intelsat or Thor I – III
- Data rates: 64 Kbps to 155 mbps.
- Network design and planning support
- System implementation
- Network operation and maintenance

Clear sight towards the geostationary communication satellite over the line, only two degrees over the horizon.

satellite-borne data. The data downloads from polar orbiting satellites are received by large antennas placed at the SvalSat facility. The signals are then transferred to Isfjord Radio ground station via Telenor’s terrestrial infrastructure consisting of fibre optic cable and radio links. The antennas at Isfjord communicate with geo-stationary satellites above equator and the signals are distributed to the customer’s location in the USA or in Europe. Telenor will also provide return channels for transmission of TT&C signals (Telemetry, Tracking & Command) to the polar orbiting satellites.

Telenor’s Satellite Networks division provides Polar Satellite Services to the Svalbard community. The division focuses on satellite-based communication services and systems to corporate niche markets in Europe, the Middle East and Africa. They provide total solutions comprising network communications infrastructure, telecommunication services, applications and support services.

Telenor is Norway’s leading distributor of voice, information, knowledge and entertainment through a broad range of modern communications services. The company reported total revenues of approx NOK 37 billion in 2000 and has more than 20.000 employees world wide. Telenor has an international portfolio of interests in more than 70 wholly or partially-owned subsidiaries and associated companies.



Concern Director Tormod Hermansen, Telenor and Managing Director Rolf Skår, Norwegian Space Centre in front of the communication equipment at the receiving station, Svalsat.