

Please review all of the following information, including the gear allocations and field team information, to ensure accuracy. This plan is an agreement between CH2M HILL Polar Services (CPS), formerly VECO Polar Resources, and your group, documenting the logistics support you will receive.

SECTION ONE: PROJECT INFORMATION

Lead Principal Investigator	Michael Bevis
Institute	Ohio State University, Byrd Polar Research Center, Department of Geological Sciences
Project Title / Grant #	Collaborative Research: IPY: POLENET/Greenland: Using Bedrock Geodesy to Constrain Past and Present Day Changes in Greenland's Ice Mass (0632320)
NSF Program and Manager	NSF\OD\OPP\ARC\ANS, William Wiseman
PFS Project Manager	Robin Abbott

Logistics Summary

<p>This project is a collaboration between Bevis, OSU (0632320, LEAD); and Csatho, SUNY-Buffalo (0632310).</p> <p>The PIs are constructing a network (GNET) of over 35 continuous GPS stations ringing the perimeter of Greenland as part of the U.S. contribution to the International Polar Year (IPY) and the international POLENET consortium. The researchers will install the stations during 2007, 2008 and 2009.</p> <p>Basing from different hubs around the island, small field teams travel to installation sites to set up the stations. The researchers installed roughly two-thirds of the sites in the first year, with several teams working simultaneously.</p> <p>A team of four (one Danish and three Americans) will return for about 4 weeks in late June 2008 to install eight stations at the northern-most sites. After assembling in Kangerlussuaq, the team will fly via C-130 to Thule, spend two nights arranging cargo stored there, and then fly on to Station Nord via the Royal Danish Air Force .. There they will base, visiting installation sites via a Super Puma AS332C helicopter. The helicopter will refuel when needed at two fuel caches set out by POLOG via Twin Otter prior to the field season.. At the end of the season, the team will depart the field site via the Royal Danish Air Force and travel to either Thule or Copenhagen for flights homeward.</p> <p>For this project,</p> <ul style="list-style-type: none"> --UNAVCO will provide GPS receivers and technical support as the field team installs the instruments throughout Greenland, as well as ongoing support to permanent sites and data storage. --CPS (formerly VPR) will provide flight coordination including cargo shipment to project hubs in Greenland, Twin Otter and helicopter air charters; lodging arrangements within Greenland; and camping equipment, some food, and communications / safety gear.
--

For the complete CPS online project record for this grant, including science objectives, go to:
http://www.vecopolar.com/arlss_reports/arlss_projectsdetail.asp?cbPropNum=0632320

For up-to-date information on the project's schedule, please view the online [Greenland calendar](http://www.polar.ch2m.com/) (<http://www.polar.ch2m.com/> > Greenland > Calendars/Schedules).

SECTION TWO: SEASON FIELD PLANS

Outstanding Actions and Notes

Issue	Responsibility	Comments
Review project support plan for accuracy, edit/add as needed, and distribute to all field team members.	PI and team members	
Obtain all necessary 'Area Allotment' permits for fieldwork	National Space Institute (NSI)	Completed See Appendix for letter/map
Complete Charter Agreement with Air Greenland for the Super Puma AS332C helicopter	CPS/Air Greenland	Pending final NSF review
Visit all hyperlinks and review all documents referred to in this support plan	Field Team Members	
Medical Clearance completed 8-6 weeks before desired deployment date	Team members	All have been approved
University of Luxembourg (Tonie van Dam) will contribute a sum of € 40,000 in 2008.	Van Dam/CPS	In process – will send separately from season plan
Important: Bring 2 different forms of picture ID. Passports are mandatory for entry into Greenland.	Field Team Members	
Add to Critical Success Factors	PI	
Ship GPS equipment, batteries, and field tools to Stratton Air Base	UNAVCO	Completed
Arrange for secure storage at Nord	National Space Institute (NSI)	Completed
Arrange Thule Air Base clearances	CPS	In process
Book rooms at Thule Air Base	CPS	Completed
Purchase airline tickets for field team members either to Stratton Air Base or to point of arrival/departure in Greenland.	NSI, OSU, & UNAVCO	Completed by the different parties
Develop a daily call-in schedule with CPS Kangerlussuaq office.	Team Leader / CPS	Arranged upon arrival in Kangerlussuaq
Ensure safety procedures are addressed for installation operations.	Team leader, Eric Kendrick	The team will meet daily with pilot; team leader ensures all safety gear is on the helicopter.
UNAVCO will provide one Iridium phone	UNAVCO	Completed: Phone number is: 881 676 318 494
Arrange for SAAM wheeled C-130 to deliver replacement fuel to Nord (coincident with Mestersvig joint committee air support)	CPS	In process
CPS/PI may approach NSF about installing remaining SE Greenland site (using Nettles logistics) if NE Greenland costs come in under budget.	CPS/PI	Pending

Allocations and Services

Allocations from Inventory

Quant/Unit	Item
2 ea	Iridium Phones (for pick up in Kangerlussuaq upon arrival.)
1 ea	Remote medical kits plus call-in service – see RMI section, below.

1 ea	Small GPS unit
Note	NSI will provide a rifle
Camping Equipment for 4 people:	
Note:	The below list of unfueled equipment will be contained in dry bags. All team members must be familiar with the bags' contents prior to going into the field and may want to repack them. All tents should be set up prior to field deployment. Fuel canisters will need to be filled, lighters or matches added, etc
Note:	Lighters /matches and fuel are the responsibility of the field team, as are all items not on this list (i.e., additional food, empty jugs for obtaining water, bug spray, cold weather clothing, etc).
2-3 ea	Dry Bags for gear (no backpacks are issued, if you a prefer one, bring your own)
4 ea	Tent (REI Geo-Mtn 3) (rocks at the installation site will be used as extra tent anchors / stakes)
4 ea	Sleeping pads (Thermarest)
~24 ea	Tent stakes
4 ea	Sleeping bags– Kelty Zephyr down, long, 66" shoulder width x 86" long, -15C bag
4 ea	Lightweight Bivy bags
2 ea	Multi-fuel stoves – MSR Dragonfly (1) and Whisperlite (1)
6 ea	Fuel bottles for stoves (22 oz size)
2 ea	Cook pots for boiling water
4 ea	Bowls
4 ea	Spoons
~12 ea	Dehydrated dinners
~12 ea	Power bars
~12 ea	Dried soups
Qty	Hot chocolate/coffee
2 ea	Roll of toilet paper
Qty	Parachute cord
1 ea	Foldable spade
4 ea	Insulated Mugs
4 ea	Thermos for hot drinks
1 Lg pkg	Wet wipes (disinfecting towels)
1 ea	Small first aid kit (MAS kit also included in one of the dry bags)
2ea	Dish towels

For more information on satellite phones, radios, manuals and other field communications support, please visit the CPS communications website at <http://vpr.sri.com>.

Other Services

Service	Comments
Arrange clearances for 109 th US Air National Guard flights and to enter Thule Air Base.	See below schedule for tentative dates.
Coordinate and pay for air charters within Greenland.	Air Greenland has sub-contracted a Super Puma helicopter through Airlift AS of Norway. The Twin Otter air charter has been arranged by POLOG.
Arrange/pay for user days in Kangerlussuaq	Meals and Internet access are included. The researchers are responsible for all other costs associated with Kanger stay
Pay for cost of accommodations, food, and handling fees at Station Nord via invoice from NSI.	The researchers are responsible for all other costs associated with Nord stay, including misc. food, drink, etc. There is no telephone or Internet service.

Arrange cargo support via ANG NY > SFJ > THU and via RDAF THU > Nord	All batteries have been staged in the CPS warehouse at Thule. The GNET field team will organize cargo in Thule for onward transport to Nord.
Arrange for use of truck at Thule.	See below schedule for tentative dates
Arrange for Royal Danish Air Force flight support THU><Nord	CPS will reschedule refueling originally to be accomplished via take-out flight from Nord.
Purchase of 64 barrels of Jet A1 in sealed 200 liter drums for shipment to Daneborg to be used for the 2009 field season	Arranged through Statoil in Copenhagen to have delivered to Royal Arctic Line in Aalborg Denmark by 30 June, 2008.
Vessel shipment of drums of fuel from Aalborg, Denmark to Daneborg Greenland.	Note: NSI will handle arrangements with the military command of Denmark/Greenland for purchase of fuel & containers that will transport the fuel drums. NSI will bill CPS for the transport costs but will handle the cost of the containers as part of their contribution to the project.

For more information on satellite phones, radios, manuals and other field communications support, please visit the CPS communications website at <http://vpr.sri.com>.

Location Information

Please visit <http://www.polar.ch2m.com/> and navigate to the Greenland menu, *Greenland Guide*, for en route and location-specific Greenland information.

Cargo and Customs

All cargo required for your project should arrive in Scotia, NY, **no later than 2 weeks prior** to the desired northbound Air National Guard (ANG) flight, must be entered into our online Cargo Tracking System, and must be properly registered with Customs.

For the most current ANG flight schedule go to <http://www.polar.ch2m.com/> and navigate to Greenland > Calendars/Schedules.

Customs instructions are available on our website at <http://www.polar.ch2m.com/> (go to Greenland > Customs)

The following is our current understanding of your overall cargo requirements:

Station Nord (C130 NY-KANGER-NORD)	Weight (lbs)	Cube (ft ³)
194 Batteries	13580	~102
8 Frames	875	56
9 Antenna Monuments	160	18
16 Solar Panels	552	41
32 Hardigg Cases	2600	410
1 Box Tools	250	50
Total	18017	575

Support Schedule

Approx Date	Location	Activity
23 June	NY > Kanger	109 th C-130 flight to Greenland (Kendrick, Wang, Nylen)
24 June	CPH > Kanger	Madsen arrives Kanger from CPH
25 June	Kanger > Thule	109 th C-130 flight to Thule with overnight stay
27 June	Thule > Nord	Fly to Station Nord (Madsen, Kendrick, Wang, Nylen) via Royal Danish Air Force
1 July	Svalbard > Nord	Super Puma AS332C helicopter from Airlift arrives at Nord
2-23 July	Installation of 8 GNET stations	Helicopter is available until 31 July if necessary
24 July	Thule > Nord > Thule > Kanger	Pax/ cargo return to Thule or Copenhagen via RDAF
27 July	Kanger > NY)
August		Fuel delivery flight to Nord via C-130

For the most up-to-date information on the project's schedule, please view the online [Greenland calendar](http://www.polar.ch2m.com/) (<http://www.polar.ch2m.com/> > Greenland > Calendars/Schedules).

Field Team Information:

Role	Name	Institution
Team leader	Eric Kendrick	The Ohio State University
Technician	Jian Wang	The Ohio State University
Technician	Thomas Nylen	UNAVCO
Technician NSI	Finn Bo Madsen	NSI (formerly Danish National Space Center), Copenhagen, Denmark

Project Contact Information

Research Team

Role	Name	Email	Phone / Fax
Principal Investigator	Michael Bevis	mbevis@osu.edu	614.499.5966
Collaborator	Bea Csatho	bcsatho@buffalo.edu	716.645.6800 / 716.645.3999
Co-PI	Cornelis van der Veen	vanderveen.1@osu.edu	614.292.6704 /
Co-PI	Terry Wilson	twilson@mps.ohio-state.edu	614.292.0723 /

SECTION THREE: CPS CONTACT INFORMATION

CPS Team Members

Contact for	Name	Email	Primary Phone(s)
Greenland operations (On-island support)	Mark Begnaud	mark@polarfield.com	Denver: 720.320.6160 Greenland: 011.299.524281
Greenland operations (project support)	Robin Abbott	robin@polarfield.com	Denver: 303.748.8507
Sat phones &	Roy Stehle	roy.stehle@sri.com	Menlo Park:

comms			650.859.2552
Medical & RMI	Kyli Olson	kyli@polarfield.com	Denver: 303.489.2151
Thule operations	Susan Zager	susan@polarfield.com	Denver: 720.320.6159
Denver operations	Jill Ferris	jill@polarfield.com	Denver: 720.320.6155
Scotia operations & customs	Earl Vaughn	earl.vaughn@gmail.com vrscotia@hughes.net	Scotia: 518.331.3103
Purchase orders	Mike McKibben	Mike.mckibben@ch2m.com	720.286.0410

Denver	Kangerlussuaq	Scotia
CH2M HILL Polar Services Western Office 8110 Shaffer Parkway Suite 150 Littleton, CO 80127 Tel: 303.984.1450/1439 Fax: 303.984.1445	CH2M HILL Polar Services Attn: Name of Employee/Researcher Postboks 1015 DK-3910 Kangerlussuaq, Greenland Tel: 011.299.841598 Fax: 011.299.841599	Earl Vaughn C/O 109 th Aerial Port Bldg. 20 Stratton Air Base Scotia, NY 12302-9752 Tel: 518.331.3103 Fax: 518.334.2537

Other

Organization	Internet	Phone
Remote Medical International (RMI)	http://www.remotemedical.com/	206.734.3430
Danish Military Command Coordinator: John Lau Hansen	Email: glkoord@mil.dk	Denmark: +45 9819 6552
Station Nord	Email: stn@glk.gl	Iridium: +881 631 410 427

SECTION FOUR: SAFETY, ENVIRONMENT, HEALTH and PERMITS

Permits

Collaborators at NSI are handling permitting for this project. In April 2007, Finn Bo Madsen of NSI submitted the Application for Permit to the Danish Polar Center/Greenland Homerule. The permission granted in 2007 was renewed again for 2008. Note: The area allotments are to be taken seriously, and in general GNET should stick as close to the location applied for as possible.

In the area allotment, the Greenland Homerule's main concerns are about stations in the National Park. The restrictions toward the inland follow the 500 m contour line. Below that, traffic is prohibited.

The Danish team member (NSI) is familiar with the area allotment conditions and will communicate them to other field members. NSI is responsible for ensuring that the conditions are respected.

For any questions or assistance required for permits contact:

Poul Henrik Sorensen

E-mail: phs@dpc.dk

Telephone: +45 3288 0100

Safety

<ul style="list-style-type: none"> • A GNET Permit Application submitted to the Danish Polar Center / Greenland Homerule includes a map listing all site coordinates. NSI will provide this map to the DPC / Greenland Homerule who in turn will forward it on to authorities and Greenland Military Command / Air Greenland who are responsible for search-and-rescue operations.
<ul style="list-style-type: none"> • The NSI team member will provide a rifle to be used for bear protection if required.
<ul style="list-style-type: none"> • CPS will provide camping gear and dehydrated food for each field team member. This equipment should be brought on all helicopter flights.
<ul style="list-style-type: none"> • A daily check-in call to the Kangerlussuaq office—via cell or Iridium phone--is required. CPS will set up a schedule when the teams arrive in Kangerlussuaq in August.

Medical Clearance

Arctic Program participants traveling into the Greenland field are generally required to pass a National Science Foundation (NSF) -mandated physical exam. All field team members should plan to complete their medical clearance process 6-8 weeks prior to their travel to Greenland. For more information refer to CPS' Greenland Guide, available at <http://www.polar.ch2m.com/> under Greenland.

Medical Assistance

If you need medical advice/assistance, do not hesitate to contact Remote Medical International (RMI) using the card included with the medical kit or the information below. Be sure that each team member knows where the kit is located and understands how to use the RMI service in the field. For further information on RMI, please visit our Web site <http://www.polar.ch2m.com/> and navigate to Medical>Remote Medical Services/Kits.

RMI contact information:

Phone: 206.734.3430

Member ID: CH2M HILL Polar Services

Risk Assessment

Following is a basic list of potential risks to the project. Each risk can have significant impact on the project's success including significant delays or cancellation.

Item	Possible mitigating actions
Customs delays shipments into Greenland	<ul style="list-style-type: none"> - Ship early
Project costs exceed budget due to unforeseen circumstances.	<ul style="list-style-type: none"> - Ensure the NSF & other funding agencies understand the risks identified in this project plan and the general risky nature of this project budget. - Ensure an NSF representative is closely involved with the project and can make decisions on the direction of the project at any time.
Equipment vandalized	<ul style="list-style-type: none"> - Investigate warehouse options or store in sea (ISO) containers before arrival of field team. - Inform people in the community about the importance of the data to be obtained from the monuments.
Lost equipment	<ul style="list-style-type: none"> - Develop cargo manifests and ensure Air Greenland or Airport Authorities at each location receives equipment. - Take photographs before delivering the cargo.
C-130 schedule delays	<ul style="list-style-type: none"> - Delay field season

Delay with the helicopter getting to Nord	- Delay flight schedule until the helicopter is available
Equipment arrives damaged at hub locations	- See if replacements can be obtained and air freighted to Nord via Svalbard, Norway. - Minimize number of site installations for the season - Cancel site or delay installation until next season.
Weather delays	- Wait at the hub location until weather cooperates - Postpone the site for another season.
Installation problems	- Have experienced people in the field. - Check batteries and equipment before the installation. - Bring back-up equipment to each hub location.
Communications problems	- Have back-up Iridium phones
Dangerous wildlife	- Carry rifles provided (1/hub) by DNSC

Critical Success Factors

Please list the factors that are most important for the success of your science. We track these factors in order to measure the success of CPS' support.

Factors
Quality of preseason planning
Availability of Super Puma helicopter
Shipment of cargo to proper location

Government and Performance Reporting Act of 1993 (GPRA)

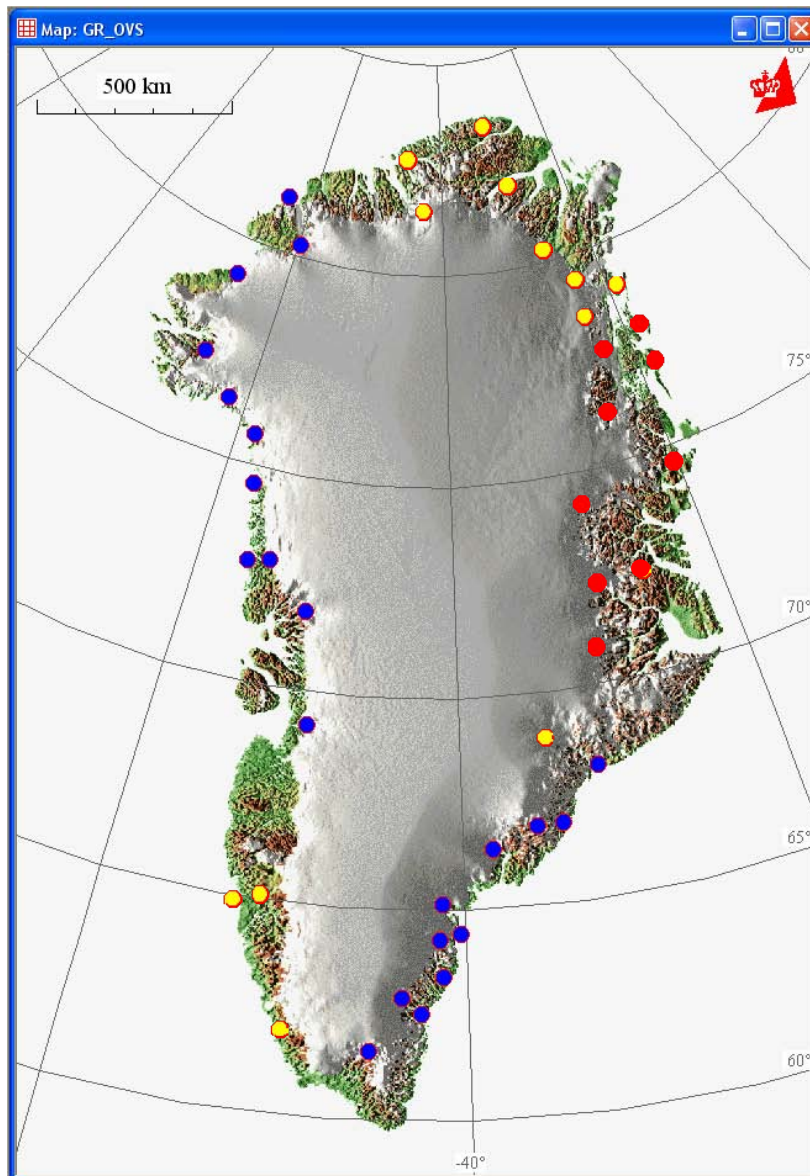
NSF/OPP requires your help in complying with the Government Performance and Reporting Act of 1993 (GPRA). One measure of CPS' performance is a "facility-performance metric" which counts the number of productive days your project has in the field while relying on CPS facilities or support. Please keep track of any "lost days" and report these to us at the end of the season.

Appendices

--2008 Map

--Area Allotment and Map

Bilag 1 GNET status og -udbygningsplan

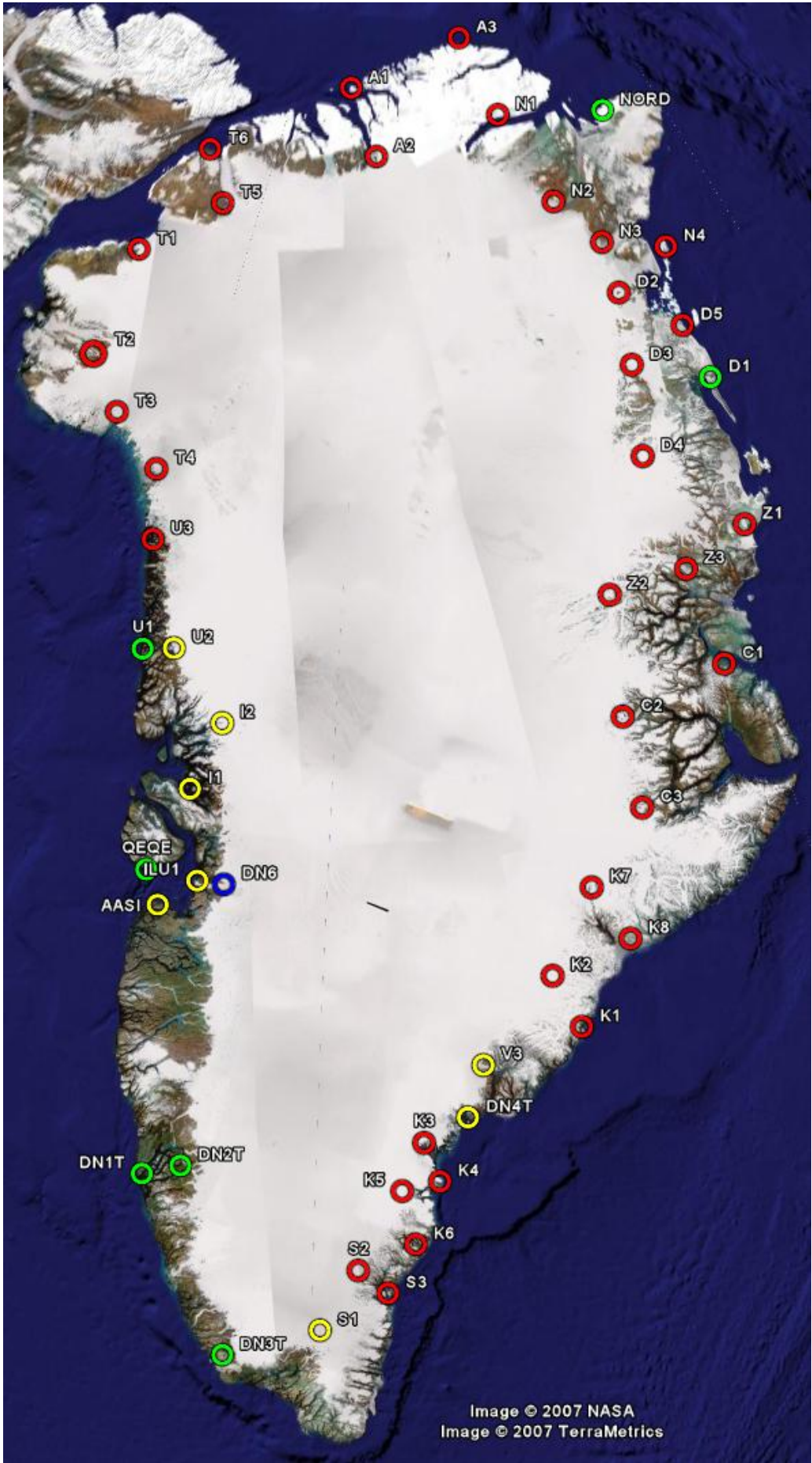


● 23 stations established 2007

● 12 stations to be established 2008

● 9 stations to be established 2009

CPS note: The 3 SW stations in 2008 will be installed by NSI. SE station is not currently approved for 2008 installation but might be possible with cost underruns.



T6	Kap Morton	81° 11' 11.318"	-63° 27' 58.739"
T5	Kap Godthåb	80° 21' 17.975"	-59° 58' 23.005"
T1	Kap Agassiz	79° 08' 33.057"	-65° 52' 51.597"
T2	Marie Glacier	77° 12' 42.710"	-69° 39' 50.000"
T3	Haffner Bjerg	76° 26' 17.965"	-62° 15' 39.103"
T4	Astrup Kystland	75° 43' 28.520"	-58° 15' 44.340"
U3	Kullorsuaq	74° 34' 50.868"	-57° 11' 46.878"
U2	Sermip Nuntaa	72° 54' 40.170"	-54° 23' 42.311"
U1	Upernavik	72° 47' 15.449"	-56° 07' 52.146"
I2	RinkIsbræ/Kangilliup Sermia	71° 50' 31,478"	-50° 59' 59.369"
I1	Uummanaq	70° 41' 23.899"	-52° 06' 55.432"
DN1T	Nuuk	64° 10' 43,426"	-51° 43' 42.336"
DN2T	Kapisillit	64° 25' 52.221"	-50° 15' 52.766"
DN3T	Kangilinguit	61° 13' 44.172"	-48° 05' 40.142"
DN4T	Isortoq	65° 32' 09.007"	-38° 58' 35.771"
DN6	KAGA Jacobshaven	69° 13' 20.280"	-49° 48' 52.560"
S1	Nunatak2820	61° 50' 03.794"	-44° 39' 33.733"
S2	Nunatak1683	63° 00' 17.921"	-43° 12' 25.073"
S3	Timmiarmiut	62° 32' 16.906"	-42° 13' 09.298"
K6	Hjørneffjeldet	63° 23' 40.576"	-41° 09' 56.208"
K5	Delmenhorsts Nunatak	64° 18' 35.934"	-41° 37' 55.500"
K4	Kap Poul Løvenørn	64° 28' 12.675"	-40° 10' 30.484"
K3	Pamiattik	65° 07' 47.254"	-40° 44' 33.770"
V3	Helheim gletcher	66° 24' 04.320"	-38° 12' 56.560"
K1	Pilappik	66° 53' 11.203"	-34° 00' 33.000"
K1A*	Kap Louis Ussing	67° 18' 03.030"	-33° 18' 05.528"
K2	Kronprins Frederik Bjerger	67° 46' 57.677"	-34° 58' 57.236"
V1	Gardiner Sø	68° 34' 58.456"	-33° 03' 07.546"
V2	Sødalen	68° 12' 29.700"	-31° 23' 38.820"
C3	Vindhjørne	70° 16' 53.882"	-29° 45' 26.128"
C2*	Charcot Land	71° 50' 17.153"	-28° 54' 07.910"
C2A	Beta Nunatak	71° 47' 54.120"	-29° 49' 00.850"
C1	Mestersvig	72° 13' 48.681"	-23° 55' 25.974"
Z2	Westfal-Larsens Nunatak	73° 47' 23.910"	-29° 09' 22.300"
V4	Strindberg Land	73° 53' 54.610"	-24° 24' 44.450"
Z1	Daneborg	74° 17' 37.200"	-20° 12' 43.640"
D4	Budolfi Isstrøm	75° 52' 47.900"	-25° 00' 41.540"
D3	Ymer Nunatak	77° 23' 45.519"	-23° 51' 05.831"
D2	Molkte Nunatak	78° 37' 36.554"	-23° 00' 24.267"
D5	Gamma Ø	77° 45' 19.380"	-19° 05' 52.805"
D1	Danmarkshavn	76° 46' 16.481"	-18° 39' 55.918"
N4	Norske Øer	79° 06' 11.602"	-17° 45' 10.170"
N3	Blåsø	79° 33' 40.958"	-22° 52' 46.365"
N2	Leffingwell Nunatak	80° 26' 12.888"	-26° 16' 21.568"
N1	Kap Harald Molkte	82° 09' 22.740"	-29° 53' 56.421"
A5	Kap Morris Jessup	83° 39' 37.583"	-33° 22' 41.343"
A4	John Murray Ø	82° 46' 48.366"	-48° 46' 09.216"
A3	Th. Pedersen Land	81° 34' 44.440"	-44° 39' 00.570"
NORD	Station Nord	82° 09' 22.740"	-29° 53' 56.421"
QEQE	Qeqertarsuaq	82° 09' 22.740"	-29° 53' 56.421"
AASI	Assiat	82° 09' 22.740"	-29° 53' 56.421"
ILUL	Illulissat	82° 09' 22.740"	-29° 53' 56.421"

Institution responsible:

University of Luxembourg /Tonie van Dam

Ohio State University /Mike Bevis (NSF)

UNAVCO Inc /Bjorn Johns

Danmarks Rumcenter /Per Knudsen & Rene Forsberg