

PROJECT INFORMATION

Lead Principal Investigator	David Simpson
Institute	Incorporated Research Institutions for Seismology,
Project Title / Grant #	MRI-Consortium: Development of a Greenland Ice Sheet Monitoring Network (0922983)
NSF Program and Manager	NSF\GEO\EAR\MRI, Dr. David Lambert
PFS Project Manager	Robin Abbott

LOGISTICS SUMMARY

The Greenland Ice Sheet Monitoring Network (GLISN) is an international project to develop and integrate 25 seismic stations (17 in Greenland and 8 nearby) into a new, real-time, quality-controlled, open data resource that is easily accessible via the IRIS Data Management Center by the US and international scientific community. GLISN develops and enhances an infrastructure of 12 new real-time sites in Greenland to complement 3 existing real-time sites and two new international sites. The GLISN infrastructure is focused on detecting, locating, and characterizing glacial earthquakes and other cryo-seismic phenomena, and contributing to our understanding of Greenland Ice Sheet dynamics.

In August 2009, two researchers visited Greenland for one week for a variety of efforts: to do a reconnaissance of the Nuuk and Narsarsuaq areas; to attend the Climate Change Conference in Nuuk; and to fly to Narsarsuaq for one day to view the current seismometer set-up installed by GEUS previously. GEUS arranged to have their local contact person in Narsarsuaq (Ulrik Poulsen) show them their 'vault' where the seismometer is located. The electronics were checked as well as the state of the Nanometrics HRD24 and the STS-2.

The 2010 field effort will focus on deploying 8 seismic stations along the margins of Greenland. In order of installation, these sites will be in Thule, Station Nord, Narsarsuaq, Nuuk, Tasiilaq, Ittoqqoormit, Daneborg, and Soedalen. First, the installation team of three (Childs, Tytgat, Anderson) will install a station at Thule in May, arriving there and departing again via 109th Air Guard flight. . In early July, the primary team (Childs, Tytgat) and a GEUS colleague (Dahl-Jensen) will work at Station Nord.

Then, in mid-July, the primary team and GEUS colleague will mount the major effort to install and upgrade seismic stations located at various communities and towns on the island, Many of the installations will be placed at existing or past GEUS seismometer sites. The team will travel via Air Greenland or Air Iceland when possible, using excess baggage to transport tools and spares for the project. They will use chartered Twin Otters to reach more remote sites. When at Soedalen, helicopter support will be provided via a mining company to transport project cargo to their installation site. The station at Soedalen will be the last to be installed during this period and should be completed by the end of August.

In addition to installing or upgrading these eight stations, personnel will do reconnaissance work at NEEM and Raven Camp, where installations are planned for 2011.

In year 2 (2011), the team will deploy the inland ice sites. They will coordinate with the ICDS crew and CPS to establish camps at NEEM and DYE-2. The third site called ICE-S, will be a rapid surface deployment with a Twin Otter. The researchers also will visit any sites that may have experienced premature instrumentation failures and return those sites to full operating status for commissioning. In addition researchers will visit those sites that do not have full bandwidth communications to retrieve the deep data archive.

Year 3 (2012) field activities will focus on final site and communications augmentations, and the commissioning of GLISN. As with year 2 deployments, researchers will visit those sites that had premature equipment failures during the year and recover all data not transmitted through the communications system. Year 3 will also be a "catch-up" year for all those field activities that may not have been accomplished in years 1 and 2 due to delays.

CPS support includes military aircraft coordination (ANG), commercial flights and cargo shipments from hub sites, coordination with POLOG and Platina mining for sharing air charters to access remote sites, lodging, vehicle rentals, and some camping gear. All other logistics will be paid by the investigators from the grant.

For the complete CPS online project record for this grant, including science objectives, go to:
http://www.polar.ch2m.com/arlss_reports/arlss_projectsdetail.asp?cbPropNum=0922983

OUTSTANDING ACTIONS AND NOTES

Issue	Responsibility	Date Due	Date Completed
Review support plan for accuracy and distribute to all field team members	PI		
Obtain all necessary permits for fieldwork	PI		
Visit all hyperlinks and review all documents referred to in the support plan	Entire Field Team		
Keep all receipts. For speedier reimbursement, turn them in to your project manager as soon as your fieldwork is complete.	Entire field team		
Note: Passports are required for Air National Guard and international travel. Also, please bring TWO copies of your passport to Greenland with you.	Rhett Butler		

ALLOCATIONS AND SERVICES

Allocations from Inventory

Quant/Unit	Item
20ea	Plugs- Danish cord ends and receptacles. 10ea right angle males and 10ea straight males. All pieces as you requested will be here in our office when you pass through on 5 May
2-3ea	Sheets of Blueboard sent to Narsarsuaq
2 ea	REI GEO Mtn Dome Tents for Daneborg site - shipped from Denver to Socorro
2 ea	Thermarest pads for Daneborg site - shipped from Denver to Socorro
Note:	The researchers will bring their own Iridium phone and medical kit.

For more information on satellite phones, radios, manuals and other field communications support, please visit the CPS communications Web site at <http://www.polar.ch2m.com/>.

Other Services CPS

Service	Comments
Clearance for flying on the 109 th Air Guard	3 people in May
Clearance for admission to Thule Air Base	3 people from 03- 05 May
Accommodation and meal tickets at the KISS building when in Kangerlussuaq	3 people on 5 May; 1 person on 19 July
Booking and purchase of Air Greenland tickets from Kangerlussuaq to different locations in Greenland (Nuuk, Ilulissat, Narsarsuaq, Tasiilaq, Kulusuk, Ittoqqortoormiit)	1 person (Tytgat) arrives Kangerlussuaq from CPH on 19 July. 1 person (Childs) flies directly to Narsarsuaq from Iceland.
Booking and purchase of Air Iceland tickets from Kulusuk to Constable Pynt	2 people on 4 Aug arranged by Yewlin Tay of Arctic Wonderland.
Booking and purchase of NordlandAir tickets from Constable Pynt > Reykjavik > Akureyri	2 people on 17 Aug arranged by Frissi/Kibba of NordlandAir, Akureyri
Hotel or other accommodations arranged and direct billed to CPS in Thule, Nord, Ilulissat, Nuuk, Narsarsuaq, and Tasiilaq, Constable Pynt,	
Ittoqqortoormiit accommodations provided by Telegreenland	POC is Tore; arranged by Dahl-Jensen - no cost for rooms
Rental truck arrangements in Nuuk (Harry Doj from Nuuk-Biludlejning Aps will provide as last season – ph 312558)	Reimbursable via expense report – Save all receipts!
CPS vehicle for Rhett Butler and 4 Swiss to visit seismic site (SFJD) in Kangerlussuaq on 26 July when they fly in from Ilulissat.	

Storage for a spare Transformer unit	Will arrive on 19 July flight and kept in Kangerlussuaq as a stand-by unit in case it will be needed at one of the sites.
Excess Baggage charges for each location on Air GL flights will be direct billed to CPS	Estimate a total of ~45,000dkk (\$7500USD) for excess baggage cost
Twin Otter Support	For access to installation sites
Helicopter support	To stage cargo at Soedalen installation site
Freight	Various commercial and other means of distributing project instruments, equipment, gear to hub locations.
Subcontracts with POLOG and Platina Mining Company	For support in Nord, Daneborg, and Soedalen respectively

Other Services GEUS

Service	Comments
Thule – ADSL line arranged	03 May arrival
Trine Dahl-Jensen from GEUS will arrange for a vehicle to use in Tasiilaq	31 July arrival
Trine will check with Keld Svendsen about power to the abandoned pumphouse for the Nuuk site	24 July arrival
Trine arranged rooms at Ittoqqortoormiit through Telegreenland	04 Aug arrival
Trine will join the GLISN team of 2 at some sites in East Greenland: Nord, Tasiilaq, Ittoqqortoormiit.	July/August
A member of the GEUS team will assist at the Daneborg site	7 Aug arrival
Coordinate with local contacts at miscellaneous sites	Ongoing

CARGO AND CUSTOMS

All cargo required for Nuuk, Narsarsuaq and Tasiilaq 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 Web site at <http://www.polar.ch2m.com/> (go to Greenland > Customs). More information is available via the *Greenland Guide*, under Greenland on the CPS site.

All cargo for Narsarsuaq, Nuuk, and Tasiilaq will be sent to the 109th Air Base in NY for further shipment onto Kangerlussuaq. Air GL Freight system will then fly cargo to designated sites.

All cargo required for Soedalen in East Greenland will be shipped via an EIMSKIP vessel to Reykjavik and then transferred to another vessel (Nesskip Lines) contracted by Platina Mining Company for onward shipment to Soedalen in East Greenland.

All cargo required for Nord will be handcarried as excess baggage to Longyearbyen, Svalbard, for the Twin Otter flight to Nord arranged through POLOG.

All cargo for Ittoqqortoormiit will be sent via Air Freight to Nordland Air in Akureyri, Iceland and then onward shipped to Constable Pynt and Ittoqqortoormiit.

All cargo for Daneborg will be sent via Air Freight to Copenhagen, and transferred to the National Environmental Research Institute's container in Aalborg bound for Daneborg.

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

Items	Weight/Cube
Thule Cargo sent to NY: arrival by 26 April	
Nuuk, Narsarsuaq, Tasiilaq Cargo sent to NY: arriving in Kangerlussuaq on 21 June	6 pieces to Tasiilaq / 7 pieces to Narsarsuaq / 18 pieces to Nuuk
Soedalen Cargo sent to Richmond, VA to EIMSKIP for shipment to Akureyri and onto Soedalen	2878 lbs / 5 pallets
Daneborg Cargo sent to Copenhagen (Roskilde), Denmark: arriving by 01 July	1205 lbs / 4 pallets, 1 L/L
Ittoqqortoormiit via Constable Pynt Cargo sent air freight to Akureyri, Iceland: arriving by first week in July	265 lbs / 1 pallet 45 lbs/ 1 bx – Hold for Soedalen
Nord Cargo carried as Excess Baggage to Longyearbyen, Svalbard; arriving on 4 July, 2010.	500 lbs

SUPPORT SCHEDULE

Approx Date	Location	Activity
3 May	NY > Thule	109 th flight to Thule Air Base – 3 GLISN pax (Kent Anderson, Guy Tytgat, Dean Childs)
4 May	Thule	Installation of seismometer in Thule location
5 May	Thule > Kanger	109 th flight to Kangerlussuaq – 3 GLISN pax (Kent Anderson, Guy Tytgat, Dean Childs)
6 May	Kanger > NY	109 th flight to NY – 3 GLISN pax (Kent Anderson, Guy Tytgat, Dean Childs)
22 June arrival in RKV	Socorro > Richmond > Halifax > Reykjavik > Soedalen	Cargo shipped via truck to Richmond Va to put on EIMSKIP vessel to Reykjavik. Ship arrives in Iceland and cargo is then transferred to a Nesskip Line vessel chartered by Platina mining that will be bound for Soedalen in mid July.
01 July	Copenhagen, Denmark	Deadline for cargo to arrive in Denmark to be repacked for ship to Daneborg
19 July	NY > Kanger	109 th flight to Kanger – 1 GLISN pax (Rhett Butler)
19 July	Copenhagen > Kanger	1 GLISN pax (Guy Tytgat)
20 July	Kanger > Nuuk	Air GL #501 (Guy Tytgat) commercial flight for 1 pax - depart 10:10 / AirGL #553 flight for 1 pax (Rhett Butler) depart 10:20
20 July	Nuuk > Narsarsuaq	Air GL #415 commercial flight for 1 pax (Guy Tytgat) depart 11:35
20 July	Reyjavik > Narsarsuaq	1 pax arrives Narsarsuaq from Iceland (Dean Childs)
22 July	Nuuk >SFJ> Ilulissat	Air GL #544 to Kanger > Air GL#580 to Ilulissat (Rhett Butler)
24 July	Narsarsuaq > Nuuk	Air GL #424 commercial flight for 2 pax (Dean Childs, Guy Tytgat)
26 July	Ilulissat > Kanger	AirGL #571 arrives in Kanger at 10:20 (Rhett Butler) + 4 Swiss
26 July	Kangerlussuaq seismic site SFJD	Coordinate with local contact (Holger Hey Mortensen) for transportation and visit to the seismic site near the TACAN above Black Ridge
28 July	Kanger > NEEM	Turnaround at NEEM to check site for GLISN 2011 season (Rhett Butler)
27 or 29 July	Kanger > Raven	Turnaround at Raven to check site for GLISN 2011 season (Rhett Butler)
30 July	Kanger > NY	109 th flight back to NY (Rhett Butler)
31 July	Nuuk > Kulusuk > Tasiilaq	AirGL #634 to Kulusuk > AirGL #695 to Tasiilaq in SE Greenland (Dean Childs, Guy Tytgat)

02 Aug	Daneborg	Estimated date for the annual vessel to arrive with GLISN cargo on board
04 Aug	Tasiilaq > Kulusuk	AirGL #682 from Tasiilaq (Dean Childs, Guy Tytgat, & GEUS, Trine Dahl Jensen)
04 Aug	Kulusuk > Constable Pynt	Air Iceland flight NY292 departing at 11:55 (Dean Childs, Guy Tytgat, & GEUS, Trine Dahl Jensen)
04 Aug	Constable Pynt > Ittoqqortoormiit	AirGL #9609 departs at 17:15 (Dean Childs, Guy Tytgat, & GEUS, Trine Dahl Jensen)
07 Aug	Ittoqqortoormiit > Constable Pynt	AirGL #9612 back to Constable Pynt (Dean Childs, Guy Tytgat, & GEUS, Trine Dahl Jensen)
10 Aug	Constable Pynt > Daneborg	Air Iceland Twin Otter weekly flight arranged through POLOG (Dean Childs, Guy Tytgat)
17 Aug	Daneborg > Constable Pynt	Air Iceland Twin Otter weekly flight arranged through POLOG (Dean Childs, Guy Tytgat)
17 Aug	Constable Pynt > Reykjavik > Akureyri	Nordland Air flight arrangements (Dean Childs, Guy Tytgat)
20 Aug	Akureyri > Soedalen	Shared Twin Otter flight with Platina Mining (Dean Childs, Guy Tytgat)
27 Aug	Soedalen > Akureyri	Shared Twin Otter flight with Platina Mining (Dean Childs, Guy Tytgat)

PROJECT CONTACT INFORMATION

Research Team

Role	Name	Email	Phone / Fax
Co-PI	Kent Anderson	kent@iris.edu	505 228.3082 /202 682.2444
Principal Investigator	Rhett Butler	rhett@iris.edu	808 956.9438 /808 956.3188
Co-PI	David Simpson	simpson@iris.edu	202 682-2220 /202 682.2444
Field engineer	Tim Parker		
Field engineer	Guy Tytgat	Guy@passcal.nmt.edu	907 460 0016 / Iridium phone while deployed: 88167 631 5342
Field engineer	Dean Childs	Dean@passcal.nmt.edu	650 240 6268 / Iridium phone while in the field: 88167 631 5342

CPS Team Members

Contact for	Name	Email	Primary Phone
Greenland science planning & support	Robin Abbott	Robin@polarfield.com	Denver: 303.748.8507
Thule science planning & support	Kim Derry	Kim@polarfield.com	Denver: 303.349.6382
Kangerlussuaq base operations	Kathy Young	Kathy@polarfield.com	Denver: 720.320.6160 Greenland: 011.299.524218
Scotia (Stratton Air Base) operations & customs	Earl Vaughn	Earl_Vaughn@gmail.com	Scotia cell: 518.605.0979
Sat phones & comms	Roy Stehle	Roy.Stehle@sri.com	Menlo Park: 650.859.2552
Remote Medical (kits & service) and Medical/Dental	Robbie Score	Robbie@polarfield.com	Denver: 303.906.0093

CPS Offices

Denver	Kangerlussuaq	Scotia
Polar Field Services 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: 518.344.2635 Cell: 518.605.0979 Fax: 518.344.2537

Other

Organization	Internet/Notes	Phone
Medical Advisory Service (Information below)	http://www.medaire.com/corp_medlink.html	Office: 480.333.3771
POLOG	CONTACT for CONSTABLE PYNT: Aka Lynge CONTACT for DANEBORG: Jesper Weiss Andersen	299 99 38 03 mobile: 45 2370 4475 Iridium# +881 641 410 984
GEUS:	Contact for Daneborg: Jørgen A. Bojesen- Koefoed	Iridium# +881 622 434 920

SAFETY, ENVIRONMENT, HEALTH and PERMITS

Effective January 1, 2010 the Government of Greenland assumed responsibility for the permitting process for research in Greenland. All science teams planning to conduct research in Greenland must complete an **annual application** in order to obtain approval from the Government of Greenland. The application forms are available from the Department of Domestic Affairs, Nature and Environment at <http://www.nanog.gl/expeditions> or by sending an email to [ekspeditioner at gh.gl](mailto:ekspeditioner@gh.gl). Applications are submitted directly through the Department of Domestic Affairs, Nature and Environment. Be advised that a new fee of 4000 DKK has been put in place for permits. For assistance with the application process, contact:

Martin Schiøtz
 Head of Section
 Section of Nature
 Department of Domestic Affairs, Nature and Environment P.O. Box 1614
 3900 Nuuk
 Greenland
 e-mail: [ekspeditioner at gh.gl](mailto:ekspeditioner@gh.gl)

Medical Advisory Service (MAS) Support

If you need medical advice/assistance, do not hesitate to contact Medical Advisory Service (MAS) 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 MAS service in the field. For further information on MAS, please visit our Web site <http://www.polar.ch2m.com/> and navigate to Medical>Remote Medical Services/Kits.

MAS 24/7 Telemed Service

Worldwide Phone: 1.480.333.3876
 Fax: 1.480.333.3821
 Member ID: CH2M HILL Polar Services

RISK ASSESSMENT

See Appendix for Risk Factors and Mitigation.

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. Examples might be the availability of the helicopter or camp gear.

Factors
Airline tickets in place for team members traveling around Greenland.
All cargo has arrived at each of the installation sites upon arrival of field team members
All excess baggage arrives with researchers on same flight or at least on the same day as team members
Logistical support group is ready and responds in the most practical and knowledgeable manner to uncontrollable changes in the field plan.

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.

APPENDIX

Risk Factors and Mitigation

RISK FACTORS and MITIGATION

Bears	<ul style="list-style-type: none"> -Hire Native guides (Provide clear expectations/procedure) -Install bear fence. Designate a fence monitor to check daily. -Carry radios to alert others to bear in area. -Develop a plan for bear in or near camp -Keep a clean camp -Participate in bear safety training -Carry bear spray -Use bear Containers
Cold Weather	<ul style="list-style-type: none"> -Team members attend a cold weather injury training course such as Wilderness First Aid or Wilderness First Responder -Proper clothing -Appropriate camping gear, insure sleeping bags are adequately rated -Check forecast before going out of camp/town.
Confined Space Work	Confined spaces AHA
Drills/augers	Drill/auger training/AHA
Firearm	<ul style="list-style-type: none"> -Participate in a gun safety training course -Use procedures for safe gun storage in camp
Fixed Wing Travel	<ul style="list-style-type: none"> -SAR plan in place -Attend a pilot briefing -Carry survival bags on the aircraft if doing day trips, or if multiple put in flights insure people travel with survival items from camp supplies
Heavy lifting/body strains and sprains	<ul style="list-style-type: none"> -Use proper lifting techniques
Helicopter Travel and working around	<ul style="list-style-type: none"> -Participate in helicopter training -Have a SAR plan in place -AHA working around aircraft