

Appendix 1: Research infrastructure in Svalbard

The research infrastructure in Svalbard is extensive. Research organizations from 20 countries are present on a regular basis, operating a wide variety of advanced facilities, ranging from large scale radars to numerous field stations scattered all over Svalbard and a variety of research vessels operating in the surrounding waters. There are permanent research and monitoring stations in Longyearbyen, Ny-Ålesund, Barentsburg, Hornsund, Svea, Bear Island and Hopen.

Instrumentation and research facilities:

Air and space related research (with links to all relevant web-sites):

- **The EISCAT Svalbard Radar** is an incoherent scatter radar facility which can observe a variety of parameters in the upper and middle atmosphere from about 80 km to 1000 km above ground.
 - <http://www.eiscat.se>
- **SPEAR** is a high power transmitter, installed to modify locally the polar ionosphere. The combination of SPEAR and radars makes it possible to carry out controlled experiments in the polar ionosphere and thereby to study a large variety of plasma processes and turbulence.
 - <http://www.ion.le.ac.uk/spear/index.html>
- **The Kjell Henriksen Observatory** with its variety of optical instruments takes advantage of the fact that in Svalbard one can study the northern lights at mid day – the most direct footprint of the interaction between the solar wind and the upper polar atmosphere to be observed from ground.
 - <http://kho.unis.no/>
- **The SOUSY radar** is installed for studying waves and turbulence in the middle atmosphere. Results are contributing to a better understanding of the effects of climate change.
 - <http://radars.uit.no/sousy/index.html>
- **SVALSAT** is a unique satellite tracking facility consisting of more than 15 antennas and serving polar orbiting satellites for NASA, NOAA, ESA and others.
 - <http://www.ksat.no/>
- **The SvalRak launch site** deploys rockets for auroral and upper polar atmosphere research and provides for studies of the dayside polar cusp including dayside aurora and processes in the magnetospheric boundary layer.
 - <http://www.rocketrange.no/services/sounding-rockets-from-svalbard/>
- **The Geodetic Station** is part of a global observing network for definition of geodetic reference frames, and the use of such to analyse parameters related to regional and global change. The stations magnetic record represents the longest continuous magnetic record at polar latitudes.
 - <http://arcfac.npolar.no/nmafacil.htm>
 - <http://www.statkart.no/IPS/?module=Articles;action=Article.publicShow;ID=1048>
- **The Zeppelin Station** runs a comprehensive, atmospheric monitoring program for pollutants and influences on the climate through a variety of instruments. The studies include aerosol microphysics and atmospheric trace gases, such as CO₂.
 - <http://www.nilu.no/niluweb/services/zeppelin/>
 - <http://www.itm.su.se/zeppelin/>

- **Meteorological stations:** There are meteorological stations in many locations, eg.
 - Isfjorden: <http://met.unis.no/index.htm>
 - Hornsund: http://hornsund.igf.edu.pl/meteo_en.html
 - Ny-Ålesund: eg. <http://www.awi-bremerhaven.de/MET/NyAlesund/met.html>
 - Nordaustlandet: <http://weather-iridium.unis.no/command=RTMC&screen=Map%20and%20Info>
 - Bear Island: http://www.met.no/english/about/organisation/met_dep/forecast_nn/bear_island.html
 - Hopen: http://www.met.no/english/about/organisation/met_dep/forecast_nn/hopen.html

Marine research (with links to web-sites):

- **The Kings Bay Marine Laboratory** is an experimental laboratory for research in marine ecology, physiology, biochemistry, as well as physical sciences like oceanography, marine geology and ice physics.
 - http://www.kingsbay.no/bins/site/templates/default.asp?norelay_hier_id_B27D6E0=10&area_2=pages%2Fresearch%2Fmarinelab&NC=4094X
- **Sea based infrastructure** counts several research vessels and a network of different moorings and buoys. Many have been deployed during the IPY and will have to be extended and replaced. The planned Aurora Borealis and the proposed new Norwegian ice-breaking research vessel will also be complementary to this proposal. Following some examples of research vessels frequently sailing in Svalbard waters:
 - RV Lance, The Norwegian Polar Institute, Norway: <http://npolar.no/lance/>
 - RV Oceania, Polish Academy of Science, Poland: <http://www.iopan.gda.pl/oceania/oceania.html>
 - RV Polarstern, Alfred-Wegener-Institute, Germany: <http://www.awi.de/en/infrastructure/ships/polarstern/>
 - RV Maria S. Merian, University of Kiel, Germany: <http://www.ifm-geomar.de/index.php?id=1401&L=1>
 - Icebreaker Oden, Swedish Maritime Administration, Sweden: http://www.sjofartsverket.se/templates/SFVXPage____1077.aspx
 - RV Jan Mayen, University of Tromsø, Norway: <http://www.nfh.uit.no/hmenyvis.aspx?id=194>
 - RV Johan Ruud, University of Tromsø, Norway: <http://www.nfh.uit.no/hmenyvis.aspx?id=199>
 - RV Johan Hjort, Institute for Marine Research, Norway: http://www.imr.no/english/about_imr/vessels/johan_hjort
 - RV G. O. Sars, Institute for Marine Research, Norway: http://www.imr.no/english/about_imr/vessels/g.o._sars
 - RV Håkon Mosby, University of Bergen, Norway: http://www.imr.no/english/about_imr/vessels/hkon_mosby

Research related to glaciers and sea ice:

- Researchers have been monitoring glaciers in Svalbard systematically since the 1960's. The most widely used sites are near the communities of Ny-Ålesund, Longyearbyen, Barentsburg and Hornsund and at more remote locations like Nordaustlandet. Following some examples of research activities:
 - <http://www.ssf.npolar.no/pages/news117.htm>
- Research related to sea ice is carried out through field observations in the Arctic Oceans and by satellite surveillance. Following some examples of research activities:

- <http://www.ssf.npolar.no/pages/news114.htm>

Terrestrial research:

- Terrestrial research in Svalbard is performed by using a variety of field station all over the islands. Adventdalen/Endalen, Ny-Ålesund, Hornsund and Nordaustlandet are among the most widely used. Following some examples of research activities:
 - <http://www.ssf.npolar.no/pages/news112.htm>

Research and logistics facilities at the Svalbard Science Centre:

The Svalbard Science Centre contains both tailor-made logistic facilities for arctic operations as well as specialized laboratory facilities.

- **Laboratory facilities:** Svalbard Science Centre houses several lab facilities specialised to arctic science. One of the great achievements is that all lab facilities have got sea water available in the water-tap. All lab facilities have also got supply of different gases from a central gas supply.
 - **Teaching lab:** Teaching lab with room for about 25 students to perform a variety of different studies.
 - **Scales room:** With different kinds of scales.
 - **Sterile lab:** For specialized experiment that needs a sterile environment.
 - **2 x Instrument rooms:** For different kinds of instruments, also instruments that needs volatiles.
 - **Chemical lab:** Specialized lab for work with all kinds of chemical substances.
 - **2 x Sea water lab:** Lab facilities, with 4 tanks in total, that could be filled with sea water to house live samples.
 - **3 x Controlled environment lab:** Specialized rooms for experiments that needs a controlled environment in respect of temperature, humidity, light and other parameters.
 - **3 x Cold lab:** Rooms for experiments with frozen samples of all kinds.
 - **Chemical storage rooms:** Specialized storage room for chemicals.
 - **7 x Research lab:** Smaller lab areas where 2 – 4 scientists can set up instruments and perform different kinds of experiments or project work.
- **Logistic facilities:**
 - The logistic facilities contains of a big storage room leading out to a “field preparation room” where equipment and instruments can be packed ready on snow scooter sledges e.g. From this room you can drive out on field work and coming back again, leave your equipment to “melt down” before taking care of as samples and instruments.
 - In close connection to the storage and preparation room there are mechanical and electrical workshops, as well as specialized rooms for storage of gas, pyrotechnic equipment and delicate instruments.
 - In close connection to the logistic facilities there are rooms for planning and leading of fieldwork, as well as wardrobes with shower-room and sauna.
- **General information:**
 - The University Centre in Svalbard: <http://www.unis.no/>
 - The Norwegian Polar Institute: <http://npweb.npolar.no/>
 - Svalbard Science Forum: <http://www.ssf.npolar.no/pages/baseLby.htm>

Research stations:

- **Svalbard Science Centre:** Svalbard Science Centre, located in Longyearbyen, is the home of The University Centre in Svalbard. In addition, The Norwegian Polar Institute, Eiscat, SvalSat, SINTEF, the National Institute for Polar Research (NIPR, Japan), Nansen Environmental and Remote Sensing Center - Mohn-Sverdrup-Centre and the University of Tromsø all have offices there. Svalbard Science Centre is also the home of Svalbard Science Forum, Svalbard Museum and the Governor's collection of cultural heritage objects.
 - General information: <http://www.ssf.npolar.no/pages/baseLby.htm>
 - The University Centre in Svalbard: <http://www.unis.no/>
 - The Norwegian Polar Institute: <http://npweb.npolar.no/>
 - European Incoherent Scatter Scientific Association EISCAT: <http://www.eiscat.se/>
 - Kongsberg Satellite Services AS, Avd. SvalSat: <http://www.ksat.no/>
 - Stiftelsen for industriell og teknisk forskning (SINTEF): <http://www.sintef.no/>
 - National Institute for Polar Research (NIPR, Japan): <http://www-arctic.nipr.ac.jp/e-index.html>
 - Nansen Environmental and Remote Sensing Center - Mohn-Sverdrup-Centre: <http://www.nersc.no/main/index2.php>
 - University in Tromsø: <http://uit.no/>
 - Svalbard Science Forum: <http://www.ssf.npolar.no/>
 - Svalbard Museum: <http://www.svalbardmuseum.no/>
 - Storage facilities for cultural historical objects (The Governor of Svalbard): <http://www.sysselmannen.svalbard.no/eng/>

- **Ny-Ålesund - Kongsfjorden International Research Base:** Kings Bay AS delivers infrastructure and logistics services such as full board and lodging and supplies field equipment to scientists and researchers from approx. 10 countries.
 - General information: <http://www.ssf.npolar.no/pages/baseNyAa.htm>
 - Kings Bay AS: <http://www.kingsbay.no>
 - Norwegian Polar Institute (Sverdrup station): <http://www.npolar.no/sverdrup/>
 - Norwegian Institute for Air Research (Zeppelin station): <http://www.nilu.no/niluweb/services/zeppelin/>
 - Stockholm University (Zeppelin station): <http://www.itm.su.se/zeppelin/>
 - Norwegian Mapping Authority (Geodetic station): <http://arcfac.npolar.no/nmafacil.htm>
 - Alfred-Wegener-Institute (AWIPEV Arctic Research Base): <http://www.ipev.fr/awipev/>
 - French Polar Institute Paul Emile Victor (AWIPEV Arctic Research Base): <http://www.ipev.fr/awipev/>
 - British Antarctic Survey (NERC): http://www.antarctica.ac.uk/living_and_working/research_stations/ny_alesund/
 - The National Research Council of Italy (Dirigibile Italia): <http://www.amap.no/envinet/site.cfm?SiteID=13>
 - Norwegian Space Centre/Andøya Rocket Range (SvalRak): <http://www.rocketrange.no/services/sounding-rockets-from-svalbard/>
 - National Institute for Polar Research (NIPR, Japan): <http://www-arctic.nipr.ac.jp/e-index.html>
 - Korea Polar Research Institute (Dasan Station): <http://www.polar.re.kr/english/stations/arctic/intro.asp>
 - Chinese Arctic and Antarctic Administration (Yellow River Station): <http://www.chinare.cn/en/index.html?pid=stations&st=yellow>
 - The Arctic Centre of the University of Groningen, The Netherlands (Netherlands Arctic Station): <http://loonen.fmns.rug.nl/arcticstation/index.php>

- The Kings Bay Marine Lab:
http://www.kingsbay.no/bins/site/templates/default.asp?norelay_hier_id_B27D6E0=10&area_2=pages%2Fresearch%2Fmarinelab&NC=4094X
- Germany's National Research Centre for Geosciences: <http://www.gfz-potsdam.de/html/index-en.html>

- **Barentsburg:** The scientific station in Barentsburg was established by Russian scientists and is used all year round to support researchers in a variety of fields.
 - General information: <http://www.ssf.npolar.no/pages/baseBarentsburg.htm>
 - Russian Academy of Science: http://www.ras.ru/index.aspx?_Language=en
 - Arctic and Antarctic Research Institute: http://www.aari.nw.ru/index_en.html

- **Hornsund:** The Polish station in Hornsund was established during the IGY in 1957/58 and is used all year round to support researchers in a variety of fields.
 - General information: <http://www.ssf.npolar.no/pages/baseHornsund.htm>
 - The Polish Polar Station Hornsund: http://hornsund.igf.edu.pl/index_en.php

- **Svea:** The research station in Svea specializes in effects and technologies related to oil spills in Arctic waters. It is operated by SINTEF.
 - SINTEF: <http://www.sintef.no/>