

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

<b>Lead Principal Investigator</b>	Elizabeth Morris
<b>Institute</b>	University of Cambridge, Scott Polar Research Institute
<b>Project Title / Grant #</b>	CryoSat Calibration / Validation (CRYOSAT)
<b>NSF Program and Manager</b>	Intl - ESA, Ms. Renee Crain
<b>CPS Project Manager</b>	Robin Abbott

### Logistics Summary

CryoSat is a European Space Agency-sponsored radar altimetry mission to determine variations in the thickness of the Earth's continental ice sheets and marine ice cover. Its primary objective is to test the prediction of thinning arctic ice due to global warming.

The PI on this project conducts ground-truthing traverses in Greenland as part of the CryoSat Calibration/Validation project. The 2008 season sees the fifth traverse in support of the project, the previous four having been conducted in 2004 and 2006. Four more campaigns will follow, two in 2010 and two in 2011.

After a February trip to prestage cargo, a two-person party will travel by commercial air to Kangerlussuaq in mid-April 2008. They will travel on to Thule via Twin Otter, and from there, put in via Twin Otter to their traverse starting point on the north-west part of the ice sheet at approximately 79 N 50 W. They will travel via snowmachine along the 2100 m contour to approximately 77 52 N 57 W and thence to the NEEM drilling site (77 30 N 51 W). From NEEM, they will return to Kangerlussuaq via LC-130 early in June.

The first part of the traverse (200 km long) will also be over-flown by an aircraft carrying the ASIRAS radar and a laser scanner. A corner reflector for the radar will be erected at the input site, where detailed measurements of snow density will be made over a 1 km square area. The entire traverse lies in a region of the dry snow zone where the correlation coefficient of height change versus power change in the ENVISAT altimeter data is high and it is hoped density data collected along the traverse will assist in the analysis of this phenomenon.

CPS will provide cargo transport by C-130 from Kangerlussuaq to Thule; fuels (Mogas, Coleman fuel, skidoo oil); packing space and assistance while the team transits Kangerlussuaq and Thule; Iridium phone and daily safety check-ins; two new snowmachines; and C-130 transport from NEEM to Kangerlussuaq.

Note: CPS provides this support on a reimbursable basis via the Danish National Science Commission (Renee Forsberg, PI), which provides the majority of the logistics coordination for the CryoSat validation experiment. CPS arranges near yearly fuel resupply to Canada's Alert Air Base for DNSC in support of various projects. This year's fuels mission supports several DNSC projects, including Damocles and an IPY study of the Arctic Ocean.

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=CRYOSAT](http://www.vecopolar.com/arlss_reports/arlss_projectsdetail.asp?cbPropNum=CRYOSAT)

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

## SECTION TWO: SEASON FIELD PLANS

### Outstanding Actions and Notes

Issue	Responsibility	Date Completed / Comment
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	Field Team Members	
Provide cost estimate for billable support (see attached)	CPS	Completed
Determine best method for payment of ANG air support (pay direct to NSF or via CPS)	NSF, CPS	In process
Develop/revise billing documentation based on decision re ANG support reimbursement	NSF, CPS	
Provide bill for actual support	NSF or CPS	
Make financial arrangements related to the late 2007 purchase of two snowmachines issued to CryoSat team.	NSF, SPRI	

### Allocations and Services

#### Allocations from Inventory

Quant/Unit	Item
2 ea	Skidoos - Skandic – single wide track
30 gallons	Coleman Fuel
5 liters	2-stroke Oil (5W 30 or less, synthetic only)
2 drum	Mogas
1 ea	Iridium Phone (to be used as back-up)

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

Project Allocations	Comments
Daily safety check-ins with CPS Kangerlussuaq office	Time of check-in will be established after arrival in Kangerlussuaq
Warehouse space	For organizing equipment/gear
C-130 transport of cargo to Thule Air Base to prestage for the field season	Delivery date from SFJ to Thule - ~4 March 2008, on Host Tenant flight.
C-130 transport for people/cargo from NEEM to SFJ after the field season	Estimating early June.
Note: The DNSC coordinates the majority of this project's field support, including Twin Otter flight arrangements.	

### Location Information

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

## Support Schedule

Approx Date	Location	Activity
5-8 Feb	Kangerlussuaq	Liz and Adrian will prepare cargo/gear for C-130 / Twin otter flights while the CPS Kangerlussuaq office is manned.
4 March	Kanger > Thule	Cargo will be moved to Thule on a 109 <sup>th</sup> C-130. It will be stored in the CPS warehouse.
19 April	Kanger > Qaanaaq	Twin Otter cargo flight with Liz and Martin from Kanger to Qaanaaq
21 April	Thule > field site	2 Twin Otter flights for put-In
~22 April	Thule > depot site	Twin Otter flight for staging fuel drums at depot site
~30 May	NEEM camp	Arrival at the NEEM camp
~ 3 June	NEEM > Kanger	C-130 pick up flight from NEEM back to Kangerlussuaq

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

## Field Team Information

Name	Location	Date In	Date Out	Email
Elizabeth Morris	Kangerlussuaq to prepare cargo	05 Feb, 2008	8 Feb, 2008	<a href="mailto:emm36@hermes.cam.ac.uk">emm36@hermes.cam.ac.uk</a>
Adrian McCallum	Kangerlussuaq to prepare cargo	05 Feb, 2008	8 Feb, 2008	
Elizabeth Morris	Kangerlussuaq > Thule> field traverse> NEEM > Kangerlussuaq	~17 April	~3 June	<a href="mailto:emm36@hermes.cam.ac.uk">emm36@hermes.cam.ac.uk</a>
Martin Hignell	Kangerlussuaq > Thule> field traverse> NEEM > Kangerlussuaq	~17 April	~3 June	

## Project Contact Information

### Research Team

Role	Name	Email	Phone / Fax
Principal Investigator	Elizabeth Morris	<a href="mailto:emm36@hermes.cam.ac.uk">emm36@hermes.cam.ac.uk</a>	1223 33-6568 /1223 33-6549
Collaborator	Rene Forsberg	<a href="mailto:rf@space.dtu.dk">rf@space.dtu.dk</a>	+45-3532-5719 / +45-3536-2475

## SECTION THREE: CPS CONTACT INFORMATION

### CPS Team Members

Contact for	Name	Email	Primary Phone(s)
Greenland operations (project support)	Jason Buening	<a href="mailto:jason@polarfield.com">jason@polarfield.com</a>	Denver: 303.638.6669 Greenland: 011.299.524218

Greenland operations (On-island support)	Mark Begnaud	<a href="mailto:mark@polarfield.com">mark@polarfield.com</a>	Denver: 720.320.6160 Greenland: 011.299.524281
Greenland operations (project support)	Robin Abbott	<a href="mailto:robin@polarfield.com">robin@polarfield.com</a>	Denver: 303.748.8507
Sat phones & comms	Roy Stehle	<a href="mailto:roy.stehle@sri.com">roy.stehle@sri.com</a>	Menlo Park: 650.859.2552
Thule operations	Susan Zager	<a href="mailto:susan@polarfield.com">susan@polarfield.com</a>	Denver: 720.320.6159
Denver operations	Jill Ferris	<a href="mailto:jill@polarfield.com">jill@polarfield.com</a>	Denver: 720.320.6155
Scotia operations & customs	Earl Vaughn	<a href="mailto:earl.vaughn@gmail.com">earl.vaughn@gmail.com</a> <a href="mailto:vprscotia@hughes.net">vprscotia@hughes.net</a>	Scotia: 518.331.3103
Purchase orders or projects w/ direct bill	Jan Zanetell	<a href="mailto:Janet.Zanetell@ch2m.com">Janet.Zanetell@ch2m.com</a>	303.268.3553

**CPS Offices**

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 <sup>th</sup> Aerial Port Bldg. 20 Stratton Air Base Scotia, NY 12302-9752 Tel: 518.331.3103 Fax: 518.334.2537

**SECTION FOUR: SAFETY, ENVIRONMENT, HEALTH and PERMITS**
**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 -
(1) Transport of science and field equipment by C-130 from SFJ to Thule before the season starts i.e. before April 18th.
(2) Delivery of 2 new skidoos plus spares at Thule before April 18th in good working condition ready for traverse. (The plan will be to do a 'shakedown' to test new skidoos during the Host Tenant flight when CRREL will be using them for scouting Thule traverse. A mechanic will be around if anything needs to be adjusted.)
(3) Provision of skidoo fuel and oil plus Coleman fuel at Thule before April 18th as requested.
(4) Uplift of field party from NEEM sometime in June by C-130. The plan at this time is 3 June.

**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.