

PROJECT INFORMATION

Lead Principal Investigator	Aku Riihelä
Institute	Finnish Meteorological Institute, Research and Development
Project Title / Grant #	Radiation, Snow Characteristics and Albedo at Summit (RASCALS) (RiihelaFMI)
NSF Program and Manager	FI\Federal\FMI, Ms. Renee Crain
PFS Project Manager	Katrine Gorham

LOGISTICS SUMMARY

Researchers with this Finnish Meteorological Institute (FMI) project will study links between physical, optical and microwave snow properties. During a three-week campaign at Summit Station in 2010, the researchers will deploy albedo-, spectro- and gonio-meters around Summit to capture the BRDF, spectral snow signatures and the overall broadband albedo. They will combine this data with on-site snow physical property measurements such as grain size and water content to improve the optical satellite estimates of surface albedo.

A team of three will travel via commercial air to Kangerlussuaq and on to Summit via ANG in June, 2010. They will base from Summit and sample daily at various sites around station, each site requiring a clear-sky view away from human infrastructure. Some sampling sites will be “fixed” and sampled repeatedly during the day, and 4-6 roving sites/day will be sampled only once; selection of these sites (TBD) will be coordinated with CPS staff and the Summit Science coordination office. Using the electric snowmachine, the team also will make one or two 20-40km transects for spatial snow heterogeneity studies and for ground-truthing satellite information.

At the end of the campaign, the team will remove all instruments and equipment and fly via ANG back to Kangerlussuaq, returning to their home institute from there via commercial air.

CPS will provide Kangerlussuaq and Summit user days, Air National Guard (ANG) transport coordination for personnel and gear from Kangerlussuaq to Summit and return, and fuel. (Summit user days include access to infrastructure and services as needed, including potential use of a low-emissions snow machine). These costs will be recouped for the Arctic Research Program via a direct bill agreement between CPS and the Finnish Meteorological Institute. The PIs will arrange all other logistics and pay for them through 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=RiihelaFMI

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	In progress
Obtain all necessary insurance and permits for fieldwork	PI	6/21/2010	In progress
Visit all hyperlinks and review all documents referred to in the support plan	Entire Field Team	6/7/2010	In progress
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
2	4-stroke snowmobiles. As an alternative to using the 4-stroke snowmobile the researchers are encouraged to use the electric snowmobile, as available. Note: These snowmobiles will be available for the team to use for off-station travel. These are not to be used for transportation around camp.
2	Nansen sleds
1	Iridium phone
1	GPS
1	VHF radio
2	2-person survival bags (for off station travel only)

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/>.

CPS will provide the following support on a direct-billable basis. Please see Appendix for an estimated cost.

Other Services

Service	Comments
User days Kangerlussuaq	
User days Summit, including meals	The researchers will sleep in 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	
Power: Battery Charging	Power outlets will be available in the Science and Operations Barn for daily recharging of science equipment (including 12 V, 25-35 Ah batteries). The researchers will provide their own chargers. Additionally, the researchers will be responsible for providing any non-US power requirements (i.e. converters or adaptors).
Science and Operations Barn (SOB)	Limited space will be provided in the SOB for warm cargo storage. The area designated for this is on the NE side of the facility. The Summit science techs will work with the researchers to coordinate storage space.
Green House Bench Space	The researchers will be provided with bench space in the Greenhouse east lab. The researchers will be allocated the north bench in this lab. Researchers acknowledge that they will need to work around the science techs who may need access to this area for the daily tasking duties.

<p>Off-Station Travel</p>	<p>The researchers will travel off station during day trips to complete measurements. All snow disturbances will be backfilled upon completion. GPS coordinates of off-station work will be recorded and provided to the Project Manager (Katrine Gorham) and Summit Science Techs.</p> <p>This work will be coordinated with the camp manager to ensure that proper off-station communication is established and maintained. Additionally, the close site work must be coordinated with the PI (John Burkhart; john.burkhart@nilu.no) for the NILU/UAV project in order to avoid any location and/or safety conflicts.</p> <p>For travel to/from the sites, the researchers will minimize snow disturbances by traveling in direct routes and using the same path whenever possible. Prior to traveling off station the researchers will review the location of other science projects in the area, with the Camp Manger (Ken Jessen) and Science Techs, to ensure that there are no disturbances. The researchers agree to stay at least 500 meters away from the ICESat line and CIO site.</p> <p>The researchers will adhere to all travel policies and clean air sector protocols and will plan off- station travel accordingly. Figure 1 in the appendices details the site locations.</p>
<p>Safety protocols</p>	<p>The researchers will adhere to all safety protocols outlined in the AHAs. This includes reading and signing off on relevant Activity Hazard Analysis (AHAs) prior to completing relevant tasks. Additionally, the researchers will adhere to the established clean air protocols and travel policies.</p>

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	Weight
Box #1: Science equipment/gear	86
Box #2: Science equipment/gear	119
Box #3: Science equipment/gear	132
Box #4: Science equipment/gear	22
Box #5: Science equipment/gear	44
Box #6: Science equipment/gear	93
Box #7: Science equipment/gear	86
Box #8: Science equipment/gear	68
Note: The total cube is ~180 cu ft. This includes ~40 cu ft of DNF.	---

SUPPORT SCHEDULE

Approx Date	Location	Activity
6/26/10	Kangerlussuaq	Field Team (Riihelä/Lahtinen/Hakala) arrive in Kanger via commercial air
6/28/10	Summit	Field Team flies from Kanger to Summit
7/21/10	Summit	Field Team departs Summit on the Thule-NEEM-Summit-Kanger flight
7/22/10	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
Hakala, Teemu	Kangerlussuaq	06/26/10	07/22/10	teemu.hakala at fqi.fi
	Summit	06/28/10	07/21/10	
Lahtinen, Panu	Kangerlussuaq	06/26/10	07/22/10	panu.lahtinen at fmi.fi
	Summit	06/28/10	07/21/10	
Riihelä, Aku	Kangerlussuaq	06/26/10	07/22/10	aku.riihela at fmi.fi
	Summit	06/28/10	07/21/10	

PROJECT CONTACT INFORMATION
Research Team

Role	Name	Email	Phone / Fax
Principal Investigator	Aku Riihelä	aku.riihela at fmi.fi	919 294152 /

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 power outlets for equipment battery recharging.
Availability of snowmobiles and Nansen sleds.
Warm storage for sensitive science gear.

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

Factor	Mitigation and Control
Heavy lifting/body strains and sprains	-Use proper lifting techniques
Snowmobile Travel	-Participate in a snowmobile training -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	-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	-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	-Carry the appropriate communications system (satellite phone) -Assure your phone and/or radio is fully charged before going out and carry a spare battery.
Foot/ski travel	-Have a communication plan in place (carry a radio) -Have a check out policy in place
Fuel Handling	-Participate in fuel handling training -Have a plan for fuel spills/first aid
High Altitude	-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	-Follow NSF Physical Qualification process
Power Tools	-Participate in a power tools training
Trench/pit Work	-Use appropriate PPE (Personal Protection Equipment)