



# Operational Requirements Worksheet

## 2009–2010,2010–2011,2011–2012,2012–2013 Seasons

*Applicant Version*

<b>Project Name:</b>	High Elevation Antarctic Terahertz (HEAT) telescopes for Dome A and Ridge A
<b>Principal Investigator:</b>	Craig Kulesa
<b>Event Number:</b>	Undefined-U
<b>Proposal Number:</b>	N/A
<b>Project Dates:</b>	N/A to N/A
<b>Printed on:</b>	Thursday, 4 June, 2009 at 15:57 MST
<b>Printed for:</b>	Craig Kulesa

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## Project Information

Many of the major USAP resources are heavily committed for the next several seasons. The most constrained of these resources are fixed wing time (LC-130, Basler, and Twin Otter support), ship time, and support and berthing at South Pole Station. General availability information for these resources is presented at [www.usap.gov](http://www.usap.gov), under the section Information for Proposers. Please consider this information carefully while creating field plans and requesting support.

**Welcome** to the first page of this worksheet where you will define your project's support requirements. You may navigate through all required pages by clicking the "Continue" button, or select a specific page by clicking any tab or link in the left navigation bar. Your information is automatically saved as you navigate from each page. If you would like to see the overall worksheet site map with a brief description of the information we gather on each page, click the "Site Map" link under **Worksheet Tools** in the left navigation bar and hover your mouse over the "i" icons.

Use this page to describe your research project. This information is required.

### \* Research Objectives

Two portable 0.6-meter telescopes (HEAT) will be deployed to Dome A and Ridge A (approx. 81.5S, 73E) for a dual purpose of comparative site-testing and to carry out observations of terahertz (far-infrared) spectral lines from the Milky Way. They will uncover for the first time the full life cycle of molecular clouds -- the "nurseries" from which all stars, planets and life originate. The exceptionally dry, calm, and cold sky above the summit of the Plateau, proven by the PI's deployment of a prototype telescope (Pre-HEAT) to Dome A via Chinese traverse in 2007 (along with the Australian PLATO observatory), makes this study possible. Like its predecessor, the HEAT telescopes are automated and autonomous. They will return data via an Iridium data link.

### \* Field-Season Overview

The first HEAT telescope will be deployed to Dome A to replace the precedent "Pre-HEAT" telescope on the PLATO robotic observatory platform in Austral summer 2010-11. It is anticipated that HEAT #1 will be transported to Dome A via Chinese traverse and that no special USAP fieldwork will be needed. The second summer season (2011-12) will see the second HEAT telescope deployed to Ridge A, about 150-200 km SW of Dome A, via Twin Otter. This HEAT telescope will contain the necessary subset of PLATO-like capabilities needed to operate through the next year. In the third summer (2012-13), this second HEAT telescope will either be refueled or retrieved based on the site testing data obtained the previous year.

### Project Web Site

**Important: Please leave blank if the project does not have a website.**

<http://soral.as.arizona.edu/heat/>

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## Project Information :: Participant Roster

Please define the Principal Investigator and Primary Contact for this project.

Principal Investigator (PI)	
<b>Kulesa, Dr. Craig (m)</b>	
933 N. Cherry Ave. Steward Observatory Tucson, AZ 85721 ckulesa@as.arizona.edu ph: (520) 621-6540 fax: (520) 621-1532 Inst: University of Arizona Tucson (Astronomy)	ORW Access: Read/Write ✓ Send Project Updates
Primary Contact	
<b>Kulesa, Dr. Craig (m)</b>	
933 N. Cherry Ave. Steward Observatory Tucson, AZ 85721 ckulesa@as.arizona.edu ph: (520) 621-6540 fax: (520) 621-1532 Inst: University of Arizona Tucson (Astronomy)	ORW Access: Read/Write
Co-PI	
<b>Walker, Dr. Christopher K. (m)</b>	
933 N. Cherry Ave. Tucson, AZ 85718 cwalker@as.arizona.edu ph: (520) 621-8783 fax: (520) 621-1532 Inst: University of Arizona Tucson (Steward Observatory)	ORW Access: Read/Write

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## Project Information :: Project Schedule

Please provide information regarding your deployments by station/vessel and season for this project. The total number of deployments is the number of deploying individuals from your group multiplied by the number of times each individual deploys. For groups that deploy only once per season to the same station/vessel, total deployments is the total number of deploying team members. **If you enter a total number of deployments, we require you to provide the highest population from your group that will be at the station/vessel at any given time during that season, the date on which the first person from your group will arrive and the date on which the last person will depart.** Please indicate whether or not your deployment dates are flexible. **If your deployment dates are not flexible, a reason why is also required.**

Station/Vessel	Season	Total # of Deployments	* Highest # on Station at Same Time	* First Arrival	*Final Departure
Non Location Specific	2010–2011	0	0	10 Jan 2011	24 Jan 2011
Dates flexible? Yes					
Non Location Specific	2011–2012	3	3	10 Jan 2012	24 Jan 2012
Dates flexible? Yes					
Non Location Specific	2012–2013	3	3	10 Jan 2013	24 Jan 2013
Dates flexible? Yes					

**Project Information :: Participant Itinerary**

Please enter all field site(s) you plan to visit at each main station listed below, if any. Many grids throughout this application have location/site dropdowns. These dropdown lists are prepopulated with the sites you define for each station and season on this page. If you do not plan on visiting any field sites at a main station during a season, leave that table blank.  
 NOTE: Each column in a table marked with an asterisk is required if a table row has been added.

**Non Location Specific :: 2010–2011 Season**

Field Site	Activities
No sites entered for the 2010–2011 season on the Non Location Specific	

**Non Location Specific :: 2011–2012 Season**

Field Site	Activities
Non-Specific	Field deployment to Ridge A, deploy and test HEAT telescope.

**Non Location Specific :: 2012–2013 Season**

Field Site	Activities
Non-Specific	Field deployment to Ridge A. Based on the previous year's data, either retrieve the HEAT telescope, or service and refuel it.

## Permits

Depending on the details of your research, some activities may be subject to regulation, such as the Antarctic Conservation Act (ACA), New Zealand Environmental Risk Management Authority, New Zealand Ministry of Agriculture and Forestry, United States Department of Agriculture, or the USAP Master Permit. For more information, refer to the online help. You may also need a permit if you plan to take certain indigenous Antarctic species, to introduce any non-indigenous species to Antarctica, or to enter Antarctic Specially Protected Areas (ASPA's). NOTE: The PI is responsible for obtaining all required permits and clearances, and paying the necessary fees.

The following is an incomplete list of types of samples that may require a MAF, ACA, USDA or ERMA permit:

- Animal material of any kind
- Plant material of any kind, including seeds
- Viruses, Bacteria or Cell Cultures
- Rock Samples
- Soil Samples
- Marine Sediment Samples
- Freshwater Sediment Samples
- Ice Samples
- Seawater Samples
- Freshwater Samples
- Air Samples
- Genetically modified organisms

Below is a summary of informational links concerning the various permits. If you have questions about which permits are required, contact your project POC.

Activity	Yes	No	Description (if applicable)
* Taking or considering importing or exporting samples from Antarctica			
2010–2011		X	
2011–2012		X	
2012–2013		X	
* Taking native antarctic mammals or birds or parts thereof			
2010–2011		X	
2011–2012		X	
2012–2013		X	
* Collecting antarctic plants			
2010–2011		X	
2011–2012		X	
2012–2013		X	
* Exporting antarctic animals or plants from the United States			

2010–2011		X	
2011–2012		X	
2012–2013		X	
* Introducing non-indigenous species into Antarctica, including micro-organisms			
2010–2011		X	
2011–2012		X	
2012–2013		X	
* Research involving native flora/fauna			
2010–2011		X	
2011–2012		X	
2012–2013		X	
* Entering Antarctic Specially Protected Areas or Antarctic Specially Managed Areas			
2010–2011		X	
2011–2012		X	
2012–2013		X	
* Collecting data/samples within the 200-mile territorial jurisdiction of any country			
2010–2011		X	
2011–2012		X	
2012–2013		X	
* Importing or exporting new and genetically modified organisms into and through New Zealand			
2010–2011		X	
2011–2012		X	
2012–2013		X	

## Permits :: Permit Applications

Please note the **minimum lead times** required for filing permits with the appropriate agencies.

**NOTE: The PI is responsible for obtaining any required ACA permits, USDA permits, ERMA permits, and U.S. Foreign Clearances.**

Permit	Lead Time
Antarctic Conservation Act (ACA)	12 weeks
Marine Mammal Protection Act (MMPA)	32 weeks
New Zealand Environmental Risk Management Authority (ERMA)	12 weeks

New Zealand Ministry of Agriculture and Forestry Form A	4 weeks
New Zealand Ministry of Agriculture and Forestry Form B	4 weeks
New Zealand Ministry of Agriculture and Forestry Form C	4 weeks
Research Vessel Clearances for Work in Foreign Exclusive Economic Zone (EEZ)	24 weeks
U.S. Department of Agriculture Permit	16 weeks
U.S. Department of State Foreign Clearance for Sample Collection	28 weeks

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**Cargo**

Cargo Requirements	Yes	No	Description (if applicable)
* Do you have any cargo requirements?			
2010–2011		X	
2011–2012	✓		Deploy HEAT telescope to Ridge A.
2012–2013	✓		Service or retrieve HEAT on Ridge A.

**Cargo :: Cargo List**

Identify your cargo requirements. DO NOT use this table for baggage, handcarry items, or items the RPSC is purchasing and shipping for you. Please note that you are not allowed to check Shipped via COMAIR for Southbound cargo, and you may not check Needed At Camp or Explosive for Northbound cargo.

If you have a multi-season ORW, enter cargo items for each season before clicking continue button (multiple seasons are links at top of table). If you get a warning notice while validating this section, be sure to check each season for validation issues.

Season: 2011–2012

Item Name	Qty	Total Wt (lbs.)	Avail. 6 wks Prior to Arrival?	Len. (in.)	Width (in.)	Ht. (in.)	Ship Via COMAIR	Cooling Needed	Oversize	Keep Dry	Do Not Freeze	Hazardous	Radioactive	Biological Specimen	Needed at Camp	Fragile	Explosive
Field-deployable HEAT telescope assembly.	1	350	✓	40	24	36				✓					✓	✓	
<b>Direction:</b> Southbound																	

Season: 2012–2013

Item Name	Qty	Total Wt (lbs.)	Avail. 6 wks Prior to Arrival?	Len. (in.)	Width (in.)	Ht. (in.)	Ship Via COMAIR	Cooling Needed	Oversize	Keep Dry	Do Not Freeze	Hazardous	Radioactive	Biological Specimen	Needed at Camp	Fragile	Explosive
Possible retrieval of HEAT telescope on Ridge A	1	350		40	24	36				✓	✓					✓	



**Direction:** Northbound

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## Environmental Requirements

Describe your project's impact on the Antarctic environment. This information is required.

Environmental Impacts	Yes	No	Description (if applicable)
<b>* Physical disturbance of land areas</b>			
2010–2011		X	
2011–2012		X	
2012–2013		X	
<b>* Construction of a field camp requiring full-time personnel for camp operations</b>			
2010–2011		X	
2011–2012		X	
2012–2013		X	
<b>* Conducting remote field deployment</b>			
2010–2011		X	
2011–2012	✓		Deploy remote instrument to Ridge A
2012–2013	✓		Service or retrieve remote instrument at Ridge A
<b>* Perturbation experiments, i.e., re-routing water flow or manipulating the habitat of birds or mammals</b>			
2010–2011		X	
2011–2012		X	
2012–2013		X	
<b>* Use of explosives – if yes, please add details in the Description box</b>			
2010–2011		X	
2011–2012		X	
2012–2013		X	
<b>* Ice, rock, or sediment coring</b>			
2010–2011		X	
2011–2012		X	
2012–2013		X	
<b>* Drilling or the release of drilling fluids</b>			
2010–2011		X	
2011–2012		X	
2012–2013		X	
<b>* Excavation of soil or snow</b>			

2010–2011		X	
2011–2012		X	
2012–2013		X	
<b>* Placement of temporary scientific equipment for more than one season that may be irretrievable</b>			
2010–2011		X	
2011–2012		X	
2012–2013		X	
<b>* Erecting any structure with a longevity of more than one year</b>			
2010–2011		X	
2011–2012		X	
2012–2013		X	
<b>* Excavation, blasting, or drilling (other than drilling ice cores of 5 meters or less)</b>			
2010–2011		X	
2011–2012		X	
2012–2013		X	
<b>Research–Related Wastes</b>	<b>Yes</b>	<b>No</b>	<b>Description (if applicable)</b>
<b>* Generating any hazardous wastes in a lab or a field location</b>			
2010–2011		X	
2011–2012		X	
2012–2013		X	
<b>Hazardous Materials Used in the Field</b>	<b>Yes</b>	<b>No</b>	<b>Description (if applicable)</b>
<b>* Use of any hazardous materials in the field</b>			
2010–2011		X	
2011–2012		X	
2012–2013		X	
<b>* Managing the fuel used at your field camp</b>			
2010–2011		X	
2011–2012	✓		
2012–2013	✓		
<b>Releases to the Environment</b>	<b>Yes</b>	<b>No</b>	<b>Description (if applicable)</b>
<b>* Excluding the emissions from the combustion of fossil fuels, will the proposed activities result in any release into the Antarctic environment, including irretrievable science equipment, hazardous materials, wastewater, etc.?</b>			
2010–2011		X	
2011–2012		X	
2012–2013		X	

Describe all activities that may affect the Antarctic Environment or any future scientific investigations. Be specific.

The operation of the both HEAT telescopes has a negligible environmental footprint. The only emissions result from the combustion of fuel at Dome A by a 4 HP diesel generator during the winter, and possibly an even smaller generator at Ridge A.

## Environmental Requirements :: Hazardous Materials Used in the Field

### Fuels

If you will be managing the fuel used at your camp(s), describe the type and quantity of fuel expected to be used at each camp.

#### Season: 2011–2012

* Camp Name, Location	* Type of Fuel	* Gallons
Non Location Specific	Diesel	200

#### Season: 2012–2013

* Camp Name, Location	* Type of Fuel	* Gallons
Non Location Specific	Diesel	200



## Computers

The person responsible for implementing and maintaining the deployed systems should fill out this section. Inaccurate or incomplete information in this section may result in delays in processing your SIP.

Ensure your project team is familiar with the most current Information Security Awareness materials. Information Security Awareness training is a Federal requirement and must be completed prior to obtaining access to the USAP network.

All systems connected to the USAP infrastructure are required to meet the most current USAP Computer Screening Requirements materials. Please ensure that everyone on your team is familiar with these requirements as they apply to both project support AND personal systems. All systems unable to meet these requirements will require special approval before being allowed to connect to the USAP infrastructure, either directly or indirectly.

USAP provides standard software on public computers. If you require non-standard software, please include the license costs in your grant proposal. (Standard Software List)

Please answer the following questions concerning your computer requirements. All answers are required.

Computer Support	Yes	No	Description (if applicable)
* Does your project plan to transfer data off land-based stations on a scheduled basis from an installed experiment, instrument or device?			
2012–2013		X	
Extensive Data Transmission	Yes	No	Description (if applicable)
* Do you expect your project to require extensive data transmission? Please provide details here and also in your proposal.			
2010–2011		X	
2011–2012		X	
2012–2013		X	

## Communications

Please indicate your communications requirements. All answers are required.

Communications Requirements	Yes	No	Description (if applicable)
* Will your project require additional power supplies?			
2010–2011		X	
2011–2012		X	
2012–2013		X	
* Will your project require the installation of communications equipment (voice, data, or video)?			
2010–2011		X	
2011–2012		X	
2012–2013		X	
* Does your team have voice communication requirements using HF or VHF radios or Iridium?			
2010–2011		X	
2011–2012		X	
2012–2013		X	
* Will your team be bringing equipment that operates at radio frequencies, or using RF equipment not issued through RPSC?			
2010–2011		X	
2011–2012		X	
2012–2013		X	
* Does your project require Iridium service to transfer data from field sites?			
2010–2011	✓		PPP and SBD services, already in use on PLATO
2011–2012	✓		PPP and SBD services
2012–2013	✓		PPP and SBD services

Please describe any additional communications requirements.

## Communications :: Iridium Data Transfer

You indicated that your project will require Iridium services to transfer data from the field. Please describe these requirements in more detail. The NSF Proposal Review Panel will assess this request.

The PLATO observatory at Dome A currently makes extensive use of the Iridium PPP and SBD links. We will continue to use this link at Dome A and will request an additional modem for deployment of the second HEAT telescope to Ridge A. We will send as much processed data as we are allowed via Iridium PPP.

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## Laboratory

Please indicate your laboratory, office space, and equipment requirements. All questions are required.

Laboratory Space and Equipment Requirements	Yes	No	Description (if applicable)
* Will your project require the use of radioisotopes?			
2010–2011		X	
2011–2012		X	
2012–2013		X	
* Will your project require the use of Liquid Cryogen?			
2010–2011		X	
2011–2012		X	
2012–2013		X	
* Do you have requirements for general–purpose science or laboratory equipment that has an estimated value greater than \$5,000 and would be purchased by the USAP and not your grant? (No comment required, further details required in Equipment section)			
2010–2011		X	
2011–2012		X	
2012–2013		X	
* Will your project require consumable lab materials or supplies? If so, identify the cost of materials and supplies needed to support your project each season. (No comment required, further details required in Equipment section)			
2010–2011		X	
2011–2012		X	
2012–2013		X	

**UNAVCO Support**

GPS Requirements	Yes	No
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## Scientific Services

Please indicate your scientific services support requirements. All answers are required.

Scientific Services Requirements	Yes	No	Description (if applicable)
* Will your field team require Biospherical Instruments (BSI) Ultraviolet (UV) data beyond the standard products?			
2010–2011		X	
2011–2012		X	
2012–2013		X	

Please describe your need for any additional scientific services.



## Mechanical Equipment

Please enter your mechanical equipment and generator requirements. All questions are required.

Mechanical Equipment Requirements	Yes	No	Description (if applicable)
* Will your project require a winch? If so, please describe your needs.			
2010–2011			
2011–2012			
2012–2013			
* Will your team require portable generators that they will operate?			
2010–2011			
2011–2012			
2012–2013			



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### Diving Support

Please indicate your diving requirements. All questions are required.

Diving Requirements	Yes	No	Description (if applicable)
* Will your project involve research diving? If yes, enter the # of divers in the Description box.			
2010–2011		X	*
2011–2012		X	*
2012–2013		X	*

## Vehicle Support

Please indicate your vehicle requirements. All answers are required.

Vehicle Requirements	Yes	No	Description (if applicable)
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Please describe any additional vehicle requirements.

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## **ODEN**

Please review the attached document ODEN Science Capabilites which contains the ODEN capabilities.

Keeping the above information in mind, please upload your requirements for work on the ODEN.

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## **Project Files:**

The following requirement documents have been uploaded and should be included with the Fastlane submission.

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