

Field season 2025

East Greenland Ice core Project (EGRIP)/ERC Green2Ice: Relocating from EGRIP.

**Prepared by Ice and Climate Group, NBI
for
The project responsables and participants and Danish and Greenlandic
authorities.**



Science work during traverse 2015.

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Introduction to 2025 field work

This report provides international partners and Danish and Greenlandic authorities information on field activities in Greenland and it provides information to the participants on the conditions in Kangerlussuaq and the field camp. It includes a summary of all individual travel dates and information on science programs. It also contains information and rules on environmental issues, work safety and disaster preparedness. All participants are assumed to be familiar with the content of this report.

In addition to general information, the report contains reference information of special interest for the Field Operation Managers and Field Leaders.

The authors wish to express sincere gratitude to the U.S. National Science Foundation and their logistical agent Battelle ARO Polar Field Services (PFS) and to the New York Air National Guard (109th) for their assistance and their supportive actions over the past many years and in anticipation of the upcoming EGRIP/Green2Ice field campaign. Without this assistance, little of what is planned for the 2025 season could be realized.

Copenhagen, February 2nd , 2025

Iben Koldtoft, Dorthe Dahl-Jensen, Marie Kirk and J.P. Steffensen

Closing of East Greenland Ice drilling Project (EGRIP) and opening ERC project Green2Ice.

The ERC synergy project Green2Ice (2023-28) is investigating the deepest and oldest ice and basal sediments drilled from the Greenland Ice Sheet (GrIS). Ice cores have been drilled the last 55 years, but the deepest ice containing basal materials has been preserved until now, and still holds undeciphered paleoclimatic messages. Green2Ice is developing and applying cutting edge dating methods on this unique sample collection to reconstruct the age and the stability of the GrIS. This knowledge will in turn be used to gain paleo-information of the past size of the GrIS, to constrain future tipping points and thereby reduce the uncertainty on estimates of future sea level rise. A major achievement of Green2Ice will be to drill a replicate core at GRIP site, from where a deep ice core was retrieved by a European drilling consortium in 1991. At the time, the drilling was terminated close to bedrock. The GRIP replicate drilling will use the existing liquid-filled GRIP borehole to gain access to the deepest part of the ice sheet and re-drill the deepest 200 m section of the ice. Furthermore, the project will aim to ensure retrieval of sediments and rock material from beneath the GrIS summit at the GRIP site. If successful, both conventional and novel dating techniques will be applied to place constraints on past waxing and waning of the GrIS. State-of-the-art methodologies on fossil remains, organic matter, in situ produced and consumed greenhouse gases, and ancient bio-molecules will provide insights on the types of ecosystems and environmental conditions that emerged during ice-free conditions. The interpretation will include ice sheet modelling with data benchmarking to establish the climatic sensitivity of the GrIS.

Principal investigators: Francois Fripiat, Bruxelles; Pierre-Henri Blard, Nancy; Anders M. Svensson and Dorthe Dahl-Jensen, Copenhagen

Green2Ice/EGRIP season 2025

Background:

In 2015, all camp assets from NEEM drilling site (2007-2012) were moved by overland traverse, some 440 km to EGRIP in the middle of NE-Greenland ice stream. Garages and main dome were setup as well as skiway for LC-130 operations.

In 2016, the EGRIP camp became almost fully equipped, and a trench system consisting of drill trench, science trench, ice core buffer, storage cave, tunnels, ramp and stairwells was constructed using the balloon technique. Drill trench and science trench were partially outfitted and the first 110 m of the deep ice core was drilled.

In 2017, the infrastructure of both science and drill trenches were completed. A freezer unit was installed inside the connecting tunnel between drill trench and core buffer. It was kept at -30 C and served as core logging area. At the end of 2017 season, the drillers reached a depth of 900 m. The top 300 m ice core was processed in the science trench, while the rest was stored in the buffer for de-stressing. Due to the core logging freezer, the crew managed to keep the cores from the brittle zone

(550 m – 900 m) at very high quality. Besides drilling and processing, EGRIP camp also supported surface snow studies, studies of water vapour and aerosols, a firn air sampling program, the Swiss RADIX fast access drill test and some associated programs.

In 2018 the main drilling continued to a depth of 1750 m, past the brittle zone and well into ice from the last glacial period. In the processing line, staff managed the complicated task of logging fresh brittle ice and put it into storage, logging brittle ice from 2017 and processing it, and finally catching up with the drillers and ending processing at 1750m. The CFA isotope laboratory was unable to complete their measurements. As the brittle zone was passed, the freezer unit of the logging cabin was dismantled.

In 2019, the CFA isotope laboratory got a head start to catch up with the processing line. The EGRIP main drilling progressed slowly. The drillers had issues with high amounts of chips in the fluid, which required intensive filtering and progressively harder core breaks. At one time, the drill became disengaged from the cable, which required the manufacture of a special hook to collect the drill from the bottom of the hole. As the number of hard core breaks grew, the winch and the cable was damaged and the winch motor was not strong enough. Drilling was halted on July 9th at a depth of 2122m. This had implications on ice core processing, as most of the core was processed by mid-July. It was decided to cancel ice core processing for the remainder of the season, except for CFA isotopes and Physical Properties. Also, the EGRIP Executive Committee decided that all future EGRIP main core processing should take place in a cold room at AWI, Bremerhaven.

The field seasons of 2020 and 2021 were both cancelled due to the COVID pandemic.

In 2022, the first half of the season was spent digging out all buried structures and raising them to the surface. Also, camp personnel successfully brought back all underground trenches by trimming the ceilings to restore proper working heights. Due to firn flow, the ceilings had come down by 1 meter from 2019 to 2022. Luckily, there was no severe structural damage to equipment in the caves. After restoration, deep drilling could continue, from 12 July to 6 August, reaching a final depth of 2418m.

In 2023, drilling could begin soon after arrival. At beginning of July, basal material was reached, and the last real ice core was at 2663.73 m. Several rock core drillings of basal material were made under red light illumination. All ice cores drilled were logged. DEP profiles were made and then the cores were packed and shipped for full processing at AWI in the autumn. A few samples for physical properties were collected. Many experiments were conducted on the deep borehole: Cryoegg, borehole logging, basal material pinger, new acoustic fluid level monitor. All equipment in the core buffer, science trench, logger trench, connecting tunnel, staircase and core storage is now packed.

In 2024, after final drillings for basal material, the drill trench was dismantled and closed. Borehole casing was extended through inclined trench, through ceiling of drill trench and to 3 m above surface. The extended casing was supported by blown in snow from snowblowers. While also supporting several associated programs, the amount of material in camp was reduced by packing and sorting

and flying excess out to Kangerlussuaq. The reduction in materiel was done in preparation of the traverse in 2025. A major issue arose, as our brand new Pistenbully, which had just undergone extensive repairs by a Pistenbully mechanic in camp, suddenly broke down totally while grooming the skiway. It was necessary to fly the vehicle out to Kanger and send it to Germany by ship. At camp opening in 2025, we need to have an extra flight to EGRIP with the repaired Pistenbully to have enough traction for traverses.

In 2025, ERC Synergy project, Green2Ice, takes over from EGRIP. Although EGRIP as a project is over, the name "EGRIP" will still be attached to the drill site and we will continue to use hardware and software (EGRIP home page and web address: eastgrip.org) during Green2Ice 2025 and 2026.

Scientific plan for Green2Ice/EGRIP 2025

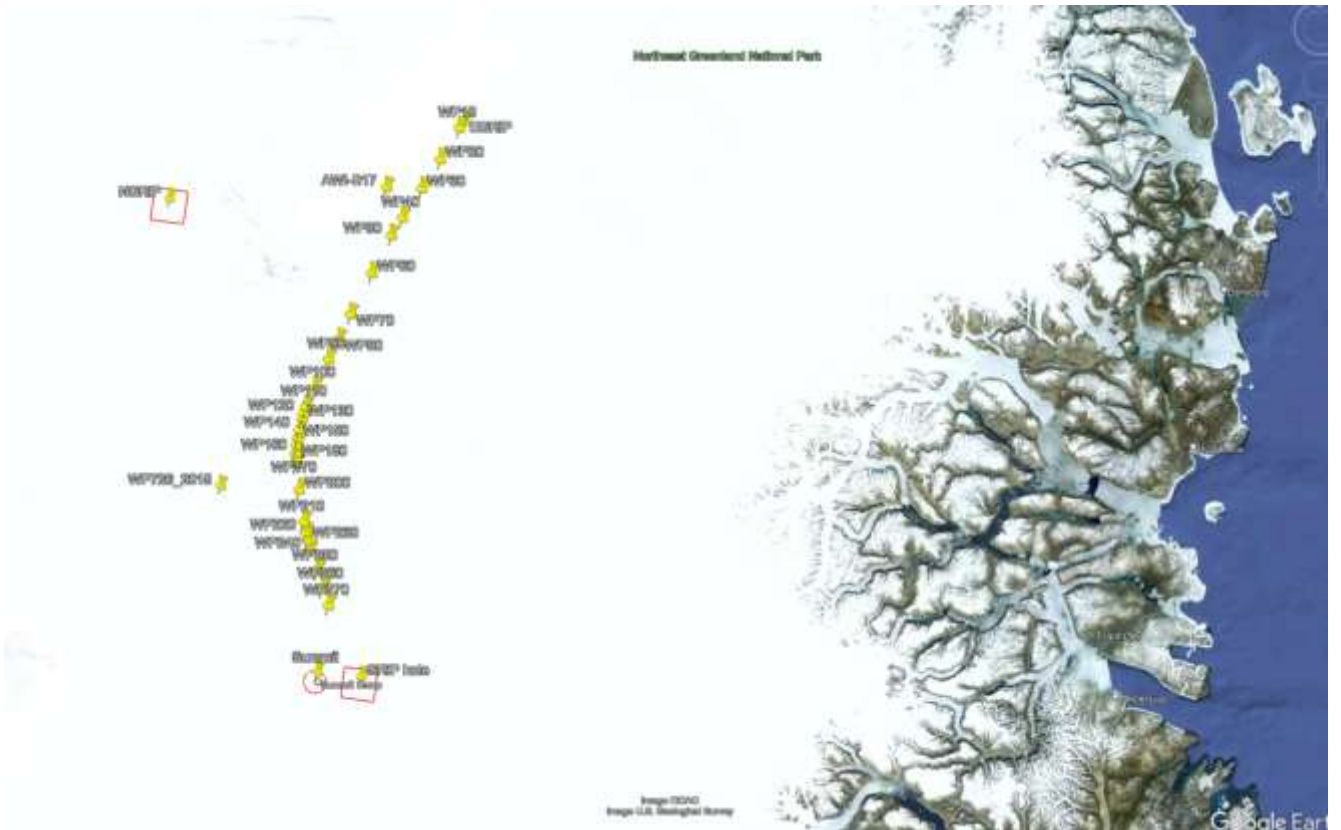
For Green2Ice, the project in 2025 is to reallocate the ice core drilling camp to GRIP for replicate deep drilling and basal sampling in 2026. Thus, most of Green2Ice activity in 2025 is logistical. However, one overland traverse, consisting of one Pistenbully and two snow mobile sled teams will serve as a science platform for the following sub-programs.

Radar profile (Dorthe Dahl-Jensen, CPH and Winnipeg, Daniel Steinhage, AWI and Prasad Gogineni, Alabama). ICELINK and PRECISE (Christine Hvidberg, CPH Helle Kjær, CPH and Maria Hörhold AWI).

The scientific overland traverse will follow the route in the table below and illustrated in the picture. Essentially, this route will be mapped by radar. A team with shallow drill and snowmobiles will deviate to point AWI-B17 to drill a shallow core on behalf of AWI and rejoin the traverse. Between WP60 and WP70 a 40+ m shallow core will be drilled, and while this drilling takes place, there is an option for another team to drive across to NGRIP to check if the borehole casing is still accessible. A second 40+ m shallow core will be drilled close to WP190 and WP200. A full depth sounder radar profile along with an accumulation radar profile will be made along the entire flowline from GRIP to EGRIP. Also, surface snow sampling and pit-studies will be done along the traverse route.

After arrival to GRIP, the team will focus on finding the GRIP borehole casing by using radar equipment, mapped fix points and information from the search for the casing in 2024. The top of the casing is estimated to be 1.5 – 2 m below current surface. Once the casing is located, the team will check if the casing is intact by video inspection.

On June 5, the traverse team will drive 27.5 km to the West and park the traverse train at a waypoint outside the U.S. Summit camp for pickup of the entire science traverse team (eight people) by LC-130 on June 6. The flight on June 6 will bring three logistics people to Summit. They will take over the traverse train and drive it in a straight line to EGRIP.



Science traverse route 2025. The red squares mark areas that we will apply for temporary area allotment for. The red circle is the present, active U.S. NSF area allotment around Summit station.

Table on science traverse (radar) waypoints:

Route from EGRIP to GRIP along flow line, feb. 2025 (Aslak Grinsted data)		
decimal degrees		
waypoint	lat	long
EGRIP	75.63055	-35.9937
WP10	75.59168	-36.0879
WP20	75.41723	-36.4841
WP30	75.25402	-36.8629
WP40	75.08951	-37.2485
WP50	74.99021	-37.4662
WP60	74.77778	-37.8385
WP70	74.54745	-38.2232
WP80	74.40771	-38.4297
WP90	74.29477	-38.6181
WP100	74.13501	-38.8588
WP110	74.02748	-39.0043
WP120	73.99463	-39.04
WP130	73.96336	-39.0662
WP140	73.90048	-39.1051

WP150	73.85431	-39.1272
WP160	73.81411	-39.1372
WP170	73.77235	-39.1373
WP180	73.74329	-39.1301
WP190	73.71089	-39.1142
WP200	73.57107	-39.0215
WP210	73.3993	-38.8901
WP220	73.34426	-38.8416
WP230	73.30138	-38.7981
WP240	73.24691	-38.7296
WP250	73.13628	-38.5747
WP260	73.04017	-38.4498
WP270	72.95075	-38.3231
GRIP	72.57534	-37.6449
extra points:		
NGRIP	75.1	-42.32
Summit	72.58333	-38.4667
AWI-B17	75.2504	-37.6248

AWS station system (Greenland Climate Network, former PARCA) maintenance (Nanna Karlsson, GEUS Copenhagen)

During the annual maintenance of the Automated Weather Stations in N-Greenland, the EGRIP camp will be re-fuelling station and base for the GC team for few days in June. GC team uses a Twin Otter air craft.

Logistic plan for Green2Ice/EGRIP 2025



The EGRIP drill site after casing extension and backfilling with snow, July 2024.



EGRIP casing at the surface, July 2024

After termination of all EGRIP deep drilling activities in 2024, infrastructure in the underground trenches was removed and either stowed in the access ramp to the trenches or returned to Kangerlussuaq. A fair amount of spareparts, machinery and infrastructure on the surface was returned to Kangerlussuaq. This was done in preparation for the Green2Ice relocation of EGRIP camp infrastructure to former GRIP drilling site at the summit of the ice sheet, some 27 km East of present day U.S.Summit Station. The logistic plan for 2025 is focused on taking down garages and tents, excavating the Dome at EGRIP site, stow everything on sledges and pull everything by tractor train 344 km to the south. Although we have three Pistenbully 300 Polar at our disposal, we cannot move everything in one trip.

There will be a first trip (see section on radar profile above) with one Pistenbully, some sleds, snowmobiles, radar equipment and shallow coring equipment. This trip will perform science on the way for radar profiling, and drilling shallow cores and surface snow sampling for projects PRECISE and ICELINK (See sections on PRECISE and ICELINK). The route will be along the flowline to GRIP (see above table on science traverse waypoints and above figure on science traverse route). In the sketch below this is illustrated by traverse legs 1 and 2). While passing, a snowmobile team will drive to NGRIP to record state of the NGRIP borehole casing.

At GRIP, the science group will use all instruments to locate the top of the casing of the GRIP hole. The top is believed to be approx. 2m under the surface. Once located, the team will investigate whether the casing is intact or not. If casing is intact, the science team will stage equipment at GRIP. If the GRIP casing is not intact, there will be no staging at GRIP. On June 6th, science and traverse team will drive to U.S. Summit to travel to Kangerlussuaq on a plane out of Summit.

A new team will arrive to Summit and take over the traverse train. The team will drive the science traverse train directly back to EGRIP (see figure below on traverse, leg 3) . While the science traverse is under way, the crew at EGRIP will prepare all cargo from cargo line, underground trenches and garages for transport to GRIP. The garage tents will be taken down and stowed, the main dome excavated and pulled to the surface. The EGRIP skiway will be removed.

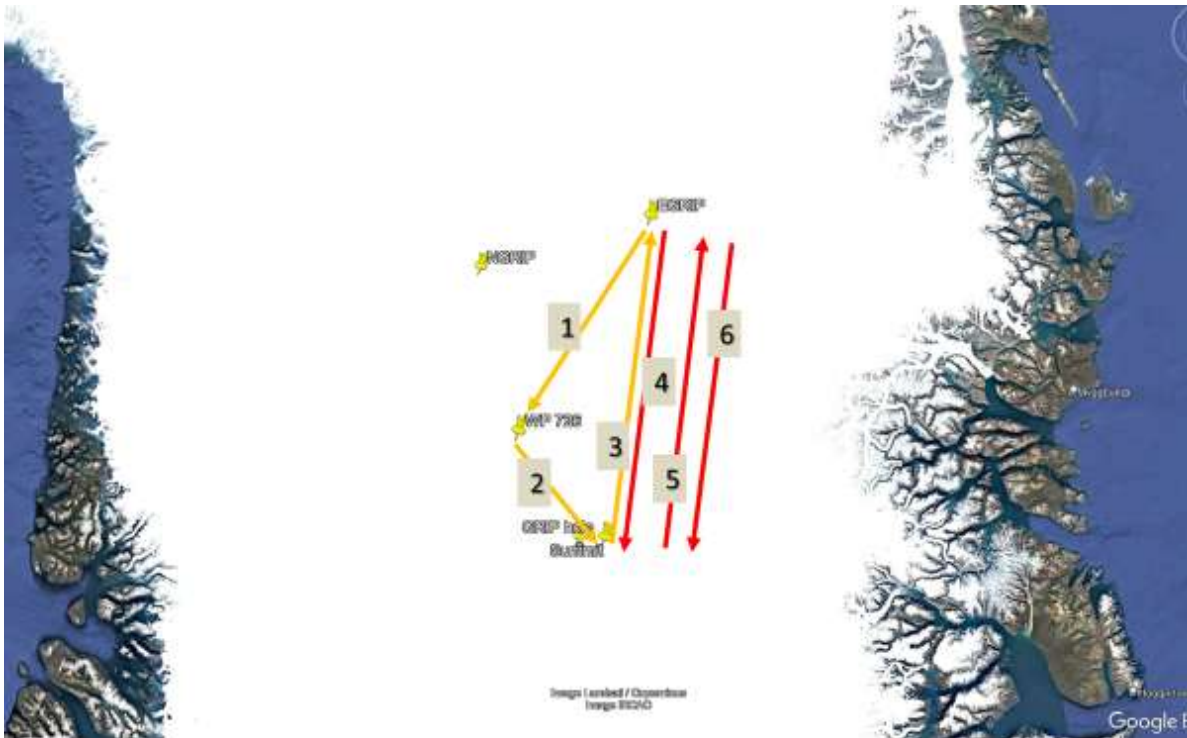
After the science traverse train has arrived at EGRIP camp, a full heavy traverse train will be prepared, involving three Pistenbullies, sleds and the main dome. This heavy traverse will drive to GRIP (see figure on traverse, leg 4), if GRIP hole was found intact, or NGRIP, if GRIP hole was not intact.

Immediately after the heavy traverse has arrived at destination, the crew will begin setting up new camp and skiway (see drawings in this report). All cargo will be unloaded and the dome will be parked.

While work on setting up the new camp is in progress, two Pistenbullies will go back to EGRIP site and pick up all remaining cargo at EGRIP (see figure on traverse, legs 5 and 6). When this second, heavy traverse is completed, the former EGRIP camp site will be completely cleaned up, except for the EGRIP borehole casing pipe.

At GRIP (or NGRIP), the crew will setup garages, the dome, skiway, install cables and prepare the site for the 2026 main season of Green2Ice. It is planned to pull-out the entire crew in July via the new GRIP skiway. During the entire season, we will use Iridium Openport and continue testing Starlink for internet linkup. All teams (vehicles) on the traverse, will communicate by VHF radio, by In-Reach and handheld Iridium phones. We plan to mount the polar bear Doppler radar again in 2025. The radar is capable of detecting movement in a 3 km radius of camp. We will continue to use our ceilometer for reporting clouds to improve weather reporting and reduce the risk of aborted flights. In the beginning, we will ship out as much equipment as possible to make traverse trains lighter.

The overall logistical goal is to stow and move a fully operational camp with housing for 20 people, workshops, drilling infrastructure and skiway to another site and setup the camp there.



Traverse legs: 1 and 2: Science traverse along flowline (radar, shallow drilling, ice chemistry).
 3: Sci. traverse return. 4: Dome and garage traverse. 5 and 6: Pick-up remaining materiel.

To accomplish the overall goal, the campaign can be broken down into the following steps:

1. Open and re-activate EGRIP camp by securing communications, power supply, water supply and quarters. The skiway will be activated and access to the storage ramp opened.
2. Receive the now repaired Pistenbully no 3 and make it ready to pull science traverse, and receive two plastic (HMWPE) sleds and fuel bladders.
3. Packing and returning surplus EGRIP equipment to Kangerlussuaq.
4. Making science traverse (one pistenbully and 2/3 snowmobile teams) along flow line towards GRIP.
5. Remaining crew at EGRIP will make repairs on the dome and make it ready for traverse to GRIP. At the same time, garages will be taken down and made ready for transport.
6. En route to GRIP, Science traverse will check conditions at NGRIP borehole and complete a radar, shallow drilling and surface sampling program.
7. At GRIP, science traverse team locate GRIP borehole casing and check whether it is intact or not. If bore hole is o.k., all science cargo will be staged at GRIP. If borehole is not o.k., the goal for the traverse will become NGRIP.
8. June 6th: Science traverse team leaves via Summit. Ice samples may be shipped out via Summit and driving team for return trip to EGRIP arrive on same plane at Summit.
9. After return of science traverse to EGRIP, the main heavy traverse with dome will be set to go.
10. After arrival at GRIP (or NGRIP), the team will begin building camp: Main dome, generator, cables, garages, places for weatherports and a new skiway.

11. During GRIP (or NGRIP) construction, two Pistenbullies and heavy sleds will perform a second round trip to EGRIP to transport all remaining cargo from EGRIP to GRIP (or NGRIP). EGRIP will now be cleaned up and only the borehole casing will be left behind.
12. Pull-out of all personnel from GRIP (or NGRIP) will occur mid-July from a newly made skiway. Camp will be left in a condition so it easily may be opened in 2026 for a full season of work around the deep borehole, mounting of solar panels on the dome and support associated programs.

2025 calendar overview.

Dates below are for our planning purposes only. We expect deviations from the dates given due to 1) weather, 2) technical issues 3) availability of aircraft and 4) traverse train progress.

22/04/2025	Tuesday		Period 1
02/05/2025	Friday		FOMs arrive in Kanger
09/05/2025	Friday		EGRIP put-in
15/05/2025	Thursday		EGRIP 2nd put-in
17/05/2025	Saturday		EGRIP PB300
19/05/2025	Monday		Placeholder
20/05/2025	Tuesday		Traverse to GRIP
29/05/2025	Thursday		Traverse at GRIP
04/06/2025	Wednesday		Period 2
06/06/2025	Friday		PAX and ice pick up from Summit
07/06/2025	Saturday		Traverse leaves GRIP
11/06/2025	Wednesday		Traverse at EGRIP
15/06/2025	Sunday		Big move 1 to GRIP
22/06/2025	Sunday		Big move 1 at GRIP
25/06/2025	Wednesday		Big move 2 back to EGRIP
01/07/2025	Tuesday		Big move 2 at EGRIP
03/07/2025	Thursday		Big move 2 from EGRIP
08/07/2025	Tuesday		Big move 2 at GRIP
09/07/2025	Wednesday		Period 3
12/07/2025	Saturday		Placeholder
17/07/2025	Thursday		Pull out
21/07/2025	Monday		FOMs leave Kangerlussuaq
22/07/2025	Tuesday		
23/07/2025	Wednesday		

Latest update 1.may 2025: Period 3: 9-21 july has been cancelled. The pull out-will occur by Basler close to 17.July.

EGRIP Manning 2025 (sorted by name)

Note: The dates of arrival and departure to and from Kangerlussuaq (SFJ) are dates of reference for booking tickets/flights to and from SFJ only. They are not fixed dates for the project. Dates in red are for calculation purposes only.

EGRIP 2025 Manning plan, 26 Mar 2025						
Sorted by name	Name	Country	Latest arrival to SFJ	To EGRIP	From Summit (GRIP)	Earliest departure from SFJ
FOM	Blunier, Thomas	DK	09/Jun			01/Jul
GRIP radar/drilling	Buchardt, Susanne Lilja	DK	13/May	15/May	06/Jun	08/Jun
FIELD ASSISTANT/COOK	Bugge Nielsen, Frederik	DK	07/May	09/May	17/Jul	19/Jul
FIELD ASSISTANT/DOCTOR	Buschieveke, Anna Maria	D	04/Jun	06/Jun	17/Jul	19/Jul
Field Assistant	Christoffersen, Thomas Kent	DK	07/May	09/May	17/Jul	19/Jul
Field Assistant	Crinella, Louise	F	07/May	09/May	17/Jul	19/Jul
Field Assistant	Döring, Michael	DK/D	07/May	09/May	17/Jul	19/Jul
Shallow Drilling	Hansen, Steffen Bo	DK	13/May	15/May	06/Jun	08/Jun
MECHANIC	Hilmarsson, Sverrir	IS	07/May	09/May	17/Jul	19/Jul
COOK/NURSE	Kalf-Hansen, Anders	DK	07/May	09/May	06/Jun	08/Jun
Field Assistant	Kande, Josefine	DK	07/May	09/May	17/Jul	19/Jul
MECHANIC	Kapitel, Christoph	D	07/May	09/May	06/Jun	08/Jun
Associated (GEUS)	Karlsson, Nanna	DK	11/Jun	13/Jun	15/Jun	17/Jun
Field Assistant	Kipfstuhl, Sepp	D	07/May	09/May	17/Jul	19/Jul
FOM	Kirk, Marie	DK	28/Apr			20/May
FOM	Kirk, Marie	DK	30/Jun			25/Jul
chemistry	Kjær, Helle Astrid	DK	13/May	15/May	06/Jun	08/Jun
MECHANIC	Koch, Florian	D	04/Jun	06/Jun	17/Jul	19/Jul
GRIP radar	Nicholaus, Kevin	US/DK	13/May	15/May	06/Jun	08/Jun
Associated (GEUS)	nn	DK	11/Jun	13/Jun	15/Jun	17/Jun
Associated (GEUS)	nn	DK	11/Jun	13/Jun	15/Jun	17/Jun
Associated (GEUS)	nn (GEUS flt crew)	IS	11/Jun	13/Jun	15/Jun	17/Jun
Associated (GEUS)	nn (GEUS flt crew)	IS	11/Jun	13/Jun	15/Jun	17/Jun
GRIP radar	Nymand, Niels	DK	13/May	15/May	06/Jun	08/Jun
FOM	Rasmussen, Sune O.	DK	19/May			10/Jun
Field Assistant	Razetti, Mario	D	13/May	15/May	17/Jul	19/Jul
Associated (GEUS)	Solgaard, Anne	DK	11/Jun	13/Jun	15/Jun	17/Jun
FIELD LEADER	Steffensen, Jørgen Peder	DK	07/May	09/May	17/Jul	19/Jul
Field Assistant	Svensson, Anders	DK	04/Jun	06/Jun	17/Jul	19/Jul
chemistry	Zander, Samira	D	13/May	15/May	06/Jun	08/Jun

Important: Sudden changes in manning plan due unforeseen issues.

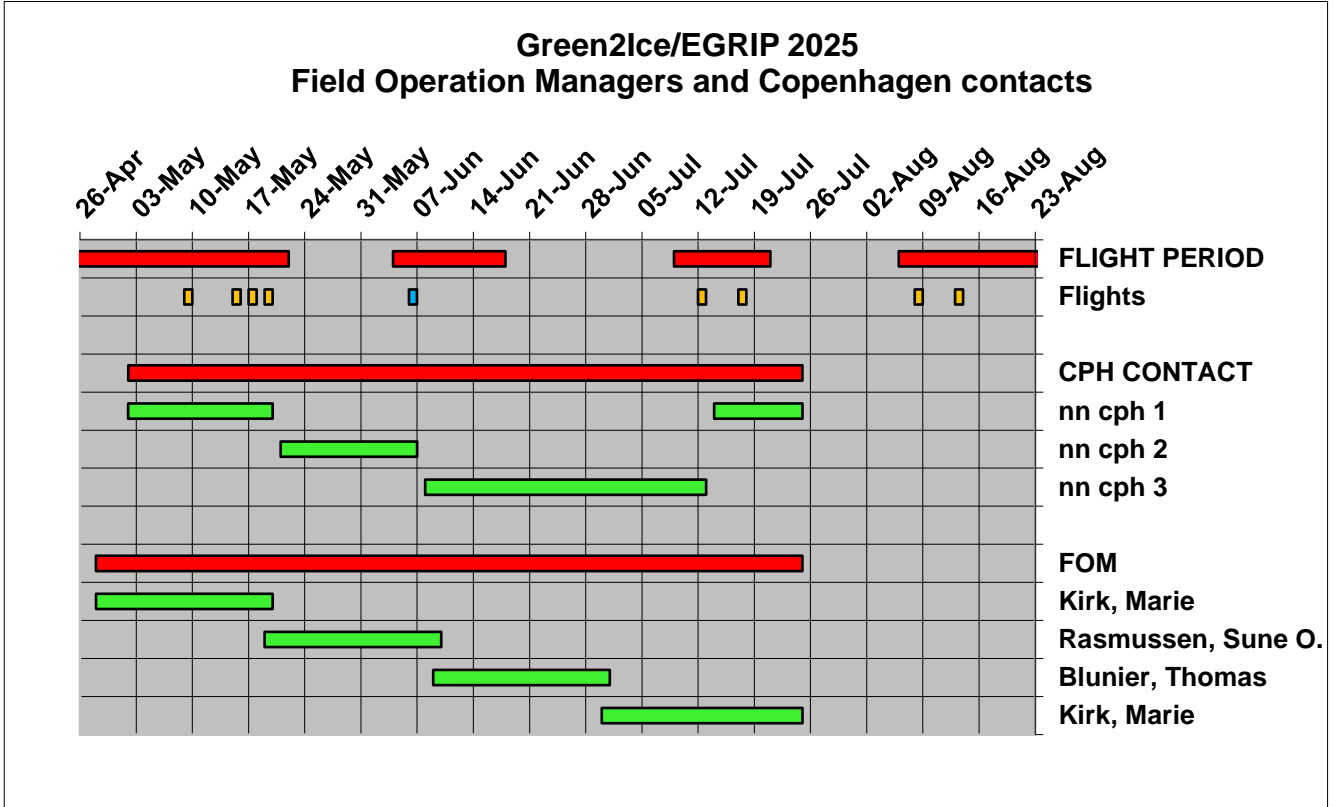
Please keep in mind, that being on the manning plan for 2025 is not a guarantee that you will go to EGRIP and stay there for the scheduled time. In this line of work, even small incidents may have large consequences. Even though we are scientists, we also share a trait with sea-men – we are superstitious. Therefore, we hesitate to mention specific incidents as it could become self-fulfilling. So, at this time let us just say, that a broken vital part with a long delivery time may cause severe delays.

THEREFORE: PEOPLE WHO APPEAR IN THIS SCHEDULE SHOULD PREPARE THEMSELVES OF THE POSSIBILITY OF EITHER HAVING TO LEAVE CAMP EARLIER THAN PLANNED OR TO HAVE THEIR STAY CANCELLED. PLEASE FOLLOW THE DEVELOPMENTS ON THE EGRIP HOME PAGE BEFORE YOU LEAVE FOR GREENLAND.

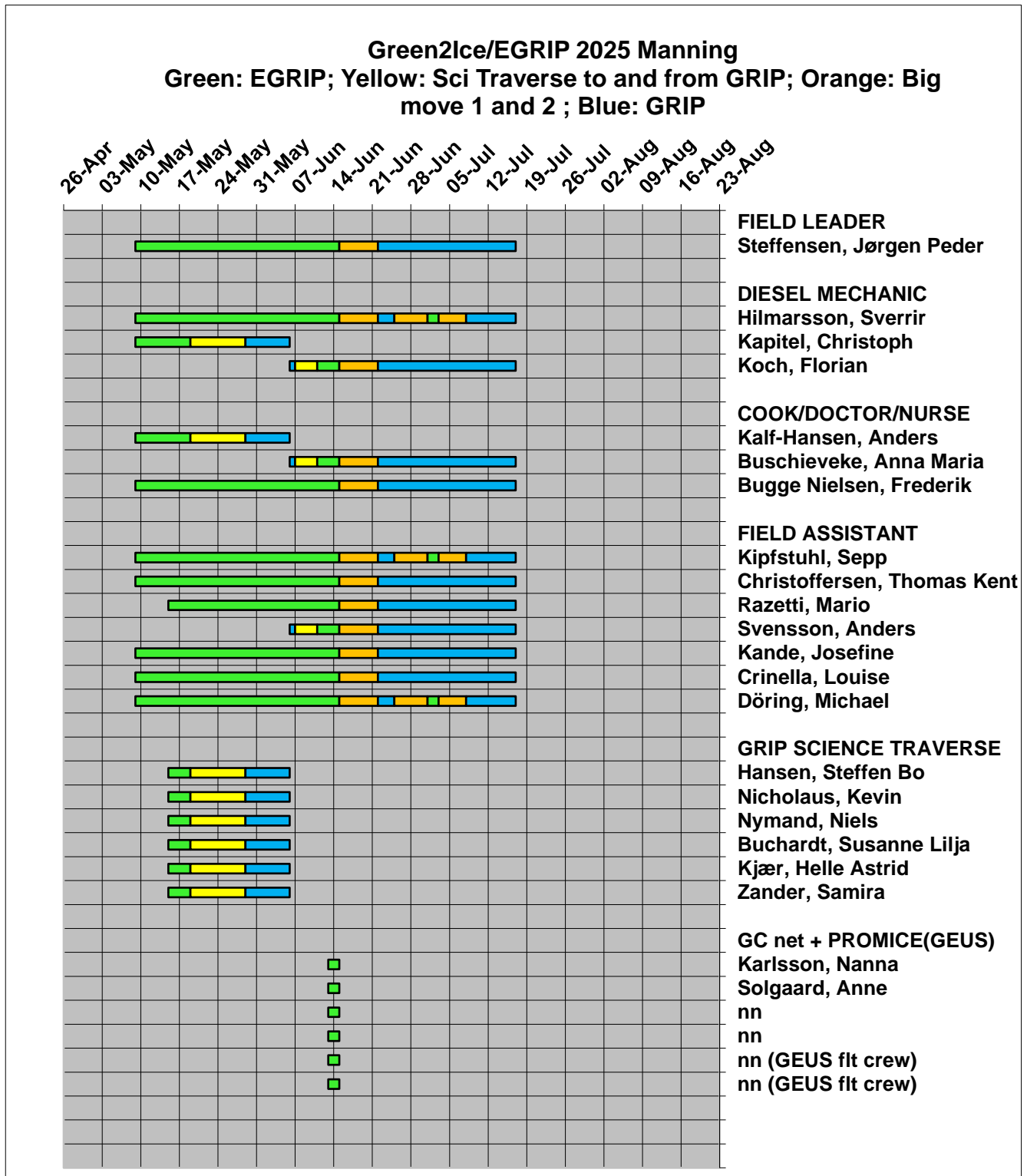
We are sorry for this inconvenience, but in our planning we have been forced to assume the most optimistic outcome of activity, i.e. the situation where the most people are needed in camp. If we had planned for less, a smaller number of people would have been planned for, and we could end up in a situation where activities had to be stopped due to lack of man-power.

Green2Ice/EGRIP GANTT sheets.

FOM's:



EGRIP manning:



Camp population

Population at EGRIP at put-in: 10

Population at EGRIP after arrival of science people: 17

During science traverse: EGRIP 9 + Traverse 8

At GRIP: 8 -> 3 through Summit.

Traverse return to EGRIP: 3

After arrival of traverse return: 12

Big move: 12 to GRIP

Big move 2: 9 stay at GRIP and 3 on traverse.

After big-move 2: 12 at GRIP

Personnel Transport 2025 and COVID quarantine issues.

The field participants will deploy to Kangerlussuaq, Greenland mostly via Copenhagen and in a few cases via Nuuk, Greenland. The transport to and from camps on the ice sheet will be direct from/to Kangerlussuaq with a U.S. air force LC130 or a Basler.

During the stay in **Kangerlussuaq**, people will be billeted in Kangerlussuaq International Science Support (KISS). At KISS, all participants will be provided with bed linen but are responsible for cleaning their room.

Note, unless arranged otherwise, each nation must take care of tickets and insurances of their own participants. If trouble arises at making ticket reservations we should be notified. Since the opening of the international Nuuk airport, the number of direct flights to/from Kangerlussuaq has reduced dramatically. This might result in long waiting lists, so please make the reservations as early as possible. Marie Kirk and Iben Koldtoft can help you with reservations. Green2Ice/EGRIP has a general financial guarantee for extraordinary Search and Rescue operations (SAR). Medical Evacuations (MEDEVAC) will be organized and covered up front by Green2Ice/EGRIP.

COVID quarantine procedures of the National Science Foundation(NSF) are at time of writing under review. NSF wants to maintain a high level of COVID safety at Summit station and is reviewing the special quarantine program.

We have planned to fly out the science traverse crew via Summit on June 6, and we will receive three crew to Summit for driving the traverse train back to EGRIP. To respect any quarantine rules of Summit that will be in effect, we have agreed with NSF/Batelle that Green2Ice/EGRIP staff will stay separated and self contained in a parking spot a few km away from Summit during the crew exchange.

Green2Ice/EGRIP staff should follow the common sense recommendations below:

1. All persons going to Greenland maintain a degree of social distancing (avoiding concerts, large bar gatherings, large family affairs etc.) one week before travelling.
2. All persons going to the ice sheet will have to have their COVID vaccinations evaluated (This is a requirement to obtain medical clearance for work at EGRIP).
3. The FOMs in Kangerlussuaq have received training and are certified to perform antigen tests with test kits that have a 95% detection rate. EGRIP provides the test kits.
4. There will be antigen tests available at EGRIP station.
5. EGRIP will have either a physician (doctor) or a nurse at EGRIP the entire season.

Personal field equipment

All participants, except for those who have special arrangements with Green2Ice/EGRIP operations, are expected to provide their own polar field equipment and personal clothing, including normal winter garments, towels, toiletries, soap, facecloth, etc. A typical polar field bag should contain:

Polar Survival Kit

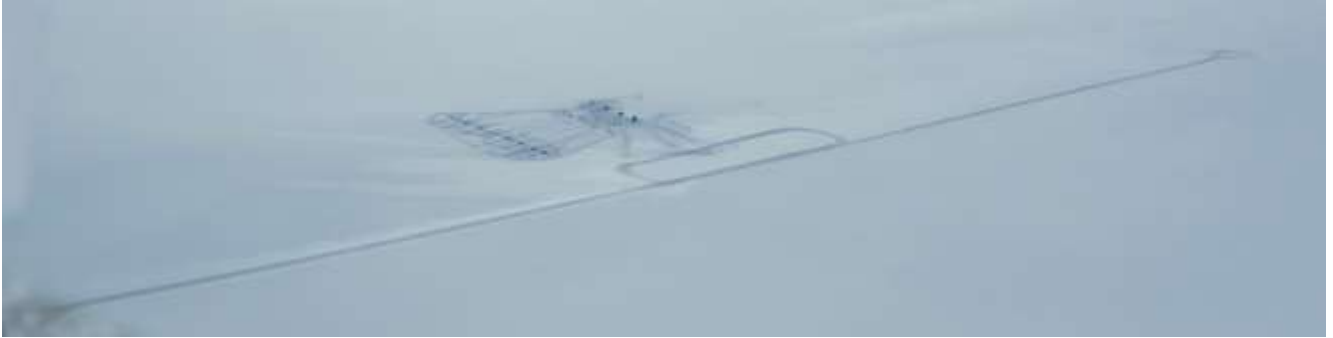
- 2 Woolen underwear, terry cloth, trousers and jacket
- 1 Fleeced trousers and jacket
- 1 Overall trousers
- 1 Polar boots, including extra liners, preferably 2 pairs.
- 3 thick woolen polar socks
- 1 polar parka coat
- 1 Insulated work leather gloves
- 1 Thin inner gloves
- 1 Insulated leather gloves, or ski type gloves
- 1 Mittens. Optional
- 1 Dark sunglasses
- 1 Sleeping bag, -10 degC or lower
- 1 Fleece liner for sleeping bag
- 1 fleece or woolen cap or hat, preferably of the balaclava type
- 1 Ear gear, fleece or rubber.
- 1 Face mask, *optional, only for those involved in snowmobile traverses.*
- 1 Personal medicine (pls inform the doctor)

Please bring also

- 1 Neck Tie or Dress
- 1 Solid hiking boots
- 1 A sturdy cup for coffee or tea
- 1 Your favourite cooking book
- 1 Your favourite music on IPOD
- 1 Your favourite game
- 1 Your favorite instrument - if it allows for transportation
- 1 A good portion of good humor

The polar field bag must follow the individual on the flight from Kangerlussuaq to the camp. It is not permitted to board aircraft or engage in traverses without a suitable survival kit. Please expect your luggage to be stowed on a pallet for transportation to camp, and like on commercial air lines, only one small carry-on bag is normally allowed. In special cases, like put-in missions, you will be allowed also to keep ONE sea bag with survival equipment with you in the LC-130.

READ CAREFULLY THIS SECTION: Rules and information on life in camps on the ice sheet.



EGRIP camp at pull out August 2016 with Main dome and three garages and the cargo line. (photo: DDJ).

The living conditions on the ice cap are quite different from those back home, therefore we would like to tell you some simple rules to follow. Some of them are even new for old-timers.

- The ski-way area and apron are **off limits** unless approved by the Field Leader.
- When an aeroplane is expected, the Field Leader has assigned a person in charge of the apron activities. You are obliged to act as instructed by this person.
- Never leave the camp without informing somebody, the weather can change very quickly. If you go more than 2 km away from camp, the field leader should be informed. Remember to bring a PLB (Personal Locator Beacon), a Garmin In-Reach unit and Iridium phone or VHF radio. The Field Leader will hand out PLB, In-Reach, phone and radio.
- The eating hours are (please be in time, to make it easy for the cook).
 - Breakfast is individual (normally between 7:00 and 8:00),
 - Lunch is at 13:00 (On Sundays a special brunch is sometimes served),
 - Dinner is at 19:00. While eating outside of lunch and dinner hours, make sure that all plates, etc. are cleaned after use.
- Heavy vehicles and snow blowers are only operated by few people assigned by the Field Leader.
- Skidoos –
 - Everybody can use the skidoos when not in specific use, but please follow these rules:
 - Drive slowly in camp, and never use 2nd gear.
 - Park the scooters with the gear in non-engaged position and plugged to power.
 - Skidoos can only be removed from the camp area after an agreement with the Field Leader.
 - When attaching a sledge to a skidoo, always use the hook. Only connect the sledge with a rope if no other option exists, and keep the rope as short as possible.
 - Make sure the main drive belt is not frozen by shaking the skidoo from side to side before start.
 - Skidoos are not toys - only drive skidoos when necessary.

- Do not drive in the clean zone, South and West of camp unless permitted by the Field Leader.
- NEVER operate vehicles and machinery under the influence of alcohol. Offenders will immediately be expelled from camp.
- Never leave any cargo or items on the surface without marking it with a bamboo pole, otherwise it may be lost due to snow drift overnight. Roll up cargo straps and put them in designated piles. Collect metal and nylon packing straps as these are dangerous for snowmobile traffic.
- If you remove marked items on the snow, then also remove the bamboo marker in order to avoid disorder and digging for nothing.
- Drinking water originates from a marked area. So never drive or walk through this area or contaminate it with any bodily fluid. Just keep out of the marked area.
- Drinking water will be produced in the cooks snow melter. To keep a steady water supply in the camp, refill it with snow from the marked area when there is room in the pot.
- In order to keep the camp clean there are only a few bamboo poles where you are allowed to take a leak. The poles are close to the outhouse tents.
- During blizzards visibility goes down. If visibility becomes so poor, that you cannot see adjacent tents or buildings from where you are, there is a serious risk of getting lost. **Stay inside where you are until you are picked up by a team member from the main dome.**

Booze and Drugs.

You can bring the following tax free to Greenland: 200 cigarettes or 100 cigarillos and 50 ml perfume or 250 ml Eau de toilette are allowed.

1 liter strong alcohol, 2 liter beer (typical six-pack) and 2.25 liter wine (typical 3 bottles) are allowed. If you are caught with excess tobacco, perfume or alcoholic beverages on arrival, it will be confiscated and you will be fined around 1,200 DKK.

You cannot import goods in excess of the allowance and declare it. You'll have to buy it in Kangerlussuaq.

You can buy alcoholic beverages and tobacco in the local store in Kangerlussuaq. The price of one beer in Greenland is approximately 20 DKK, one liter hard liqueur costs approximately 500 DKK.

People can bring their own prescription medicine. If prescription medicine is needed, make sure camp physician is informed. In case of illness, necessary drugs will be supplied by the camp physician. Greenland law forbids any import and consumption of drugs, such as cannabis, morphine and designer drugs. Any person who attempts to bring in or use illegal drugs in Greenland will be expelled from camp immediately and FOMs and Field Leader will contact Greenland police.

Policy for use and handling of pictures/recordings

Prepared by Sune Olander Rasmussen, Copenhagen, olander@nbi.ku.dk. Final version adopted by the EGRIP-SC October, 2016 (Modified for Green2Ice).

All persons, including visitors, going to Greenland as part of the Green2Ice/EGRIP field campaign implicitly give their consent to the following use of pictures/recordings by accepting to participate in the field campaign. Additional rules or limitations may be enforced by the field leader in special cases.

Participants appearing on pictures and in recordings:

The Green2Ice/EGRIP field work participant approves use of digital and analogue pictures, filmed material, and sound recordings made during the Green2Ice/EGRIP campaign (defined here as the period from arrival in Greenland until departure from Greenland) in which the participant appears. The approved use comprises, but is not limited to; use on the internet, in print, in television broadcasts, but only applies to material depicting field participants during work and daily life situations.

Any field member may withdraw this consent for any given photo or film sequence without further explanation.

Pictures/recordings depicting participants in situations not mentioned above should never be made public without explicit consent from all recognizable persons on the pictures/recordings. Field members taking pictures or making film and/or sound recordings must accept to delete pictures/recordings if requested to do so by a participant that appears in the material.

Rights of use

When material is shared with other field participants or uploaded to field computers, the photographer by doing so gives permission for the material to be used by the Green2Ice/EGRIP project. Photographers wanting personal acknowledgment must make sure that their pictures are named with the photographer's name as the last part of the file name, e.g. " EGRIP-main-dome-4-July-2017-John-Doe.jpg".

Material produced as part of the field campaign or obtained from participants can be used by all Green2Ice/EGRIP collaborators crediting the Green2Ice/EGRIP project as a community: "Photo/Source: Green2Ice project, www.green2ice.eu". For media files containing the name of the photographer, use the credit line with the name of the photographer included, e.g. "Photo/Source: John-Doe , Green2Ice project, www.green2ice.eu".

The original photographer retains the rights to any other use of the material, including any commercial use.

Declaration of liability release for *Green2Ice*/EGRIP field participants

The Green2Ice/EastGRIP project aims to have a medical doctor/physician in camp at all times, and is prepared to arrange medical evacuation to a medical facility on the Greenlandic coast of a field participant or visitor if deemed necessary by the doctor and field leader. However, participation in the EastGRIP field work or visits to the EastGRIP camp is at the participant's (and/or their institution's) own risk, and each participant (or his/her institution) is responsible for medical and proper insurance cover.

Each institution should be prepared to contribute to costs related to evacuation of their participants from camp to a medical facility at the coast, and in particular, each participant (or their institution) is responsible for securing cover of costs of medical treatment and repatriation (and/or for taking out insurance against these costs).

In extreme cases, a Search and Rescue operation (SAR) may be necessary. Once initiated, a SAR is carried out by the Joint Rescue Coordination Centre (JRCC) Denmark, and is out of the hands of the EastGRIP project. The JRCC staff collects and distributes essential information concerning a distress situation, arranges the dispatch of rescue assets to aircraft or ships in distress and coordinates the efforts of all responding resources. Each nation is responsible for covering SAR costs for their participants (and/or for taking out insurance against this cost).

All field participants are required to sign a liability waiver accepting these terms before boarding a plane to Green2Ice/EastGRIP.

By joining the Green2Ice/Eastgrip fieldwork, each participant waive any rights to hold University of Copenhagen, the Green2Ice/EastGRIP project, or any project staff members liable for any non-deliberate injury or damage caused e.g. by accidents, failure of equipment, or during medical treatment.

By signing the participant declare that he/she understands that is it the responsibility of himself/herself or his/her home institution to arrange appropriate insurance cover for personal injury or liability.

By signing the declaration, each participant also expresses understanding that it is the responsibility of himself/herself or his/her home institution to securing cover of costs of medical treatment and repatriation (and/or for taking out insurance against these costs).

By signature, each participant also confirms that he/she will follow the safety guidelines outlined in the field plan and follow instructions given by the field operations manager, the field leader, and flight crews.

The declaration is signed before deployment to Green2Ice/EGRIP camp and uploaded in the medical system. The declaration will be kept in the field operations office in Kangerlussuaq.

Policy on handling cases of work place accidents, safety issues, mobbing, harassment and sexual harassment at *Green2Ice/EGRIP* camps and traverses.

In accordance with the law on physical and psychical working environment at Danish/Greenlandic workplaces, and the Arctic safety manual for University of Copenhagen, the Field Leader at Green2Ice/EGRIP is the project appointed safety officer. All work related incidents should be reported to the Field Leader.

In case of sensitive issues such as harassment or sexual harassment, incidents may be reported to one of two NAMED PERSONS (one male, one female) who will then inform the Field Leader about the issues in an anonymized version. The Field Leader or the camp physician may also be approached directly about such issues. The Field leader shall post the two NAMED PERSONS on a note on the board next to the bathroom entrance.

Assigned Duties

Everybody in camp will be assigned extra duties on a rotary basis. These duties include:

Cooking. Although there will be a cook, Saturday night dinners are prepared by the camp crew. Sunday morning breakfast is self-service. If you skip meals, please inform the cook(s) in advance.

The field Leader will make a roster with rotating duties on the following:

Dishwashing. We expect all to help keeping the dishwashing an easy duty.

Snow melter. Although one person is assigned, everybody has the duty to keep the snow melter full. Check the water level before and after you have taken a shower and after doing laundry.

Drinking water snow melter.

Each day one person is assigned to be responsible for keeping the drinking water snow melter full. Use ONLY the assigned buckets and shovels and take ONLY snow at the assigned spot. Hygiene is very important.

House mouse duty.

One or two persons will be assigned to keep toilets and common areas in the main dome clean.

Terms of reference for the EGRIP 2025 Field Season (formal control and command)

During the field season Jørgen Peder Steffensen, Helle Astrid Kjær and Anders Svensson will be Field Leaders at EGRIP camp, traverses and GRIP/NGRIP having formal command & responsibility of operations in camp. All field participants must follow all instructions from the Field Leaders (The Field Leader role is similar to the role of a captain of a ship at sea).

In Kangerlussuaq, Marie Kirk, Sune Olander Rasmussen and Thomas Blunier will be field Operations Managers (FOMs). There will be FOM assistants as well. The FOM is the official spokesperson for Green2Ice/EGRIP and the FOM has control of all Green2Ice/EGRIP assets in Kangerlussuaq, such as the office, cars, bicycles etc. The FOM is the formal liaison between EGRIP and U.S. logistics (Battelle ARO), New York Air National Guard and Greenland authorities. The FOM has final say on composition of cargo and on passenger lists for all flights to and from camps on the ice sheet.

Dangerous goods (HAZMAT) Lithium batteries.

While certification of dangerous goods and the packing thereof rests with qualified personnel, Marie Kirk has IATA, DOT (49 CFR) and U.S. Air Force certification (AFMAN 24-204) together with and J.P. Steffensen have, we want to point out some new important regulations,

Under normal circumstances people travelling do not carry HAZMAT in amounts that require certification and declaration. As there have been a series of incidents involving fires on aircraft from shorted lithium batteries, you must take special care.

All modern electronics: Cell phones, GPS, laptops, cameras etc. contain lithium batteries. Most of these batteries are considered "small" in the new regulations, except for laptop batteries with extended life time. They are considered "medium". And for "medium" batteries the following apply:

Quote from IATA regulations 2.3.3.2 Lithium Ion Batteries:

"Lithium ion batteries exceeding a watt-hour rating of 100 Wh but not exceeding 160 Wh may be carried as spare batteries in carry on baggage, or in equipment in either checked or carry on baggage. No more than two individually protected spare batteries per person may be carried."

As long as the batteries are installed in the appropriate equipment, they are not considered HAZMAT, but loose spare batteries have to be packed in such a manner that shortening is impossible by e.g. covering the poles with tape. The quoted IATA regulation says, that you may not put medium sized spare batteries into your checked baggage. You may be allowed to have two spares in your carry on – HOWEVER, THIS DEPENDS ON THE AIRLINE. CHECK RULES FOR LITHIUM BATTERIES WITH THE AIRLINES YOU ARE USING.

When travelling with the 109th to and from EGRIP/GRIP/Summit keep all your batteries in your carry on. Do not put spare batteries in your luggage (suitcase or duffel bag).

For all scientists that ship lithium batteries by cargo, please note that Lithium batteries are Dangerous Goods and have to be packed and certified by authorized companies. It is still possible to pack a

laptop in a zarges box, but be careful with spare batteries. If in doubt, consult us or your local HAZMAT company.

Note: There is a huge distinction between “lithium batteries” and “lithium ion batteries”.

“lithium batteries” are non-rechargeable high-power cells that work very well in the cold. They are always HAZMAT. In size they vary from button cells in remote controls to car battery size. Automatic defibrators (AEDs) contain Lithium batteries.

“lithium ion batteries” are rechargeable batteries that are in almost any computer, cell phone or GPS. They are only HAZMAT under the regulations mentioned above.

For more information on HAZMAT and Lithium, please see section on HAZMAT.

If in doubt, contact Marie Kirk.

Personal Locator Beacon (PLB) and Garmin In-Reach.

A personal locator beacon, PLB, will be issued to everyone who has to leave camp. It is a unit with the size of a hand held radio. The unit is registered at the radio authority of Greenland. When activated, the unit contacts a satellite with a distress signal. The unit transmits its identity code and GPS position (it has a built in GPS). The radio authority will contact the FOM in Kangerlussuaq with specifics of identity and position. The PLB is a last resort emergency device.

EGRIP camp will have a number of Garmin In-Reach devices to give to people working away from camp. The In-Reach will be set up so that the Field leader receives position updates on remote field teams. If you're interested, it is possible to buy these devices on the web. The device can be set to transmit your position at a fixed time each day by e-mail to your family and friends.

Accidents and Illness

There will be a doctor/nurse during the Green2Ice/EGRIP field work. The doctor/nurse will begin at EGRIP, join the traverse, will be exchange at GRIP, and return to EGRIP to join the main traverse. The doctor/nurse will have a hot line to doctors in Denmark. In case of illness, the camp will be able to treat a patient with a wide selection of drugs. In case of accidents, the patients will first be given First Aid and if evacuation is needed an aeroplane will be called in from Kangerlussuaq, East Greenland, Thule, Summit, Station Nord, etc. to transport the patient(s) to a suitable emergency site/hospital.

Good communication (Satellite broad band, Iridium handheld, Iridium OpenPort, Radio, personal locator beacons) and navigation equipment (GPS) should ensure fast evacuation if needed. Under most circumstances, we can move a patient to a hospital within 24 hours.

Handling of Waste and environmentally hazardous chemicals

Green2Ice/EGRIP has been imposed with strict environmental conditions on EGRIP camp operations by the Greenland government. As EGRIP camp is located in a pristine area of the Greenland ice sheet and is inside the NE-Greenland National Park, the camp is constructed to reduce the environmental impact as much as possible, e.g. by using wood and snow as primary construction materials and by using temporary tent structures to maximum extent.

In EGRIP camp strict guidelines of waste management will be enforced.

LITTERING IS NOT ALLOWED. It is the duty of everybody to pick up any litter encountered.

Any traffic outside the general camp area has to be sanctioned by the Field Leader.

All waste will have to be sorted into the following categories:

- Natural combustible (e.g. wood, card board).

- Kitchen Waste.

- Glassware.

- Metal (e.g. cans, nails and screws).

- Hazardous solids (e.g. batteries, PVC).

- Hazardous fluids (e.g. fuel, hydraulic fluid, drill fluid).

All glassware, metal and hazardous material and kitchen waste will be retrograded to Kangerlussuaq for further processing.

To limit possible spills of fuel, only authorized personnel is allowed to operate pumps for fuel transfer.

All spills of hazardous fluids to the snow have to be excavated and the polluted snow has to be deposited in a salvage drum.

Use only designated toilets. Urination is only allowed at designated spots (pee-poles).

Special rules apply for fuel handlers, heavy vehicle operators and mechanics: A daily check on fuel tanks, pump system, hydraulics and hazardous chemical storage is necessary to insure no leakage to the environment.

Fire hazards

Camp structures are spaced so that an accidental fire will not spread to other structures. Carbon dioxide extinguishers and fire blankets will be placed at all locations where fuel is handled, at EGRIP in the kitchen and on the first floor of the main dome.

Only one of the three main fuel tanks will be in camp at any time. The other two tanks will be at the apron on in the cargo line.

An emergency response plan for spills and fire has been made for EGRIP camp. This plan is available in the main dome kitchen (Evacuation Zone A) and the Field leader office and in the carpenters garage (Evacuation Zone B). Camp personnel should know the contents of this plan.

Power Supply

Within all operations during 2024, 230 Volts, 50Hz will be the standard supply. The camp will be powered by diesel generators. For projects away from camp, such as shallow coring and radar surveys, we have both gasoline diesel generators available.

EGRIP/GRIP:

Diesel

1 – Iveco	125KVA	3 x 230V (400V/50Hz)	Main generator.
1 – SDMO	40KVA	3 x 230V (400V/50Hz)	Backup generator
1 – SDMO	10KVA	3 x 230V (400V/50Hz)	traverse power

MoGas

1 – Honda	4.5KVA	1 x 230V / 50Hz	shallow drilling
1 – Robin	4KVA	1 x 230V / 50Hz	

Reserves in Kangerlussuaq:

Diesel

1 – Hatz	5 KVA	1 x 230V / 50Hz	available
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MoGas (i.e. petrol/benzin)

1 – Honda	4KVA	1 x 230V / 50Hz	
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Please help to conserve fuel by conserving power.

Green2Ice/EGRIP 2025 – Address and useful numbers

Official address: Green2Ice/EGRIP 2025
 Box 12
 DK-3910 Kangerlussuaq
 Greenland
 Phone +299 52 41 25
 e-mail: fom@egrip.camp

This is the address of the Field Operations Manager (FOM) office in Kangerlussuaq which is located in the KISS building room 208

During the field season contact to the participants on the ice sheet can be made as described below:

Camp Internet Connection – Starlink test

At Green2Ice/EGRIP in 2025, we continue using the satellite communication Starlink which is connected to a global satellite grid. In 2024, the system worked well, and while it was operational, all communications and data traffic was handled through a flat rate package with unlimited data and communications. This system will be set up again for test at locations and during traverse during field work in 2025.

Camp Cell phones – Satellite network.

For telephony when in camp, people can use their smartphones on the Green2Ice/EGRIP wireless network to make calls between each other. There will be an app to download. Installation guides will be available in the dome. The system will not be operational the first week. We will test the system during traverses.

We plan to install a computer that will act as a hub for WIFI connection of all cell phones in camp. It is the intention to link this computer to the internet via the STARLINK system. If the STARLINK connection is available, participants can also make international calls from their phones, and the outside world can call into camp. The system will not be operational the first week, and might not be working during traverse.

The number for the EGRIP exchange (IP-phone) will be published in daily reports and SITREPs when active.

The caller will be asked to put in the local extension for the desired participant.

EGRIP field Leader will have ext. 401, EGRIP FOM will have ext. 301, public phone in EGRIP Dome will be ext. 402.

Details on how to connect and when the system is on-line will be posted on the EGRIP webpage.

Camp Iridium OpenPort system

Green2Ice/EGRIP camp will utilize the Iridium OpenPort system in the first week, and then the system will act as backup in case the other satellite system goes off-line. This system consists of an array of antennae and receivers that multiplex to obtain two in-going phone lines and internet connection. This system has been reliable in previous years. At Green2Ice/EGRIP there are two complete OpenPort systems: One will stay in main dome, and the other will be with the traverse teams. While the Field Leader has unrestricted access to telephones and the internet via OpenPort, camp personnel are in general restricted from access to the internet.

When camp is communicating via OpenPort, Please Note:

Using the internet over Iridium OpenPort is paid for per Mbyte (price is about 10 USD per Mb). If unlimited, unnecessary uploads & downloads of software updates, large email attachments, images, movies, etc. by EGRIP participants will very quickly cost the Green2Ice/EGRIP budget a fortune! Please, turn off all automatic downloads and all banners and pictures on your browser before connecting. Communication costs for NEEM 2010: 360,000 DKK

Iridium OpenPort telephone to EGRIP Camp

This number is not yet fixed. Please be aware that calling camp on Iridium can be as expensive as 6 USD per minute. Please ask the Field Operations Manager which number is current.

Only some of the Iridium numbers will be available at any given time. Please ask the Field Operations Manager (FOM) which number is current.

Initially **NO** external bell will be connected to the phones so arriving calls are not always heard.

Good times to call are during

Lunch 15:00 – 16:00 GMT

Evening dinner 21:00 – 22:00 GMT

The Iridium system OpenPort will be operational 24 hours.

EMAIL:

The Field Operations Manager will check arriving E-mail at least once a day on the following email: fom@egrip.camp (Don't forward large attached files).

For Field leader at EGRIP: fl@egrip.camp

On the ice, when we use the Iridium OpenPort system to send & receive E-mails, we will still be able to send & receive any E-mail via the above address; BUT at a high cost! PLEASE Remember to avoid attaching image files with your e-mails. The field leader will send images for the Green2Ice diary on the Green2Ice home page every day on behalf of everybody.

Please look up on the Green2Ice web-page to check if Green2Ice/EGRIP camp is communicating by VSAT or OpenPort.

Green2Ice/EGRIP official communications:***SITREP***

Field Leader and FOM will Sunday night prepare a **SITUATION REPort** "SITREP", i.e. a report on the preceding week's field activity. This report will be transmitted by E-mail to the Copenhagen office. From here, it will be retyped and put on the EGRIP home page for download and for the relevant Greenlandic and Danish authorities.

The Sitrep follows the following format:

1. Number, date and time
2. Passenger movements
3. Cargo movements
4. Camp activities

5. Sub programs
6. Drill depth and time
7. Status for drilling
8. Other info
9. Signature of the Field Operations Manager

Daily reports on the web (www.green2ice.eu) and SITREPs on www.green2ice.eu

Daily, a short “What we have done today” report and stories from camp will be placed on the web. Information will be sent from the EGRIP camp to the Field Operations Manager office in Kangerlussuaq who, in turn, will take care of the home page together with the logistical team in Copenhagen (logistics@egrip.camp). The Field Operations Manager (fom@egrip.camp) will coordinate this activity.

Description of EGRIP camp

Quartering and buildings



EGRIP camp July 2016.

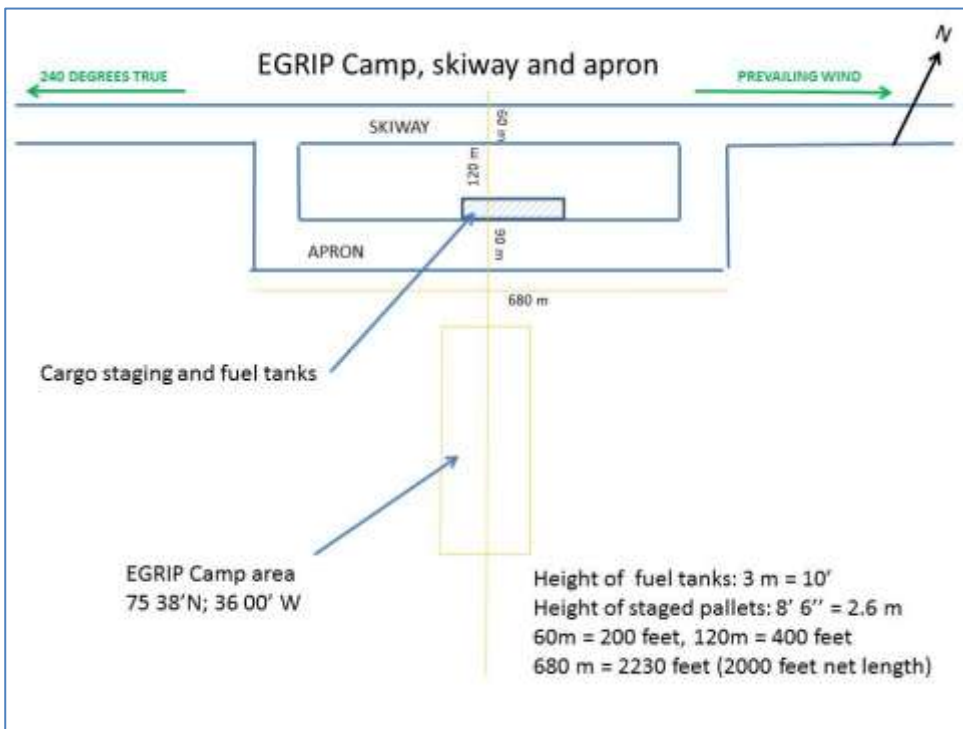
This year EGRIP camp will be moved by two traverse trains to GRIP. While packing down, camp and skiway will look like the EGRIP winter situation shown below. Quartering and buildings are given in this table:

EGRIP	until May 20: PAX Normal(max)	after May 20: Pax Normal(max)	
Kitchen/office	8(10)	3(10)	40' wooden dome
Big tomato	1(2)		Fiberglass hut
Small tomato	1(1)	1(1)	Fiberglass hut
Pistenbully no2	0(1)	0(1)	Cabin
Pistenbully no3	1(2)		Cabin
Garage, mechanic			26' x 40' Weatherport
Garage, carpenter			26' x 40' Weatherport
Garage, storage			24' x 28' Weatherport
Quarter (WP 6) Not planned			10' x 15' Weatherport
Quarter (WP 8) + food Not planned			12' x 20' Weatherport
Freshie shack (WP 9) Not planned.			12' x 20' Weatherport
New quarter (WP 7) Not planned.			12' x 20' Weatherport
Quarter (WP 5) planned for traverse			10' x 15' Weatherport
Quarter (WP 3) Not planned			10' x 10' Weatherport
New quarter (WP 4-clinic) Not planned.			12' x 10' Weatherport
Total	11(16)	4(12)	

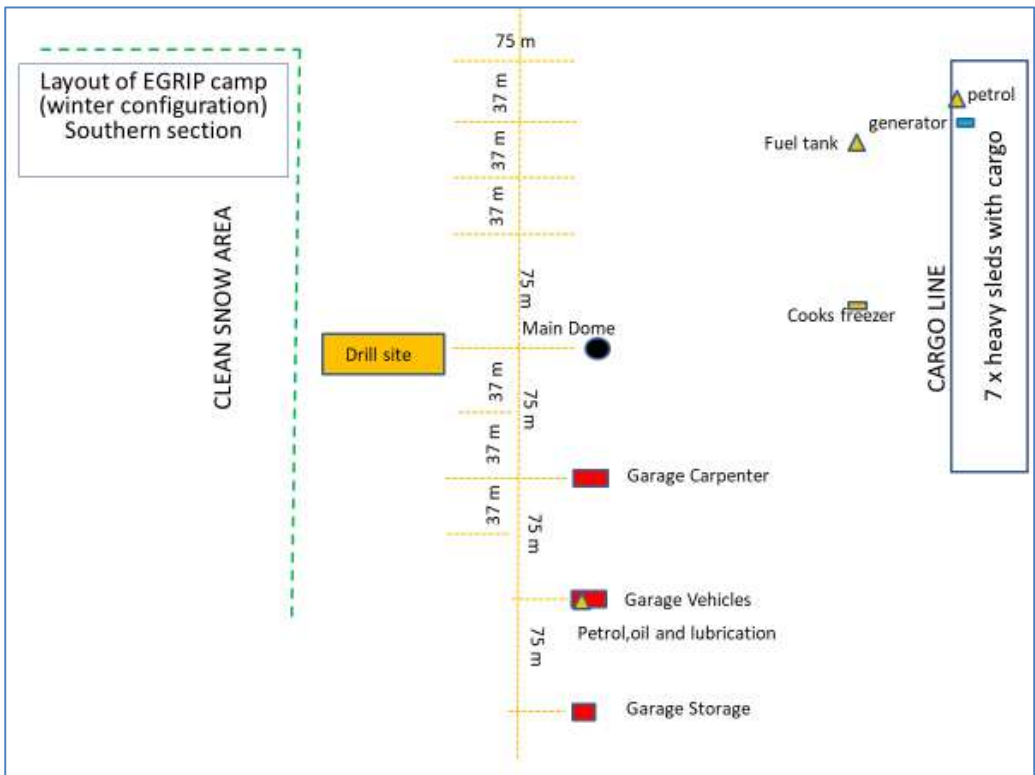
WPs 1 and 2 are returned to Kangerlussuaq. More WPs will be returned in 2025. For those individuals who prefer to sleep in small tents, EGRIP has a few tents to lend out.

Maps of the EGRIP camp area.

On the following three pages are maps of the EGRIP camp and Science areas in different scales.



Camp, skiway and apron layout.



Map of EGRIP camp in winter situation. All weatherports are stowed on cargo line.

Description of GRIP camp.

After arrival at the GRIP site, the first crew will begin to lay out and construct new camp infrastructure. The entire lay out will be anchored on two main considerations: The old GRIP drill hole casing should be in the middle of the future drilling tent, and the new skiway should run 180-360 true. By choosing this N-S skiway orientation, we will keep approaching airplanes as far as possible from the air space over the U.S. Summit camp, 28 km to the west. Also, although wind directions at GRIP vary a lot, there is a statistical main air flow from the South, with least amount of cross winds at 180-360 degrees.

GRIP quartering and buildings.

GRIP	after June 22:	after July 7:	
PAX	PAX		
Normal(max)	Normal(max)		
Kitchen/office	8(10)	5(10)	40' wooden dome
Big tomato		1(2)	Fiberglass hut
Small tomato	1(1)	1(1)	Fiberglass hut
Pistenbully no2		1(1)	Cabin
Pistenbully no3		1(2)	Cabin
Garage, mechanic			26' x 40' Weatherport
Garage, carpenter			26' x 40' Weatherport
Garage, storage			24' x 28' Weatherport
Quarter (WP 1)		2(4)	10' x 15' Weatherport
Quarter (WP 2)*			10' x 15' Weatherport
Quarter (WP 3)*			12' x 20' Weatherport
New quarter (WP 4)*			12' x 20' Weatherport
Freshie shack (WP food)*			12' x 20' Weatherport
Quarter (WP)*			10' x 10' Weatherport
New quarter (WP-clinic)*			12' x 10' Weatherport
Total	9(11)	11(20)	

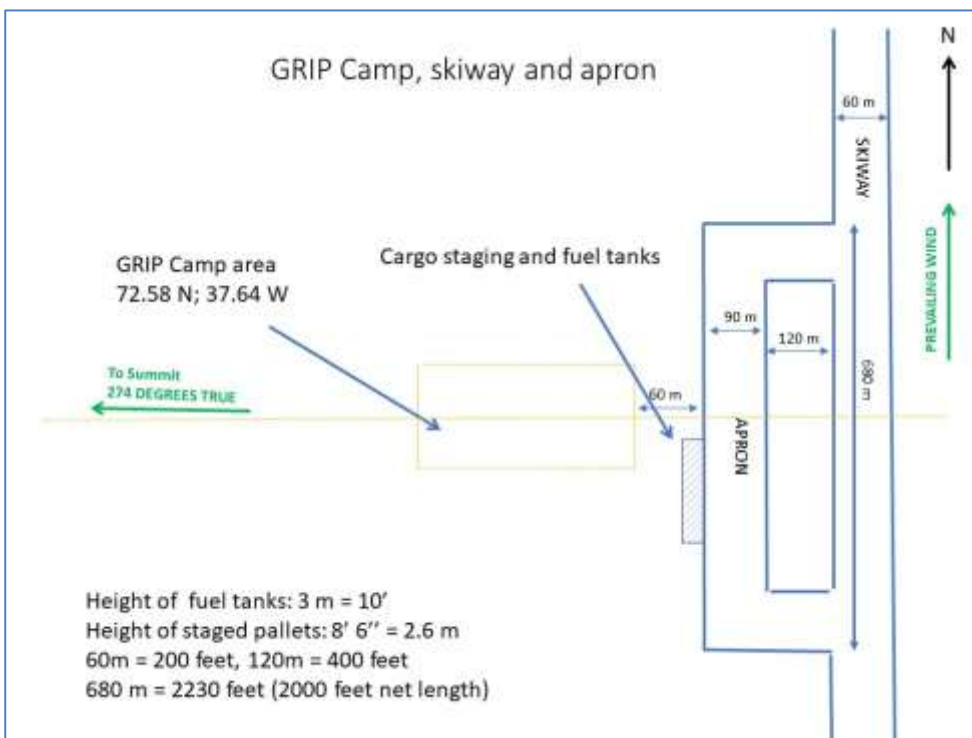
Structures marked with "*" are not planned for the 2025 season.

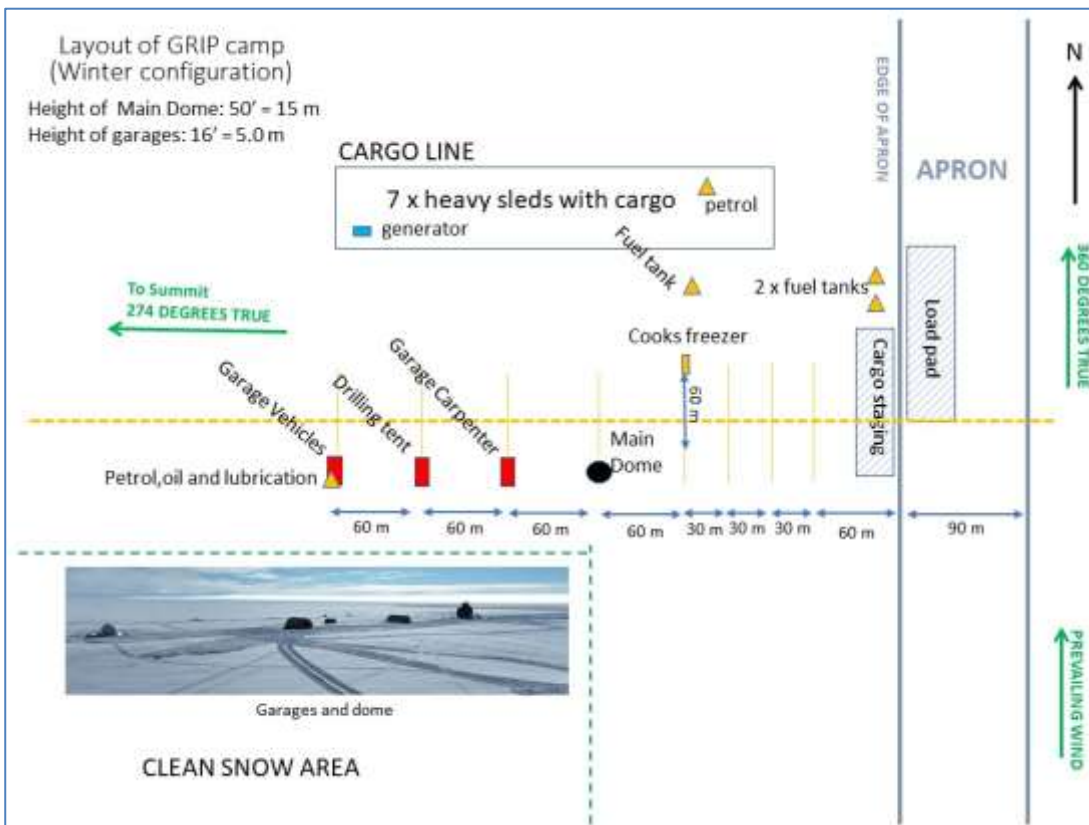
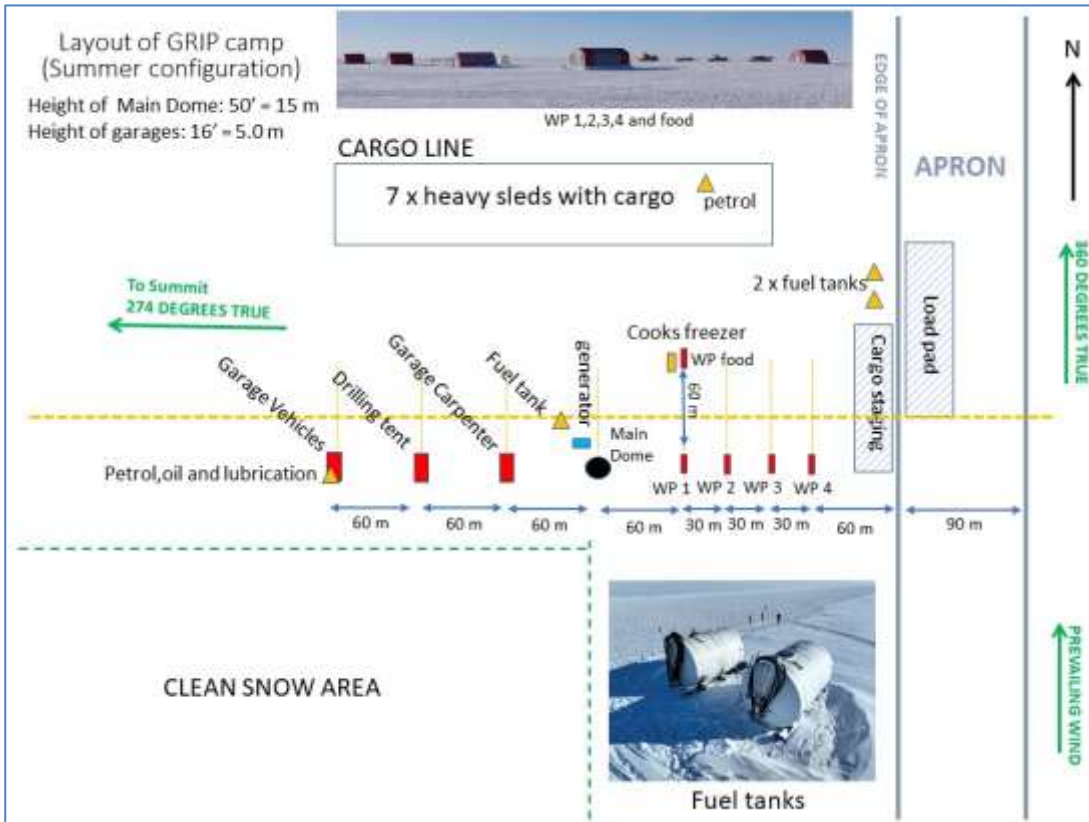
For those individuals who prefer to sleep in small tents, GRIP has a few tents to lend out.

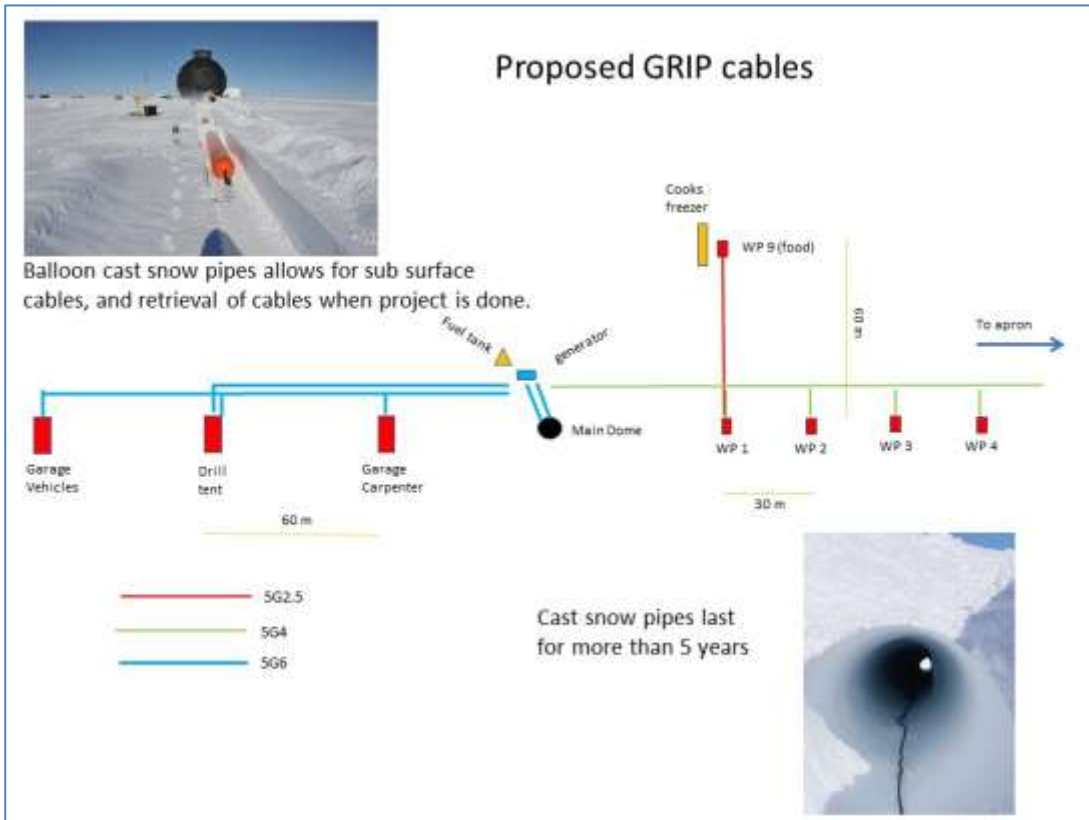
Maps of the GRIP camp area.



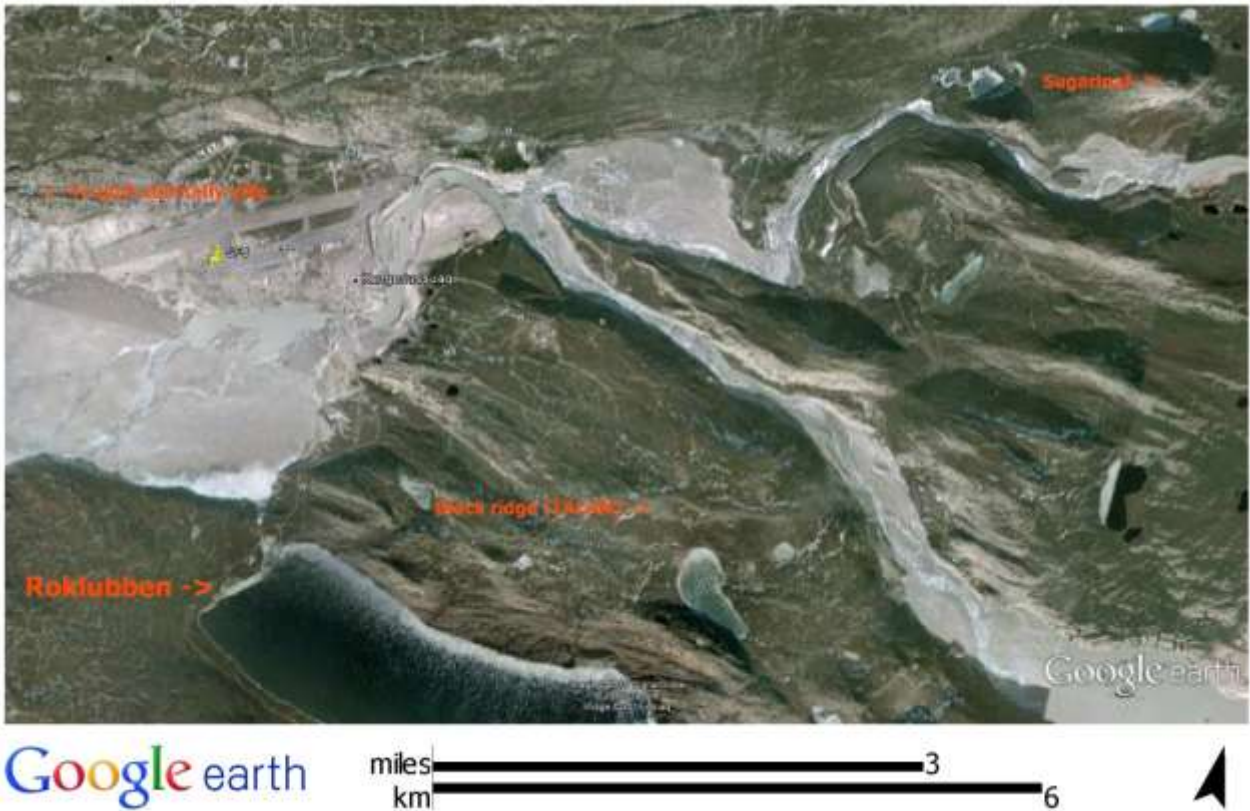
Planned skiway will be 12,000 feet long and 200 feet wide.







Description of Kangerlussuaq and Surrounding Area



In terms of complexity, Kangerlussuaq (Søndre Strømfjord or SFJ) is unique. Originally there was no native village. The first settlement was the US base Blue West Eight during World War II. The base was closed October 1, 1992, and all facilities handed over to the Greenland Airport Administration. Due to its US origin, the main electrical supply in Kangerlussuaq is 60 Hz, and you may encounter both 115V and 208V US type sockets, as well as 230V Danish sockets.

Since the opening of a new international airport in Nuuk in November 2024, most flights between Greenland and Denmark are out of Nuuk. However, sometimes when weather is really bad in Nuuk, Kangerlussuaq is used as alternate. In Summer of 2025 approx. two to three flights per week have a planned direct connection between Kangerlussuaq and Copenhagen. The fact remains that Kangerlussuaq is not the dominating hub for flights to/from Greenland anymore and traffic and overall activity has been reduced significantly. The population has shrunk from approximately 450 to about 250. The terminal area still has some businesses: Air Greenland, local supermarket "Pilersuisoq" and some souvenir shops. However Air Greenland cargo terminal has closed. The terminal side includes private housing, a combination of Air Greenland terminal and Hotel Kangerlussuaq, which also houses the Air Greenland offices and an ATM in DK Kroner. There are also buildings to the west of the terminal which house the Airport Administration. The Greenlandic Post Office "Tusass" is located next to the local supermarket.

On the South side of the runway is the old U.S. Base. Here EGRIP office and quarters will be in KISS (Building 662). The project warehouse is building 442 which in 2022 was purchased from Greenland Airports by University of Copenhagen.



Weather: The climate is continental and dry with an annual precipitation averaging 120mm; winter temperatures reach down to -50°C and the summer temperature increases to above $+20^{\circ}\text{C}$. In project planning for fieldwork in or around Kangerlussuaq, it is always best to prepare for the worst. The weather in Kangerlussuaq can be cold in May, and snow is always a possibility. June, July and August are normally fairly temperate with temperatures ranging from $5\text{-}21^{\circ}\text{C}$. Rain used to be rare in these months, but in July 2023, it was raining most of the time and the soil around Kangerlussuaq became really boggy.

Field clothing should include windbreaker, rain wear, work boots, warm hats and gloves, woollen shirts, sweaters and trousers. Given the wide range of temperatures during summer months, the use of layered clothing offers the greatest flexibility.

Be aware that cell phones cease to work 5 km from Kangerlussuaq. If you go on a walk, please tell the FOM where you are going and when you expect to be home. The FOM can lend you a satellite phone for emergencies.

Another important consideration is the insect season, normally from first week of June to late July. During this period, large, voracious Arctic mosquitoes are abundant.

In the past 5 years there have been 4 polar bear sightings in the Kangerlussuaq area.

In Kangerlussuaq you can buy regular, canned or freeze-dried foods, fuels (jet fuel/kerosene, gasoline, and field stove alcohol). There is also a post office, an airport hotel with cafeteria, a gym centre with swimming pool, a tennis-, badminton-, racket ball- and soft ball court, a golf course - and also a small museum with exhibitions about the history of Kangerlussuaq. Check www.greenland-guide.gl for information.

There are a few alternative dining and drinking establishments in Kangerlussuaq. Dining is available at the terminal. There is a cafeteria where the price of a typical meal is DK Kr.100, and a restaurant. In summertime restaurant "Roklubben" is mostly open for the public. This lakeside restaurant, some 5 km from Kangerlussuaq, offers a splendid view while dining on Greenland specialities.

BASE FOR SCIENCE

Kangerlussuaq has a long tradition as an important base for field geophysical and glaciological research projects, but so far the region has had only limited activities within the disciplines of life science. The area lies at the edge of the Polar Cap Zone and the Aurora Zone. It is therefore of particular interest to science studies related to the ionosphere and the magnetosphere as well as to the lower and upper atmosphere.

The Kangerlussuaq region is within the low Arctic eco zone with diverse habitats like salt lakes, dune systems, mountain tundra and steppes with caribou and musk ox populations etc. Reindeer are indigenous but muskoxen were introduced from Northeast Greenland forty years ago. Muskox and reindeer are hunted and in season meat can be purchased at authorized butchers.

The plant growing season is long, featuring 150 days without snow cover, 80 continuously frost-free days, and 150 consecutive days with maximum air temperature continuously above freezing; (the numbers given are average values). The climate is very stable and with low rate of rainy days. The monthly mean is 241 sun hours in May through August.

The Kangerlussuaq region is a well exposed high grade basement terrain forming the southern border zone of the Nagsugtoqidian orogen. The region has a glacial landscape dating back 8,000 years. The town is sitting on uplifted fjord sediments that popped up due to isostatic rebound after the last glacial. You may find proto-fossilized fish in the sediments west of town. Please note: It has become illegal to take large amount of fossils and rocks out of Greenland. As a rule of thumb, you are allowed to take out what you can have in a closed fist.

The proximity of the Inland Ice has a significant effect on the climatic regime for the living resources and further it presents unique logistic opportunities for studies on the Ice Sheet proper, the edge zone, and periglacial geomorphology.

The KISS (Kangerlussuaq International Science Support) facility

Scientists and students who plan to work in Greenland have facilities available in Kangerlussuaq. KISS offers an array of modern facilities and possibilities to rent equipment and goods for use in the field or at the labs of the KISS building.

KISS (bldg. 662 in the map) is owned by Greenland Airports and operated by the Kangerlussuaq Airport Management. The use of KISS is reserved exclusively for researchers and research projects registered by the Greenland Authorities after submission of project plans.

It is important to realise that KISS is a year-round facility and that the Kangerlussuaq region offers obvious research opportunities and potentials during the 8 winter months. This applies both to projects in biology and geophysics and the presence of KISS now greatly improves the logistics for performing field operations during winter time

The KISS facility, and the other facilities in Kangerlussuaq offer unique possibilities for performing science based at Kangerlussuaq. Please contact the EGRIP/Green2Ice FOM office for more information.

EGRIP/Green2Ice 2025 Participant Address List (31 March 2025)

NAME	NATION	E-MAIL
Blunier, Thomas	DK/CH	blunier@nbi.ku.dk
Buchardt, Susanne Lilja	DK	susanne.l.buchardt@nbi.ku.dk
Bugge Nielsen, Frederik	DK	fbn24946599@gmail.com
Buschieveke, Anna Maria	DK/D	ambuschsieweke@gmail.com
Christoffersen, Thomas Kent	DK	skofle@outlook.dk
Crinella, Louise	F	louise.crinella-morici@univ-lorraine.fr
Döring, Michael	DK/D	michael.doring@nbi.ku.dk
Hansen, Steffen Bo	DK	sbh@nbi.ku.dk
Hilmarsson, Sverrir Æ.	IS	shilmars@simnet.is
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Kande, Josephine	DK	josephine.kande@nbi.ku.dk
Kapitel, Christoph	D	Christoph.Kapitel@pistenbully.com
Karlsson, Nanna	DK	nbk@geus.dk
Kipfstuhl, Sepp	D	Sepp.Kipfstuhl@awi.de
Kirk, Marie	DK	m.kirk@nbi.ku.dk
Kjær, Helle Astrid	DK	hellek@nbi.ku.dk
Koch, Florian	D	florian-koch1@web.de
Nikolaus, Kevin	DK/US	kevin.nikolaus@nbi.ku.dk
nn (GEUS flt crew)	CAN	x
nn (GEUS flt crew)	CAN	x
nn (GEUS team)	DK	x
nn (GEUS team)	DK	x
Nymand, Niels	DK	niels.nymand@nbi.ku.dk
Rasmussen, Sune O.	DK	olander@nbi.ku.dk
Razetti, Mario	D	mario.razetti@awi.de
Solgaard, Anne	DK	aso@geus.dk
Steffensen, Jørgen Peder	DK	jps@nbi.ku.dk
Svensson, Anders M.	DK	as@nbi.ku.dk
Zander, Samira	D	samira.zander@awi.de

Address of the 109th:

109th Airlift Group
 New York Air National Guard
 Stratton Air National Guard Base,
 1 Air National Guard Rd.
 Scotia, New York 12302-9752

Phone numbers

Contacts to Ice and Climate group, NBI

Iben Koldtoft:	+45 35 33 06 43
e-mail:	iben.koldtoft@nbi.ku.dk
Marie Kirk	+45 35 33 13 20
e-mail:	m.kirk@nbi.ku.dk

Green2Ice/EGRIP FOM (Field Operations Manager) telephone	+299 52 41 25
FOM satellite phone	(will appear on EGRIP home page)
e-mail	fom@egrip.camp

Iridium Satellite handheld telephones to EGRIP camp.

Only some of the telephones will be available at any given time. Please ask the Field Operations Manager (FOM) which numbers are current.

Iridium OpenPort system (EGRIP only)

Please ask the Field Operations Manager (FOM) which number is current. Numbers will be published in the Situation report (SITREP) on the EGRIP web page.

Kangerlussuaq

While participants are in Kangerlussuaq, they can be reached through the internet, as EGRIP offers WIFI services in KISS also by their own cell phones.

EGRIP/Green2Ice FOM Cell :	+299 52 41 25
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FIC: telephone:	+299 36 33 53 (sector north)
FIC e-mail	fic@naviair.dk
Notam & com centre	+299 36 33 04

Joint Rescue and Coordination Centre (JRCC)	+299 36 33 18
e-mail:	rcc@naviair.dk

KISS manager	+299 52 45 33
email	sciencesupport@mit.gl

MEDICAL ADVISORY GROUP

EGRIP medical team in Denmark	medicals@egrip.camp
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Cargo shipments to Greenland

Green2Ice/EGRIP will have a Field Operations Manager in Kangerlussuaq all the time this season. It is essential that all shipments are labelled correctly, and that Green2Ice/EGRIP is informed about every shipment. In addition, we can expect delays in the Air Greenland transport from Copenhagen to Kangerlussuaq although Air Greenland has increased the number of flights in summer.

Cargo to Kangerlussuaq should be labelled:

Green2Ice/EGRIP Operations 2025
Box 12
DK-3910 Kangerlussuaq
Phone +299 52 41 25
Greenland

The international designation of Kangerlussuaq is SFJ (Søndre Strømfjord)

We would like following information about each collo:

Weight

Dimensions

Volume

Additional information and labeling

Non Freeze

Hold in Kangerlussuaq

Hazardous Material, including UN number and Proper shipping name.

Information on shipments and **Air Way Bill # (AWB)** should be emailed to:

fom@egrip.camp and logistics@egrip.camp

We urge people to ship cargo as early as possible. Based on our experience and this year available air cargo space to Greenland we as a minimum recommend following:

SHIPPING DEADLINES:**Cargo deadlines
2025****AIR Cargo**

If you cannot have your cargo ready by these dates, please talk to Marie/Iben.
Note. It might be difficult to bring extra weight as hand-carry on the SFJ charter flights.

Flight Period:	ETA cargo EastGRIP:	ETA cargo SFJ:	ETD Cargo from UCPH/BWS to SFJ:	Dash 8 cargo door w:1.27m x h:1.34m
EGRIP Put-in / SHIP via. Sisimuit	09-17 May 2025	27 April 2025	07 Marts 2025	With sledge from Sisimuit
EGRIP Put-in / AIR	09-17 May 2025	02 May 2025	01 April 2025	Must fit into Dash 8.
Summit PAX exchange	6-7 June 2025	30 May 2025	19 May 2025	Must fit into Dash 8. Only items necessary for the traverse.
GRIP Pull-out	12-17 July 2025	07 July 2025	24 June 2025	Must fit Dash 8 or send as ship cargo.

SHIP Cargo

Boat (RAL)	ETA cargo GRIP:	Arrival SFJ:	Departure UCPH:	ETD cargo Aarhus:
1	12-17 July 2025	11 June 2025	21 May 2025	29 May 2025
2	Spring 2026	17 Sep 2025	27 Aug 2025	04 Sep 2025

Shipping to EGRIP from the United States

Battelle ARO POLAR FIELD SERVICES and the EGRIP FOM must be notified of all cargo shipments, including commercial air in order to arrange for the receipt and transportation of cargo to the appropriate location in Greenland.

Please send the following info:

Weight
Dimensions
Volume

Date of arrival in NewYork

To EGRIP FOM's: fom@egrip.camp, logistics@egrip.camp,

Battelle ARO: Tracy Sheeley (sheeley@polarfield.com) and Kyli Cosper (kyli@polarfield.com)

PLEASE NOTE: Be sure to mark your cargo with "EGRIP 2025" to avoid your cargo ending up at Summit!

**Useful tables
for planners, field leaders, Field Operation Managers,
drillers and other interested parties.**

Positions of GRIP, NGRIP and EGRIP camps.

EGRIP position: 75.63N, 36.00W (decimal degrees), 2708 m a.s.l. (8885 feet)

GRIP position: 72.5779 N, 37.6366 W (decimal degrees), 3232 m a.s.l. (10,694 feet)

NGRIP position: 75.10 N, 42.30 W (decimal degrees), 2918 m a.s.l. (9573 feet)

Positions of EGRIP skiway (official-April 2024):

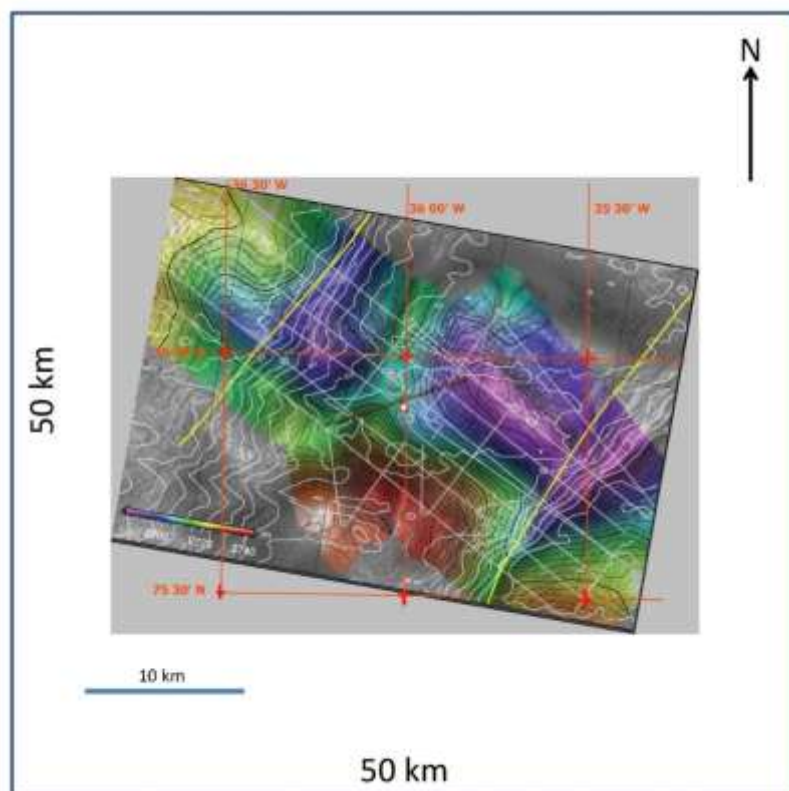
NorthEast end: 75 38' 46.18"N; 35 56' 08.09"W ELEVATION: 8871 feet (2704 m)

SouthWest end: 75 37' 47.10"N; 36 03' 02.84"W ELEVATION: 8898 feet (2712m)

Skiways runs 240 30' and 060 30' degrees true.

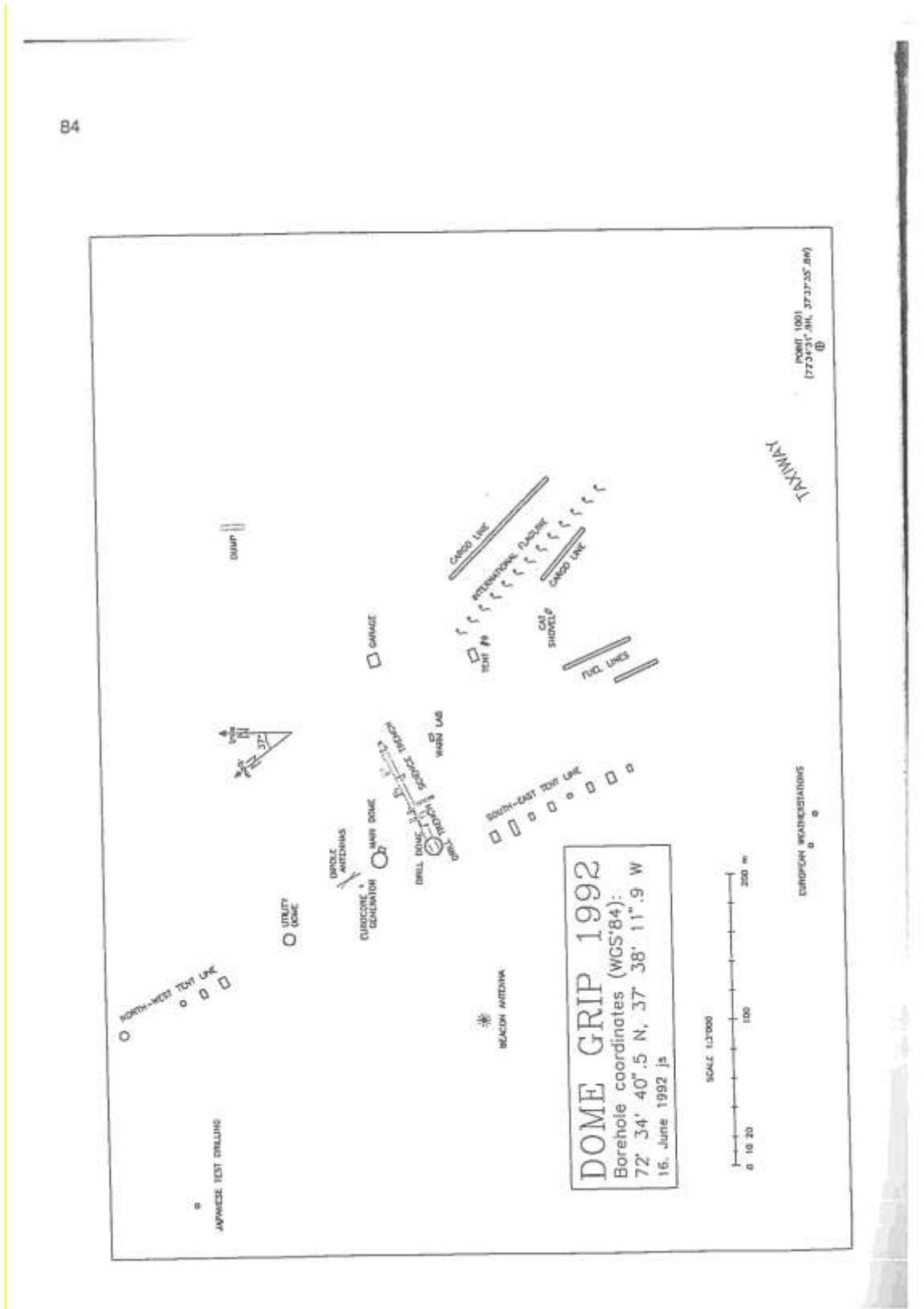
Official (109th) altitude: 8,885 ft, Slope 0.22 degrees, down vs 060.

Note: The entire camp moves 51m towards NNE each year.

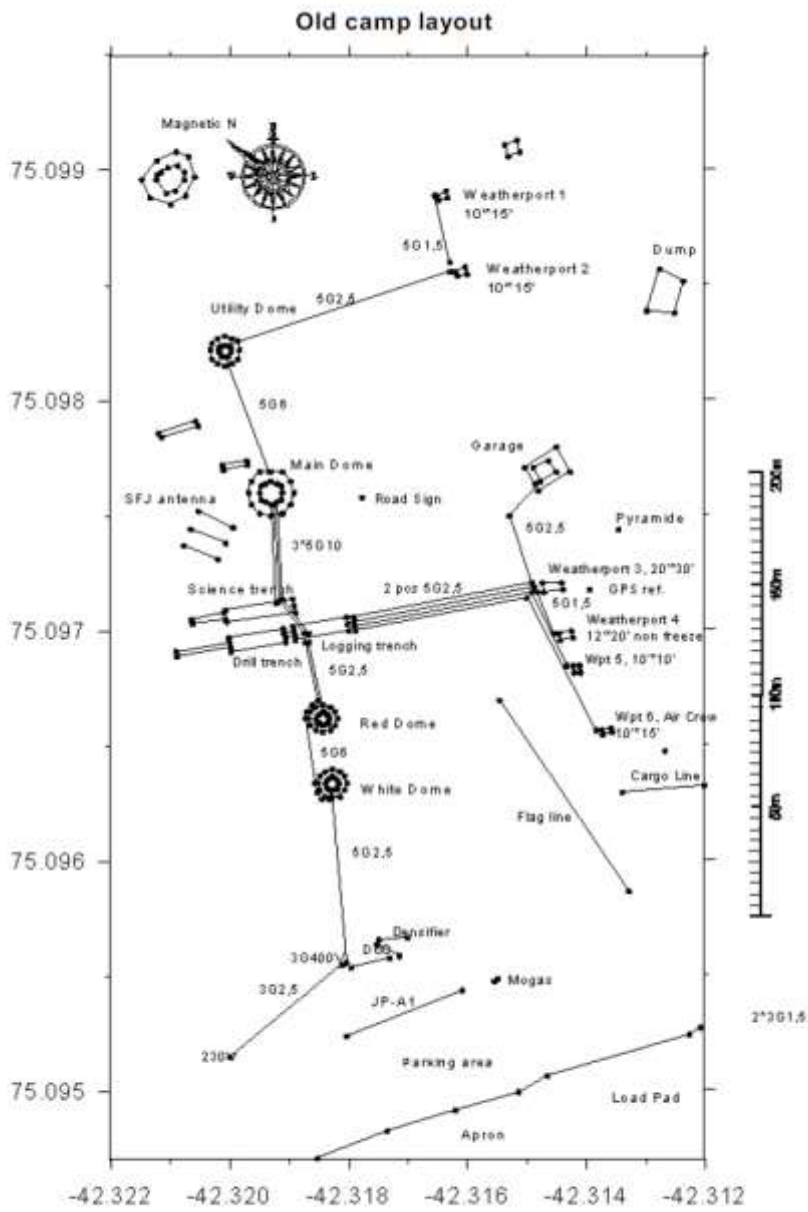


Map on the vicinity of EGRIP camp with camp and skiway (240 degrees true). Data has been compiled by Knut Christiansson, Penn. State. The entire frame is 50 km by 50 km and represents the area allotment requested for EGRIP at Greenland authorities.

Map of the GRIP camp from 1992.



Map of the NGRIP camp from 2000



Shipping boxes

The type of shipping box is very critical for both the protection of the cargo, and for efficient air transport. In Kangerlussuaq, the boxes will be stored on the cargo line which is exposed to snow, rain, sand and wind. On the ice, drifting snow will creep through any openings. The off loading from the aircraft at Summit is in the form of drifting cargo: The pallets are slid down the rear ramp of the aircraft while the aircraft is taxiing. In order to obtain the full payload and prevent the aircraft from cubing out before reaching maximum weight, the boxes should be stackable on an Air Force pallet. Also, wooden boxes with nails sticking out are dangerous to handle. By experience, we have found the following series of boxes to satisfy all the requirements:

Zargas aluminium box, type K-470. The following sizes are preferred:

order no	Internal dimens (L*W*H)	Outside dimens	Weight
40678	550*350*310	600*400*340	5,0
40564	550*350*380	600*400*410	5,3
40565	750*550*380	800*600*410	10,0
40566	750*550*580	800*600*610	12,0
40580	1150*750*480	1200*800*510	20,0

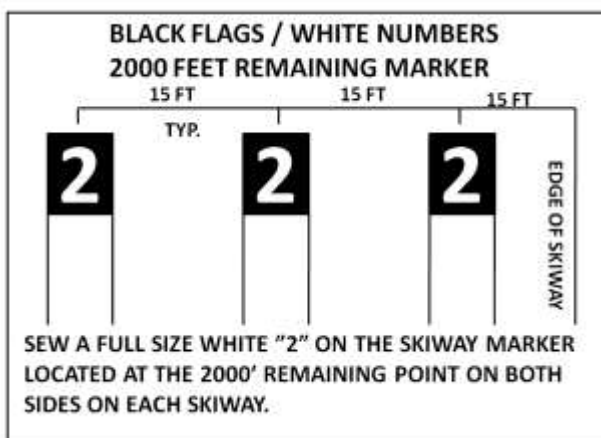
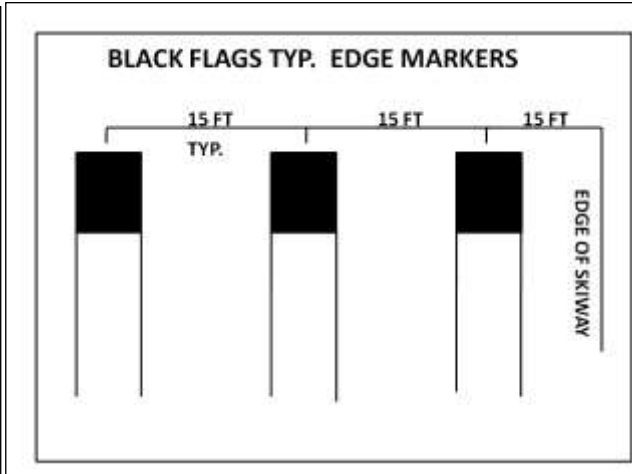
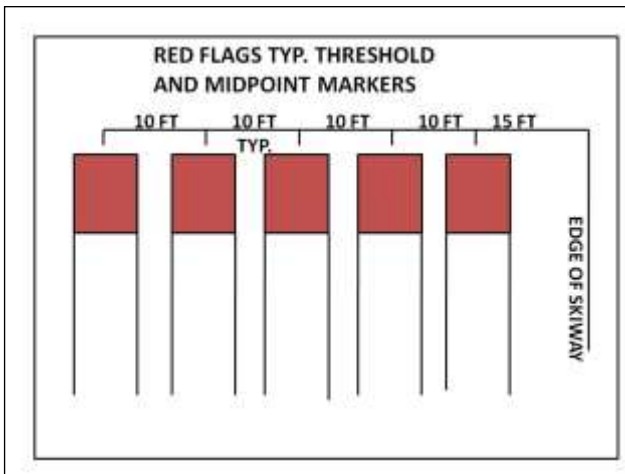
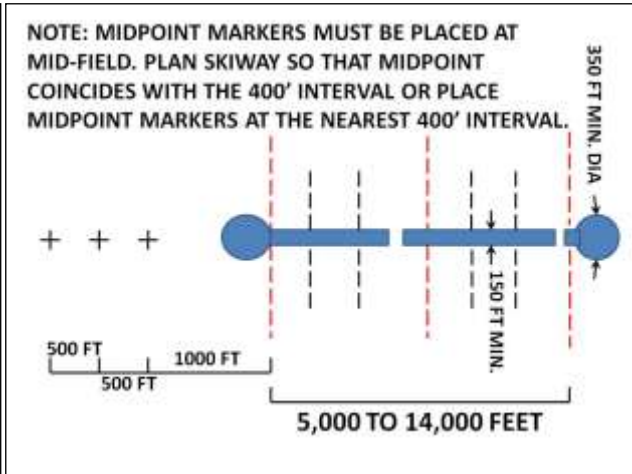
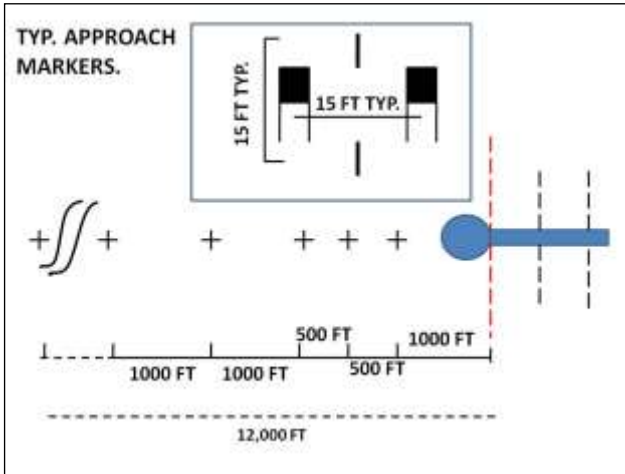
The boxes should be lined with a shock absorbing layer. We have found a 27mm layer of Dow Chemical EDPM foam, 35kg/m³, to provide the needed protection for even fragile material. Finally, in order to seal the box, all seams (bottom inside and outside, two vertical seams) should be sealed with Loctite 290 penetrating sealing compound.

We propose that, whenever possible, all participants use these or compatible boxes for their cargo. In order to be compatible, a box should have the same outside dimensions, and the same type of inter-box locking mechanism. The boxes should be equipped with handles.

The costs of transporting boxes are considered to be part of the field expenses.

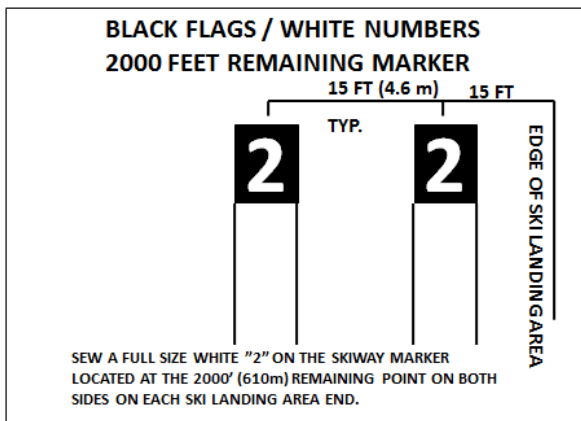
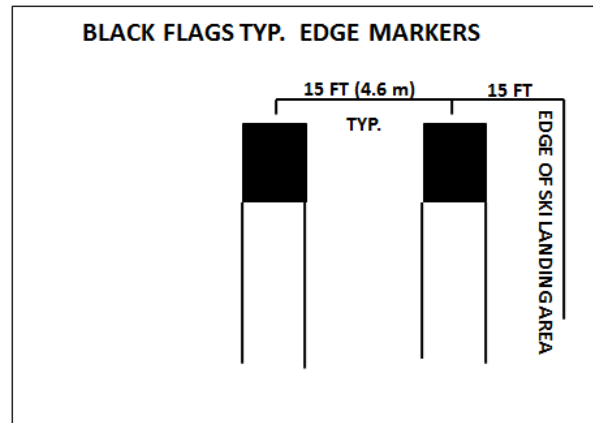
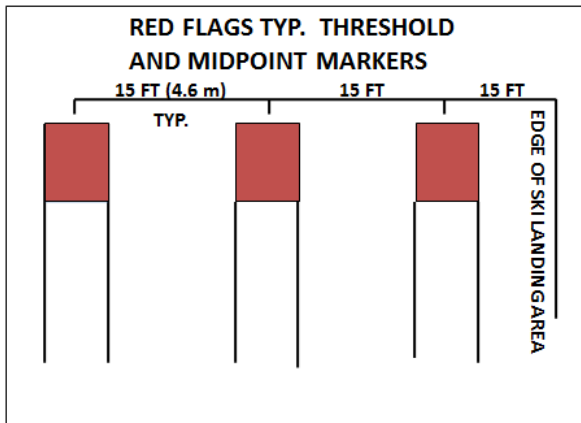
Skiway Marking:

EGRIP skiway is (and GRIP skiway will be) 200' x 12,000' (Feet) – (choice of length 5,000' – 16,000', width 150' – 400') Skiway design from AFI 13 – 217, 10.MAY 2007

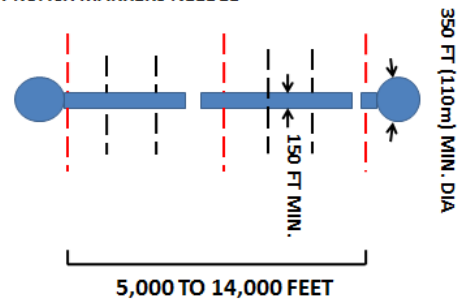


Ski Landing Area Marking (temporary skiway, last used at NEEM):

A ski landing area can be 200' x 12,000' (Feet) – (choice of length 5,000' – 16,000', width 150' – 400').
Landing Area design from AFI 13 – 217, 10.MAY 2007



NOTE: MIDPOINT MARKERS MUST BE PLACED AT MID-FIELD. PLAN SKI LANDING AREA SO THAT MIDPOINT COINCIDES WITH THE 500' (152.4m) INTERVAL OR PLACE MIDPOINT MARKERS AT THE NEAREST 500' INTERVAL. NO APPROACH MARKERS NEEDED



TYPICAL DIMENSIONS FOR MARKER BAMBOO:
2.4 m (94") x 2.5 cm (1 ")DIAMETER

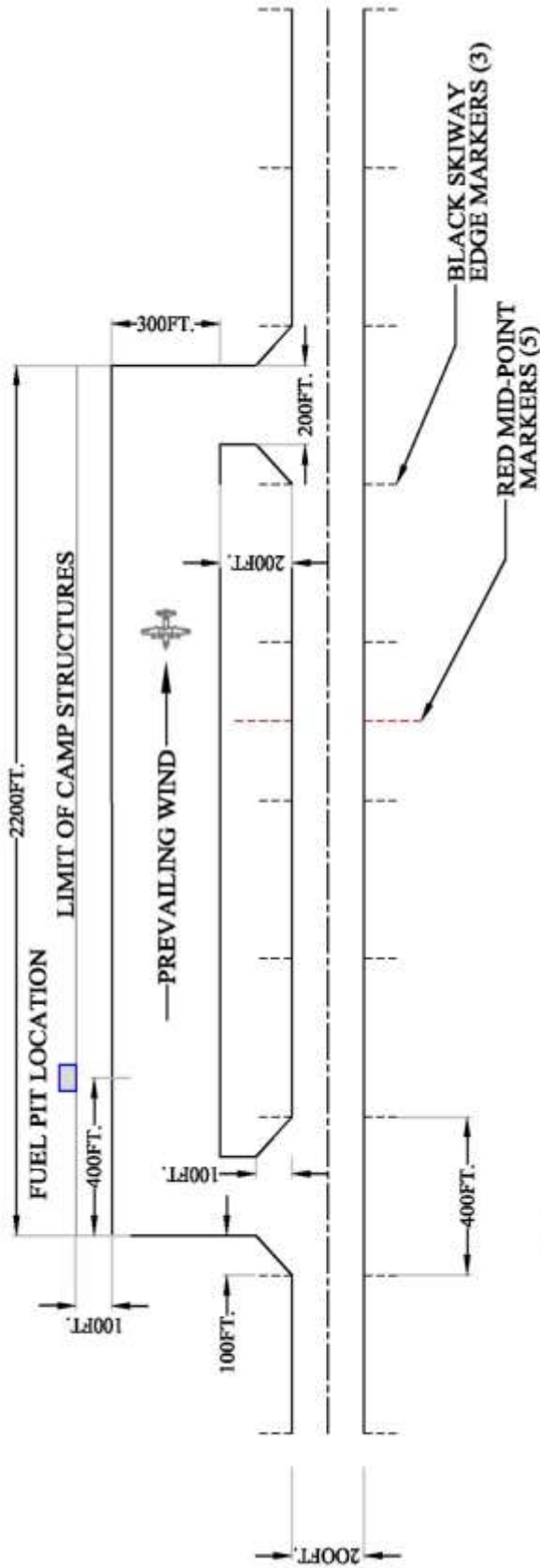
SKIWAY:

NO OF MARKERS NEEDED (12,000 FEET X 200 FEET) (3660 m X 61 m):
30 RED AND 12 BLACK WITH "2" AND 268 BLACK (INCLUDING APPROACHES).
APRON AND TAXIWAYS: 30 GREEN.

SKI LANDING AREA :

NO OF MARKERS NEEDED (12,000 FEET X 200 FEET):
18 RED AND 8 BLACK WITH "2" AND 80 BLACK
APRON AND TAXIWAYS: 30 GREEN.

SKIWAY APRON LAYOUT (CARGO OFFLOAD / ONLOAD AREA)



- NOTES:**
1. DIMENSIONS AS NOTED.
 2. ACTUAL LOCATION OF SKIWAY APRON IN RELATIONSHIP TO SKIWAY MAY CHANGE DEPENDING ON CAMP LOCATION.
 3. MARK APRON CORNERS WITH DOUBLE GREEN FLAGS, APRON LIMITS WITH SINGLE GREEN FLAGS.
 4. MARKERS ENLARGED FOR CLARITY.

LC-130 AIRPLANE DESCRIPTION

WINGSPAN...132' 7"
 LENGTH...97' 9"
 HEIGHT...38' 6"

Skiway official survey document:

May 29, 2015 survey in black

May 1 2018 re-survey in brown. April 30 2023 survey in blue. May 16 2024 survey in red.

SURVEYOR: Jorgen Peder Steffensen (Document updated May 2024).

NOTE:

1. ALL ELEVATIONS REFERENCE MEAN SEA LEVEL IN FEET (METRIC)
2. LATITUDES/LONGITUDES AND AZIMUTHS EXPRESSED IN DEGRESS-MINUTES-SECONDS FORMAT
3. ALL DISTANCES IN FEET (METRIC)
4. DUE TO ICE FLOW, EGRIP SKIWAY IS MOVING 150 FEET PER YEAR, BEARING 030

EGRIP CAMP (BGEG)

AIRFIELD REFERENCE POINT (ARP): CENTERLINE STATION 1640 (500 meter)

LATITUDE: 75-38-02.82 N LONGITUDE: 36-00-12.96 W

LATITUDE: 75-38-07.48N LONGITUDE: 36-00-00.90 W

LATITUDE: 75-38-15.18N LONGITUDE: 35-59-39.98 W

LATITUDE: 75-38-16.87N LONGITUDE: 35-59-35.52 W

ELEVATION: 8885 (2708 meter)

DISTANCE SKIWAY CENTERLINE POINT TO THRESHOLD:

APPROACH: 6000

DEPARTURE: 6000

MAIN SKIWAY (200 ft. x 12000 ft.)

APPROACH (24) Magnetic 2022: Skiway 28

LATITUDE: 75-38-32.52 N LONGITUDE: 35-56-46.80 W

LATITUDE: 75-38-37.07 N LONGITUDE: 35-56-34.12 W

LATITUDE: 75-38-44.52 N LONGITUDE: 35-56-13.06 W

LATITUDE: 75-38-46.18 N LONGITUDE: 35-56-08.09 W

ELEVATION: 8871 (2704 meter)

DEPARTURE (06) Magnetic 2022: Skiway 10

LATITUDE: 75-37-33.36 N LONGITUDE: 36-03-38.82 W

LATITUDE: 75-37-37.85 N LONGITUDE: 36-03-27.54 W

LATITUDE: 75-37-45.66 N LONGITUDE: 36-03-07.27 W

LATITUDE: 75-37-47.10 N LONGITUDE: 36-03-02.84 W

ELEVATION: 8898 (2712 meter)

MAIN SKIWAY GRADIENT: 0.22%

SKIWAY AZIMUTHS from Approach True 24

True: 240 30' (2022). The 2015 azimuth theodolite determination of 237 24' was 240 25' by GPS

Grid: unknown (mag. Declination Jan 2019: 27 00')

MAIN DOME (HIGHEST STRUCTURE)

LATITUDE: 75-38-00.38 N LONGITUDE: 35-58-59.63 W (April 2023)

ELEVATION: 8925 (top of structure) (2720 meter)

AGL:

DISTANCE TO SKIWAY CENTERLINE: 1640 (500 m)

DISTANCE SKIWAY CENTERLINE POINT TO THRESHOLD:

APPROACH 24 : 6000 (1829 meter)

DEPARTURE 06 : 6000 (1829 meter)

Typical specifications for Twin Otter and Basler:

Actual specs depend on the aircraft used, its equipment, fuel type etc.

	De Havilland DHC-6, Twin Otter:	Basler (modern DC-3), Polar 6:
Weight empty [kg]	3456	8900
Max take off weight [kg]	5682	13068
Weight of ski	250	544
Empty weight with ski	3706	9444
Max load [kg]	1976	4008
Fuel consumption [kg/hr]	270(330l/hr)	470 (570l/hour)
Speed without ski [km/hr]	250(135 kn)	380 (205 kn)
Speed with ski [km/hr]	230 (125 kn)	300 (160kn)
Max range [km]	556	3225
Max altitude [ft]	30,000	25,000
With pax	10,000	25,000
Fuel load [kg]	1100	4008
Loading data:		
Cargo hatch [m*m]	2.0*1.9	2.15 *(1.9 front – 1.6 rear)
Cargo compartment		
Length, incl rear cabin etc [m]	8.1	12.85
Width 1,1m, max	1.2	2.34
Height 1,3m, max	1.4	2.0
Pay load		
Normal with full fuel load [kg]	990	2500 (with fuel for 3 hours)
Maximum	1260	1500 (with fuel for 5 hours)

Twin Otter:

In order for the cargo to fit through the cargo door, if the cargo is:

- 5.5m long, it must not be more than 0.2m thick
- 4.0m long, it must not be more than 0.35m thick
- 2.5m long, it must not be more than 0.65m thick
- 1.3m long, it must not be more than 1.2m thick

Basler:

In order for the cargo to fit through the cargo door, if the cargo is:

- 6.0m long, it must not be more than 0.6 m thick

Typical LC-130 specifications:

(all specs for info only, depends on aircraft etc)

An empty LC-130 is [lbs]	91000
Tank capacity [lbs]	61000
Max touch down weight open snow [lbs]	125000
Max take off weight [lbs]	155000
Max landing weight [lbs]	155000
Max landing weight on prepared skiway [lbs]	135000
Fuel capacity [lbs]	62000
Fuel consumption [lbs/hr]	5000
Nominal speed [kn]	290
Flight time SFJ-NGRIP-SFJ (1020 nm)	4.4 hours
Flight time SFJ-NEEM-SFJ (1260 nm)	5.4 hours
Range with max payload [miles]	2364
Max air hours [h]	10
Cargo room max 41*10.3*9' [m]	12.50*3.14*2.74
Physical door width 116" [m]	2.94
Cargo deck to ceiling 9' 1" [m]	2.76
Max weight for one pallet, pos 1-4 [lbs]	10000
Max weight of one pallet, pos 5 [lbs]	8500
Max weight of ramp pallet [lbs]	4664
Nominal empty weight of pallet and nets [lbs]	355
Max weight multplie pallet for combat offload [lbs]	12000
Pallet outside dimensions 88"*108" [m]	2.23*2.75
Pallet inside dimensions 84"*104"*2.25" [m]	2.13*2.64
Max height normal pallet, 96" [m]	2.44
Normal height of pallet, snow and combat [m]	2.28
Max height ramp pallet for combat offload [m]	1.75
Max height dual or tripple pallet [m]	1.75
Max vol per pallet [m ³]	13.7
Max vol ramp pallet [m ³]	8.75
Width wheel well area 123" [m]	3.12
Width ramp without rails 114" [m]	2.89
Width outboard rails 105 5/8" [m]	2.68
Ramp height 44" to 49" [m]	1.12 to 1.25
Ramp length 10' [m]	3.05
No of pax without using pallet space	4
1 pallet equals [pax]	8
2 pallet equals [pax]	14

Note: Pallet heights are measured from top of pallet.
Max weight for pallet on 931B forks is 2200 lbs

Small table of values and conversions:

1 foot =	0.3048 m
1 lbs =	0.4536 kg
1 US gallon =	3.7854 l
1 knot =	0.514 m/s

Max dimension of cabin luggage:	55*40*23 cm, 8 kg
Density of Jet A1	805 kg/m ³
Density of mogas	720 kg/m ³
200 l drum of JET A1 or D60	178 kg
Empty standard drum	15 kg
Jet A-1 weight vs. volume	0.52 liter per lbs.
Firn density for stop of water flow:	720 kg/m ³

CINA equation for the relation between pressure and altitude:

$$p[hPa] = p_0 \left(\frac{288 - 6.5 \cdot 10^{-3} \cdot h [m]}{288} \right)^{5.256}$$

where $p_0=1013.25$ hPa, 288K standard air temperature at sea level (15 °C) and $6.5 \cdot 10^{-3}$ the standard lapse rate in the troposphere [°C/m]. Use this equation to obtain the sea level pressure when the altitude is known, i.e. for aviation weather reports.

Chill temperature:

This is the formula used for calculating wind-chill-temperatures (t temperature in C, v windspeed in m/s):

$$t_{\text{Chill}} [^{\circ}\text{C}] = \left(\frac{10.45 + 10\sqrt{v} - v}{22.034} \right) \cdot (t - 33) + 33 [^{\circ}\text{C}; \text{m/s}]$$

Current capability of electrical cables:

Area [mm ²]	Resistance [Ohm,/100m]	Nom load [A]	Max load [A]
0,7	2.3	6	10
1,5	1.16	15	25
2,5	0.69	20	35
4,0	0.43	25	45
6,0	0.29	40	60
10	0.175	60	80
16	0.11	80	110
25	0.07	100	135

Connections to 5-conductor cable:

Old system

Yellow/green:	Protective ground
Blue	Neutral (0)
Black	L1
Brown	L2
Black	L3

New system

yellow/green
blue
brown
black
grey

Coordination of LC-130 in Kangerlussuaq

Note regarding the coordination of Polarfield/EGRIP and 109'th TAG activities in Kangerlussuaq.

This note is written to make the field coordination between Polarfield/Batelle ARO, EGRIP and 109'th TAG as smooth and easy as possible by ensuring efficient ways of exchanging firsthand information between the responsible Field Operations Managers (FOM's) for CPS and EGRIP and 109'th TAG personnel during periods with flights for the GISP and EGRIP programs.

The outline of this paper should be presented to each Deployment Commander(DC) in a briefing and each mission crew should be briefed on the contents before scheduling a flight to/from EGRIP. This will ensure that the FOM's and the 109'th personnel will operate along the same outlines throughout each period of deployment.

In the following it is assumed that prior to the field activities of Polarfield and EGRIP in Greenland, plans and agreements have already been made between Polarfield/EGRIP and 109'th TAG regarding times of deployment in Kangerlussuaq, expected number of missions throughout the season, total cargo estimates, estimates on cargo straps, nets and pallets needed, ski-way marking, ski-way preparation, off load areas, radio frequencies etc.

Flight period:

After arrival of 109'th to Kangerlussuaq a meeting should be held between 109'th DC, 109'th cargo responsables (Load masters and Aerial port) and the FOM's of Polarfield and EGRIP. Both FOM's need to be there since U.S. NSF activities and EGRIP project are independent and each FOM carries the financial responsibility regarding 109'th operations. At this meeting the FOM's will provide information on:

- Planned flights,
- Amount of cargo,
- Hazardous cargo,
- Number of PAX to be transported,
- Ski-way conditions in camp.
- Ski-way, taxiway and off-load area outlines relative to the camps,
- Updates on radio frequencies,
- Current weather and
- Communication radio frequencies & phone numbers.

The DC will provide information on the exact duration of the deployment, ground crew availability, aircraft availability and options in case of bad weather. The meeting will result in an operation schedule for the flight period in question. Both FOM's and the DC should consult each other in case of changes in this schedule.

Day to day operations:

The FOM's will normally organize that all cargo is palletized, strapped down and weighed. In cases of doubt the FOM's will consult the Aerial Port regarding palletizing. The FOM's will always consult the Aerial Port when married pallets are being built and when load vehicle (k-loader) is needed. The FOM's will list the weight and height of the pallets. The FOM's will indicate to Aerial Port which pallets are going on each flight and will indicate the position of any hazardous cargo on the pallets. Normally, transportation of pallets from the staging area to the planes and vice versa will be handled by Aerial Port using the Articulated front loaders(ATs) or other load vehicles. However, the FOM's will assist in the on- and off-loading of aircraft whenever needed using the EGRIP forklifts and trucks.

Cargo manifests, passenger manifests and shippers declarations of hazardous material will be prepared by each FOM office and delivered to Skier operations on the day before departure. In case of last minute changes (e.g. changes in passengers) the changes to the manifests will be passed on to Skier operations no later than two hours before departure. The FOM's will get aviation weather observations from the field camps on a one hour basis, starting at least 3 hours prior to scheduled departure. The FOM will ensure that the Field Leader also sends three consecutive Aviation weather reports to the DMI office, so DMI may work out an aviation weather report for the 109th pilots.

Since each FOM is economical responsible to his/her program, the FOM and DC either in person or by telephone will agree on whether a flight will depart or not. The FOM should be present at the AC at departure to provide last minute briefing with the departing crew.

During missions Telephone, Iridium phones, OpenPort phones and e-mail will be monitored for updates on weather and mission progress from plane crews and field camps. NOTE: Both EGRIP camp and FOM office will have phone lines open 24 hours a day. The FOM office will relay information on mission progress to Skier OPS. The FOM keeps a record of departure times and reported arrival times.

End of flight period:

At the end of deployment, before departure of the 109'th to the U.S. or, when there is a change of DC, a meeting should be held between the 109'th and the CPS and EGRIP FOM's in order for the FOMs and DC to sign the mission sheet, which includes the number of flight hours assigned to the different programs.

Updated, February 25, 2022 by J.P.Steffensen

Communication plan

Typical radio communication plan.

The major part of the communication is performed using a satellite link, Iridium OpenPort and Iridium satellite communication. However, flight related communication close to camp is performed on VHF radio.

Call signs (Site Names): Polarfield Sonde, Summit Radio, East GRIP , GOC Sonde.

VHF radio.

Camp communication with air craft is performed on Air band **122.8MHz** FM, In camp radios will operate on Maritime Channel 8 (156.400 MHz). Maritime VHF is also used to support SAR operations.

If aircrafts are expected, weather reporting from camp starts 3 hours prior to estimated take off time on a one hour basis unless otherwise arranged. Reporting primarily on e-mail with telephone and radio as backup unless agreed otherwise. Weather observations should be reported to the FOM office, weather office in Kangerlussuaq (DMI) and the 109th. DMI needs at least three observations from camp to issue a local area forecast to the flight crews.

Summary of frequencies used in Greenland

VHF radio air band.	118.1	CNP AFIS
	118.3	SFJ Approach
	121.3	NUUK FIC
	121.5	Call, Emergency
	122.8	Air to ground, EGRIP or Summit
	126.2	SFJ Tower
	123.45	Open Mic. Flight chat line
VHF marine band:	Ch 8	EGRIP talk channel
	Ch 12	EGRIP talk channel
	Ch 16	International call and distress channel (156.8 mHz)

Phonetic alphabet

A special way of saying letters and numbers that makes them less likely to be misunderstood when they are transmitted over radios.

A	Alpha	N	November	1	Wun
B	Bravo	O	Oscar	2	Too
C	Charley	P	Papa	3	Tree
D	Delta	Q	Quebec	4	Fower
E	Echo	R	Romeo	5	Fiwer
F	Foxtrot	S	Sierra	6	Six
G	Golf	T	Tango	7	Seven
H	Hotel	U	Uniform	8	Aight
I	India	V	Victor	9	Niner
J	Juliet	W	Whiskey	0	Zeeroh
K	Kilo	X	Xray		
L	Lima	Y	Yankee		
M	Mike	Z	Zulu		

In addition, numbers are usually spoken as individual digits. For example, 123 would be read as “wun too tree”.

Useful abbreviations for de-cyphering pilot talk on flight plans.

AC: Air craft.

ACL: Air Craft Load = Total weight of aircraft (in kg or pounds)

GC: Centre of gravity For balancing the Air Craft

FL: Flight Level level of flight in nearest 100 feet

POB: Persons on board = total number of souls (PAX and crew)

Endurance or FOB = Total time of flight with current fuel load.

1000z = 10.00 GMT (0800 AM West Greenland summer time)

Flightplan:

IDENT: C-GHGF TYPE: DC3T VFR M SHG/S

DEPART BGNM@1200 FL125 N0205

ROUTE: BGSF

EET 0330 FOB 0600 POB 5

For PIC E BENGTSOON

J.P.Steffensen, FL EGRIP Camp

+8816 777 15686

Identity: Charlie-Golf Hotel Golf Foxtrot. Type: Turbo DC3 (Basler), Flying Visual Flight Rules. Safety equipment "M SHG/S" Departs EGRIP at 1200z , flying at flight level 12500 feet, , route to Sondrestrom, Estimated flight time 03.30 hours, Fuel on board 06.00 hours. 5 Souls on board. Pilot in Charge: E Bengtsson.

METAR and TAF:

METAR bgsf 111320z auto 08007kt 9999ndv ncd m30/m34 q0995=

METAR	METAR
Bgsf	Valid for Kangerlussuaq/Sdr Strømfjord
111320z	Issued the 11th day of the month at kl. 13:20UTC
auto	
08007kt	Wind from 80° at 7 knots
9999ndv	Visibility > 10 km
ncd	
m30/m34	Temperature -30 degrees C, dewpoint temperature -34 degrees C
q0995	Pressure 995 hektopascal (hPa)

TAF-FT bgsf 111058z 1112/1123 06006kt 9999 bkn150 tempo 1113/1123 4500 -shsn bkn024=

TAF-FT	Long TAF
Bgsf	Valid for Kangerlussuaq/Sdr Strømfjord
111058z	Issued the 11th day of month at 10:58 UTC
1112/1123	Valid from 09:00 and the next 11 hours
06006kt	Wind from 60° at 6 knob
9999	Visibility > 10 km
Bkn150	Broken at 15000 feet
Tempo	Periods with change
1113/1123	Between kl 13:00z and 23:00z
4500	Visibility 4500 meter (4,5 km)
-shsn	Light snowshowers
bkn024	Broken at 2400 feet

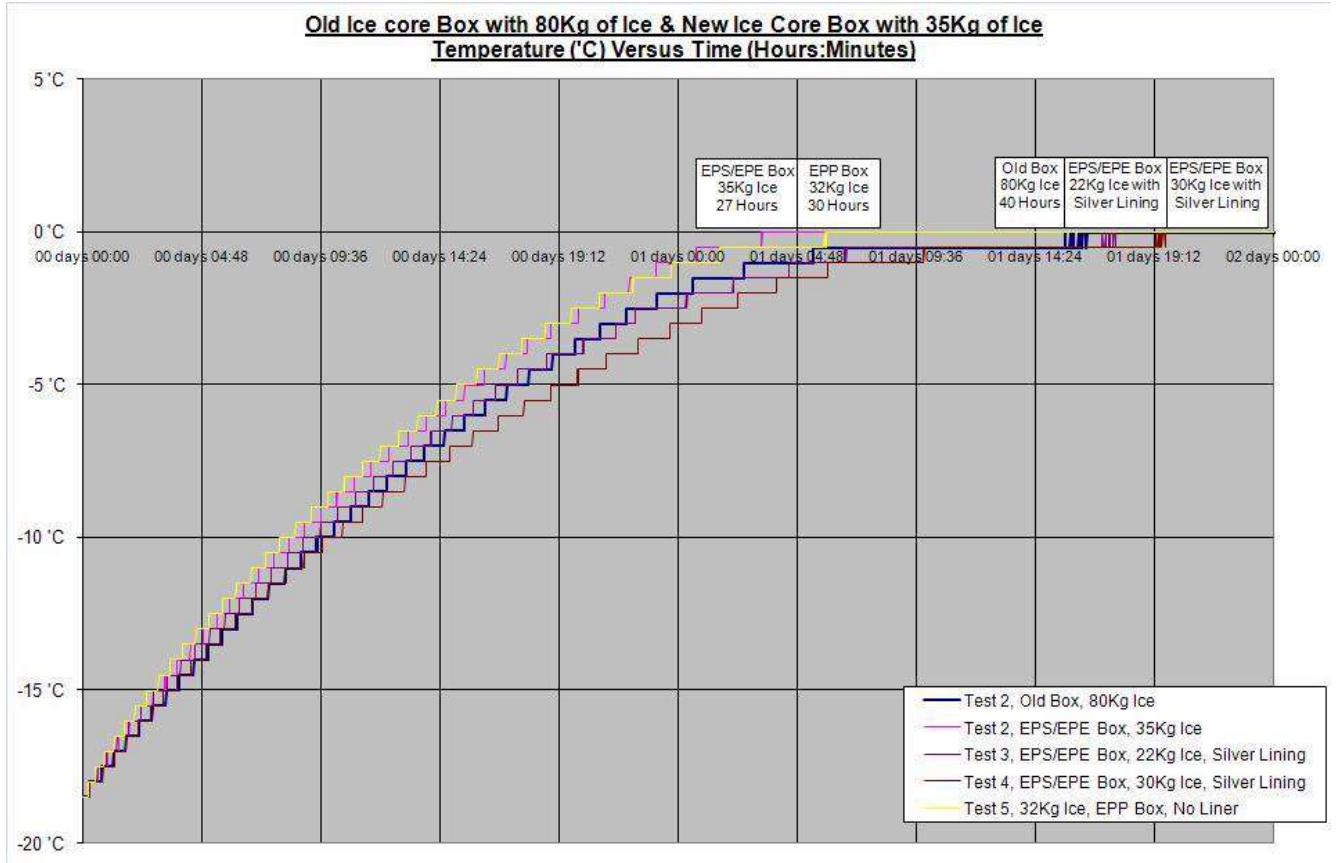
Positions in Greenland

Positions in Greenland				
Site	N, deg	W, deg	N, deg, min	W, deg,min
Aasiaat, BGAA	68,7219	52,7847	68 43 19	52 47 05
Akureyri, AEY	65,65	18		
AWI 1995 depot	76,63	46,37	76 38	46 22
Camp Century, tower	77,1797	61,10975	77 10 46	61 06 35
Camp Century,upstream	77,22122	60,80012	77 13 16	60 48 00
Constable Point, BGCO	70,7417	22,6583	70 44 30	22 39 30
Danmarkshavn, DMH	76,79	18,65		
Dye-2	66,485	46,298	66 29 06	46 17 54
Dye-3	65,15139	43,81722	65 09.05	43 49.02
EGRIP	75,63541	36,00025	75 38 07	36 00 01
GISP 2 (Summit)	72,58833	38,4575	72 34.78	38 27.27
GRIP	72,58722	37,64222	72 34.74	37 37.92
Hans Tausen, 95 Drill site	82,50556	37,47222	82 29.8	37 28.2
Jakobshavn, BGJN	69,2444	51,0622	69 14 40	51 03 44
Kangerlussuaq, BGSF	67,0111	50,725	67 00 40	50 43 30
Kulusuk, BGKK	65,5736	37,1236	65 34 25	37 07 25
Longyearbyen	78,25	15,5		
Narsarsuaq,BGBW	61,1611	45,42780	61 09 40	45 25 40
NEEM	77.4486	51.0556	77 26 54.93	51 03 19.89
NGRIP	75,1	42,30000	75 06	42 20
NGT23, B20	78,83333	36,50000	78 50 00.0	36 30 00.0
NGT27, B21	79,99925	41,13744	79 59 57.3	41 08 14.8
NGT30, B22	79,34142	45,91156	79 20 29.1	45 54 41.6
NGT33, B23	78,00000	44,00000	78 00 00.0	44 00 00.0
NGT37	77,25000	49,21667	77 15	49 13
NGT39	76,65000	46,48333	76 39	46 29
NGT42	76,00000	43,50000	76 00	43 30
NGT45	75,00000	42,00000	75 00	42 00
Nuuk, BGGH	64,1944	51,6806	64 11 40	51 40 50
Saddle North	66,43333	43,33333	66 26	43 20
Station Nord (STANOR)	81,6	16,650	81 36	16 39
Storstroemmen			77	22
T53. JJ			71 21.24	33 27.34
T61	72,2	32,3	72 12	32 18
Thule AB	76,53	68,7	76 32 00	68 42 00
Uummannaq, BGUQ	70,7342	52,6961	70 44 03	52 41 46

Relevant distances

From	To	km
AEY	NOR	1780
AEY	CNP	600
CNP	THU	1532
CNP	DMH	686
CNP	RENLAND	161
DMH	NGT33	627
DMH	NOR	539
EGRIP	GRIP	344
EGRIP	CNP	695
EGRIP	SUMMIT	350
EGRIP	NEEM	440
EGRIP	NGRIP	190
MST	CNP	170
MST	RENLAND	141
NEEM	SFJ	1180
NEEM	THU	480
NEEM	UPERNAVIK	600
NEEM	NGRIP	365
NGRIP	CNP	799
NGRIP	GRIP	315
NOR	Longyearb	717
NOR	HT	335
SFJ	THU	1224
SFJ	JAV	245
SFJ	EGRIP	1088
SFJ	GRIP	796
THU	CC	205
THU	HT	887
THU	NGT33	625
THU	GRIP	1005
THU	NOR	1182

Ice core boxes, temperature measurements:



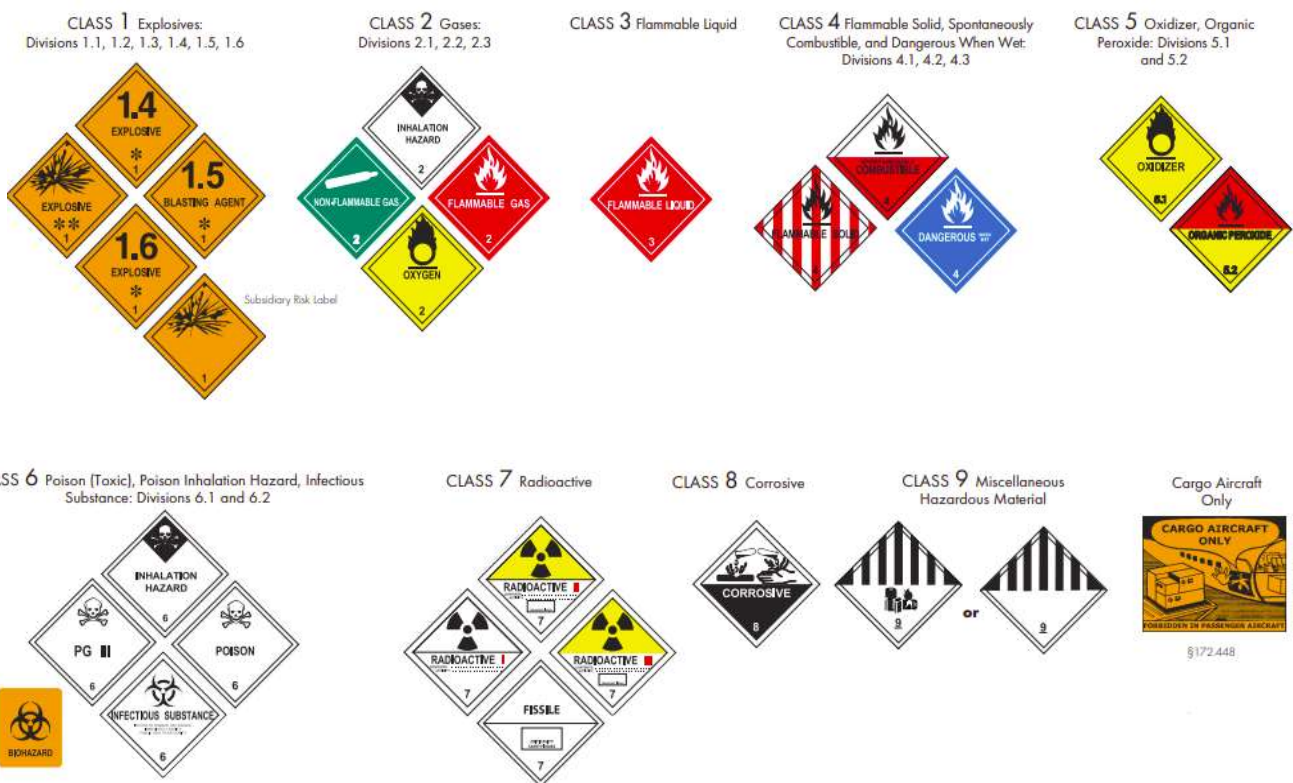
HAZMAT / DGR Information

What to be aware of when shipping Dangerous Goods DGR (EU) / HAZMAT (US)

Dangerous goods include explosives, gases, flammable liquids, toxic substances, infectious substances, radioactive substances, corrosive substances, lithium batteries and more, which can be a hazard to people, animals or the environment if not properly handled in use or in transport.

There are heavy regulations regarding shipping anything listed as DGR/HAZMAT and if not following these regulations, we can get in real trouble and heavily fined. Therefore, when you plan to ship cargo by Road, Rail, Ship or Air, it is important that you check your cargo for any of the left or similar danger symbols.

Another thing you should look out for are the below shipping labels (divided by the UN Model Regulations classification of danger).



If your goods or cargo is marked with any of these or any other hazardous labels, then you need to handle and ship them as DGR/HAZMAT. Which means that the packaging, labelling and paperwork, must be, handled by certified personnel e.g. the shipping agency that you plan to use, the logistical department at your institution, or the EastGRIP logistical group.

Important info: If you have found an old box with any of the shipping labels above, and you want to re-use it for shipping something else not hazardous, then you **MUST** remove the old labels, as the box will otherwise be considered as containing hazardous materials. Which can end up giving you a penalty.

It is very good to know that it is allowed to re-use undamaged shipping boxes. DGR/HAZMAT boxes are expensive.

Lithium Batteries

Lithium batteries have become very restricted to ship by AIR due to, a series of incidents involving fires on aircraft from shorted lithium batteries. All modern electronics, such as cell phones, laptops, cameras etc. contain lithium batteries.

IATA distinguishes between “lithium ion batteries” and “lithium metal batteries”

“**lithium ion batteries**” are a type of secondary (rechargeable) battery commonly used in consumer electronics. Also included within the category of lithium-ion batteries are lithium polymer batteries. **Generally found in mobile telephones, laptop computers, etc.**



“**lithium metal batteries**” are generally primary (non-rechargeable) batteries that have lithium metal or lithium compounds as an anode. **Generally used to power devices such as watches, calculators, cameras, temperature data loggers.**



Lithium batteries are classified in Class 9 – Miscellaneous dangerous goods as:

Loose batteries: UN 3090, Lithium metal batteries, or UN 3480, Lithium ion batteries **(forbidden for transport as cargo on passenger aircraft IATA).**

Or, if inside a piece of equipment or packed separately with a piece of equipment to power that equipment as: UN 3091, Lithium metal batteries contained in equipment, UN 3091, Lithium metal batteries packed with equipment, UN 3481, Lithium ion batteries contained in equipment, or UN 3481, Lithium ion batteries packed with equipment **(less restricted IATA).**



So what does that mean for us?

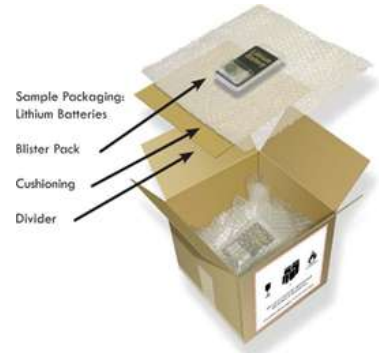
- 1). Find the MSDS (Manufacturers Safety Data Sheet) or SDS (not old version) and see under **Section 14: Transport information**, if/how your lithium batteries can be, shipped.
- 2). As UN 3090, Lithium metal batteries and UN 3480, Lithium ion batteries are, forbidden for transport as cargo on passenger aircraft. Always consider to ship as packed in /or with equipment. However even this has become complicated.
- 3). Consider to send by Ship (IMDG less restricted), or carry as hand luggage (see next page).

Example of lithium batteries packed with equipment, in the original packaging.

Packaging of the lithium batteries

It is important to remember, that one of the major risks associated with the transport of lithium batteries and battery-powered equipment is short-circuit of the battery as, a result of the battery terminals coming into contact, with other batteries, metal objects, or conductive surfaces.

- Packaged batteries or cells must, be separated in a way to prevent short circuits and damage to terminals.
- Cover the poles with tape.
- Must be packed in a strong outer packaging (preferable the original packaging) or contained in equipment (in preferable the original packaging).

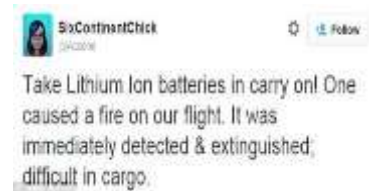


To carry lithium batteries in your carry on hand luggage



To carry lithium batteries as carry on hand luggage is often easier than to ship them as cargo. However, here is also a few things to be aware off. One thing is that the different Airlines, have different regulations, so check their homepage before you travel with the lithium batteries.

A thing they all agree about; “it is safer to have lithium batteries in your carry on hand luggage, than in your checked in luggage.”



Therefore, you will also find that you can actually carry quite a lot of lithium batteries with you on the plane.

<https://www.easa.europa.eu/en/domain>

IATA distinguishes between small (up to 100 Wh), medium (up to 160 Wh) and large lithium batteries (more than 160 Wh):

Wh rating or lithium metal content	Configuration	Carry-on baggage	Checked baggage	Operator approval
≤ 100 Wh / 2g	In equipment (PED or PMED)	Yes (max 15 PED/PMED ¹)	Yes	No ²
	Spare battery(ies)	Yes (max 20 spare batteries ²)	No	No ²
>100 to ≤160Wh	In equipment (PED or PMED)	Yes	Yes	Yes
	Spare battery(ies)	Yes (max 2 spare batteries)	No	Yes
>160Wh	Must be prepared and carried as cargo in accordance with the IATA Dangerous Goods Regulations			
> 2g ≤ 8g	In equipment (PMED only)	Yes	Yes	Yes
	Spare batteries for PMED	Yes (max 2 spare batteries)	No	Yes

1. Each person is limited to a maximum of 15 PED. The operator may approve the carriage of more than 15 PED.
2. Each person is limited to a maximum of 20 spare batteries of any type. The operator may approve the carriage of more than 20 batteries.

Watt-hour rating, expressed in Watt-hours (Wh), the Watt-hour rating of a lithium cell or battery is calculated by multiplying the rated capacity in ampere-hours by the nominal voltage.

www.iata.org/contentassets/6fea26dd84d24b26a7a1fd5788561d6e/passenger-lithium-battery.pdf

Help: Marie Kirk has IATA, IMDG, DOT (49 CFR) and U.S. Air Force certification (AFMAN 24-604), and can help you with any questions that you might have. However, it is important to stress that Marie cannot certify cargo from your country of origin to Denmark/Greenland, as she needs to be able to physically inspect the cargo.

Sun glasses

It is recommended to use sunglasses with UV-protection (Polaroid) to protect eyes from excessive ultraviolet radiation, primarily to avoid snow-blindness, but also to reduce long-term ocular damage such as cataracts. Be careful to wear glasses that also block the sunrays around the edges of the lenses.

Standards for sunglasses – see labelling on inside of the frame

Europe CE (EN 1836:2005)

0	insufficient UV protection
1	sufficient UV protection
2	good UV protection
3	full UV protection

US (ANSI Z80.3-1972)

A compliant lens should have a UVB (280 to 315nm) transmittance of no more than one per cent and a UVA (315 to 380nm) transmittance of no more than 0.5 times of the visual light transmittance.

Australia (AS 1067)

0	some UV protection
1	.
2	.
3	.
4	high level of UV protection

Acute mountain sickness - AMS

Symptoms/signs of acute mountain sickness:

- Headache
- Fatigue/nausea
- Difficulty in breathing
- Sleep disturbances (insomnia)

Symptoms of AMS usually start 6 to 8 hours after a rapid ascent and reach their greatest severity within 24 hours, subsiding over 72 hours. Rapid ascent, exercise, and continuing to ascent to higher altitudes greatly increases the chances of suffering from AMS and its symptoms.

Best way to reduce risk of AMS is to **avoid excessive alcohol consumption the night before flying into camp** and to keep well hydrated on water.

AMS is rarely serious and is usually self-limiting, but may lead to more serious high altitude cerebral edema or high altitude pulmonary edema.

How to operate the Gamow bag

The purpose of the Gamow bag is to provide temporary first aid treatment to victims suffering from varying degrees of acute mountain sickness (AMS) on location and on an emergency basis.

1. Place victim inside bag.
2. Pull the zipper close.
3. Pump the foot operated air pump to begin inflation.
4. Check to make sure that the nylon web retaining straps are not twisted and that they are in their proper locations
5. Inflate the Gamow bag to the desired pressure – see below.
6. A pump per minute rate of 10 to 20 must be maintained at all times to ensure adequate victim protection from excessive carbon dioxide concentrations. An electric oil free air-compressor with an output of at least 1 cubic foot per minute (cfm) may be used to pressurize the Gamow bag (use chrome inlet).
7. Do not connect the bag to oxygen.

Ambient conditions			Inside Gamow bag when pressurized to 2 psi (103 mmHg)		
Meters	Feet	mmHg	Meters	Feet	mmHg
2400	7874	562	1054	3458	665
2700	8859	541	1310	4298	645
3000	9843	522	1555	5102	626
3300	10827	503	1805	5922	607
3600	11812	484	2053	6736	588

The Gamow bag should only be used on a temporary or emergency basis. The bag is not intended as a cure for AMS.

Treatment with oxygen greatly outweighs the use of the Gamow bag, but must be maintained at a flow of 6-8 liters per minutes.

How to monitor blood pressure using the Omron electronic monitor

1. The subject sits down and rests their arm on a table so the brachial artery is level with the heart. Alternatively lie on your back and rest the arm across your stomach. This is important when monitoring blood pressure, as pressure is proportional to height. For example, if one

measures the blood pressure at head height, the systolic/diastolic pressure readings will be approximately 35mmHg less compared to readings taken at heart level, whereas at ground height the pressure readings will be 100mmHg greater.

2. Wrap the sphygmomanometer cuff around the upper arm, just above the elbow. Place the tubings on the hollow of your elbow.
3. Press the **ON** button.
4. Press **START**.
5. The blood pressure monitor will automatically measure the blood pressure.
6. **NOTE:** Do not move the arm during monitoring.
7. Monitor displays the systolic blood pressure (the high value) and diastolic blood pressure (the low value) and heart rate.

Blood pressure	Interpretation	Action
SBT>180 mmHg or DBT>110 mmHG	Severe hypertension	Repeat the test; Contact physician
SBT>160 mmHg or DBT>100 mmHG	Moderate hypertension	Repeat the test; Contact physician
SBT>140 mmHg or DBT>90 mmHG	Mild/borderline	
SBT≈120 mmHg and DBT≈80 mmHG	Optimal	
SBT<90 mmHg and DBT<60 mmHG	Hypotension	

SBP= Systolic blood pressure

DBP= Diastolic blood pressure

How to monitor blood glucose

1. Wash your hands.
2. Prepare your lancing device.
3. Remove the test strip from its foil packet.
4. Insert the three black lines at the end of the test strip into the strip port.
5. Push the test strip in until it stops. The monitor turns on automatically.
6. Wait until the monitor displays the "Apply Blood message", which tells you that the monitor is ready for you to apply blood to the blood glucose test strip.
7. Use your lancing device to obtain a blood drop either from a finger or an ear lobe.
8. Before you obtain a blood sample from the fingertip or ear lobe, make sure the sample site is clean, dry, and warm. Avoid squeezing the puncture site.
9. Apply the blood sample to the test strip immediately.
10. Touch the blood drop to the white area at the end of the test strip. The blood is drawn into the test strip.
11. If the monitor shuts off before you apply blood to the test strip, remove the test strip from the monitor and try again.

12. Continue to touch the blood drop to the end of the test strip until the monitor begins the test. The monitor begins the test when you hear the beeper and/or the display window shows the status bar.
13. Then the display window shows the countdown. **Note: Do not** remove the test strip from the monitor or disturb the test strip during the countdown.

Result of blood glucose monitoring

Blood glucose	Interpretation	Action
LO = low (<1.1 mmol/L or 20 mg/dL)	Extremely low	Repeat the test; Contact physician
<2.8 mmol/L (50 mg/dL)	Moderately low	Repeat the test; Contact physician
4.1-5.9 mmol/L (74-106 mg/dL)	Normal	
>11 mmol/L (200 mg/dL)	Moderately high	Repeat the test; Contact physician
HI = High (>27.8 mmol/L or 500 mf/dL)	Extremely high	Repeat the test; Contact physician

Error messages:

Error no 105 or 705: take out batteries, wait five seconds, insert batteries, and try again.

Calibration of new test strip lot:

Insert calibration strip into strip port. Wait until the monitor displays the lot number. Check number against packet.