



Operational Requirements Worksheet

2008–2009, 2009–2010, 2010–2011 Seasons

Applicant Version

Project Name:	A High Elevation Antarctic Terahertz Telescope
Principal Investigator:	Craig Kulesa
Event Number:	Undefined-U
Proposal Number:	0838998
Project Dates:	N/A to N/A
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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, 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

This portable 0.5-meter telescope (HEAT) will be deployed to Dome Argus to carry out observations of Terahertz (far-infrared) spectral lines from the Milky Way. It will uncover for the first time the full life cycle of molecular clouds -- the "nurseries" from which all stars, planets, and life originate. The exceptional submillimeter sky above Dome Argus, proven by the PI's deployment of a prototype telescope (Pre-HEAT) to the site in 2007, makes this study possible. It could otherwise only be performed from airborne or orbital platforms. Like its predecessor, the HEAT instrument will be automated and autonomous. It will return data via an Iridium data link, however the attractive option of a portable (TDRSS) field antenna will be explored.

* Field-Season Overview

HEAT will be installed on top of the University of New South Wales' PLATEau Observatory (PLATO) module, already at Dome A and currently hosting the Pre-HEAT telescope that is the technological forerunner to the HEAT telescope. The installation of HEAT will involve USAP field work in the 2009-10 and 2010-11 seasons. In the first fieldwork season, the HEAT telescope will be installed on the PLATO module, supplanting Pre-HEAT, in addition to the annual refueling and maintenance of the PLATO "life support" modules. The second season would see maintenance to the HEAT telescope and PLATO systems. Equipment, fuel, and personnel transport would ideally be shared between USAP capabilities and the annual Chinese traverses to Dome A.

Project Web Site

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

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

Project Information :: Participant Roster

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

Principal Investigator (PI)	
Kulesa, Dr. Craig (m)	
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	
Kulesa, Dr. Craig (m)	
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	
Walker, Dr. Christopher K. (m)	
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

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	2009–2010	3	3	15 Jan 2010	22 Jan 2010
Dates flexible? Yes					
Non Location Specific	2010–2011	3	3	15 Jan 2011	22 Jan 2011
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 :: 2009–2010 Season

Field Site	Activities
Non-Specific	Field deployment to Dome Argus in sync with Chinese traverse: deploy HEAT telescope, annual refueling and maintenance of PLATO

Non Location Specific :: 2010–2011 Season

Field Site	Activities
Non-Specific	Field deployment to Dome Argus in sync with Chinese traverse: maintain HEAT telescope, return data storage from previous year, annual refueling and maintenance of PLATO

Project Information Comments

There are no comments entered for this section.

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.

Activity	Yes	No	Description (if applicable)
* Taking or considering importing or exporting samples from Antarctica			
2009–2010		X	
2010–2011		X	
* Taking native antarctic mammals or birds or parts thereof			
2009–2010		X	
2010–2011		X	
* Collecting antarctic plants			
2009–2010		X	
2010–2011		X	
* Exporting antarctic animals or plants from the United States			
2009–2010		X	
2010–2011		X	
* Introducing non-indigenous species into Antarctica, including micro-organisms			

2009–2010		X	
2010–2011		X	
* Research involving native flora/fauna			
2009–2010		X	
2010–2011		X	
* Entering Antarctic Specially Protected Areas or Antarctic Specially Managed Areas			
2009–2010		X	
2010–2011		X	
* Collecting data/samples within the 200–mile territorial jurisdiction of any country			
2009–2010		X	
2010–2011		X	
* Importing or exporting new and genetically modified organisms into and through New Zealand			
2009–2010		X	
2010–2011		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

Permits Comments

There are no comments entered for this section.

Cargo

Cargo Requirements	Yes	No	Description (if applicable)
* Do you have any cargo requirements?			
2009–2010	✓		Deploy HEAT telescope to Dome A, service PLATO (refuel, service and replace generator engines as needed)
2010–2011	✓		Service HEAT telescope on Dome A, service PLATO (refuel, service and replace generator engines as needed)

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: 2009–2010

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
HEAT telescope, PLATO engines/parts. USAP should negotiate sending this with the Chinese traverse.	1	1000	✓	80	80	80				✓					✓	✓	
Direction: Southbound																	

Season: 2010–2011

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
PLATO and HEAT components. USAP should negotiate sending this with the Chinese traverse.	1	600	✓	60	60	60				✓					✓	✓	
Direction: Southbound																	

Cargo Comments

There are no comments entered for this section.

Environmental Requirements

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

Environmental Impacts	Yes	No	Description (if applicable)
* Physical disturbance of land areas			
2009–2010		X	
2010–2011		X	
* Construction of a field camp requiring full-time personnel for camp operations			
2009–2010		X	
2010–2011		X	
* Conducting remote field deployment			
2009–2010	✓		Deploy remote instrument to Dome A
2010–2011	✓		Maintain remote instrument at Dome A
* Perturbation experiments, i.e., re-routing water flow or manipulating the habitat of birds or mammals			
2009–2010		X	
2010–2011		X	
* Use of explosives – if yes, please add details in the Description box			
2009–2010		X	
2010–2011		X	
* Ice, rock, or sediment coring			
2009–2010		X	
2010–2011		X	
* Drilling or the release of drilling fluids			
2009–2010		X	
2010–2011		X	
* Excavation of soil or snow			
2009–2010		X	
2010–2011		X	
* Placement of temporary scientific equipment for more than one season that may be irretrievable			
2009–2010		X	
2010–2011		X	
* Erecting any structure with a longevity of more than one year			
2009–2010		X	PLATO will be the platform on which HEAT is installed. It is already at Dome A.

2010–2011		✗	PLATO will be the platform on which HEAT is installed. It is already at Dome A.
* Excavation, blasting, or drilling (other than drilling ice cores of 5 meters or less)			
2009–2010		✗	
2010–2011		✗	
Research–Related Wastes	Yes	No	Description (if applicable)
* Generating any hazardous wastes in a lab or a field location			
2009–2010		✗	
2010–2011		✗	
Hazardous Materials Used in the Field	Yes	No	Description (if applicable)
* Use of any hazardous materials in the field			
2009–2010		✗	
2010–2011		✗	
* Managing the fuel used at your field camp			
2009–2010	✓		PLATO's diesel generators burn 1050 gallons of fuel over the course of an entire year.
2010–2011	✓		PLATO's diesel generators burn 1050 gallons of fuel over the course of an entire year.
Releases to the Environment	Yes	No	Description (if applicable)
* Any permanent releases into the environment of any hazardous material, science equipment, or wastewater			
2009–2010		✗	
2010–2011		✗	
* Excluding the emissions from the combustion of fossil fuels, releasing any solid, liquid, or gaseous substance (e.g., scientific materials, wastewater, equipment) while in the field			
2009–2010		✗	
2010–2011		✗	

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

The combination of PLATO and HEAT as an astronomical observatory has a minimal environmental footprint. The only emissions result from the combustion of fuel by a 4 HP diesel generator during the winter.

Environmental Requirements Comments

There are no comments entered for this section.

Science Construction :: New or Modified Facilities

You indicated that, based on your understanding of standard USAP station and field facilities, these facilities will not meet the needs of your projects. Please describe your requirements in more detail. The NSF Proposal Review Panel will assess this requirement.

Science Construction Comments

There are no comments entered for this section.

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?			
2010–2011	✓		Iridium PPP link, (ideally) supplemented with a portable TDRSS field antenna
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.			
2009–2010	✓		15 MB of raw astronomical data per day
2010–2011	✓		15 MB of raw astronomical data per day

Computers :: Data Transmission

Please fill out the appropriate grid(s) if you plan to transfer data off station or off vessel on a scheduled or automated basis.

Methods of transferring the data could include:

- installed equipment
- installed instruments
- other devices
- outreach efforts

NOTE: Because of bandwidth limitations, off-ice transfer rates can be very slow. For example, transferring a 500 MB file may take

twelve hours or longer.

If your data quantity requirement is equal or less than 1 MB, please enter 1 for your quantity.

Season: 2010–2011

* Qty of Data (MB)	* Transmission Method	Transmission Frequency	Describe Instrument/Experiment/Data/Outreach
15	SFTP	Day	Daily transmission of data from telescope

If you have additional data transmission requirements, please specify them here.

Data transmission will be performed with an Iridium PPP link for basic telemetry and preprocessed data; raw data would ideally be downloaded daily with a (TDRSS) field antenna. This applies to both 2009-10 and 2010-11 seasons.

Computers Comments

There are no comments entered for this section.

Communications

Please indicate your communications requirements. All answers are required.

Communications Requirements	Yes	No	Description (if applicable)
* Will your project require additional power supplies?			
2009–2010		X	
2010–2011		X	
* Will your project require the installation of communications equipment (voice, data, or video)?			
2009–2010	✓		(TDRSS) portable field antenna installation
2010–2011		X	
* Does your team have voice communication requirements?			
2009–2010		X	
2010–2011		X	
* Will your team be bringing equipment that operates at radio frequencies, or using RF equipment not issued through RPSC?			
2009–2010		X	
2010–2011		X	
* Do you have Iridium requirements for field safety purposes?			
2009–2010	✓		
2010–2011	✓		
* Does your project require Iridium service to transfer data from field sites?			
2009–2010	✓		PPP and SBD services, already in use on PLATO
2010–2011	✓		PPP and SBD services, already in use on PLATO

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 currently makes extensive use of the Iridium PPP data link. We will continue to use this system as we have done for the Pre-HEAT telescope. We will issue Iridium SBD requests for scheduling observations and approximately 250 KB of data per day via the PPP link.

Communications Comments

There are no comments entered for this section.

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?			
2009–2010		X	
2010–2011		X	
* Will your project require the use of Liquid Cryogenes?			
2009–2010		X	
2010–2011		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)			
2009–2010		X	
2010–2011		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)			
2009–2010		X	
2010–2011		X	

Laboratory Comments

There are no comments entered for this section.

UNAVCO Support Comments

There are no comments entered for this section.

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?			
2009–2010		X	
2010–2011		X	

Please describe your need for any additional scientific services.

Scientific Services Comments

There are no comments entered for this section.

Field Support Comments

There are no comments entered for this section.

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.			
2009–2010		X	
2010–2011		X	
* Will your team require portable generators that they will operate?			
2009–2010		X	
2010–2011		X	

Mechanical Equipment Comments

There are no comments entered for this section.

Air Support Comments

There are no comments entered for this section.

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.			
2009–2010		X	*
2010–2011		X	*

Diving Support Comments

There are no comments entered for this section.

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.

Vehicle Support Comments

There are no comments entered for this section.

Heavy Equipment Comments

There are no comments entered for this section.

Explosives Comments

There are no comments entered for this section.

Major Systems and Equipment Comments

There are no comments entered for this section.

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.

ODEN Comments

There are no comments entered for this section.
