

PROJECT INFORMATION

Lead Principal Investigator	Hans Thybo
Institute	University of Copenhagen, Department of Geography and Geology
Project Title / Grant #	HTSeismic
NSF Program and Manager	DK\Research\Higher Ed\GEUS, Ms. Renee Crain
PFS Project Manager	Katrine Gorham

LOGISTICS SUMMARY

The PI leads seismological research at the University of Copenhagen to better understand onshore uplift of the North Atlantic region. A three-person research team will use Summit Station as a hub and an entry point to the Greenland ice sheet in late June 2010 to visit existing seismic monitoring instruments to the southeast of Summit. (Some or all of these instruments were installed in 2009 by a University of Copenhagen team led by Trine Dahl-Jensen).

After travelling to Summit via the ANG logistics chain, the team will spend ~10 days off-station traversing approximately 400 km away from Summit via snowmachines to service their existing seismic stations. They will camp during this period. Later, the team will return to Summit and, based from there, spend another ~10 days making day trips to conduct drill tests a short distance from Summit.

When finished the researchers will depart the station via the ANG, returning to Kangerlussuaq and traveling back to Europe via commercial air.

CPS will provide ANG coordination for passenger and cargo transport between Kangerlussuaq and Summit, user days at Summit, one snowmachine and five sleds (three Nansen; two Siglin) from Summit inventory, and six 55-gallon drums of fuel (five snowmobile fuel; one jet fuel). This support will be paid via a direct-bill arrangement with the PI's institution. The researchers will pay for all other logistics, including travel to Kangerlussuaq and KISS user day expenses, with their own resources.

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=HTSeismic

For up-to-date information on the project's schedule, please view the online Greenland calendar

(<http://www.polar.ch2m.com/> .> Greenland > Calendars/Schedules).

OUTSTANDING ACTIONS AND NOTES

Issue	Responsibility	Date Due	Date Completed
Review support plan for accuracy and distribute to all field team members	PI	6/7/2010	Completed
Obtain all necessary permits and insurance for fieldwork	PI	6/7/2010	In progress
Visit all hyperlinks and review all documents referred to in the support plan	Entire Field Team	6/7/2010	Completed
Contact the GEOSummit Science Coordination Office (SCO) sco at summitcamp.org regarding your project's plans for the season	PI	6/7/2010	Completed
Complete medical clearance process 6-8 weeks before desired deployment date	Entire field team	6/7/2010	Completed
Provide cost estimate for billable support	CPS	6/7/2010	Completed
Develop a purchase order with CPS prior to field work	PI	TBD	

Provide bill for actual support	CPS	TBD	
Note: Passports are required for Air National Guard and international travel. Also, please bring TWO copies of your passport to Greenland with you.	Entire field team	6/7/2010	Okay
Complete Critical Success Factors	PI	6/7/2010	Completed

ALLOCATIONS AND SERVICES

Allocations from Inventory

Quant/Unit	Item
1	2-stroke snowmobile. Note: This snowmobile will be available for off-station travel. Summit promotes a pedestrian community, and it is not to be used for transportation around camp.
2	Large Siglin Sleds
3	Nansen Sleds
1	Iridium Phone
3	Handheld GPS
3	VHF Radios
3	Arctic Oven tents for sleeping
1	8x8 Arctic Oven tent for drill site
1	Arctic Oven Field Toilet for drill site

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

Service	Comments
User days Summit, including meals	The researchers will sleep in Arctic Oven tents provided by CPS. Researchers will provide their own sleeping bags and ECW gear. Personnel will use the Big House facilities for meals and observe regular meal times. They should notify the camp manager and chef if they plan to eat outside normal meal times. Any special diets or food allergies should be reported to the chef upon arrival at Summit. If possible, the science group can send an early email to manager at summitcamp.org to prep the cook for special diet requirements.
ANG travel Kanger-Summit-Kanger	For all team members
Cargo Services	
Fuel Services	Six drums, five snowmobile fuel; one jet fuel
Off Station Travel	The researchers will travel off station for an approximately 10 day snowmobile traverse to the SE of Summit (See Appendices, Figure 1). This work will be coordinated with the Camp Manager (Ken Jessen) and Project Manager (Katrine Gorham) to ensure that proper off-station communication is established and maintained. The researchers agree to establish communication via Iridium phone with Summit Station twice per day at a designated time (as arranged by the Camp Manager). The researchers acknowledge that failure to establish communication could result in a search and rescue effort. The researchers will adhere to all travel policies and clean air sector protocols and will plan off station travel accordingly.

	The researchers will depart and return to Summit via a route designated by the Camp Manager (Ken Jessen) and Summit Science Techs. A specific route is required to avoid interference with any of the existing science projects or clean air boundaries.
Drill Site	<p>The researchers will conduct drill test work at the drill site located to the north of camp. See Appendices, Figure 2, for map of Summit and drill site location. The drill site will be located ≥ 5km north of the main camp. The Camp Manager will flag the drill area and obtain exact coordinates prior to arrival of the researchers at Summit. The researchers agree to work only in the designated area and minimize impact (foot and snowmobile traffic) on the surrounding area. The researchers will record GPS coordinates for the exact location of the drill work and provide these to the Project Manager (Katrine Gorham) and the Summit Science Technicians.</p> <p>An Arctic Oven tent will be provided for shelter at the drill site, and a modified Arctic Oven tent will be erected for use as a rustic toilet.</p>
Safety protocols	The researchers will adhere to all safety protocols outlined in the AHAs. This includes reading and signing off on Activity Hazard Analysis (AHAs) prior to completing relevant tasks. Additionally, the researchers will adhere to the established clean air protocols and travel policies.

LOCATION INFORMATION

Please visit <http://www.polar.ch2m.com/> and navigate to the Greenland menu for en route and location-specific Greenland information. Prior to deployment, your entire field team should be familiar with the content of the *Greenland Guide* and, if traveling to Summit, with the guidelines provided in the *Summit Users' Guide*. Both are available electronically via our Web site's Greenland menu.

CARGO AND CUSTOMS

All cargo shipped through the U.S. is 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 cargo arriving in Kangerlussuaq via Europe with commercial carriers, it must arrive **at least one week** prior to the desired Kangerlussuaq to Summit Air National Guard flight.

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

If you are a **new user** requiring access to the Cargo Tracking System, contact [Jason Buening](#).

(If you need **technical support** with the Cargo Tracking System, contact [Mike Dover](#) .

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.

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

Cargo List

Items	Box #	Cube (ft ³)	Weight (lbs)
Food (Dinner)	1	10	154
Food (Lunch/Breakfast)	2	10	176
Spareparts/Tools/Drill for Ski Doo	3	4	49
Clothes – Paul (Hold in Kanger)	4	10	66

Clothes – Hans (Hold in Kanger)	5	10	66
Clothes – Peer (Hold in Kanger)	6	10	66
Tripod	7	11	55
Spare Parts for Pumps	8	4	44
MP1 Pump/Heat Element/Shower/Clamps	9	10	154
2x Generator/3x Jerrycans	10	10	110
2xCompressor/2x Storz/1x Jerry Can	11	10	110
Hoses, Wheel	12	18	221
Tent/Sleeping Bag/4xSolar Panels	13	10	99
STS-2 Metal detector/Tools for Station	14	10	132
Micro Oven/Heat Panel	15	10	66
3x Beds	16	2	44
Texan Equipment	17	10	165
5xJerry Cans/ Extension Cord/Gloves	18	10	44
5xJerry Cans/Rope/25x Cargo Straps	19	10	44
2xOil heaters/Camera/5x Tarpaulin	20	6	66
15xRT-125 Texans	21	4	66
15xRT-125 Texans	22	4	66
4xShovel	23	1	22
Pressure Pump	24	16	110
Pressure Pump	25	12	165
Pressure Pump	26	12	165
Hot Box	27	13	154
Hot Box	28	13	154
Hot Box	29	13	154
10xJerry Cans	30	11	33
10xJerry Cans	31	11	33
Drill rods	32	3	88
Bath Tub	33	18	132
First Aid/Tarpaulin/Burner	34	4	22
First Aid/Burner	35	4	22
First Aid/Burner	36	4	22
Wooden Plates	---	15	265
12Volt Gel Battery	37	1	77
12Volt Gel Battery	38	1	77
12Volt Gel Battery	39	1	77
12Volt Gel Battery	40	1	77
Ski Doo	41	217	882
Ski Doo	42	217	882
10xJerry Cans	43	11	33
Nansen Sled	---	15	100
Total	---	809	5815

SUPPORT SCHEDULE

Approx Date	Location	Activity
6/26/10	Kangerlussuaq	Field team (Thybo/Jorgensen/Christiansen) arrive in Kanger via commercial air
6/28/10	Summit	Field team flies from Kanger to Summit
6/30/10	Summit	Field team depart on traverse where they will travel by snowmobile approximately 700 km to the SE of Summit
7/10/10	Summit	Field team returns from traverse

7/12/10	Summit	Field team commences with controlled seismic study at the designated Summit drill site location
7/22/10	Kangerlussuaq	Field team flies from Summit to Kanger
7/24/10	Kangerlussuaq	Field team departs Kanger via commercial air

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

FIELD TEAM INFORMATION

Name	Location	Date In	Date Out	Email
Jorgensen, Peer	Kangerlussuaq	06/26/10	07/24/10	Peerj at geo.ku.dk
	Summit	06/28/10	07/22/10	
Christiansen, Paul	Kangerlussuaq	06/26/10	07/24/10	Pc at geo.ku.dk
	Summit	06/28/10	07/22/10	
Thybo, Hans	Kangerlussuaq	06/26/10	07/24/10	thybo at geo.ku.dk
	Summit	06/28/10	07/22/10	

PROJECT CONTACT INFORMATION

Research Team

Role	Name	Email	Phone / Fax
Principal Investigator	Hans Thybo	THYBO at geo.ku.dk	353 22452 /

CPS Team Members

Contact for	Name	Email	Primary Phone
Summit science planning & support	Katrine Gorham	Katrine at polarfield.com	Denver: 303.349.2884
Greenland science planning & support	Susan Zager	Susan at polarfield.com	Denver: 720.320.6159
Greenland science planning & support	Robin Abbott	Robin at polarfield.com	Denver: 303.748.8507
Kangerlussuaq base operations	Kathy Young	Kathy at polarfield.com	Denver: 720.320.6160 Greenland: 011.299.524218
Scotia (Stratton Air Base) operations & customs	Earl Vaughn	Earl Vaughn at gmail.com	Scotia cell: 518.605.0979
Sat phones & comms	Roy Stehle	Roy.Stehle at sri.com	Menlo Park: 650.859.2552
Remote Medical (kits & service) and Medical/Dental Clearance (PQ)	Robbie Score	Robbie at polarfield.com	Denver: 303.906.0093
Purchase orders	Karen Shaughnessy	Karen Shaughnessy at ch2m.com	Tel: 720.286.0413 Fax: 720.286.9165

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

Summit Station

Winter	Summer
Polar Field Services Attn: Name of Employee/Researcher 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 - Summit Station C/O Earl Vaughn 109 th Aerial Port Bldg. 20 Stratton Air Base Scotia, NY 12302-9752 Tel: 518.344.2635 Fax: 518.344.2537

Other

Organization	Internet	Phone
Medical Advisory Service (MAS) (see below for Remote Telemed #)	http://www.medaire.com/corp_medlink.html	Office: 480.333.3771
Summit Science Coordination Office (SCO)	http://www.geosummit.org sco at summitcamp.org	John Burkhart +47 96 82 5011

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 Clearance

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

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
Availability of one snowmobile and five sledges from the Summit inventory.
Successful transportation of the above mentioned goods (Cargo List Table).
Provision of six drums of fuel (five snowmobile fuel; one jet fuel).

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.

Factor	Mitigation and Control
Heavy lifting/body strains and sprains	-Use proper lifting techniques
Snowmobile Travel	<ul style="list-style-type: none"> -Participate in a snowmobile training and AHA -Have SAR plan in place -Use appropriate Personal Protection Equipment/helmets -Carry Survival Gear on extended trips -Use radio communications between snowmachines -Carry a PLB (Personal Locator Beacon) -Carry a GPS (Global Positioning System) unit
Cold Related Injuries-weather	<ul style="list-style-type: none"> -Team members participate in a cold weather injury training course such as Wilderness First Aid or Wilderness First Responder -Wear proper clothing -Appropriate camping gear, insure sleeping bags are adequately rated -Check the forecast before going out of camp/town -Watch the weather while out -Be mindful of hydration, carry sufficient food -Develop and share your travel plans -Have and share an emergency plan for bad weather
Emergency Plan	<ul style="list-style-type: none"> -Compile a list of emergency contacts for your field team and share it with critical participants including your home institution and CPS. -Share your satellite phone number as a means for others to contact you.
Communications	<ul style="list-style-type: none"> -Carry the appropriate communications system (satellite phone) -Assure your phone and/or radio is fully charged before going out and carry a spare battery.
Fuel Handling	<ul style="list-style-type: none"> -Participate in fuel handling training -Have a plan for fuel spills/first aid
Hazardous Materials	<ul style="list-style-type: none"> -Haz Comm SMS (Safety Management Standard) -Identify items for hazardous material transportation -Review MSDS (Material Safety Data Sheet)
High Altitude	<ul style="list-style-type: none"> -Participate in high altitude training -Have medical call in service available -Have SAR plan in place -Have oxygen available in high altitude camps -Develop plan to acclimatize -Consult with physician on use of medication for acclimatization
Medical fitness for remote work outside ANG flight period	<ul style="list-style-type: none"> -Follow NSF Physical Qualification process
Power Tools	<ul style="list-style-type: none"> -Participate in a power tools training
Remote Camp	<ul style="list-style-type: none"> -Have a remote medical call in service -Have a SAR plan in place -Have a First Aid kit available -Participate in First Aid training- be sure that someone or all field personnel have Basic First Aid training at a minimum -Have a communication/ check-out/check-in plan in place -Keep a camp roster by each radio to be used in conjunction with the check-out/check-in plan -Develop a list of current camp member's training levels and certifications -Maintain back-up equipment and supplies in case of emergency (comms, generators, tents, food) -Maintain an emergency contact list, include all applicable agencies, field team members, provide camp location and description to local SAR groups -Develop a plan for general camp operations including camp hygiene and handling human waste -Participate in PLB (Personal Locator Beacon) training

	-Participate in GPS (Global Positioning System) training
Glacier Travel	-Participate in glacier travel/crevasse rescue training -Have a SAR plan in place -Carry and use equipment and gear properly