

PROJECT INFORMATION

Lead Principal Investigator	David Holland
Institute	New York University,
Project Title / Grant #	Observations and Modeling of Ocean - Ice Sheet Interaction in Jakobshavn and Helheim Ice Fjords, Greenland (0806393)
NSF Program and Manager	NSFOD\OPPARCVANS, Dr. Martin Jeffries
PFS Project Manager	Robin Abbott

LOGISTICS SUMMARY

This grant expands on research begun under the PI's previous SGER grant (0644156). The researchers will measure interannual variability of ocean properties in key Greenland ice fjords--Ilulissat on the west coast and Helheim on the east coast. The data will help the researchers to determine the role of warm, deep ocean waters in influencing ice sheet retreat.

For each of five years beginning in 2009, a team of two to three will spend 2-3 weeks in Greenland in July/August at the Jakobshavn and Helheim outlet glaciers, based at Ilulissat for the former and Tasiilaq for the latter. In ice-free areas, the researchers will use boats to measure water temperature, salinity, oxygen, suspended sediment, and currents using CTD and ADCP. In ice-covered parts, the team will use a helicopter to hover over leads and deploy expendable XCTD and XCP. A mooring will be placed at the mouths of the Jakobshavn and Helheim fjords in the first field season, and will be retrieved and redeployed in each subsequent field season. The team will develop a coupled ocean-ice sheet model in synergy with the observations.

For 2010, a team of three will travel to Greenland in mid-July via the ANG, and spend ~3 weeks doing the field work described above. In addition, they will visit AWS stations on the south shore of the Helheim ice fjord (installed in 2009) and near the calving face of the Jakobshavn Glacier to perform annual maintenance. Finally, a British collaborator will join the team in Ilulissat to collect sediment cores for paleoclimate analysis.

When this fieldwork is complete around the 10th of August, the Holland team will remain in Ilulissat for several more days to work on NASA-funded seal-tagging project with Aqqalu Rosing (Greenland Institute of Natural Resources). Basing from Ilulissat, the team will travel overland to a seal colony, and spend about 2 days tagging the animals. They will then depart Greenland and fly homeward, travelling via commercial airline through Iceland.

For the NSF-funded project, CPS will provide ANG arrangements, commercial airline tickets within Greenland and lodging for 3 people, storage and freight costs within Greenland, helo charters, Kangerlussuaq user days, vehicle rentals, communications service, and safety gear. UNAVCO will design and provide the power system to be used in Greenland. All other logistics, including fishing boat rentals, will be paid by the PI from the grant.

The PI will pay for all costs associated with the seal-tagging portion of his field work directly, using NASA funds.

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=0806393

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		
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.	Entire field team		
Please review flight information carefully, as some times have changed.	Entire field team		

ALLOCATIONS AND SERVICES

Allocations from Inventory

Quant/Unit	Item
2 ea	Iridium Phones (picked up in Kangerlussuaq to be used in both Tasiilaq and Ilulissat)
1 or 2 ea	Survival Bag(s) to accommodate 3 people in both Ilulissat and Tasiilaq. These will be shipped via Air GL commercial freight to each location
1 ea	Medical Kit (picked up in Kangerlussuaq to be used in both Tasiilaq and Ilulissat)

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

Project Allocations	Comments
Clearance on 109 th flight to Greenland	19 July – David Holland, Denise Holland, Carl Gladish
KISS user days when in Kangerlussuaq	Meal tickets included
Air Greenland commercial flights for 3 team members from Kanger > Nuuk > Tasiilaq > Nuuk > Ilulissat	Booking # : OEE5NR (copy of bookings sent to PI)
DoD SIMS cards	2 ea issued in 2009
ILULISSAT:	
Hotel arrangements at Hotel Arctic; no food or Internet costs are included	Two rooms booked between 01 Aug – 10 August; (PI has done the booking and will be reimbursed)
Air Greenland commercial freight shipment for project equipment/gear to Ilulissat (survival bags included)	Located at Air GL freight terminal in Ilulissat
Project equipment (AWS kit) shipped to Kangerlussuaq via Air Greenland commercial freight after the work is complete in Ilulissat.	Arrangements made by Holland, charged to CH2M HILL
Truck, booked from Toyota in Ilulissat from 01 Aug 01 – 10 August	Toyota Hilux; gray color; License number GR31275. Can be picked up in Airport Parking lot. Contact person is Tom Andersen at ph# 543 549
Reimbursement for cost of excess baggage – Receipts required.	AWS repair kit (75 lbs) from Tasiilaq > Nuuk > Ilulissat
2 ea- shipping containers rented by CPS located at AirGL hangar for winter-over storage	Shared usage with other researchers working in Ilulissat.
TASIILAQ:	
Hotel arrangements at Hotel Ammassalik; no food or Internet costs are included	Two rooms booked by David Holland between 21-31 July. Will be direct billed by Yewlin Tay of Arctic Wonderland to CH2M HILL.
Air Greenland commercial freight shipment for project equipment/gear to Tasiilaq	Located at Air GL freight terminal in Tasiilaq

Reimbursement for vehicle use in Tasiilaq. Receipt is required.	Arrangements made by Holland with local tourist company.
Winter storage for boxes of equipment	Container rental, ongoing.
NUUK:	
Hotel arrangements at Hotel Hans Egede in Nuuk during transits between Tasiilaq and Kanger or Ilulissat; no food or Internet costs are included.	Two rooms booked on both 20 July- Reference # 33250 and on 31 July- Reference # 33254 . (Researchers will pay and be reimbursed. Receipts required.)

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*, available electronically via our Web site's Greenland menu.

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 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	Weight/Cube
UNAVCO shipment of a small battery kit for Holland's Tasiilaq site	
Holland shipments total ~16 boxes (8 for Tasiilaq; 8 for Ilulissat (see below)	200 cu ft / 1000 lbs
General list of cargo includes:	
<ul style="list-style-type: none"> - CTD, 100 lbs to go to Tassilaq. - Winch box ex, 100 lbs, one to go to Tassilaq, and also one to Ilulissat (size is 30 foot cube neach). - Bathymetry measurement boxes, 100 lbs each, one to each Tassilaq and Ilulissat. - AWS repair kit, three boxes, 75 lbs each, PI will carry as excess baggage to Tassilaq, then to Iluissat. - Power supply cases, 50 lbs, one to go one to Tassilaq and one to Ilulissat. - XCTD probes, 50 lbs, one box to go to Tassilaq and one to Ilulissat. - High-res cameras, 20 lbs each, one to Tassilaq and on to Ilulissat. 	

SUPPORT SCHEDULE

Note some AirGL flight times have changed

Approx Date	Location	Activity
19 July	NY > Kanger	109 th flight arrival in Kangerlussuaq (David Holland, Denise Holland, Carl Gladish)
20 July	Kanger > Nuuk	Air GL flight #555 - dep 13:10 / arr 14:00 (Holland x 2, Gladish)
21 July	Nuuk > Kulusuk > Tasiilaq	Air GL flight #634 to Kulusuk - dep 06:45 /arr 08:30 Air GL flight #697 to Tasiilaq – dep 15:50 / arr 16:00
22 July	Tasiilaq	Bell 212 helicopter flight for 3 pax to visit AWS station – evening flight - put in for 3-4 hrs, pick up and return to Tasiilaq

23 & 24 July	Tasiilaq	Bell 212 helicopter flights to drop probes over the bay – 3 hrs ea day - evening flights
26-30 July	Tasiilaq	CTD boat work, outreach activities, deconstruct winch, pack (Holland x 2, Gladish)
31 July	Tasiilaq > Kulusuk > Nuuk	Air GL flight #690 – dep 13:10 / arr 13:20 Air GL flight #635 – dep 14:00 / arr 15:45
01 Aug	Nuuk > Ilulissat	Air GL flight #512 – dep 11:30 / arr 14:05 – pick up rental truck at airport.
02-03 Aug	Ilulissat	Winch set up, boat work
04 Aug	Ilulissat	Bell 212 helicopter flight for 3 pax to visit AWS station (Holland x 2; Carl Gladish)
05 Aug	Ilulissat	Bell 212 helicopter flights to drop probes over the bay –
06 - 10 Aug	Ilulissat	CTD boat work, deploy moorings, outreach activities, Jeremy Lloyd joins project for sediment coring , undo winch set-up
11-13 Aug	Ilulissat	Seal tagging activities, all costs covered by NASA funding
14 Aug	Ilulissat > Reykjavik	Air Iceland departure for 3 pax (Holland x 2 , Gladish)

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
Holland, David	Tasiilaq	7/21/2010	7/31/2010	holland at cims.nyu.edu
	Ilulissat	8/01/2010	8/14/2010	
	Kangerlussuaq	7/19/2010	7/20/2010	
	Nuuk	7/20/2010	7/21/2010	
Holland, Denise	Tasiilaq	7/21/2010	7/31/2010	
	Ilulissat	8/01/2010	8/14/2010	
	Kangerlussuaq	7/19/2010	7/20/2010	
	Nuuk	7/20/2010	7/21/2010	
Gladish, Carl	Tasiilaq	7/21/2010	7/31/2010	
	Ilulissat	8/01/2010	8/14/2010	
	Kangerlussuaq	7/19/2010	7/20/2010	
	Nuuk	7/20/2010	7/21/2010	
Lloyd, Jeremy	Ilulissat	8/06/2010	8/10/2010	Sediment coring. Researchers cover associated costs

PROJECT CONTACT INFORMATION

Research Team

Role	Name	Email	Phone / Fax
Principal Investigator	David Holland	holland at cims.nyu.edu	212 998.3245 /212 995.4121

CPS Team Members

Contact for	Name	Email	Primary Phone
Greenland science planning & support	Robin Abbott	Robin at polarfield.com	Denver: 303.748.8507
Greenland science planning & support	Susan Zager	Susan at polarfield.com	Denver: 720.320.6159
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: 303.552.6072
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

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: 518.331.3103 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

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.

Factors
Safety. This year we are again travelling to the Helheim site in east Greenland. I am hiring a local person as a polar bear protection, to accompany us during the two days in which we will do the AWS maintenance.
Use of helicopter to measure fjord properties using expendable XCTD in each Ilulissat and Helheim areas. The technique was used in the previous season and was approved as being safe by the pilot.
Use of helicopter to perform maintenance for AWS at Ilulissat and the AWS at Helheim.
Availability of rental truck in Ilulissat and Tasiilaq. For Tasiilaq I have been in contact with a local company who said they would rent a truck to me. In Ilulissat CPS has booked a rental truck for me.
Hotel lodging in Ilulissat, Tasiilaq, Kanger, and Nuuk for the days in which we are located at these locations.
Satellite phones for field communications should be in good working order.
Survival gear to take on helicopter trips that will suffice to adequately to serve the three member field team (David, Denise, and Carl).
Timely arrival and departure of gear shipped into and out of Ilulissat and Tasiilaq. Storage for equipment left behind at Ilulissat and Tasiilaq.

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
Bears	Hire Native guides (Provide clear expectations/procedure)
Boat Travel (including raft, kayak, barge, hovercraft, etc.)	Participate in boat training Develop a rescue plan Carry emergency equipment Carry communications system (radio) AHA
Cold Weather	Team members attend a cold weather injury training course such as Wilderness First Aid or Wilderness First Responder Proper clothing Check forecast before going out of town.
Helicopter Travel and working around	Participate in helicopter training Have a SAR plan in place AHA working around aircraft 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