

S U M M I T G U I D E **2 0 1 6**

CH2M HILL Polar Services

8100 Shaffer Parkway, #100 Littleton, CO 80127-4268

<http://cspolar.com/>

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Summit Station User Guide

Summit Station was established in 1989 as the Greenland Ice Sheet Project 2 (GISP2) drill site. Since that time it has developed to support a wide range of scientific research on a year-round basis. The fields of meteorology, glaciology, atmospheric chemistry, and astrophysics are all represented. In addition, the station serves as a base for long-term environmental observations.

Summit is situated inside the southern boundary of the North East Greenland National Park and located near the apex of the Greenland ice sheet at 72° N, 38° W, at an elevation of 10,530 ft. The effective pressure altitude ranges from 11,000 to 12,000 feet. Weather conditions range from -88 F in the winter to approximately 32 F in the summer. Winds in the summer are generally mild, but can exceed 40 knots during storm events. Winter is the time of year when major storms often occur; with wind speeds recorded in excess of 70 knots.

The purpose of this document is to acquaint researchers with the system in place for facilitating a quality research environment at Summit Station. This is achieved by identifying responsibilities and the processes through which we can ensure a cooperative and mutually rewarding experience. Short and long-range plans are in effect to improve the station infrastructure, but the primary agent of change is you. The goal is to continue maintaining a world-class research facility, and create an unparalleled example of environmental stewardship.

Planning Process

Begin planning for your project at Summit Station by contacting the CH2M Hill Polar Services (CPS) Summit Science Project Manager, Matt Okraszewski (matthew@polarfield.com). CPS will work closely with you to determine your needs and keep logistics within scope. Planning will be an ongoing process that will likely be finalized just a couple of weeks before your project deploys for the field.

After your initial contact with CPS, the next step is to ensure that your project meets the Government of Greenland permitting requirements. Visit www.nanoq.gl/expeditions to view requirements and download forms from the Ministry of Nature, Environment and Justice Section of Climate, Energy, Nature and Justice for conducting scientific research in Greenland. Almost all projects require government approval; you can find the guidelines and criteria on this webpage. Also, contact your Project Manager to determine if your project will fall under the existing CPS permit that covers Summit Station.

Conducting Research: Roles and Responsibilities

Science Coordination Office (SCO)

The nature of research conducted at Summit Station is very dynamic and diverse, and for this reason the Science Coordination Office (SCO) was established. The role of the SCO is to ensure that science needs are met, and potential conflicts of interest are minimized. The SCO is a team of researchers who have a comprehensive understanding of the operational requirements, science, and station infrastructure.

Researchers considering fieldwork at Summit are required to contact the SCO at sco@summitcamp.org during the proposal stage. Those wishing to work at Summit Station must also contact the CPS Greenland Science Planner during this time (Jason Buenning jason@polarfield.com; ph. 303.984.1450 x207). CPS will distribute a *Requirements Questionnaire* to the researchers to determine the scope, impact, and feasibility of the project. CPS can also answer logistical questions and will provide a project cost estimate, which must be included with proposals to the NSF and other funding agencies. Learn more about available proposal assistance at <http://cpspolar.com/for-researchers/proposal-assistance/>.

Summit Science Project Manager

The Summit Science Project Manager works directly with researchers to develop seasonal support plans prior to deployment to Summit which detail the support provided by CPS. The Project Manager also serves as a liaison between the SCO and researchers to ensure there are no conflicts of interest between science projects.

Additionally, the Project Manager supervises the Summit Science Technicians to ensure that science support requirements are met for projects with year-round support. The Project Manager also coordinates with the Station Site Supervisor to ensure that project needs are met while the team is in the field.

Contact the Summit Science Project Manager (Matt Okraszewski matthew@polarfield.com; 303.984.1450 x227) with questions regarding Summit Station, support of your project, and any changes to project plans.

Summit Science Technicians

Researchers requiring Science Technician services must request this support at the project planning stage. The researcher must work with the Project Manager to provide comprehensive science protocols. This information will be reviewed by the SCO and CPS to ensure the protocol provides adequate guidance for the Science Technicians, and is supportable within the current staffing level planned for the season.

It is recognized that the nature of experimental research sometimes requires continued troubleshooting and development. However, if the time committed to any given project routinely exceeds the anticipated level by 25% or more, it may begin to adversely impact other projects. In such an event, the Project Manager will assist with making recommendations in an effort to find a solution. All equipment, instrumentation, and science protocols must be fully operational before the Science Technicians can assume responsibility for an experiment.

The level of support the Science Technicians are able to provide is largely determined by the researchers who own the project. Researchers must communicate with the Science Technicians to ensure that support requirements are being met. When contacted by the Science Technicians regarding an experiment, it is the researchers' responsibility to respond promptly.

Construction Support

All requests for construction support must be identified in advance and discussed with your Project Manager. This includes even seemingly small requests such as cutting of wall penetrations or minor carpenter assistance. The construction team operates on a very tight and limited schedule, and unplanned tasking can be very impactful.

Because of electrical and safety code requirements, special power demands must be coordinated in advance so a licensed electrician can be assigned as needed. Anything other than a standard 110v plug-in must be discussed with your Project Manager during the planning process. In no case will researchers be allowed to modify grid- tied electrical components themselves.

Summit Station Site Supervisor

The Summit Station Site Supervisor has the final authority on all safety and operational issues. The Station Site Supervisor will rate the weather conditions, and may restrict or prohibit travel or other activities accordingly. Any concerns or requests should be addressed to the Site Supervisor. The Site Supervisor will often redirect researchers to their Project Manager, as appropriate.

Cargo

All cargo destined for Summit Station is routed through Kangerlussuaq prior to shipment with the New York Air National Guard (NYANG) to Summit. Cargo arriving in Kangerlussuaq can arrive via commercial air from Europe or via the NYANG from Scotia, NY. Researchers will be asked to conform to the NYANG 109th's schedule. All cargo requirements and special needs should be communicated as early as possible to your Project Manager, as space on these flights is often very limited.

At Summit, a cargo line is provided for storing shipping containers, gas cylinders, and spare materials. Limited indoor heated can be provided for items that cannot be frozen. Please work with your Project Manager to identify your needs for indoor storage prior to arrival at Summit. Researchers should plan to remove all supplies from Summit at the end of their deployment. Only priority items approved by the Project Manager can remain over the winter season or beyond the length of the project life.

All hazardous cargo must to be identified to your Project Manager prior to shipment. Researchers are responsible for hazardous cargo arrangements and must provide MSDS to the

Summit Station Site Supervisor upon arrival. Researchers are responsible for return shipping of hazardous cargo.

It is the researcher's responsibility to ensure all inbound and outbound shipments are accurately entered into the Cargo Tracking System (CTS). To obtain a CTS account, please contact your Project Manager. Resources in the field are very limited, so we encourage you to plan outbound shipments prior to deployment. All hazardous cargo shipped out of the field requires certification. If you are not qualified to certify hazardous cargo you must notify field personnel upon arrival so that certification arrangements can be made.

Please refer to the Greenland Guide and/or CPS website for details on how to prepare cargo for transport on the New York Air National Guard 109th flights.

Travel to Summit

Visit the CPS website at www.polar.ch2m.com and review the *Greenland Guide* prior to your trip. It may also be useful for you to visit <http://www.summitcamp.org> and <http://niflheim.nilu.no/geosummit> for information on current research projects, conditions, and services. If you are not a US citizen, consult the US Customs and Border Protection's website at <http://www.cbp.gov> for information on visas. Contact your Project Manager if you have any questions prior to departure or en route.

Travel to Kangerlussuaq

It is possible to travel to Kangerlussuaq commercially through Copenhagen or with the Air National Guard (ANG) from Scotia, NY. Please refer to the [Greenland Guide](#) for further details.

Kangerlussuaq to Summit via ANG

Upon arrival in Kangerlussuaq you will be briefed regarding the flight plans for the Kangerlussuaq to Summit flight. Schedules are highly dependent on weather and are subject to change. Updates will be provided by the CPS staff in Kangerlussuaq. It is advisable to regularly check the notice white-board that is located on the first floor of the Kangerlussuaq International Science Support (KISS) building.

Flights to Summit during the summer are via ski-equipped LC-130, and are approximately two hours. It is important to dress appropriately, as you will be subject to Summit weather conditions upon exiting the aircraft. Upon arrival you will be directed to walk a short distance to the Big House where the Station Site Supervisor and Station Medic will greet you and provide a briefing. With exception of your hand-carry items, all of your cargo will be off-loaded by the Summit staff and NYANG crew.

Station Layout

Summit is a remote research station that exists solely to support science. The station houses a variety of structures designed to support a highly variable population that ranges from a skeleton crew of five or six during the winter to peak summer populations of up to 45.

The Big House is a 26-feet-wide by 56-feet-long building that serves as the center of station activity. It contains the kitchen, dining area, communications office, and has a full bathroom and laundry facility.

The Green House is a structure made from connected modules and contains a laboratory, science office, emergency kitchen and communications, bathroom, laundry, two bedrooms, and a lounge. The Berthing Module—the main living quarters, connected to the Green House—has six bedrooms, a bathroom, and includes a small common area.

Diesel generators housed in the Science and Operation Building (SOB) power the station. The SOB also houses a snow melter for water production, mechanic workspace, and scientific balloon launching facility.

The two main science structures at Summit are the Temporary Atmospheric Watch Observatory (TAWO) and the Mobile Science Facility (MSF). The TAWO is located within the clean air sector one kilometer south of Summit Station. The MSF is located several hundred feet east of the Big House.

Services, People and Living

Accommodations

Most researchers and staff sleep in Arctic Oven tents. The tents are assembled on plywood floors to provide insulation and protect the tent from damage during shoveling. Participants are provided with sleeping pads, but are responsible for providing their own sleeping bags. Indoor rooms are reserved for seasonal staff and science technicians.

Food

Summit Station is staffed with a cook. Meals are provided six days a week, excluding breakfast, which is self-serve. On Sunday, staff and researchers are asked to cook their own food or consume left-overs. The Site Supervisor will assign 'house mouse' duty on a rotating schedule to both staff and researchers. Those assigned are expected to dedicate a significant portion of the day to chores, cleaning, and kitchen assistance.

Phone

There are Iridium, VoIP, and VSAT phones available at Summit. For non-emergency use, CPS requests that researchers only use the VoIP phones, as these are the most economical. Phones are available at several locations around Summit Station; however, researchers are asked to limit personal phone usage, as the phones are primarily reserved for priority science and business needs.

Computer/Internet

CPS offers the following guidelines:

- Science and business needs always take priority over personal use.
- Be aware that bandwidth is limited. Do not use video Skype, download videos, or other recreational internet usage that will compromise the available bandwidth.
- Disable auto-update features on all computers and devices
- If possible, schedule activities that consume heavy bandwidth during periods of low usage. If that is not possible, make other participants aware of your plans so they can attempt to reschedule their usage. - Be considerate of others. Limit your time on the network so others can share the resource.

If the system is abused, it becomes unusable for everyone and compromises critical science needs. If this occurs CPS will institute strict policies to regulate usage.

Money

Danish Kroner is the currency used throughout Greenland. However, there is no need to bring money—either Danish Kroner or US Dollar—to Summit as there are no venues available for purchasing goods. See the Greenland Guide for further information regarding money use in Greenland.

Medical

CPS contracts with a service to provide emergency and non-emergency medical consultation. A subcontractor also provides Summit Station with a full-time, on-site paramedic during the summer months. The station is stocked with a full field medical kit. In addition to these services, several staff members on station have Wilderness First Responder credentials.

Upon arrival in Kangerlussuaq, anyone experiencing symptoms of illness should be evaluated prior to departure for Summit. Please alert the Kangerlussuaq operations staff if a medical condition has developed that could compromise travel to Summit. Even a moderate head cold can greatly diminish tolerance to altitude.

Upon arrival at Summit, the station medic will provide a voluntary medical information questionnaire. Be sure to bring a sufficient supply of prescribed medications, with the awareness that departure flights are often delayed.

Altitude Sickness

Altitude sickness is a serious concern and can potentially result in evacuation. For that reason, CPS recommends that all participants consult with their physician regarding prescription medications for preventing altitude sickness.

You will not have a chance to acclimatize before arriving at Summit. Follow these suggestions to minimize the risk of altitude sickness:

- Do not drink alcohol for a few days before arrival
- Avoid fatty or greasy foods
- Eat a large quantities of carbohydrates for a few days before arrival
- Drink as much non-alcoholic liquid as possible for a few days before arrival
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- Get adequate rest prior to and during travel

Conservation

All resources available at Summit Station come at a high cost – both physically and monetarily. As such, participants must use resources very carefully. In particular, power and water at Summit are limited and costly. Power generation is primarily via diesel generators using fuel either flown or towed from the coast. Efforts to make electronics as efficient as possible will reduce local emissions and long-term operating expenses. Water is produced with a great deal of effort by melting snow. Plan on washing only one load of laundry per week, and limit showers to a maximum of once every four days. Bring ample clothing to get through eight days. Hand soap and laundry detergent are supplied.

Recreation

There are limited recreational facilities and materials available at Summit, including exercise equipment, a video library, and books. Skiing or walking the skiway are also popular activities.

Drugs & Alcohol

CPS does not tolerate alcohol or drug abuse. Any staff or researchers over the age of 21 may consume alcohol and are expected to drink responsibly. Anyone using illegal drugs or abusing alcohol will be sent from Summit Station on the next available flight.

All staff and researchers are required to abide by the Government of Greenland policy for importation of alcohol into Greenland. The policy is subject to change, and in past years importation of alcohol has been restricted or illegal. If you are interested in bringing alcohol with you, please ask your Project Manager for further information. Illegal import of alcohol will not be tolerated.

Vehicle Use and Travel

For safety reasons, the Summit area has been defined as either “in-Station” or “out-Station.” Different travel requirements apply to these locations. The details of the travel requirements are contained within the *Summit Station Travel Policy*, which the Station Site Supervisor will review upon your arrival. Contact your Project Manager to help understand how your project will be supported in accordance with the policy.

At Summit Station a “pedestrian culture” is encouraged. Most areas can be reached by foot, and it is critical for the ongoing success of science to minimize emissions whenever possible. Small sleds are available for transporting loads by hand.

CPS maintains a small pool of snowmobiles for use by staff and researchers. Snowmobile use must be approved by the Site Supervisor. Projects requiring snowmobiles must coordinate in advance with their Project Manager to ensure that an appropriate machine is available. Unauthorized use of snowmobiles will not be tolerated. All staff and researchers must receive snowmobile training.

Operation of equipment in the clean air sector is strictly controlled, and requests must be approved by the Project Manager and the SCO. Details and guidelines for access to the clean air sector are outlined in the *Clean Air Management Plan*, available from your Project Manager.

About this Guide

This guide is meant to give you an overview of what to expect at Summit and to help you plan for your trip. It is not intended to provide all the information necessary for a safe and productive season at Summit. It is not a substitute for a CPS-developed *Season Plan*. This guide is updated annually and suggestions/comments are welcome. Please contact Matt Okraszewski at matthew@polarfield.com.