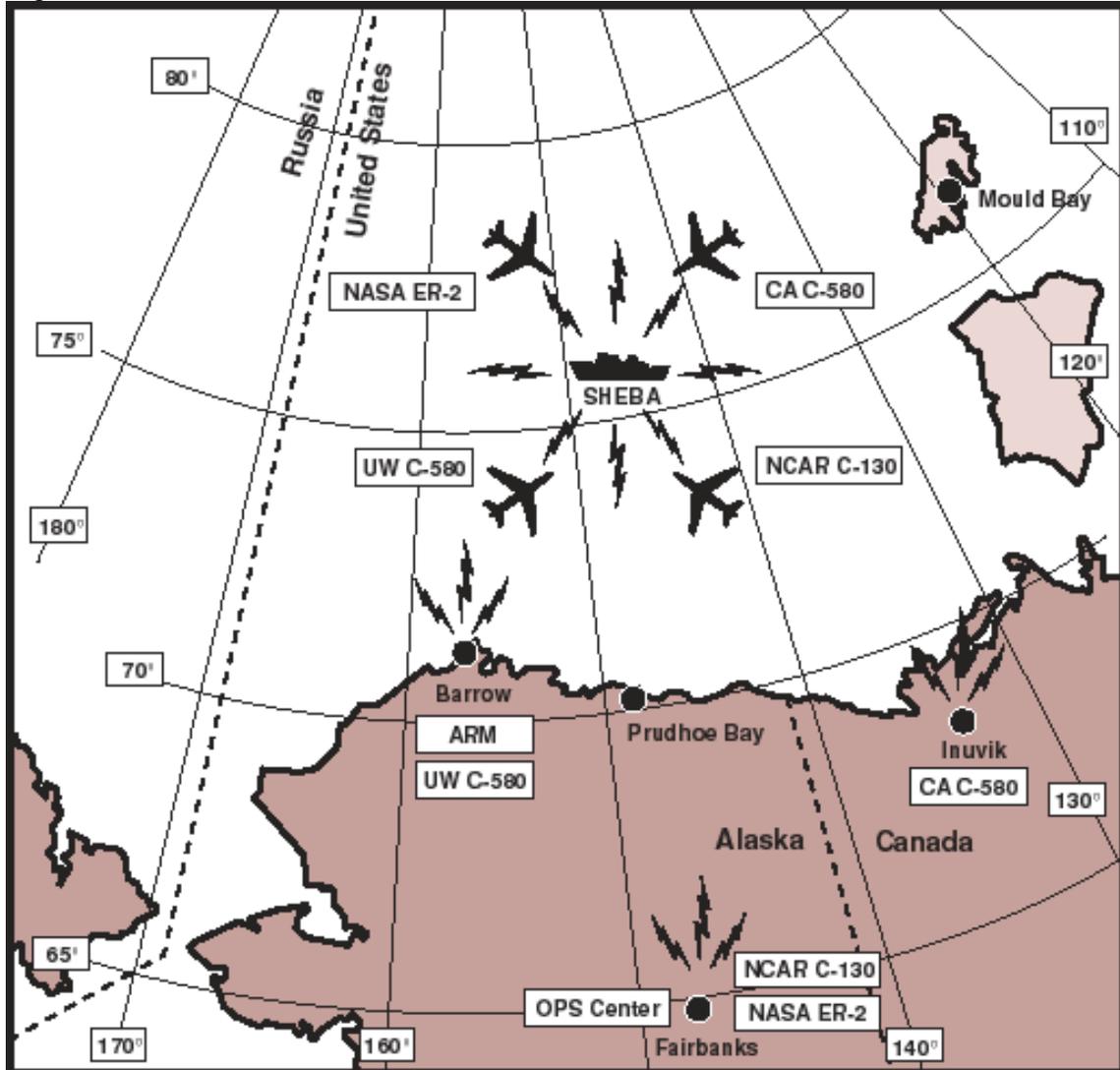


9.0 COMMUNICATIONS

9.1 Overview

The FIRE Project Office will establish a communications network to provide transmissions between the Operations Center and the other locations and elements in the experiment. This network will consist of radio, telephone, facsimile, e-mail, and GTS links. Figure 9.1-1 gives a schematic of the communications links. This network will be operational at least three days prior to arrival of the airplanes

Figure 9.1-1. Schematic of Communications Network



9.2 Radio, Telephone, Satellite, and GTS Links

Table 9.2-1 summarizes the communication capability for each station and platform.

Table 9.2-1 Communications Capability

	Land Phone	Satellite Phone	E-mail	MF Radio Voice	VHF Radio Voice	Phone FAX	Cell Phone
Fairbanks PO							
Ship							
ER-2							
ER-2 Base Fairbanks							
C-130							
C-130 Base Fairbanks							
Can CV-580			()				
Can CV-580 Base Inuvik							
UW CV-580							
UW CV-580 Base Barrow							
Ultra-light							
Helicopter					()		
Twin Otter					()		

() = not yet confirmed

Radio Links:

a. Aircraft to(VHF): NASA ER-2, NCAR C-130, UW CV-580, Canadian CV-580, Twin Otter, Helicopter, and Ultralight and SHEBA Ship

b. Fairbanks Operations Center to: NASA ER-2, NCAR C-130, UW CV-580 and Canadian CV-580

c. Barrow to: UW CV-580

d. Inuvik to: Canadian CV-580

e. SHEBA Ship to: Canadian CV-580, UW CV-580, NASA ER-2 and NCAR C-130 and Barrow, Inuvik and Fairbanks Ops Center

Phone (Voice, Fax, and E-mail):

a. Fairbanks Operations Center to: Inuvik(Canadian CV-580), SHEBA Ship, and Barrow(ARM and UW C-580)

b. Cellular Phones: LMS, FIRE PO, ER-2, NCAR C-130.

c. Internet: Operations Center(multiple), SHEBA Ship, Barrow (ARM and UW) and Inuvik (Canadian CV-580)

Satellite

Communications to and from the SHEBA Ship will be via INMARSAT B and will cost the caller about \$4 per minute. Using the number given in section 9.2.1 from a commercial telephone will establish contact with the SHEBA Ship via the satellite. The connection is currently sometimes unreliable and is not at all assured when the Ship is above 75 degrees latitude.

9.2.1 Telephones and Fax

The principal mode of communications will be via telephone and fax. The office and laboratories will be equipped with analog telephones; there will be at least one fax machines located in the Fairbanks Operations Center, the C-130 operations center, the ER-2 operations center, at Barrow and at Inuvik. Since analog phones do not provide for phone-mail, you will need to bring such hardware if you determine it is needed. Faxes will be the preferred mode of contacting the field sites. Excellent telephone and fax facilities are also available at local hotels. Table 9.2.1-1 identifies the phone numbers at each location.

Table 9.2.1-1 Phone Numbers

Location	Voice Phone Number	FAX Phone Number
Fairbanks Ops Center		
Fairbanks ER-2 Ops		
Fairbanks C-130 Ops		
Barrow ARM/NOAA Ops	907-852-6500	907-852-4622
Barrow UW CV-580 Ops		
Inuvik Canadian CV-580 Ops	Hangar: 867-777-4498 Hotel Computer Rm : 867-777-3213 MSAT: 1-600-701-6603 Hotel Desk: 867-777-2647	867-777-4504 867-777-3578 867-777-3442
SHEBA Ship	011-872-33-160-7212	

Calls to the SHEBA Ship will be via land telephones and INMARSAT B and will cost between \$3.50 to \$4.00 per minute, depending upon time of call(least expensive is 2 A.M. to Noon, AST). Commercial telephone or credit cards must be used to pay for such calls unless they are made from the Fairbanks Ops Center hangar, in which case the call is added

to the local service bill.. Calls to the Ship should be at pre-arranged times to insure the desired person is readily available. Calls from the Ship to Barrow and Inuvik will be paid at the Ship and calls to the Fairbanks Ops Center will be collect. Collect calls to a person in the Fairbanks Ops Center hangar will be automatically charged to the Fairbanks local service bill.

9.2.2 Cellular Telephones

The project will arrange for cellular phones for one person representing the ER-2, C-130, FIRE PO, MAS and Lead Mission Scientist groups. These phones should be used for emergency communications regarding mission plans and operations only where getting to a desk phone would result in an unreasonable delay. These phones should be activated and available at all times. They are not to be used for convenience. Desk phones are to be used as much as possible. Table 9.2.2-1 identifies the groups, its representative and the phone number. All in-coming and out-going cellular phone calls are to be logged in using the Appendix K-Log ID S form.

Table 9.2.2-1 Cellular Phones

<u>Group</u>	<u>Representative with phone</u>	<u>Phone Number</u>
Lead Mission Scientist	Curry	
C-130 Operations	Laursen	
ER-2 Operations		
MAS	King	
FIRE Project Office	McDougal	

9.2.3 Internet

There will be Local Area Network(LAN) set up in Fairbanks, Hangar 4 and it will be hooked to a T-1 line to enable access to/from off-sites, the Internet and the lower 48 states. This should provide efficient electronic communication between those in the hangar and reliable connection to the Internet, off-site and home networks.

In order to connect your computer to this LAN, your computer must have the following:

1. Ethernet adapter card with RJ-45 connector(modular) and driver software(e.g. 3COM 509, Asante NIC-PCI, etc.)
2. Networking software(e.g. TCP/Connect II, PC/TCP, ON-NET 32, etc.)

It is known that different Ethernet adapter cards and networking software may not be compatible with the LAN and information provided by you below will enable us to verify compatibility or get back with you regarding needed changes before you arrive in Fairbanks.

A. Contact name: _____

B. Contact Organization: _____

C. Contact e-mail address: _____

D. Name for your machine: _____

9.2.4 Telephone Policy

Due to the expected high cost of telephone calls, the following policy will be implemented for the use of telephones and fax machines:

- a. Fax machines will be used as much as possible. A fax center will be set up at the project administration desk with at least one fax for the sending, receiving, and distributing of fax traffic, including the transmission of field operations information and data. Please check your organization's mail slot for incoming faxes.
- b. Only those long distance calls directly related to the planning and conduct of mission operations are authorized. All outgoing calls must be logged in on the Telephone Log Sheet(Appendix K--Log ID R).
- c. Local calls using the local lines are allowable. All other calls will be at the expense of the individual.
- d. You may use the telephones for incoming calls. You may also use the telephones for outgoing calls if you charge the call to your credit card or reverse the charges. You should consider setting up a daily call-in schedule from your home organization.
- e. If you absolutely have to call someone personally, please limit your call to 1 minute (in other words, have the person call you right back). All outgoing calls must be logged in on the Telephone Log Sheet(Appendix K-Log form R).
- f. The bill for all long distance calls will be reviewed and if not directly related to the planning and conduct of FIRE.ACE operations, will be charged to the person making the call.

9.3 Aircraft Communications

Each airplane is equipped with transceivers for long and short range communications. Long range communications are generally from or to the plane to or from the SHEBA Ship, Fairbanks, Barrow or Inuvik. Short range communications are generally between planes or from or to the planes and the SHEBA Ship, Barrow, Fairbanks or Inuvik. The ER-2, U. WA CV-580 and the Canadian CV-580 will each be able to communicate with their base of operations at Fairbanks, Barrow or Inuvik, respectively. The C-130 will be able to reach its base of operations at Fairbanks through an MF radio transceiver located in the FIRE Project Office of the Fairbanks Ft. Wainwright hangar. The authorized VHF frequency at all sites is 126.7 Mhz. The Canadian CV-580 is authorized to use 2182/2558 kHz at the Ship and at Inuvik. All other planes are only authorized to use 2582 kHz at the Ship and Fairbanks or Barrow. Table 9.3-1 lists the radio frequencies for the Arctic Cloud Experiment communications. Figures 9.3-1 and 9.3-2 schematically present communications between the airplanes and base stations and the SHEBA Ship.

Figure 9.3-1 Airborne Communications

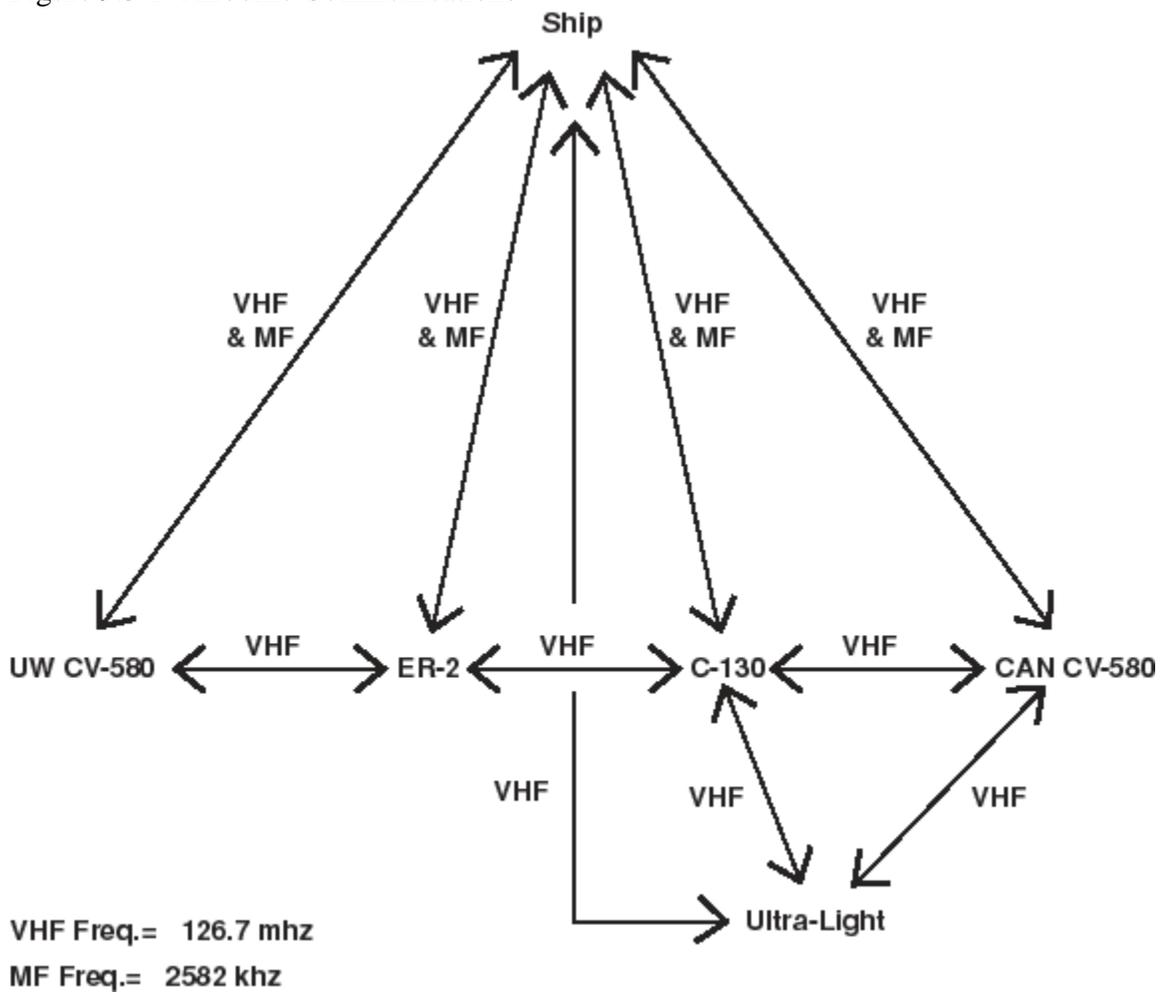
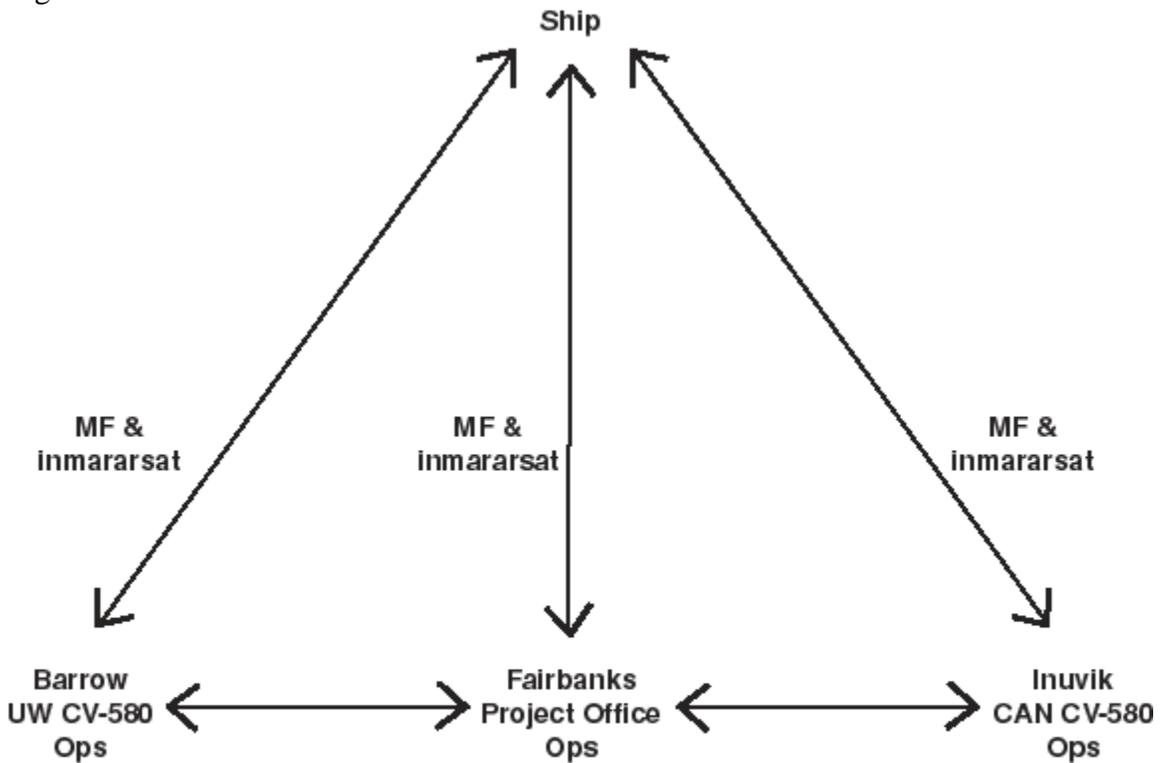


Figure 9.3-2 Ground Communications



MF Freq.= 2582 khz

The SHEBA ice station will have an MF radio for long range contact with any aircraft and VHF radio for short range aircraft communications. Communication to and from it will be possible by the ER-2, Canadian CV-580, UW CV-580, and NCAR C-130. This is a requirement to confirm that the tethered balloons are safely on the surface, especially for low overpass flights of the in situ aircraft, or to request helicopter support for the ER-2.

Note: Some units can only monitor one frequency at a time.

Table 9.3-1. Arctic Cloud Experiment Radio Frequencies

Platform	Call Sign	Number	Radio Capability	Frequency Selection
NASA ER-2	NASA 709		HF: 2-30Mhz VHF: 116-152MHz UHF: 225-400MHz	14.455Mhz 2.582Mhz 126.7MHz 138.9MHz 290.7MHz
NASA ER-2 Base Radio	NASA OPS			14.455Mhz 2.582Mhz 126.7MHz 138.9MHz 290.7MHz
NCAR C-130	NCAR 2		HF: 2-30MHz VHF: 116-152MHz UHF: None	2.582MHz 126.7MHz
NCAR C-130 base radio				
University of Washington CV-580	N3UW		HF: 2-25MHz VHF: 118-152MHz UHF: 225-400MHz	2.582Mhz 126.7MHz 129.075MHz
UW CV-580 base radio				2.582MHz
Canadian CV-580	Research 9	CFNRC	HF: 2-30MHz VHF/AM: 118-136 MHz VHF/FM: 138-174 MHz UHF: 225-400MHz	2.182/2.558MHz 126.7MHz
Canadian CV-580 base radio				2.182/2.558MHz
SHEBA Ice Station	CGDX			HF monitoring: 2.182/2.582MHz HF Working: 2.558/2.582MHz VHF/AM prime: 121.5 MHz (emergency) VHF/AMsecond- ary: 126.7MHz
SHEBA Quicksilver			VHF: 116-152MHz	VHF: 126.7MHz
SHEBA Helicopter				
SHEBA Twin Otter				

9.4 Web Pages

The Arctic Cloud Experiment will have a web page operational during the experiment. The web page will include an overview of the experiment, daily operations plans, Daily Mission Summaries to date, experiment participants, announcements, etc. Hot links to SHEBA, ARM and other key sites will be included. The experiment web page will allow participants in the field at Fairbanks and remote sites (Barrow, SHEBA ice station, etc.), as well as interested observers back home, to poll the page to see the latest status, plus accomplishments to date. The actual server, webmeister, and location will be on-site at hangar 4, Fort Wainwright. The site will be operational from Langley beginning in early April to support the Canadian CV-580 flights, from Fairbanks from April 29 until June 13 and for the month of July. After the field operations phase, the site will be operated for a time at Langley and the material on the site will subsequently will be phased into the Arctic Cloud Experiment portion of the existing FIRE home page.

The ability to readily ingest the following information/data formats exists:

- GIF, JPEG, TIFF image files
- data fax
- e-mail messages
- 8 mm tapes
- PC & Mac 3.5 floppies
- scanner for hard copy

Table 9.4-1 summarizes the URLs for the various WEB pages containing information relevant to this experiment.

Table 9.4-1. Arctic Cloud Experiment Information WEB Pages

Subject	URL
AirMISR	http://www-misr.jpl.nasa.gov/mihome.html
Alaska Climate	http://climate.gi.alaska.edu/weather/tourist/information.html
Alaska NWS	http://www.alaska.net/%7Enwsar/
AMPR	http://wwwghcc.msfc.nasa.gov/ampr
ARM-NSA/AO	http://arm.gov/docs/sites/nsa/nsaaao
ARM Data Archive	http://www-eosdis.ornl.gov/welcome.html
ARM-Instrument Status	http://www.joss.ucar.edu/cgi-bin/joss-catalog/report_browse?ARM
ASF	http://www.asf.alaska.edu/contents.html
CAR	http://climate.gsfc.nasa.gov/CAR
CLS	http://virl.gsfc.nasa.gov/er2cls.html
DAAC-Langley	http://eosdis.larc.nasa.gov/
DMSP Data	http://www.ngdc.noaa.gov/dmsp/dmsp.html
DMSP Descriptions	http://www.ngdc.noaa.gov/dmsp/source/descript.html
ECMWF-Bretherton	http://www.atmos.washington.edu/~breth/SHEBA/ECMWF.html
EOS Project Science Office	http://eospsoc.gsfc.nasa.gov/
Fairbanks FIRE Operations	
FIRE.ACE Operations PLan	http://asd-www.larc.nasa.gov/fire/index.html FIRE III/Arctic Cloud/Documents
HIS	http://cimss.ssec.wisc.edu/his/hishome.html
MAS	http://ltpwww.gsfc.nasa.gov/MAS
Minnis--Clouds	http://albedo.larc.nasa.gov:1123/pages/minnis_home.html
Minnis--FIRE.ACE	http://angler.larc.nasa.gov/arctic
NCAR C-130	http://chinook.atd.ucar.edu/~krista/sheba_c130.html

NCAR C-130 Data	http://www.atd.ucar.edu
NOAA Cloud Radar examples	http://www6.etl.noaa.gov/data/mmcrr
NOAA CMDL Data	http://www.cmdl.noaa.gov
NOAA DABUL homepage	http://www2.etl.noaa.gov
NOAA Operational Models	http://nic.fb4.noaa.gov:8000
NOAA Polar Orbiters	http://www.ncdc.noaa.gov/ol/satellite/satelliteresourcesabout.html#POES
RADARSAT	http://www.asf.alaska.edu/source_documents/radarsat1_source.html
SeaWiFS	http://seawifs.gsfc.nasa.gov/SEAWIFS/SEASTAR/SPACECRAFT.html
SeaWiFS Overpass Predicts	http://akumal.gsfc.nasa.gov/~alice/Predictions.html
SHEBA	http://sheba.apl.washington.edu
SHEBA Phase II Abstracts	http://sheba.apl.washington.edu/current_docs/abstracts.html
SHEBA-ARM agreement	http://sheba.apl.washington.edu/current_docs/agen_agreements/SHEBA-ARM.html
SHEBA field catalog access	http://www.joss.ucar.edu/sheba/catalog/
SHEBA preliminary datasets	http://www.joss.ucar.edu/codiac
SHEBA-Status/Summary Repts	http://www.joss.ucar.edu/cgi-bin/joss-catalog/report_browse?ARM
SHEBA-Daily Report	http://sheba.apl.washington.edu/database/Lasso.acgi
SHEBA-Ops Rept Browse	http://www.joss.ucar.edu/cgi-bin/joss-catalog/prods_browse
SHEBA-Ship Products	http://www.joss.ucar.edu/cgi-bin/joss-catalog/ship_prods_browse
SSM/I Pathfinder	http://www.ssmi.com
Wedgewood Resort	http://www.mosquitonet.com/~fountain/
Wylie's homepage--met data	http://www.ssec.wisc.edu/~donw

(see also Appendix I- Things to Do In Fairbanks)

10.0 DATA MANAGEMENT

10.1 Data Protocol and Publications Plan

The Arctic Cloud Experiment data protocol and publication plan has been prepared to encourage an orderly and timely analysis, interpretation, and publication of the data obtained during Arctic Cloud Experiment. It is hoped that the development and distribution of this plan will enhance the science output by promoting cooperation among the investigators and encouraging the early publication of results, thereby enriching the scientific interpretation of the data obtained from single and ensemble of instruments.

The Arctic Cloud Experiment Science Team (AST)(also referred to as the Arctic Cloud Experiment Working Group) is responsible for the certification of data submitted to the permanent Arctic Cloud Experiment data archive located at the Langley Research Center (LaRC) Distributed Active Archive Center (DAAC). The certification process will normally take 6-24 months after acquisition. During the certification process period, the following set of data protocol and publication ground rules will be agreed upon and abided to by all AST members as a condition of their participation in the Arctic Cloud Experiment project.

10.1.1 Data Protocol

1. AST members will have free and timely access to all Arctic Cloud Experiment data acquired during the project. The normal vehicle for data dissemination will be a transfer of data via the LaRC DAAC; however, direct transfer of data between investigators is also encouraged.
2. Each investigator's data is proprietary until the data appear in publication or, if the data are included in the LaRC DAAC, until this archive is published/released to the scientific community. AST members who collect Arctic Cloud Experiment data are responsible for the reduction, analysis, interpretation and publication of their data and research results.
3. An investigator whose unpublished data are to be used in an investigation has the right to be included among the authors of any resulting publication. The investigator may refuse co-authorship but not the use of his data. The investigator must provide information concerning the quality of the data and may require that suitable caveats regarding the data be included in the publication. It is the responsibility of the sponsoring investigator to solicit the participation of the investigator whose data are to be used as early as possible during the formative stages of the investigation.
4. AST members may release their own data to whomever they wish. They may not release the data of other investigators without consent.
5. Selected sets of reduced data obtained by investigators participating in collaborative research will be made available to AST participants within 9 months following acquisition.
6. The AST will normally provide the forum in which collaborative investigations are planned and executed; however, this is not meant to discourage collaborative investigations outside the scope of Arctic Cloud Experiment.

7. Any data sets resulting from collaborative investigations among AST members will be made available to the LaRC DAAC. This includes all collaborative efforts both within and outside the AST.
8. Scientists who are not AST members, co-investigators, or associates may participate in investigations using unpublished Arctic Cloud Experiment data provided they are sponsored by a AST member and they make available whatever data they plan to use to the LaRC DAAC at the beginning of the participation. Co-investigators and associates may participate in the investigation of a AST member.

10.1.2 Data Publication

Early publication of results from Arctic Cloud Experiment research is strongly encouraged. Towards this goal, the following minimum publication plan has been developed:

1. A mission overview of the Arctic Cloud Experiment will be prepared by key AST researchers and program personnel for publication in an appropriate journal. The paper will describe the scientific objectives, operational plans, and potential results of the major Arctic Cloud Experiment activities to the scientific community during the early stages of Arctic Cloud Experiment.
2. A synopsis of the key operational activities and preliminary results from the Arctic Cloud Experiment field experiment will be prepared by key AST researchers and project personnel for publication in an appropriate journal. This paper will be designed to be a "quick look" publication to inform the scientific community at an early stage of the implementation of the mission and possible highlighted observations.
3. Publication of results from the Arctic Cloud Experiment field experiment may be in a special issue of an appropriate journal. The special issue decision will be made by the AST. The issue will contain (a) an overview paper and (b) science papers.

The overview paper will be co-authored by key researchers and program personnel and will include a statement of the goals of the particular field mission. It will describe the field site, the instrumentation involved in the deployment, flight plans, and other operational activities.

The science papers will be contributions from the Arctic Cloud Experiment investigators. They will be "stand-alone" papers that the investigators will prepare summarizing measurements, data interpretation, and data correlations. Collaborative papers between different groups are strongly encouraged.

4. The timetable for publication of the special issue papers is given in table 10.1.2-1. All of the papers will be submitted for publication prior to a mutually agreed date.

Table 10.1.2-1 Publication Dates

Description	Date	Lead Resp.
Mission Overview(BAMS)	9/98	Curry/Randall
--Preliminary Results	9/98	Key PIs
--Operational Activities Synopsis	9/98	McDougal/Raper
Overview of Results-Special Issue	TBD	Curry/Randall
Results-Special Issue	TBD	Individual/Collaborative PIs

5. Oral presentations of selected results by the investigators and the project may be presented together at an appropriate conference.
6. Additional publications or presentations by Arctic Cloud Experiment investigators beyond those identified above are expected and encouraged. Other publications should, however, be in harmony with the data protocol and publication plan contained in this document.

10.2 Data Management Responsibilities

10.2.1 Working Group

The Arctic Cloud Experiment Working Group will be composed of FIRE principal investigators pursuing research common to the scientific objectives of Arctic Cloud Experiment. The data management functions of the group are:

1. To determine the content and format of all principal investigator data sets to be submitted to the Langley Research Center Distributed Active Archive System (LaRC DAAC). If requested, only Arctic Cloud Experiment researchers will have access to data in the LaRC DAAC during the time period for data certification.
2. To set standards for data quality, documentation of all data sets, and certification criteria for data products that will be released to the at-large scientific community.
3. To assign a data "category" (section 10.5) to each data parameter that reflects it's usefulness to subsequent data analysis and whether and when it should be archived.
4. To select case study data sets for special intensive processing (including reformatting) by all relevant principal investigators and to identify other additional processing of data to accomplish Arctic Cloud Experiment objectives.
5. To coordinate data management decisions and ensure uniform Arctic Cloud Experiment data characteristics.
6. To certify, within 6-24 months after acquisition, those data products from the LaRC DAAC that will be released to the scientific community.

10.2.2 Principal Investigators

All data reduction and analysis functions in Arctic Cloud Experiment reside with the scientists carrying out their research as part of the program. To encourage the interactions of these researchers needed to integrate the various observations and models into a more comprehensive understanding, Arctic Cloud Experiment investigators will have free and timely access to all data collected during Arctic Cloud Experiment, either by individual principal investigators or collected from satellites. Coordination of data analysis and modeling activities requires all principal investigators to perform certain other tasks as part of the Arctic Cloud Experiment data management scheme. These functions are:

1. To provide to the LaRC DAAC written information concerning data holdings, including all data collected as part of Arctic Cloud Experiment and other data deemed relevant to Arctic Cloud Experiment research.
2. To save all data collected in unreduced form for five years so that reduction of data can be repeated if necessary.
3. To provide to the LaRC DAAC copies of all category 1, 2, and 3 (if desired) observations in a mutually-agreed upon format (see section 10.5 for definition of data category) accompanied by complete instrument, reduction algorithm and data format documentation.
4. To provide, within nine months after acquisition, to the LaRC DAAC copies of any data analysis products deemed relevant to the accomplishment of Arctic Cloud Experiment objectives, accompanied by appropriate documentation .
5. To provide for archival of all submitted data sets by producing back-up copies of all data and taking other necessary precautions to ensure the preservation of the Arctic Cloud Experiment data.
6. To provide to other Arctic Cloud Experiment investigators or the LaRC DAAC, upon request, copies of other data sets acquired for Arctic Cloud Experiment research, that are relevant to other Arctic Cloud Experiment studies.
7. To provide to other Arctic Cloud Experiment investigators reasonable access to unreduced observations to facilitate particularly crucial multi-data analyses.

10.2.3 Arctic Data Working Group

The Data Management Working Group (DMWG) will be comprised of key members from the Arctic Cloud Working Group, as well as from the LaRC DAAC. The FIRE Project Manager will chair the DMWG. Table 10.2.3-1 lists the members. The responsibilities of the DMWG are:

- i. provide interaction and coordinate data management decisions among the Arctic Cloud Working Group, the data archives, and the Principal Investigators.
- ii. identify parameters, priority and schedule of data to be archived.
- iii. ensure uniform FIRE data characteristics

- iv. define listings of parameter units and conventions for data products to be archived.
- v. oversee the plans, progress, and performance of the data archives.

Table 10.2.3-1 Arctic Cloud Experiment Data Working Group Members

Name	Organization	Focus Area
David McDougal	NASA LaRC	Chair
John Olson	NASA LaRC	Co-Chair; FIRE Data Archive Manager
Pat Minnis	NASA LaRC	Satellite
Chris Bretherton	U. Washington	Modeling
Taneil Uttal	NOAA ETL	Surface-Active
Peter Pilewskie	NASA ARC	Surface-Passive
Jim Spinhirne	NASA GSFC	Aircraft-Remote
George Isaac	AES	Aircraft-Insitu
Jim Moore	UCAR	SHEBA Data
Bernie Zak	DOE Sandia	ARM
Bill Rossow	NASA GISS	Radiation Calibration
Herman Gerber	Gerber Scientific	Microphysics QA
Judy Curry	U. Colorado	Lead Mission Scientist
Brad Orr	NOAA ETL	Ad Hoc-ETL Data Manager
Jim Raper	NASA LaRC	FIRE Data Manager

10.3 Data Archival

It is expected that all data parameters needed for PI investigations will be archived in one of several archives as indicated in Table 10.3-1 and Appendix G. There also may be selected instances where a PI will elect to make his data available from his web site. All archived data parameters will ultimately become publically available from these sites according to the Project schedule. Table 10.3-1 summarizes the person at each archive from whom FIRE.ACE data may be acquired. Contact information for each is given in Appendix J.

Table 10.3-1 Archive Contacts

Archive Name & Location	Point of Contact
FIRE	John Olson
SHEBA	Jim Moore
ARM	
NWS	
NCAR	Bob Rilling
NOAA CMDL	Ellsworth Dutton

It is recommended that the SHEBA common data format, which was developed for point source and aircraft observations, be used for data archival. This format will greatly ease the development of the Integrated Data Sets from multiple sources.

10.3.1 Langley DAAC

The LaRC DAAC will serve as the primary Arctic Cloud Experiment Central Archive. The LaRC DAAC is responsible for archiving and distributing NASA science data in the areas of radiation budget, clouds, aerosols, and tropospheric chemistry. It will also archive some of the data sets which result from the EOS program and other elements of Mission to Planet Earth. Appendix H provides details for Langley DAAC data archival.

The DAAC has developed an on-line computer system which allows the user to logon, search through the DAAC's data inventory, choose desired data sets, and place an order. Data may be received either electronically (via FTP) or on media such as 4mm tape, 8mm tape, or CD-ROM (prepackaged datasets only).

Users with an X-Windows terminal (e.g., Motif) or a Sun Open Windows display system with access to Internet, may log onto the system by entering:

```
xhost + eosdis.larc.nasa.gov
(or: xhost + 192.107.191.17)
telnet eosdis.larc.nasa.gov
login name: ims password: larcims
```

At the prompts, enter `x` for the X-Windows interface and then your display name (name of your workstation followed by `":0"` or internet address followed by `":0"`).

Users with access to NCSA Mosaic can use the following URL address:

<http://eosdis.larc.nasa.gov/>

Users without access to a terminal with an X-Windows display system but who have access to Internet may log onto the system by entering:

```
telnet eosdis.larc.nasa.gov
login name: ims password: larcims
```

At the prompt, enter `c` for the character interface and then press return.

Users who cannot access the system or who have questions concerning the Langley DAAC may contact:

Langley DAAC User and Data Services
Mail Stop 157B
NASA Langley Research Center
Hampton, VA 23681-0001

Phone: (757) 864-8656 FAX: (757) 864-8807
e-mail: larc@eos.nasa.gov

For further information on LaRC DAAC contact John Olson at 757-864-8609, olson@magician.larc.nasa.gov.

The LaRC DAAC will provide a centralized data holding and on-line system in order to facilitate easy access to all Arctic Cloud Experiment data by all Arctic Cloud Experiment investigators. Since most of the satellite data are not collected directly by Arctic Cloud Experiment principal investigators, the LaRC DAAC will also be responsible for holding of the satellite data sets required for Arctic Cloud Experiment research from the relevant

satellite operating agencies. The specific data management functions of the Arctic Cloud Experiment Data Archive are:

1. To hold all reduced observations and data analysis products submitted by individual principal investigators or groups of principal investigators upon the request of the Arctic Cloud Experiment Science Team.
2. To hold all satellite data sets required for Arctic Cloud Experiment as specified by the Arctic Cloud Experiment Science Team.
3. To provide, upon request, copies of any data sets to Arctic Cloud Experiment investigators (at minimal cost to investigators).
4. To produce a data ingest request of the complete Arctic Cloud Experiment data holdings of the archive and the individual principal investigators indicating the current analysis status of these data. The data ingest request entries should provide information about the location of the data holding, the instrument(s) performing the observations, the temporal and spatial resolution of the data, and the format of the data.
5. To update the data ingest request every year and to make it available to Arctic Cloud Experiment investigators in both hard copy and electronically (on-line dial-up) form.
6. To restrict access to the data products in the LaRC DAAC to only researchers associated with the Arctic Cloud Experiment project, if so requested by the AST. The at-large scientific community will not then have access to these data sets until they are released.
7. To "release", on an annual basis, certified Arctic Cloud Experiment data from the permanent archive for unrestricted access by the at-large scientific community. The "transfer" process removes the access restraints to the at-large scientific community.
8. To provide for archival of the permanent Arctic Cloud Experiment data in the data archive by producing back-up copies of all data and taking other necessary precautions to ensure the preservation of the data.
9. To publish documentation, such as a Arctic Cloud Experiment Data Archive Users Manual that describes the contents of the Arctic Cloud Experiment Data Archive, data formats, data request information, and other pertinent descriptive material.

10.3.2 Sheba Data Archive

SHEBA instrument data is archived by SHEBA at Boulder. The catalog system is described in later sections. The URL is given in section 9.4.

10.3.3 ARM Data Archive

ARM instrument data is archived at the DOE Oak Ridge National Laboratory DAAC. The URL is included in section 9.4.

10.3.4 NCAR Data Archive

Data from instruments on the C-130 will be archived at NCAR. The data may be accessed at the web site indicated in Table 9.4-1. Data access is through the link for SHEBA-1998. Your attention is called to the link to ATD Policy regarding data distribution at this site page.

10.3.5 NOAA CMDL Data Archive

NOAA CMDL instruments located at Barrow will archive their data at NOAA CMDL Boulder. The data may be accessed at the web site indicated in Table 9.4-1. Data access is through the links “data available by anonymous ftp” and “observatory operations”. Data is available for aerosols, ozone, meteorological, solar and thermal and atmospheric transport measurements.

10.4 Data Products

There are several types of data products that will be acquired, submitted, and archived. These products, which will be obtained from a variety of instruments onboard satellite, airborne, or surface-based platforms during the field experiment, are as follows:

1. Guide/Summary--written information about the data holdings of the individual PI's, including location of the data holdings instrument(s) performing the observations; resolution and area coverage of the data; date, time, and location of the observations; format of the data; and analysis status of these data.
2. Raw data--original observations acquired by the instrument, in instrument units (voltages, etc.).
3. Reduced data--observations converted to the physical quantity directly sensed by the instrument with quality control inspection and removal of bad data.
4. Value-added products--physical quantities derived from the observations, including documentation on the analysis algorithm and any auxiliary data sets used in the analysis.
5. Calibration, quality, and navigation information--describes the conversion to physical units, the conditions of observation and the location of the observation.
6. Instrument documentation and data tape format description.
7. Data for special case studies which have been arranged for intercomparison of multi-platform observations.
8. Data selected for special processing to facilitate model studies.
9. Status and bibliography of Arctic Cloud Experiment publications.

It is requested that preparation of data for the archive consider the minimum data averaging times recommended in Table 10.4-1. These minimum resolutions are driven by the natural variability of the scientific processes being measured. It is requested that the data be

archived at the temporal resolution at which it was originally recorded in the field or at a resolution greater than, but not less than, that given in Table 10.4-1.

Table 10.4-1 Recommended Minimum Archival Data Resolution

Parameter Type	Recommended Minimum Resolution, Hz.
Microphysics	
Radiation	
Chemistry	
Atmospheric State	
Platform state	

The data acquired by the individual experimenters will be reduced to final values and forwarded to the appropriate archive. The format for the submittal of data to the archive must be in ASCII or HDF/netCDF (see Appendix F for the Langley DAAC). In addition, a written description of the readme file or pertinent remarks should be included in the data file or in a separate file to be submitted with the data. The Langley DAAC will assist data producers putting data into HDF.

Transfer of the final data between the investigators and the LaRC DAAC may be accomplished by electronic data transfer using ftp.

Transfer of the data from the data archive to the investigators will be done either physically (using DATs, 9-track tapes or floppy disks) or interactively (via electronic transfer) where such systems are available (http or ftp).

10.5 Data Categories

Each of the data products will be assigned a data "category" by the science team which will reflect its usefulness to subsequent data analysis and whether and when it should be archived. Table 10.5-1 outlines the definition of the five data categories. The Arctic Cloud Experiment Science Team will be responsible for these assignments, coordinated with the responsible PIs.

Table 10.5-1. Definition of Data "Categories"

Category	Definition	Usefulness	Archive?
0	Fundamental Measured Parameter	Quick Look or near real time	No
1	Fundamental measured parameter	Critical	ASAP or 3-6 months
2	Fundamental measured parameter	"A lot of people will use it"	9-18 months
3	Reduced or value-added parameter	Useful	Welcomed; not required
4	Difficult to derive or produce	TBD	No; but if becomes useful, will upgrade to 3

Appendix G lists the data products, the assigned category and the archive.

10.6 Data Management Schedule

The following describes the data management milestones and schedule for the data reduction, analysis, submittal, certification, and release activities for the Arctic Cloud Experiment (see table 10.6-1).

Approximately 3 months after Arctic Cloud Experiment, the experimenters will submit the Guide/Summary and preliminary category-1 data to the appropriate archive.

Approximately 4-6 months after the conclusion of the Arctic Cloud Experiment, a Science Data Workshop-I will be held. The experimenters will describe the performance of their sensors, a sample of the preliminary reduced data, an estimate of the sensor accuracy and precision, and report on key measurement results. The Arctic Cloud Experiment Science Team will review the measurements and analyses obtained to date, determine a priority list of case study days, identify possible collaborative research activities, and discuss future plans. The Arctic Cloud Experiment Science Team will ascertain the data parameters that have been acquired during the experiment, decide on category elements such as reduced, value-added, and investigator-held data, and assign category priorities and data submittal schedules.

Approximately 6 months after Arctic Cloud Experiment, the experimenters will submit the final Guide/Summary and category-1 data information to the appropriate archive.

Approximately 9 months after Arctic Cloud Experiment, the experimenters will submit the preliminary reduced category-2 and category-3 (if desired) data products to the appropriate archive.

Approximately one year after the field experiment, a Science Data Workshop-II will be held to review the key research results. The Arctic Cloud Experiment Science Team will review each of the major scientific objectives in light of the measurements and analyses performed to date, review the status and availability of the data, explore synergistic relationships among the data, actively plan collaborative research activities, and discuss future plans. The Arctic Cloud Experiment Science Team will review the reduced data parameters that have been submitted, review the data category elements and priorities, and recommend possible verification and quality assurance activities.

Approximately 18 months after Arctic Cloud Experiment, the experimenters will submit the final reduced category-2 and category-3 (if desired) data products to the appropriate archive.

Table 10.6-1. Data Management Schedule

	1998	1999	2000
January			
February			
March		Preliminary category-2 and-3 data submitted	
April	Field Experiment		
May	Field Experiment		
June	Field Experiment	Science Data Workshop-II	Science Conference
July	Field Experiment		Data released publically

	1998	1999	2000
August	Field Experiment		
September	Guide/Summary info and preliminary category-1 data submitted		
October			
November			
December	Science Data Workshop-I; Final Guide/Summary and category-1 data submitted	Final category-2 and -3 data submitted	

About 24 months after the field experiment, the Arctic Cloud Experiment Science Conference will be held for the presentation of individual and group science results. This conference may be either a stand alone meeting or possibly held as part of an international science conference. The Arctic Cloud Experiment Science Team will review all data products that have been submitted, review the status of the quality assurance and verification activities, and make recommendations concerning the certification process of the data sets that will eventually be released to the scientific community.

After the certification of the data has been completed (within 6-24 months), the archive will release the data publically. Any proprietary rights (see section 10.2.1) to the data and data interpretation will be voided at this time.

10.7 Data Exchange with SHEBA and ARM

10.7.1 SHEBA Introduction and Background

The Surface Heat Budget of the Arctic Ocean (SHEBA) Project is designed as a multi-agency sponsored, multi-disciplinary project with many investigators and varied instrumentation. An integrated data management activity is central to providing a complete database that is easily accessible to all project investigators and the science community in general. The SHEBA Project Office will be responsible for developing and implementing an integrated data management strategy and coordination amongst data centers. The UCAR Joint Office for Science Support (JOSS) has been funded by the National Science Foundation to work with the SHEBA Project Office (SPO) in the development and implementation of data management plan to support PhaseII SHEBA activities.

JOSS has primary responsibility for the implementation of the data management approach described in this plan. The final objective is a high quality data archive that has easy and timely access by a large community of investigators. This is a large task given the diversity of participation and instrumentation planned for SHEBA. In addition, several other National Data Centers will assist in this project in assuring the availability of this rich dataset. JOSS will perform the following tasks in support of the SHEBA Project:

1. Provision of an on-line catalog at the ice station and on the mainland utilizing the JOSS data management system to provide primary access to summary data and documentation of activities during and following the field season.
2. Access to preliminary datasets and selected operational data using the on-line catalog and CODIAC during and after the 13 month field deployment.

3. Suggest standardized format(s) and guidelines for dataset documentation, status and summary reporting and other important data management procedures as necessary to assure complete documentation of project activities.
4. Assist SPO with planning and coordination of data management activities among other agencies, projects and groups to meet investigator needs at the ice station and on the mainland.
5. Coordinate the transfer of SHEBA datasets to the final archive at the National Snow and Ice Data Center (NSIDC).

JOSS proposes to complete the 5 major tasks noted above during the three year duration of SHEBA Phase 2 support. Specific features of the SHEBA support will include an on-line data catalog for easy data access and project summary generation. The catalog can act as a living archive to permit routine updates throughout the 13 month field phase. Certain SHEBA datasets (as determined by the PIs) will reside on the JOSS CODIAC data management system while allowing users distributed access to other data centers that contain added data important to SHEBA.

10.7.2 SHEBA Data Management Policy

The following data protocols are specified in the SHEBA Science Plan, August 1996, and form the basis of the data management strategies discussed in subsequent sections of this document.

- Ensure open access to all SHEBA datasets. This requires a data management strategy that facilitates data exchange and investigators taking responsibility for making data available in a timely fashion.
- Cooperation/Coordination with several existing data centers. SHEBA will take advantage of several existing data centers to house a variety of datasets to be collected. These include the NSIDC, NCAR, NASA/LaRC/DAAC, ARM/ORNL and UCAR/JOSS.
- Cooperative agreements for unrestricted exchange and access of SHEBA data with related projects will be established. The projects include ARM, FIRE and SCICEX. In addition informal data exchange is expected from several ancillary experiments that are utilizing SHEBA facilities. Every effort will be made to provide access to appropriate data from NOAA, NASA, DOE-ARM, etc. that might be conducting programs in conjunction with or of interest to SHEBA investigators.
- Prompt submission of data. All investigators participating in SHEBA must agree to promptly (within one year of the end of the project) submit data to JOSS or the appropriate data center (see Section 10.7.4) to facilitate the data processing, archival and distribution. Final datasets will be due by 1 October 1999. Datasets must be submitted to the archive in a useable format and with sufficient documentation to allow easy access and understanding by others.
- Complete documentation with all data. Investigators must provide sufficient documentation so that all interested people understand the characteristics and attributes of requested datasets.
- Prompt dissemination of data. JOSS will work with the investigators and SPO to assure that preliminary and final datasets are archived and made available through the JOSS data

management system. JOSS will provide ongoing coordination with other data centers to facilitate access.

- Direct exchange of data among the investigators is encouraged. Authors should offer research collaboration and/or co-authorship for data providers. Investigators are also encouraged to provide a copy of the data and documentation to JOSS so that a complete record is maintained in a single location during the analysis phase and data can be distributed as directed by the PIs.

- SHEBA will use a distributed archive strategy. JOSS will work with the other data centers to establish links for data access.

- Ensure that the SHEBA dataset is comprehensive. The SPO and JOSS will work with the investigators and cooperating programs to ensure access to all datasets relevant to SHEBA.

10.7.3 SHEBA/JOSS Data Management System

Central to the JOSS data management is the on-line, interactive, catalog, archival and distribution system. The on-line catalog capability within this system allows investigators limited perusal and display of preliminary data products during the field phase. The catalog will also provide in-field project summaries (daily or otherwise as required) and summarize collection activities. offers scientists a means to identify datasets of interest, the facilities to view selected data and associated metadata, and the ability to automatically obtain data from geographically dispersed data centers via Internet file transfer (FTP) or separate media (tapes, CD-ROM, disks, etc.). The CODIAC function will be used during and following the field season as the primary access point for SHEBA operational data and for preliminary and final research datasets as they become available. Links will also be provided from CODIAC to other data centers holding cooperative project data and other relevant information to SHEBA research.

The catalog will permit on-line entry (data collection details, metadata, field summary notes, certain operational and research data etc.), data browsing (listings, images) and information distribution to other locations worldwide. Daily operations summaries will be prepared that contain as much information about operations (major instrument systems status and sampling times, satellite overpasses, submarine tracks, aircraft flight times and tracks, etc.) as desired by the investigators. "Standard" ice station meteorological data (see section 4) available as ASCII format listings or simple time series plots will also be made accessible through the catalog. It is also possible for the project scientists to contribute graphics, i.e. plots in GIF, other image formats or Postscript format for retention in the catalog. These plots will then be accessible by all participants at the ice station or on the mainland via Internet. The status of data collection and instrumentation will be updated from the ice station to the mainland using two methods described in Section 10.7.3 below.

One version of the on-line catalog will be operated on the ship by SPO and/or JOSS personnel. An identical catalog will be "mirrored" (identical in form, function and content) the in the mainland. In this way, scientists not at the ice station can monitor project operations, instrument status and special observations of interest to them. For a project lasting 13 months, it will be critical to be able to monitor data collection activities so that sensor repairs and adjustments may be made in a timely fashion. JOSS and the SPO have worked out details to permit limited daily near real time updating of both catalogs using the satellite communications systems aboard ship.

Both catalogs will be completely updated every six weeks to correspond to the transport of a CD-ROM to coincide with logistics aircraft flights. It will include a complete back-up

archive of all catalog input, data received from ARM, Standard Meteorological station data and any PI data received. Once on the mainland, the data will be distributed by JOSS to respective investigators, ARM and the University of Washington. Any products will be made available via the mainland catalog. The shipboard catalog will be updated to contain all special product information collected by JOSS that could not be relayed to the ship by satellite.

The archive portion of the JOSS data management system (CODIAC) that is described in section 10.7.3 above will be available for receipt and redistribution of SHEBA datasets from the first day of the project. It will be possible for PIs to provide preliminary and final datasets along with associated documentation they become available throughout the 13 month field season.

Following the field season CODIAC will be populated with any data provided by the investigators. Data will be searchable by file name and/or data type. The investigators will have complete responsibility for the processing and delivery of their data to the JOSS/SPO within one year of the conclusion of the field phase. As data are received they will be promptly staged as "preliminary" datasets and made available to all SHEBA participants.

Information from the on-line field catalog (data collection summaries, operations reports, instrumentation attributes, graphical products, etc.) obtained during the field season will also be accessible. JOSS intends to keep the catalog available for several years following the end of the field phase as a ready summary of the ice station observations and operations. Links to the other data centers (ARM, NASA, etc.) will be in place as necessary so that users can have access to all SHEBA specific data from a single entry point. It will be possible to make data requests, via World Wide Web (WWW)/Netscape or other interface, and download files via ftp from the catalog or other data center.

10.7.4 SHEBA Coordination with Data Centers and other Agencies

The SHEBA Project will take advantage of existing Data Centers for archival, and in some cases collection, of project specific datasets and important supporting information. The principal sites and their respective roles in SHEBA data management are listed below.

1. The National Snow and Ice Data Center (NSIDC) is the archive for all ARCSS datasets. NSIDC plays a central role in the development and implementation of ARCSS data protocols as well as overall responsibility for the long-term archival of all data collected under the auspices of ARCSS. This includes all SHEBA data after they have been processed and quality controlled.
2. There are three groups within the National Center for Atmospheric Research (NCAR) that will collect, process and archive SHEBA Project datasets. The Research Aviation Facility (RAF) is responsible for all C-130 aircraft data from a standard suite of aircraft instruments and any special systems or facilities (e.g. Lidar) that are used. Investigators are responsible for data collection and processing from instrumentation they bring on board the aircraft for special measurements. The NCAR/SCD Data Support Section (DSS) is the permanent repository for a variety of global model products that will be important to SHEBA analysis. The NCAR/ATD Surface and Sounding Systems Facility is responsible for GPS/CLASS and PAM-III datasets.
3. The Oak Ridge National Laboratory (ORNL) houses the long-term DOE Atmospheric Radiation Measurements Program (ARM) data archive. This archive will house all data collected from ARM instrumentation at the Ice station and/or on the Alaska North Slope

during SHEBA. A memorandum of participation between SHEBA and ARM now exists to assure easy access to these important data by all SHEBA participants.

4. The NASA Langley Research Center (LaRC) Data Analysis and Archive Center (DAAC) archives all data collected during the multi-year First ISCCP Regional Experiment (FIRE). There are plans for a complementary program measurement (NASA aircraft) from FIRE supported investigators during the SHEBA field phase. SHEBA investigators will have access to all FIRE data obtained during the SHEBA experiment. A memorandum of participation between SHEBA and FIRE is now being finalized to assure easy access to these important data by all SHEBA participants.

5. Agreement in principle now exists between the ARM Program and the National Weather Service Office in Fairbanks to provide special weather forecast products for the ice station. SHEBA will work with ARM to make sure this information can be available at the ice station. In return, SHEBA will provide project soundings and other special ice station observations in near real time that might be useful to the NWS.

JOSS proposes to initiate and maintain coordination activities with these Centers to assure completeness in the data management activities and to avoid duplication of effort. We have already begun working with NSIDC on various aspects of the SHEBA data management process as it fits within the larger context of ARCSS. It is important that any specific plans for SHEBA be compatible with ongoing NSIDC responsibilities as the ARCSS DCC. NSIDC is now the location for accessing historical data that will be useful in the conduct of preliminary studies in preparation for the field phase. JOSS intends to be responsive to specific research and data access needs of the SHEBA community that go beyond NSIDC responsibilities during and after the field phase. This could include use of CODIAC for certain types of special data (composite datasets) or arrangements for data exchange with other data centers. The data perusal and distributed data system capabilities of CODIAC will be very important. All final SHEBA datasets will reside at NSIDC for long-term archival and access.

10.7.5 ARM Data

The ARM instruments automatically collect data on surface and atmospheric properties, and the information is routinely provided to the Site Data System. This system is linked by high speed communications to the ARM Experiment Center at the Pacific Northwest National Laboratory and the ARM Data Archive at the Oak Ridge National Laboratory. The External Data Center, located at Brookhaven National Laboratory, acquires additional data from other sources, such as National Weather Service satellite and surface data. The Experiment Center processes these data in near real time and provides tailored data packages to ARM Science Team members. Most of the ARM data are distributed in netCDF format. The FAN utility provides a high-level interface and runs on most Unix platforms.

Data may be ordered from the ARM Archive in one of two ways:

1. World Wide Web Interface
2. Send e-mail to Arm Archive User Services or call (423) 241-4851

Much of these data are in either the netCDF or the HDF format.

The ARM Experiment Center has also announced the availability of a new toll-free ARM Information hotline: 1-888-ARM-DATA (1-888-276-3282).

This toll-free phone line has been established to provide a single phone number for ARM Scientists to contact the ARM infrastructure. The phone is staffed Monday through Friday from 8:00 AM - 8:00 PM (Eastern) to receive requests for:

- ARM data
- Changes to existing Experiment Operations Plans
- Specific data quality/availability information
- General ARM information

Do not hesitate to call with any questions or problems being experienced. While answers to questions may not be immediately available, every effort will be made to identify someone who can provide the answer. The ARM goal is to continually increase the scientific utility of the ARM data and is always grateful for suggestions for improvement.

ARM may also be contacted at info@arm.gov, if email communication is preferred.

11.0 LOGISTICS

It is assumed that the NASA ER-2, NCAR C-130, UW CV-580, and Can CV-580 and their respective scientists will be responsible for any logistic or infrastructure need not described in the following sections. This includes interacting with local organizations as necessary to successfully accomplish the mission objectives.

Appendix I gives an overview of Alaska in general and Fairbanks and Barrow in particular.

11.1 Time Definition

All times referred to in this document and subsequently for flight planning are local (L) time. Investigators, however, should record their data times as Universal Time Coordinated (UTC). Table 11.1-1 gives the time differences between UTC and key locations.

Table 11.1-1 Time Differences

Location	UTC
Greenwich	0
EDT (Washington, DC; Hampton, VA)	-4
PDT (Seattle, WA)	-7
ADT (Fairbanks, Barrow, SHEBA Ice Station)	-8

Note: The above table reflects Daylight Savings Time which begins April 5, 1998. When not on Daylight Savings Time, the above table would show -5, -8 and -9.

11.2 Shipping

NASA Ames, NCAR, University of Washington, and AES will be responsible for the shipping of their support equipment and supplies for the NASA ER-2, NCAR C-130, UW C-580, and AES C-580 respectively, including equipment required by the aircraft researchers.

All PI's are responsible for shipping their own supplies and equipment to Alaska. Investigators who plan to ship equipment to the SHEBA ice station should contact the SHEBA Project Office, University of Washington (Dick Moritz, Director), for shipping information, requirements, and schedules. The SHEBA Project Office maintains a home page on the Internet web (see section 9.4) that provides important information about logistics, data management and distribution, and coordination between programs such as SHEBA, ARM, FIRE, RGPS and SCICEX.

Items shipped to Fairbanks may be addressed to:

NASA FIRE Arctic Project
For: (PI or Group Name)
Bldg. 2106
Montgomery Road Hanger 4/5
Fort Wainwright, AK 99703
Attn: TBD

907-353-xxxx

Personnel have recently been moved from the hangar and there currently is not a designated person to receive shipments. During the April 1 site visit an attempt will be made to identify a person with a phone number who can receive shipments. The plan will be to receive your shipments, insure their security and have them in the hangar when you arrive.

"Overnight" shipping services to and from Fairbanks and Barrow are available using standard commercial carriers, such as Federal Express, UPS, etc. Service generally requires two days for shipments to and from Barrow. Air freight is also available but space may be limited on certain flights and days, especially to Barrow.

The return shipping to the home institution is also a PI responsibility, including crating and the completion of shipping forms.

11.3 Travel Arrangements

All participants are expected to make their own travel arrangements, including hotel accommodations and car rentals.

There is daily jet service to Fairbanks and Barrow. However, commercial air is the only viable way to get to Barrow. Alaska Airlines is currently the only commercial carrier that serves Barrow, with two to four arrivals each day. These flights originate in Anchorage and Fairbanks. Be prepared for the weather because passengers must board and deplane outside.

Hotel space in Fairbanks may be a concern due to the heavy bookings by the cruise tour companies. A block of rooms has been reserved under the name "FIRE Arctic" for the period of May 1 - June 10, 1998 at the Wedgewood Resort, 212 Wedgewood Drive, 1-800-528-4916 (<http://www.mosquitonet.com/~fountain/>). **Participants are responsible for arranging their own reservations.** After December 1, all unreserved rooms will be released. All Arctic participants who plan to utilize this block are strongly urged to make their reservations as soon as possible before December 1. After this date, rates cannot be guaranteed and rooms may not be available.

The room rate is \$60.00 per night for the period of May 1 - 15. Due to the start of the summer season, the rate increases to \$100.00 per night starting May 16th. Tax of 8% will be added to this for stays less than 22 days. For stays of 22 days or more, there is no tax. Although per diem rates for Alaska are revised several times a year, we expect these room rates to fall within the per diem amount for the area.

Rental cars are available from several commercial companies in Fairbanks. In Barrow, they are available through Jon's Car Rental or Dunbar's Car Rental. The rates in both locations are considered expensive relative to continental U.S. rates.

11.4 Facilities

Figure 11.4-1 and 11.4-2 are maps of Fairbanks which show the locations of Fort Wainwright, National Weather Service (NWS), Geophysical Institute (GI), University of Alaska, Alaska Synthetic Aperture Radar Facility (ASF), the Wedgewood Resort and Sophie Station Hotel.

The NWS, located at 101 12th Avenue, will be the principal source of meteorological products and forecasting information. It is located close to Fort Wainwright.

The GI may be able to provide office and laboratory support, including computer access, if requested. It is located on the main campus of the University of Alaska. Appendix O contains the Memorandum of Agreement between the U. AK and NASA.

The ASF's main office is located on 590 University Avenue. The data access, processing, and data facilities are located at the GI. ASF will be the source of radar images of the sea ice and leads.

The NASA ER-2 and NCAR C-130 aircraft will be based at Fort Wainwright. The ER-2 will be housed in Hangar 4. The C-130 will be parked on the tarmac in front of the hangar. The UW CV-580 and the Canadian CV-580 will also be parked on the tarmac in front of the hangar when they are in Fairbanks. Appendix N contains the Memorandum of Agreement between the U.S. Army and NASA.

The ER-2 and C-130 personnel and the project operations staff will be located in Hangar 4 (figure 11.4-3). Table 11.4-1 outlines the expected distribution of office equipment which will be provided by the FIRE Project Office.

Table 11.4-1 - Distribution of Office Equipment

Group Name		Desks	Tables	Chairs	Phones	Computer	Cellular	Fax
						ports	Phones	Mach.
Ft. Wainwright Hangar 4								
<u>NCAR C-130:</u>								
PM, APM, S/W Engr.	3	3	1	3	2	4	1	1
Tech & Engr Planning	4	2	2 2	4 5	1	2		
Mech & Pilots AIMR etc.	5 2	2 2		5 3	1 1	1 2		
Curry et al. CPI	3 3	2 2		3 3	1 1	3 1		
RAMS CCN	2 1	2/0 2	0/2	2 1	1 1	1 1		
Cloudescope CFD	1 1	1 1		1 1	1 1	1 1		
subtotal	25	19	8	31	11	17	1	1
<u>NASA ER-2:</u>								
Operations Maintenance	3 6	2/0 1/0	2/4 5/6	3 8	3 1	1 1	1 1	1
PIs MAS	2	3		4	1	1	1	
SHIS SSFR	6 2	6 3		6 4	4 1	6 1		
CLS MIR	2 2	1 1	1 1	2 2	1 1	1 4		
AMPR AirMISR	3 4	4 4		4 4	1 1	4 1		
subtotal	30	25	9	37	14	20	3	1
Satellite, Surface, Modeling Scientists	4	4		4	4	4		

Group Name		Desks	Tables	Chairs	Phones	Computer	Cellular	Fax
						ports	Phones	Mach.
Web Site	2	2	2	3	2	4		
LMS	1	4		6	1	1	1	
FPO	5	6		8	4	4	1	1
Conference Room (Wylie & Minnis)	4	4/2	2/4	68	4	6		
UWash CV-580								
Canadian CV-580								
subtotal	16	20	4	89	15	19	2	1
Total	71	64	21	157	40	56	6	3
-								
UAF-GI	1	1		2	1	1		
Mission Planning								
NSBF	20				9	13		

##/# indicates tables can be substituted for desks; totals assume no tables substituted for desks

11.5 On-Site Project Office Support

The on-site FIRE Project Office will provide logistic and administrative support to mission participants in Fairbanks. Additional support will include, but will not be limited to, the following:

- Procurement of supplies associated with the Fairbanks Operations Center
- Assistance in preparation of daily mission summaries and daily reports
- Dissemination of information including notices and schedule changes
- Administration of the Project message center
- Coordination with hotels
- Assistance with travel changes
- Maintenance of personnel rosters

In addition, a fax machine and a copier will be located in the Project Office for use by all mission participants.

The FIRE Project will provide administrative support with a computer configured as follows:

- Macintosh System 7.1
- Word Processing (Word version 6.0)
- Spreadsheet (Excel version 5.0)
- Netscape 3.0
- Floppy (3.5" inch) disk; 2 mb
- Jazz drive
- Scanner; flat bed
- E-mail; Eudora 2.0.1

- Local area network
- Also able to read PC files. Can read and edit files in WordPerfect 5.x for Windows and Word 2.x for Windows.

Since much of the administrative support will involve receiving schedule, daily report, web page, etc. inputs from many different participants and merging them into a compatible format, it is requested that every effort be made to configure your computers to provide input compatible with the above capabilities. If you are unsure whether your computer's output is compatible, please contact Roy Chesson. With adequate lead time, it may be possible to expand the capability of the FIRE Project computer.

11.6 Fort Wainwright and U. AK-GI Support

Ft. Wainwright has agreed to provide certain expendibles and other normally-available base support as requested at cost to the user. This includes liquid oxygen and nitrogen; fuel for planes; APUs; and access to mechanical, electronic, etc. emergency repair facilities.

The University of Alaska-Geophysical Institute has agreed to provide selected support on an as-needed and cost-reimbursement basis. This includes access to electronic and machine shops for emergency instrument repair; special gases, electronics and chemicals, and office space and furnishings.

Roy Chesson, the FIRE Project Logistics Coordinator, will be the liaison between all Arctic Cloud Experiment personnel and Fort Wainwright and/or U. AK-GI for this support and will coordinate both the arrangements and the payment. **Persons needing such support should contact him first.**

11.7 Medical Considerations

Persons with medical conditions who may require unexpected assistance during field operations are requested to inform the Operations Manager of appropriate actions, should the need for assistance arise.

11.8 Insurance Considerations

Participants should be aware that NASA does not provide any life or health insurance for personnel involved in field experiments. Individuals who intend to fly on board the NCAR C-130, UW CV-580, or Canadian CV-580 may want to determine if their present policies cover flights on these aircraft during field experiments.

11.9 Alcohol Restrictions

Until recently, Barrow had been a dry village, meaning that the sale, importation, and possession of alcohol, even for personal consumption, was banned in the community. Although these restrictions were lifted by referendum on November 1, 1997, problems in the community as a result of this change are already evident and could lead to reinstatement of the earlier restrictions. Travelers to Barrow should be aware of the current laws prior to bringing any alcohol into the town. The legal drinking age in Alaska is 21.

Figure 11.4-1 - Location of Key Facilities at Fairbanks (West)

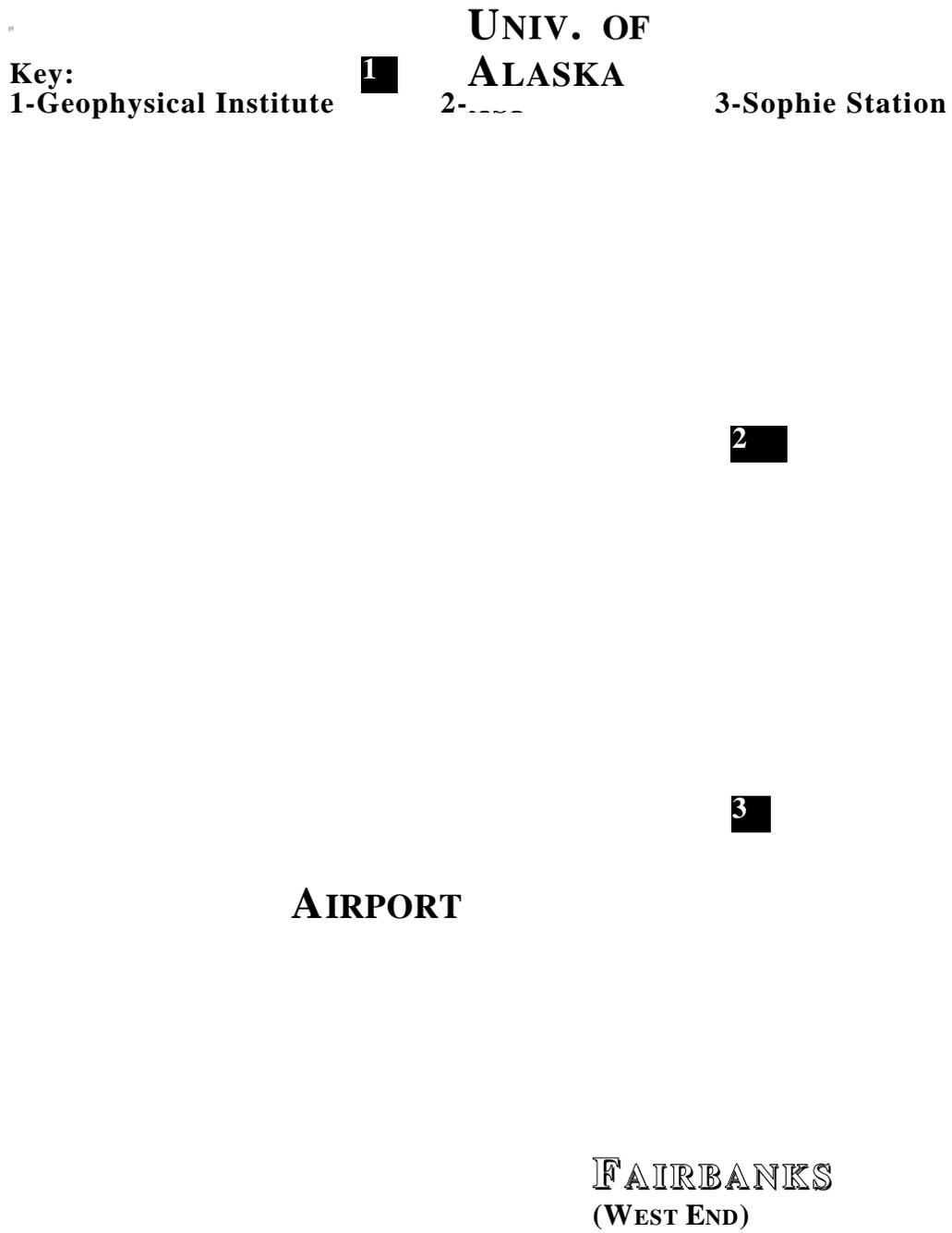


Figure 11.4-2 - Location of Key Facilities at Fairbanks (East)

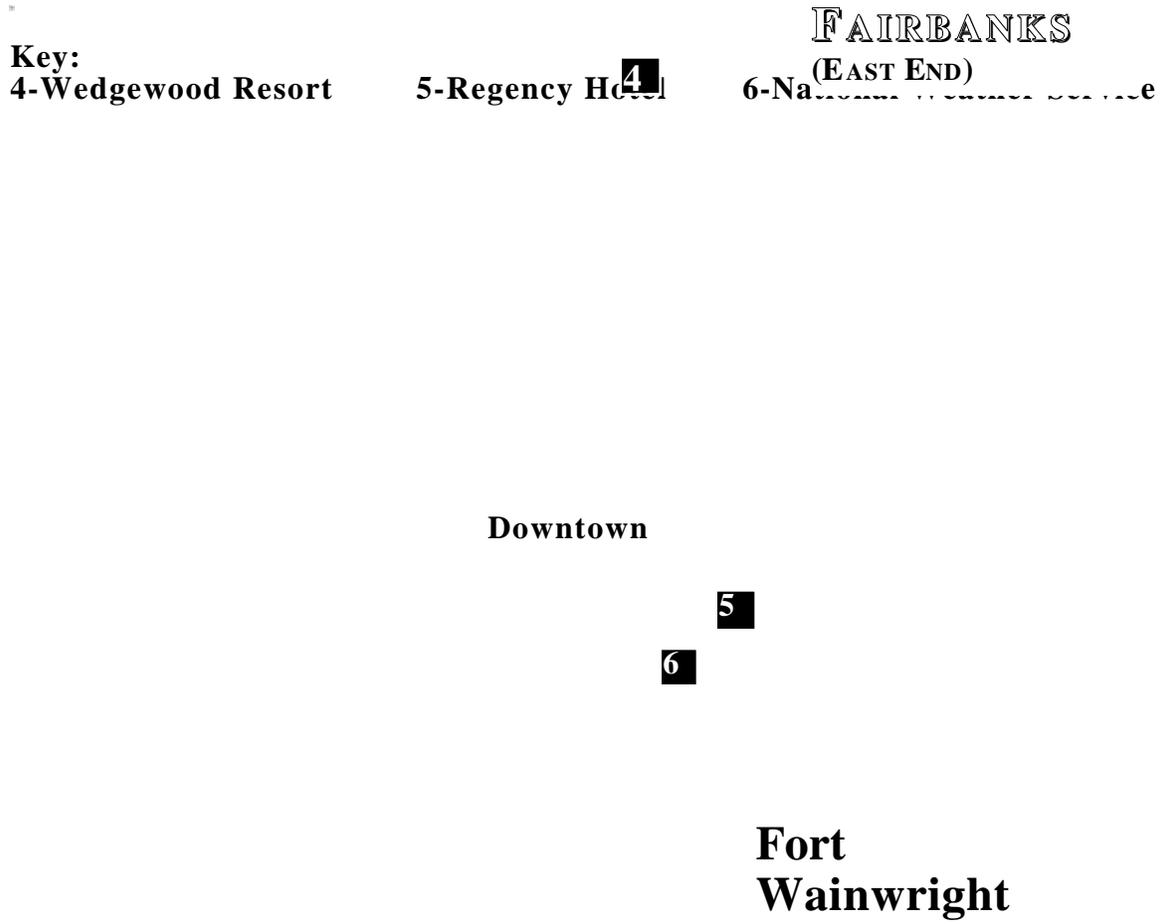


Figure 11.4-3 - Ft. Wainwright Facilities Location Map

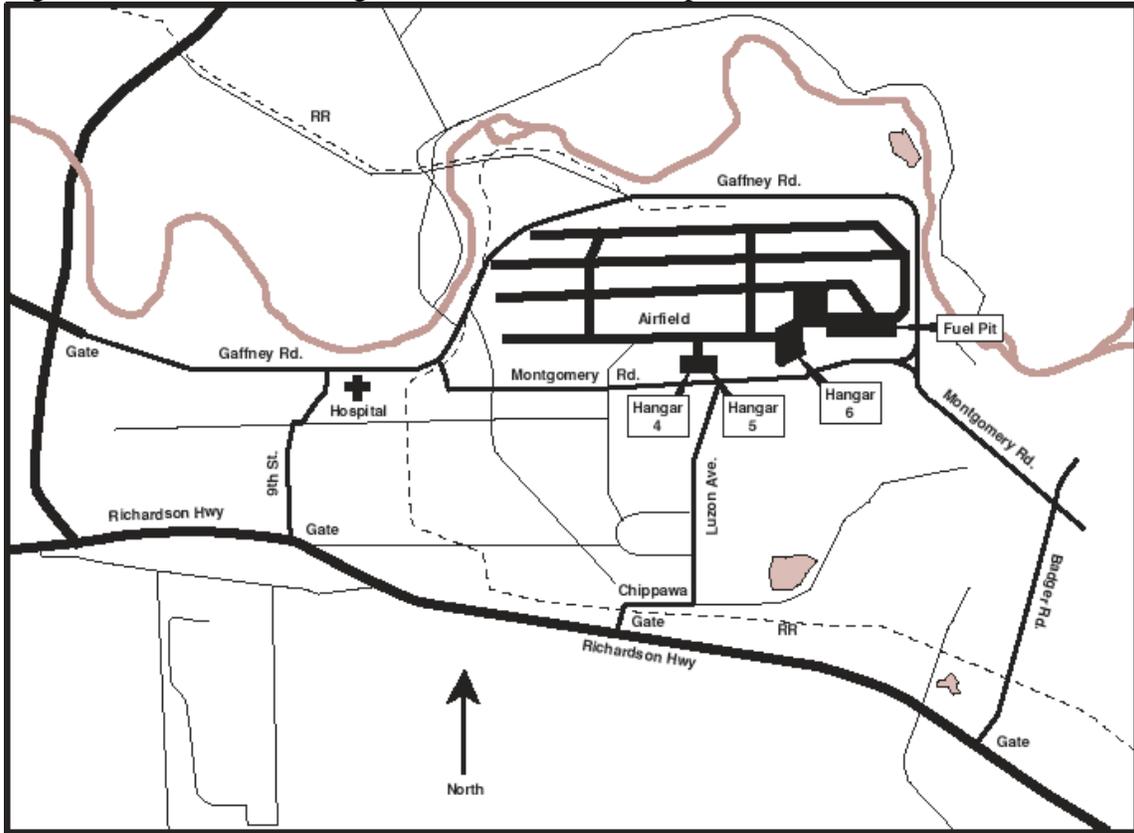
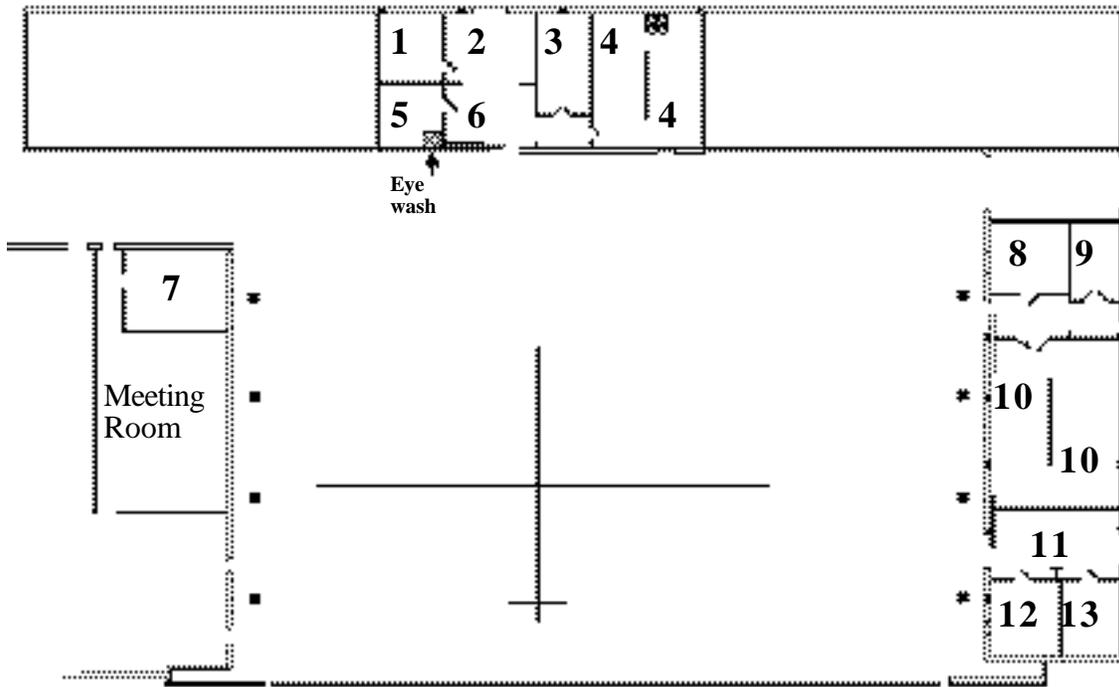


Figure 11.4-4 - Location of ER-2, C-130 and Project Operations Facilities In Hangar



Hangar 4 (Bldg 2106) Fort Wainwright, Alaska

■ steel beam

- | | |
|---|---|
| 1 Project Office (200 ft ²) | 7 ER-2 Operations (450 ft ²) |
| 2 SAIC Office (300 ft ²) | 8 C-130 Operations (340 ft ²) |
| 3 Lead Mission Scientist and
Daily Mission Scientist (300 ft ²) | 9 C-130 Operations (220 ft ²) |
| 4 Satellite, Modeling, and Surface Scientists,
Web server, etc. (660 ft ²) | 10 C-130 PI's (1250 ft ²) |
| 5 ER-2 suit room (200 ft ²) | 11 MAS, SHIS, SSFR (500 ft ²) |
| 6 Meteorology and Overflow space (300 ft ²) | 12 CLS, MIR (280 ft ²) |
| | 13 AMPR, AirMISR (280 ft ²) |

Meteorology Office located inside the Meeting Room

11.10 Site Locations

The approximate latitude and longitude for the operational sites is presented in Table 11.10-1. The location of the SHEBA ice camp/ship varies with time and is currently given in SHEBA homepage material(see section 9.4 for the URL)(See figure 1.4-3 for prior movement history).

Table 11.10-1. Operational Site Locations

Site	North Latitude, Deg.	West Longitude, Deg.
Fairbanks	64.8	147.7
SHEBA ship*	75.3	142.7
Barrow-ARM	71.323	156.609
Inuvik	68.3	133.7
Prudhoe Bay	70.3	148.4

* location changes over time; starting point given

11.11 Public Relations

A press release will be prepared by the NASA Project Manager and released at the appropriate time.

The Arctic Cloud Experiment will generate a great deal of interest with the local news media. The Project Manager, or his designee, will be the official spokesman for purpose, plans, and objectives of this experiment. Information on an individual investigation is the PI's responsibility. Any written material with reference to this experiment must be coordinated with the Project Manager before release to any news media.

A press briefing will be scheduled at the Fairbanks Operations Center on or about May 14, 1998, the day before the NASA ER-2 and UW C-580 Operations begin. The briefing, which will begin immediately following the initial Mission Planning meeting, will be open to the media. Representatives of the aircraft and instrumentation are asked to be present to answer specific questions about their instruments, as well as allow for touring of their respective equipment. An informal open house for invited guests may follow.

We may receive additional requests from the local news media, government officials, or local scientists to tour the aircraft, see the instrumentation, and interview program, project and science personnel during the Arctic Cloud Experiment operations. Such tours and interviews should be arranged through the Project Manager, who will contact the appropriate personnel. PIs may be asked to have a knowledgeable person on board the aircraft as the spokesman for his experiment. Nominally, such individual tours will be scheduled with at least 24 hours notice and with minimum impact on the experiment. These individual tours will not be scheduled until 10 days after the open house has been held.

11.12 Personnel Access to Facilities

Fort Wainwright:

Fort Wainwright is an open installation with generally no security checks or guards at the gates. No badges are required. The Army does require, however, that the FIRE Project Office provide to Base Security a list of all FIRE/SHEBA personnel who will be on base at

any time during the field mission. Mission participants who are not US citizens are restricted to Hangars 4 and 6.

To accomplish this, all participants, regardless of nationality, must complete and return the Mission Registration Form which was sent via e-mail to the FIRE community in February. Anyone not receiving a form should send the following information to the SAIC FIRE Project Office(e.n.harper@larc.nasa.gov) no later than March 15.

Full Name
Organization
Place of Birth
Citizenship
Fairbanks arrival and departure dates

During your times on base, please keep in mind that all gates but the Main Gate on Airport Way/Gaffney Road, close at 10 p.m. every night and reopen at approximately 5 a.m. in the morning. The Main Gate is open 24 hours a day and no entry check is provided, except after 10 p.m., when Military Police provide such a check. Also, please be aware that a nightly security check is performed at the buildings on-base and personnel on-base should have their names on the FIRE/SHEBA roster in order to insure minimal problems.

University of Alaska-Geophysical Institute:

There are no security or citizenship restrictions for entry. However, we are obligated to provide a list of people who will be coming into the Geophysical Institute. We will provide this list at the first of May based upon who we think may need entry. The memo will be posted on the bulletin board in Hangar Four's conference Room. Please inform Roy Chesson or Erika Harper if you need access to the GI and your name is not on the list.

Keys can be obtained by those people who require frequent after hours access to the GI. A refundable \$20 deposit may be required. See Roy Chesson or Erika Harper for details.

Parking is at a premium at the GI. Contact Roy Chesson or Erika Harper several days in advance about getting no-charge parking permits which will be specific to only your car and will prevent nasty parking tickets.

National Weather Service:

There are no security or citizenship limitations on entry. A key-card is required for entry into the NBS building. Notify Don Wylie of your need/desire to visit the NWS and he will arrange to get you a key-card.

Dryden Flight Research Center

Because ER-2 operations occur on the Air Force side of the Edwards Air Force Base, it will be necessary for foreign nationals associated with the ER-2 instruments to be escorted by the instrument PI at all times while on the base.

11.13 Personnel Rosters

The Project Office has been requested to maintain a roster of where all participants are located at all times while in the field. You are requested to notify the Project Office in Fairbanks of your plans as they change. Form U in Appendix K should be used to

indicate your initial plans. All people who are participating in the FIRE Arctic Cloud Field Mission are asked to complete the registration form.

With this information, we can provide the required security lists for both Ft. Wainwright and the Geophysical Institute. Additionally, we will use this information when arranging desks, telephone lines, and computer drops in the Ft. Wainwright hangar and to develop a roster of personnel locations.

Groups participating in both Phase 1 and Phase 2 should provide information for both phases, as indicated. Exact dates are not important; please give us your best estimate now and call or e-mail changes later.

This form was sent only to personnel listed in the directory (Appendix J) of the Arctic Cloud Experiment Operations Plan. **PRIMARY INVESTIGATORS AND THOSE WHO WILL BRING OTHERS WITH THEM ARE TO PROVIDE THIS INFORMATION FOR EACH MEMBER OF THEIR TEAM.**

Please return this information to the SAIC FIRE Project Office at r.w.chesson@larc.nasa.gov or fax it to 757-825-4968 no later than March 15.