

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>	Richard Honrath
<b>Institute</b>	Michigan Technological University, Department of Civil and Environmental Engineering
<b>Project Title / Grant #</b>	Collaborative research: A synthesis of existing and new observations of air-snowpack exchanges to assess the Arctic tropospheric ozone budget (0713992) <b>and</b> Biomass-burning and anthropogenic impacts on arctic tropospheric chemistry (NASAPolarcat)
<b>NSF Program and Manager</b>	NSF\OD\OPP\ARC\ARCSS, Dr. Neil Swanberg <b>and</b> NASA, Dr. Seelye Martin
<b>PFS Project Manager</b>	Sandra Starkweather

### Logistics Summary

The PI brings two projects to Summit in 2008. Together, these bring about six scientists to the station during the late-May-through-June 2008 set-up period, and three to six total (best estimate four) during the remainder of the summer. To minimize costs and impact to Summit Station, the investigators are combining resources where able. But they also have distinct support needs as well. Because one project is NASA-funded and subject to an interagency funds transfer NASA > NSF, we have attempted to identify the items in this plan that are subject to the transfer.

**Logistics 0713992:** Researchers on this collaborative NSF-funded project led by principal investigators Honrath, MTU, Lead (0713992), and Helmig, CU (0713943), will conduct extensive campaign ozone and nitric oxide measurements from 2008-2010. Collaborating scientists led by L. Ganzeveld (Wageningen University, Netherlands) also will assist with research. The researchers will gather their information during two years of measurements at Summit Station, Greenland, beginning in 2008; and one fall-to-spring season at Toolik Lake Field Station, Alaska, beginning in 2009 or '10.

For the work at Summit, a research team from Michigan Tech and the Univ. Colorado totalling 3-6 people will set up their experiment during a 2- to 3-week visit to the station beginning in late May 2008. The tasking will include installing a suite of instruments: two new fast (eddy correlation) and several standard ozone instruments, one high-sensitivity nitrogen oxides instrument, and various instruments to monitor snow and atmospheric temperature, meteorology and radiation. The researchers intend to make the experiment operational in early June, but no later than the planned June-July ARCTAS and POLARCAT (aircraft based pollution studies) flights over Summit, as the aircraft measurements will be useful for assessing relationships between long-range transport and the air-snow processes studied in this project.

Following this first installation period, scientists will observe the experiment continuously during the summer season in order to (a) ensure that high-quality measurements are obtained for the entire period and (b) ensure that all instruments to be run over the winter period are functioning fully automatically with all identifiable problems worked out. During this period (July through August 2008), 2-3 scientists total will be on site at any one time, with the exception of short overlaps between outgoing and incoming researchers where this number will be exceeded (up to 6 maximum, both projects). In addition to troubleshooting and maintaining the instruments, the researchers will conduct intensive measurements of eddy correlation fluxes and gradients of ozone and nitrogen oxides, and conduct meteorological and radiation measurements.

During the winter period of 2008-2009, the Summit Station science technicians will monitor a subset of the summer measurements.

Measurements identical to those conducted during 2008 will be repeated during 2009. However, measurements will begin much earlier – preferably in early March – in order to observe the seasonal variations of air-snow fluxes and chemistry. The number of scientists on site during the 2009 season will be similar to that in 2008, or possibly somewhat lower. At the end of the experiment in late summer 2009, the instruments will be removed.

A research team is expected to visit Alaska's Toolik Field Station in 2009 or 2010.

This work is part of IPY activity #213, "Air-Ice Chemical Interactions," or AICI, and is collaborative with IPY activity #32, POLARCAT ("Polar Study using Aircraft, Remote Sensing, Surface Measurements and Models, of Climate, Chemistry, Aerosols, and Transport").

For the work in Greenland, CPS (formerly VPR) will provide ANG coordination (and air charters as needed to access Summit during non-seasonal periods), user days at Kangerlussuaq and Summit, and access to support infrastructure and services at the station, including science technical services. In addition, prior to the closing of the ANG logistics chain at the end of summer, 2007, CPS purchased and shipped gases to Summit needed for the 2008 effort.

For the work in Alaska, CPS will provide Toolik user days, a vehicle, and construction support to power the PIs' instrument sites. IAB will provide infrastructure support, voice and data communication, and services at Toolik. The researchers will pay all other costs from the grant.

**Logistics NASAPolarcat:** For this NASA project, the investigators will make continuous year-round measurements of a suite of nitrogen oxides and non-methane hydrocarbons (NMHC) at Summit Station, Greenland, and then will analyze them in conjunction with transport simulations and simultaneous observations of carbon monoxide, ozone, selected chlorofluorocarbons (CFCs) and black carbon particles.

The experiment will be operated continuously from June 2008 until August 2010.

A research team from Michigan Tech and the University of Colorado totaling 3-6 (same group as above) will set up their experiment during a ~ 3-week period beginning in late May 2008. The installations will include one automated non-methane hydrocarbon system, one high-sensitivity nitrogen oxides instrument, and one peroxyacetyl nitrate (PAN) instrument. The experiment will be operated continuously from June of 2008 until August of 2010. Full operation following a test period will begin in time to overlap with the planned ARCTAS and POLARCAT flights over Summit, as the aircraft measurements and this project's measurements will both study long-range transport of pollution and its impacts in the Summit region.

Following this first period, several trips throughout the summer will be used to exchange staff. Scientists will observe the experiment continuously during the summer season to (a) ensure that high-quality measurements are obtained for the entire period and (b) ensure that all instruments can be run over the winter period. During this period (July through August 2008) 1 to 2 scientists total will be on-site at any one time, with the possible exception of overlaps between outgoing and incoming researchers. The research team will return to Summit during 2009 with similar personnel needs expected during that season.

During the 2008-9 and 2009-10 over-winter periods, on-station science technical staff will run the experiments.

The research team will remove the instruments from Summit during the 2010 field season, unless a new project involving their use there has begun. 2010 staffing needs will be developed in 2009.

Some field activities for this project may be combined with the PI's NSF grant. This project is part of IPY activity #32, POLARCAT, and is funded through NASA ROSES 2006 NRA.

CPS support includes ANG coordination of cargo/personnel, provision of Kangerlussuaq user days, access

to the Summit infrastructure and services (including ~4 hours weekly of science technical support), and procurement of compressed gasses. Some of the latter were purchased for shipment in late 2007. NSF will recoup the cost of CPS support via an interagency funds transfer.

For the complete CPS online project record for these grants, including science objectives, go to:  
[http://www.vecopolar.com/arlss\\_reports/arlss\\_projectsdetail.asp?cbPropNum=0713992](http://www.vecopolar.com/arlss_reports/arlss_projectsdetail.asp?cbPropNum=0713992) and  
[http://www.vecopolar.com/arlss\\_reports/arlss\\_projectsdetail.asp?cbPropNum=NASAPolarcat](http://www.vecopolar.com/arlss_reports/arlss_projectsdetail.asp?cbPropNum=NASAPolarcat)

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

## SECTION TWO: SEASON FIELD PLANS

### Outstanding Actions and Notes

Issue	Responsibility	Date Completed/Note
Review support plan for accuracy and distribute to all field team members	PI	
Obtain all necessary permits for fieldwork	PI	Included with Summit Station permit
Visit all hyperlinks and review all documents referred to in the support plan	Field Team Members	
Contact the GEOSummit Science Coordination Office (SCO) <a href="mailto:sco@summitcamp.org">mailto:sco@summitcamp.org</a> regarding your project's plans for the season	PI	September 2007
Medical Clearance completed 6-8 weeks before desired deployment date. Still outstanding: (MTU): Kramer (CU): Helmig, Lang, Hueber	Field team Members	PQ'd: Honrath (5/7/08) Dziobak (3/14/08) Tanner (4/11/08) Seok (5/7/08) Van Dam (5/2/08)
Provide cost estimate for interagency transfer related to POLARCAT support Provide end-of-season actual costs <b>Note: Actual costs likely will differ from those reflected in the cost estimate due to exchange rates and other influences.</b>	CPS  CPS	See appendix
Passports are required for ANG and international travel. It's a good idea to bring two IDs and to pack a copy of your passport in case the original is lost.	Field Team Members	Note
Complete Critical Success Factors	PI	3/18/2008
Provide list of all cargo	Honrath	
Provide safety protocols	Dave Denny	After walk-through (June)

### Allocations and Services

#### Allocations from Inventory

Quant/Unit	Item
1/ea	Arctic oven sleep tent
2/ea	Sleep pad
1/ea	Wireless laptop card

CPS will provide the following support. NASAPOLARCAT support will be funded via an interagency funds transfer between NASA and NSF as indicated below.

**Other Services**

<b>Project Allocations</b>	<b>Comments</b>
User days Kangerlussuaq	NASA pays for 6 people R/T
User days Summit	NASA pays 50%
Travel: Kanger > Summit	NASA pays for 6 people R/T
Cargo Services	NASA's portion broken out in appendix
Science Technical Services	NASA portion: 4 hours/week
5 racks, 40 cylinder, 2 storage shelf allocation in Buried Flux Facility	CPS has completed extensive work with this group on requirements and design development of the Buried Flux Facility. The complete description of the PI requirements can be found on-line at ( <a href="http://docs.google.com/Doc?id=dg99q7tv_36g4d4dffr">http://docs.google.com/Doc?id=dg99q7tv_36g4d4dffr</a> ) and in the Buried Flux Facility project plan. For a summary, view the appendix.
Gas Cylinder procurement and delivery.	CPS will procure and stage gas at the facility for the researchers' use. Gas procurement for 2008 was completed in August 2007. A second procurement will be completed by August 2008 for the following year. Amounts as currently understood by CPS are found in the Appendix with 2008 prices. Any changes to 2009 procurement should be provided no later than July 1, 2008. NASA's portion is broken out in the appendix.
Gas piping and regulators.	PI's will provide all of their own regulators and tubing to pipe in-use gases from stored gas shed to module equipment racks.
Small NO (UN1660) cylinders	PI's will provide small NO cylinders for use in the specific ventilated gas enclosure for this gas. PI will take responsibility of transferring NO to smaller cylinders for large cylinders that were procured last fall. Limit: 15 ft <sup>3</sup> at STP at any given time.
Cylinder transfer	CPS will provide a hand truck and fabricate small, removable ramps for the safe transfer of gases from above ground storage (cargo berm) to BFF storage (ventilated storage sheds).
Web camera and flood light for tower	CPS will provide mounting, power and wireless access for a Web camera to be provided by the PI's and mounted on the back of the BFF dog box.
Climbing equipment for BFF tower	CPS will provide safety gear for safe ascent of the BFF tower to the PI's during set up. This gear will be compatible with the BFF systems as ordered.
Safety protocols	PI's will adhere to all safety protocols outlined for those using the BFF by the CH2M Hill safety engineer. These are found in the appendix.
Toilet facilities	Occupants of the BFF should plan to use the rustic Sat Camp toilet facilities. These facilities are maintained by the Sat Campers. BFF occupants should share in the responsibility of transporting bagged and liquid waste back to station.
Snacks/Break Area	The BFF occupants should plan to store snacks and beverages at the nearby Sat Camp Mobile Science Facility.
Meals	The BFF occupants 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 <a href="mailto:manager@summitcamp.org">manager@summitcamp.org</a> to prep the cook for special diet requirements.
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## Location Information

Please visit <http://www.vecopolar.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 the *Summit Users' Guide*. Both are 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.vecopolar.com> and navigate to Greenland > Calendars/Schedules.

If you are a new user requiring access to the Cargo Tracking System, contact Jason Buenning ([jason@polarfield.com](mailto:jason@polarfield.com)).

Customs instructions are available on our website at <http://www.vecopolar.com> (go to Greenland > Customs)

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

### Detailed Shipping Lists are found in Appendix (Still need Honrath's)

Items	Weight/Cube
Set of equipment for MTU-NSF nitrogen oxides measurements	2800 pounds/325 cubic feet
Set of equipment for MTU-NASA nitrogen oxides and PAN measurements	3000 pounds/350 cubic feet
Combined equipment for CU-NASA/NSF	3834 pounds/564 cubic feet

## Support Schedule

Approx Date	Location	Activity
May 14	Scotia	Shipping deadline for Honrath-Helmig gear bound for Summit
May 28	Kangerlussuaq	Honrath-Helmig gear shipment to Summit
May 28	Kangerlussuaq	PI's arrive in Kanger
May 29	Summit	PI's arrive at Summit. (DNF cargo must be stored in Science Barn until transfer to BFF.)
May 29 - June 1	Summit	PI's complete tower training with on-site medic
June 1	Summit	PI's may begin occupancy of BFF
June 1-15	Summit	Punch List/break in period for BFF

Prior to August 22	Summit	PI's complete on-site training of Phase I science technicians
August 22	Summit	PI's complete field season at Summit

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

### Field Team Information

Institute	Name	Location	Date In	Date Out	Email
MTU	Honrath, Richard (1 trip, 14 days)	Kangerlussuaq	6/23/2008	7/12/2008	<a href="mailto:reh@mtu.edu">reh@mtu.edu</a>
		Summit	6/24/2008	7/10/2008	
	Dziobak, Michael (2 trips, 61 days)	Kangerlussuaq	5/28/2008	6/28/2008	
		Summit	5/29/2008	6/26/2008	
	Dziobak, Michael	Kangerlussuaq	7/21/2008	8/24/2008	
		Summit	7/22/2008	8/22/2008	
	Kramer, Louisa (1 trip, 62 days)	Kangerlussuaq	5/28/2008	8/2/2008	
		Summit	5/29/2008	7/29/2008	
CU	Helmig, Detlev (1 trip, 8 days)	Kangerlussuaq	5/28/2008	6/7/2008	<a href="mailto:Detlev.Helmig@colorado.edu">Detlev.Helmig@colorado.edu</a>
		Summit	5/29/2008	6/5/2008	
	Tanner, David (2 trips, 13 days)	Kangerlussuaq	5/28/2008	6/7/2008	<a href="mailto:David.m.tanner@colorado.edu">David.m.tanner@colorado.edu</a>
		Summit	5/29/2008	6/5/2008	
	Tanner, David	Kangerlussuaq	8/17/2008	8/24/2008	<a href="mailto:David.m.tanner@colorado.edu">David.m.tanner@colorado.edu</a>
		Summit	8/18/2008	8/22/2008	
	Seok, Brian (1 trip, 29 days)	Kangerlussuaq	5/28/2008	6/28/2008	<a href="mailto:seok@colorado.edu">seok@colorado.edu</a>
		Summit	5/29/2008	6/26/2008	
	Van Dam, Brie (2 trips, 54 days)	Kangerlussuaq	5/28/2008	6/7/2008	<a href="mailto:Brie.vandam@colorado.edu">Brie.vandam@colorado.edu</a>
		Summit	5/29/2008	6/5/2008	
	Van Dam, Brie	Kangerlussuaq	7/7/2008	8/24/2008	<a href="mailto:Brie.vandam@colorado.edu">Brie.vandam@colorado.edu</a>
		Summit	7/8/2008	8/22/2008	
	Lang, Kathrin (1 trip, 17 days)	Kangerlussuaq	6/23/2008	7/12/2008	<a href="mailto:Eva.lang@colorado.edu">Eva.lang@colorado.edu</a>
		Summit	6/24/2008	7/10/2008	
	Hueber, Jacques (1 trip, 17 days)	Kangerlussuaq	6/23/2008	7/12/2008	<a href="mailto:Jacques.heuber@colorado.edu">Jacques.heuber@colorado.edu</a>
		Summit	6/24/2008	7/10/2008	

### Project Contact Information

#### Research Team (for both projects)

Role	Name	Email	Phone / Fax
Co-PI	Detlev Helmig	<a href="mailto:detlev@instaar.colorado.edu">detlev@instaar.colorado.edu</a>	303.492.2509 /303.492.6388
Principal Investigator	Richard Honrath	<a href="mailto:reh@mtu.edu">reh@mtu.edu</a>	906.487.3202 /906.487.2943

## SECTION THREE: CPS CONTACT INFORMATION

**CPS Team Members**

Contact for	Name	Email	Primary Phone(s)
Summit operations	Sandy Starkweather	<a href="mailto:sandy@polarfield.com">sandy@polarfield.com</a>	Denver: 303.518.8714
Greenland operations (project support)	Jason Buenning	<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
Medical & MAS	Kyli Olson	<a href="mailto:kyl@polarfield.com">kyl@polarfield.com</a>	Denver: 303.489.2151
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

**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

**Summit Station**

Summer
CH2M HILL Polar Services Attn: Name of Employee/Researcher - Summit Station C/O Earl Vaughn 109 <sup>th</sup> Aerial Port Bldg. 20 Stratton Air Base Scotia, NY 12302-9752 Tel: 518.331.3103 Fax: 518.334.2537

**Other**

Organization	Internet	Phone
Summit Science Coordination Office	<a href="http://www.geosummit.org">http://www.geosummit.org</a> <a href="mailto:sco@summitcamp.org">sco@summitcamp.org</a>	John Burkhart 209.658.7142

## SECTION FOUR: SAFETY, ENVIRONMENT, HEALTH and PERMITS

### Medical Clearance

Arctic Program participants traveling into the Greenland field are generally required to pass a National Science Foundation (NSF) -mandated physical exam. All field team members should plan to complete their medical clearance process 6-8 weeks prior to their travel to Greenland. For more information refer to CPS' Greenland Guide, available at <http://www.vecopolar.com> under Greenland.

### Risk Assessment

All major and deep field science projects require a risk assessment exercise. This is an active process that requires the participation of all of the team members, and your CPS Project Manager. Your PM will contact you to schedule this exercise and the results will be documented below.

For Risk Assessment on this project, please refer to the appendix.

### 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.

<b>Factors</b>
Facility ready for occupancy by June 1
Strict adherence to clean air protocols. After the construction phase, the PI's will be notified prior to any vehicle operation around the facility.
Successful delivery of all equipment to BFF by June 1.
Availability of all gases requested for 2008 field season.
Availability of power and Internet throughout the experiment.
Post and observe acceptable traffic/disturbed snow zones around the facility both for construction and operational (post-construction) phases.

### 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.

### Appendices

Campaign Flux Facility Summary  
Risk Assessment (Construction of Flux Facility)  
Cargo List

**Campaign Flux Facility**

A new Campaign Flux Facility (CFF) is planned for two funded projects that require a buried facility for occupancy June 1, 2008. In late April, an HEO will begin excavations and a construction crew will assemble the facility. The detailed requirements for this facility are outlined in the Campaign Flux Facility Project Plan. In broad terms, the building must be below grade, located in an upwind location in the Clean Air Zone (CAZ) with an adjacent tower. These experiments are scheduled to operate year-round for the next 2 years. In 2008 CPS will design, procure, deliver and assemble a building that can be installed below grade. The building will be located in a crosswind transect with the Satellite Camp. A stop work date of 6/23 is assigned to this project to allow for Sat Camp measurement campaign.

*Note: Refer to the CFF operations plan (distributed separately) for more detail. If you need an additional copy, please request one from Sandy Starkweather.*

**Risk Assessment**

Risk	Prevention/Mitigation
Science data compromised by construction activity	<ul style="list-style-type: none"> <li>- Complete construction before/after researchers are on-site</li> <li>- Suspend construction activities on north wind days</li> <li>- Involve research community in developing construction schedule and disseminate widely before season begins</li> </ul>
Schedule slip or other problem prevents on time delivery of materials	<ul style="list-style-type: none"> <li>- Notify scientist about schedule delays</li> <li>- Monitor procurement schedules closely</li> </ul>
Weather delays	<ul style="list-style-type: none"> <li>- Allocate more trades personnel to the project</li> <li>- Reprioritize construction and maintenance projects</li> </ul>

## Summit Shipping List

Item	Date in Albany	Width feet	Length feet	Height feet	Weight lbs	Volume Cubic Feet	DNF	NSF		NASA	
								Weight	Volume	Weight	Volume
Detlev Personal Gear	6-May	3	4	4	2	40				40	24
David Personal Gear	6-May	3	4	4	2	40				40	24
David Personal Gear	Aug. 17	3	4	4	2	40				40	24
Brian Personal Gear	6-May	3	4	4	2	40		40	24		
Brie Personal Gear	6-May	3	4	4	2	40		40	24		
Brie Personal Gear	7-Jul	3	4	4	2	40		40	24		
Jacques Personal Gear	16-Jun	3	4	4	2	40				40	24
Kathrin Personal Gear	16-Jun	3	4	4	2	40		40	24		
TEI 49C Ozone	6-May	2	2.5	1.25	40	6	X	40	6		
TEI 49C Ozone	6-May	2	2.5	1.25	40	6	X	40	6		
TEI 49	6-May	2	2.5	1.25	40	6	X	40	6		
Fast Ozone #1	6-May	2.3	3	4	150	28	X	150	28		
Pump Box #1	6-May	1.5	2	1.5	40	5	X	40	5		
Fast Ozone #2	16-Jun	2.3	3	4	150	28	X	150	28		
Pump Box #2	16-Jun	1.5	2	1.5	40	5	X	40	5		
Campbell Sonic	6-May	2	2.5	1	25	5		25	5		
Metek Sonic 1	6-May	1.5	3	1.3	40	6		40	6		
Metek Sonic 2	6-May	1.5	3	1.3	40	6		40	6		
Aspirated Temperature 1	6-May	0.75	4	0.75	15	2		15	2		
Aspirated Temperature 2	6-May	0.75	4	0.75	15	2		15	2		
Aspirated Temperature 3	6-May	0.75	4	0.75	15	2		15	2		
Wind Speed 1	6-May	1	2	1	8	2		8	2		
Wind Speed 2	6-May	1	2	1	8	2		8	2		
Wind Speed 3	6-May	1	2	1	8	2		8	2		
Distance Sensor	6-May	0.75	1.5	0.75	5	1		5	1		
Wind Speed/Direction	6-May	1	2	1.5	5	3		5	3		
Cables	6-May	2	3	2	30	12		30	12		
Tubing	6-May	2	3	2	30	12		30	12		
Flux Data System	6-May	1.5	3	2	20	9	X	20	9		
Flux System Rack	6-May	0.33	0.33	5.5	20	1		20	1		
Flux Tools	6-May	1	2	1	25	2		25	2		
Cross Arms	6-May	0.5	8	0.5	50	2		50	2		
Metek Sonic Electronics Boxes	6-May	1.25	1.5	1.25	20	2		20	2		
Snow Gradient Tower	6-May	0.5	8	0.5	30	2		30	2		
GC	6-May	2.33	1.75	1.25	100	5	X			100	5
GC Electronics	6-May	3	2	1	100	6	X			100	6
GC Inlet System	6-May	1.83	1.58	2	100	6	X			100	6
Hydrogen Generator	6-May	1.42	2	2	100	6	X			100	6
GC Rack	6-May	5	0.33	0.33	20	1				20	1
GC Tools/Parts/Supplies	6-May	2.83	1.833	1	100	5				100	5
GC Sampling Line	6-May	2.83	1.833	1	100	5				100	5
GC Computer	6-May	3	2	1	150	6	X			150	6
GC Monitor	6-May	1.5	1.5	0.5	10	1	X			10	1
GC Traps	6-May	2.33	1.75	1.25	200	5				200	5
GC Zero Air	6-May	3	2	1	100	6				100	6
H2O Gen Res	6-May	3	2	1	50	6				50	6
GC Standards	6-May	3	2	1	50	6	X			50	6
SODAR	6-May	4	4	4.5	590	72	X	590	72		

SODAR	6-May	4	4	4.5	785	72	X	785	72		
David 2nd trip parts	Aug. 17	1	2	3	50	6				50	6

CU Grand Total					3834	564					
Total NSF								2444	398		
Total NASA										1390	166
Total May					3484	436					
Total June 16					270	80					
Total July 7					40	24					
Total August 11					90	30					

32.5  
12  
3  
2.5

-12.2222  
-23.3333