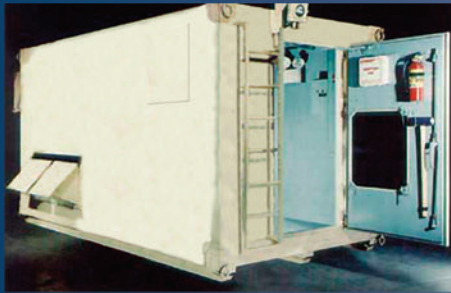




The U.S. Department of Energy ACRF Management Plan



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Atmospheric Radiation Measurement Climate Research Facility Management Plan

1.0 Mission

Mission Statement for the U.S. Department of Energy's Atmospheric Radiation Measurement (ARM) Climate Research Facility

The U.S. Department of Energy's (DOE's) ARM Climate Research Facility (ACRF) has been designated a national user facility for the purpose of providing this unique asset for the study of global climate change to the broader national and international research community. Research at this facility will include the study of alterations in climate, land productivity, oceans or other water resources, atmospheric chemistry, and ecological systems that may alter the capacity of the earth to sustain life. Global change research also includes study, monitoring, assessment, prediction, and information management activities to describe and understand: the interactive physical, chemical, and biological processes that regulate the total earth system; the unique environment that the earth provides for life; changes that are occurring in the earth system; and the manner in which such system, environment, and changes are influenced by human actions.

2.0 Background

Over the last few decades, the U.S. Government has invested billions of dollars to develop the infrastructure to improve the Nation's ability to stay at the forefront of science and technology research. As part of this investment, DOE has established several major research facilities for use by the scientific community for studying the interactions between energy use and the environment. The U.S. Global Change Research Act of 1990 established an interagency program within the Executive Office of the President to coordinate U.S. agency-sponsored scientific research designed to monitor, understand, and predict changes in the global environment. At that time, it was determined that the highest priority area for new research was to develop an improved understanding of how clouds affect the radiation balance of the atmosphere (e.g., incoming solar radiation and outgoing infrared radiation or heat energy) and hence influence the earth's climate.

To address the need for new research on clouds and radiation, DOE established the ARM Program. Since 1990, the ARM Program has supported a combination of field measurements and modeling studies designed to improve the representation of clouds in understanding and predicting changes in the earth's climate. Through the ARM Program, DOE has funded the development of several highly instrumented ground stations for studying cloud formation processes and their influence on radiative transfer and for measuring other parameters that

determine the radiative properties of the atmosphere. These stations also provide enhanced sites for periodic airborne and remote sensing studies and complement atmospheric observations made by satellite.

The scientific infrastructure that has been created as part of the ARM Program is a valuable national and international asset for advancing scientific knowledge of earth systems. In fiscal year 2003, DOE designated the ARM sites as a national scientific user facility. The fiscal year 2004 budget included an increment for enhancing the sites to provide more research capability for the global scientific community. The budget increment provides the resources to build and expand on the existing infrastructure to broaden the scientific scope of the sites and to support a larger user base. The enhanced infrastructure will eventually include improved physical facilities as well as new and enhanced scientific capabilities. The resulting new ACRF has enormous potential to contribute to a wide range of interdisciplinary science in areas such as meteorology, atmospheric aerosols, hydrology, biogeochemical cycling, and satellite validation, and to provide potential monitoring sites where remote sensing and modeling related to homeland security can be validated.

The existing infrastructure of the ACRF continues to serve the ARM Program as its top priority. Because the basic infrastructure needed to address management of a user facility is already in place, the changes that need to be made to ensure a broader use are minimal. In developing a management concept for the user facility, the existing ARM management structure is being expanded and modified to ensure support for the broader scientific community.

The ACRF supports routine as well as new intensive operational periods (IOPs), new long-term measurement systems, new instrument testing and validation, new scientific algorithm development for adding value to instrument data, and enhanced data access. The requirements for these services are developed in cooperation with representatives of the non-ARM climate (or appropriately related) research community. While the ACRF does not provide direct funding for scientific research, small amounts of funding may be provided to allow the facility to assist with logistics, the development of data streams and archiving, and other activities associated with the facility usage.

3.0 ACRF Oversight

Oversight of the ACRF is provided by the DOE ARM Program Manager and, through that office, the Biological and Environmental Research Advisory Committee, a committee of scientists nominated to review programs of DOE's Office of Biological and Environmental Research. In addition, DOE has appointed an ACRF Science Board, a group of leading scientists, to recommend priorities for increasing the utility of the ACRF. Recommendations for future development of the facility are developed annually by the ACRF Infrastructure Management Board (IMB) and include input from the ACRF Science Board. These

recommendations are presented to the DOE Program Manager for consideration and potential inclusion in budget and spending plans.

3.1 ACRF Science Board

The objective of the ACRF Science Board is to ensure that the best quality science is conducted at the ACRF. The goal of the ACRF is to serve scientific researchers by providing unique data and tools to facilitate scientific applications for improving understanding of climate science.

The function of the ACRF Science Board is to review proposals requesting the use of ACRF. These proposals may be submitted by the ARM Science Team or by any other interested users of the facility, including the U.S. government agencies engaged in scientific research, colleges and universities, and other interested international scientific and educational bodies. The Science Board coordinates with the ACRF IMB to assess the availability and resource requirements of the proposed facility usage. The ACRF Science Board considers facility usage proposals in a timely manner to assist the scientific investigators with their proposals for funding from their prospective funding agencies.

The ACRF Science Board consists of eleven members. The Board is chaired by a respected scientist in the field of climate science or a related science who is appointed by the DOE Program Manager. In addition to the Chair, the Science Board includes five members from the ARM Science Team Executive Committee who represent the interests of the ARM Program and five members who represent the interests of the broader scientific community. One of the members from the latter group represents the DOE Atmospheric Science Program. The DOE Program Manager approves Board membership. Board business is conducted mostly by email correspondence, but the Board meets formally on an annual basis. Board correspondence and meetings are facilitated by the ACRF Science Liaison. Significant access requests may be deferred for consideration at the annual meeting. The Science Board Charter can be found in Appendix A.

3.2 ACRF Reporting Requirements

As a matter of government policy, all DOE user facilities, including the ACRF, have several reporting requirements. The ACRF is required to report to the DOE Program Manager, to the DOE's Office of Biological and Environmental Research, and to the White House Office of Management and Budget. A primary requirement for the ACRF is the documentation of users. Users for this purpose are defined as visitors to any of the ACRF sites. The category of users also includes data users at the Archive or any of the local site data systems. In addition, a separate accounting is documented of users who log into the ACRF Education Program site.

The main performance measure for site operations is the data availability for each instrument at each site. The Operations Manager is responsible for keeping the instruments operating as continuously as possible and keeping the data flowing to the Archive, where the data and metadata are eventually made available to users. The Data Quality Office is responsible for data usability, making sure that the data are of known and reasonable quality. The Data Quality Office routinely provides rigorous data quality checks and reports problems to the Operations Manager. These problems are resolved as quickly as possible and the causes and solutions to the problems are documented to help prevent any future data loss. The Archive is the repository of all ACRF data and all user facility data. The Archive Manager is responsible for user data accessibility. The ACRF Communications Program reports on the development and growth of new and existing facility users.

4.0 ACRF Locations and Instruments

The ACRF permanent research sites represent three different climatic regimes: (1) the Southern Great Plains (SGP), (2) North Slope of Alaska (NSA), and (3) Tropical Western Pacific (TWP). Respectively, these sites address a range of climatic conditions: (1) variable mid-latitude climate conditions, (2) land and land-sea-ice arctic climate, and (3) the tropical warm pool in the western Pacific Ocean. In addition, an ARM Mobile Facility (AMF) is being developed for short-term deployment (approximately 1 year) at future sites to be determined by the ACRF Science Board. The locations of the ACRF permanent research sites are shown in Figure 1. Details on the specific nature of each site and the instrumentation at each can be found on the ARM website at <http://www.arm.gov/instruments/>.



Figure 1. Locations of ARM Fixed Sites.

4.1 Southern Great Plains

The SGP site consists of in situ and remote-sensing instrument clusters arrayed across approximately 55,000 square miles (143,000 square kilometers) in north-central Oklahoma and south-central Kansas. The SGP site is the largest and most extensive climate research field site in the world and can be viewed as a real observatory. The site includes a central facility with extensive core instrumentation. Routinely operating instruments at the central facility include the only continuously operated Raman lidars in existence; a millimeter wavelength cloud radar (MMCR), micropulse lidar (MPL), microwave radiometer (MWR), and multiple radar wind profilers. These remote sensors are augmented by state-of-the-art surface radiation measurements, balloon-borne atmospheric profiling, and dutiful surface latent and sensible heat flux measurements. Additional subsets of instrumentation are situated at more than 30 locations distributed across the SGP site. In addition to the study of clouds and radiation, scientific activity ongoing at the SGP site includes studies of the carbon, water and energy cycles at the landscape scale and aerosols. Because the SGP site contains one of the largest collections of ground-based remote sensors and continuous measurements for atmospheric research in the world, it is an ideal site for major collaborative field projects.

4.2 North Slope of Alaska

The NSA site consists of a primary facility at Barrow, Alaska, which includes a subset of the instruments at the SGP central facility; and a second, but more sparsely instrumented facility at Atkasuk, 50 km inland from Barrow. Routinely operating instruments include an MMCR, MPL, several radiometers, and other instruments for atmospheric profiling and measurements of surface meteorology. Data from these instruments are being used to understand cloud processes in the arctic and to refine models and parameterizations as they relate to arctic climate. The NSA site provides a test bed for studies of climate change at high latitudes. In this region, ice (including snow) is the predominant form of condensed water most of the year, both in the air and on the surface. Ice and snow scatter, transmit, and absorb sunlight and radiant heat much differently than water. There is very little water vapor in the atmosphere, changing the impact of the atmosphere on the propagation of radiant energy, particularly radiant energy propagating upwards from the surface, and on the performance of some atmospheric remote sensing instruments. The major “pumps” for the global ocean currents are at high latitudes, and there is good reason to believe that those pumps will be affected by climate-related changes in the atmosphere. High latitude atmospheric processes over both land and sea must be characterized for incorporation into global climate models.

4.3 Tropical Western Pacific

The TWP site includes an area at the equator near Indonesia. The TWP site consists of facilities at Manus Island in Papua New Guinea, the island Republic of Nauru, and Darwin, Australia. Data are transmitted continuously from each site by satellite relay for distribution and archival.

Instruments at each of the TWP facilities include an MMCR, MPL, several radiometers, and other instruments for atmospheric profiling and measurements of surface meteorology. This region of the world plays a large role in the inter-annual variability observed in the global climate system. For instance, the El Niño/Southern Oscillation phenomenon has far reaching implications for weather patterns over much of the Northern Hemisphere, and perhaps the entire planet. The TWP consistently has the warmest sea surface temperatures on the planet and is referred to as the Pacific “warm pool.” The warm pool supplies heat and moisture to the atmosphere above it, resulting in the formation of deep convective cloud systems, which in turn, produce high-altitude cirrus clouds that spread out over much of the region.

4.4 ARM Mobile Facility

The AMF is a new capability planned for initial deployment in 2004-2005. The AMF is comprised of a subset of the instrumentation operated at the permanent ARM sites, including an MMCR, MPL, and profiling MWR. The AMF is being developed for 6- to 12-month deployments in different climate regimes. Proposed deployment sites will be recommended by the ACRF Science Board based on an evaluation of the scientific and collaborative opportunities as well as projected demands on available resources.

4.5 Unmanned Aerospace Vehicle

A related DOE program manages use of an unmanned aerospace vehicle (UAV). The DOE-UAV Program was initiated to demonstrate the utility of UAVs for atmospheric research and to foster the development of instruments and measurement techniques suitable for use on UAVs as part of the larger DOE objective of improved understanding of the role of clouds in global climate change. The long-term UAV goal of taking measurements at the top of the troposphere in the tropics resulted in the requirement for a long endurance UAV capable of carrying an instrumented payload to altitudes above 60,000 feet.

5.0 ACRF Management Structure

The ACRF is being built on the foundation of user activity already ongoing at the ARM sites. Since 1992, the use of ARM facilities has been dominated by ARM or ARM-related activity, but with clearly distinguishable groups of collaborators (users) loosely related to ARM or not at all. The current ARM management structure has been able to routinely accommodate this activity. The new ACRF management structure (see Figure 2) is built on the existing ARM infrastructure management and modifications designed to broaden the group’s focus to the larger scope of the user facility.

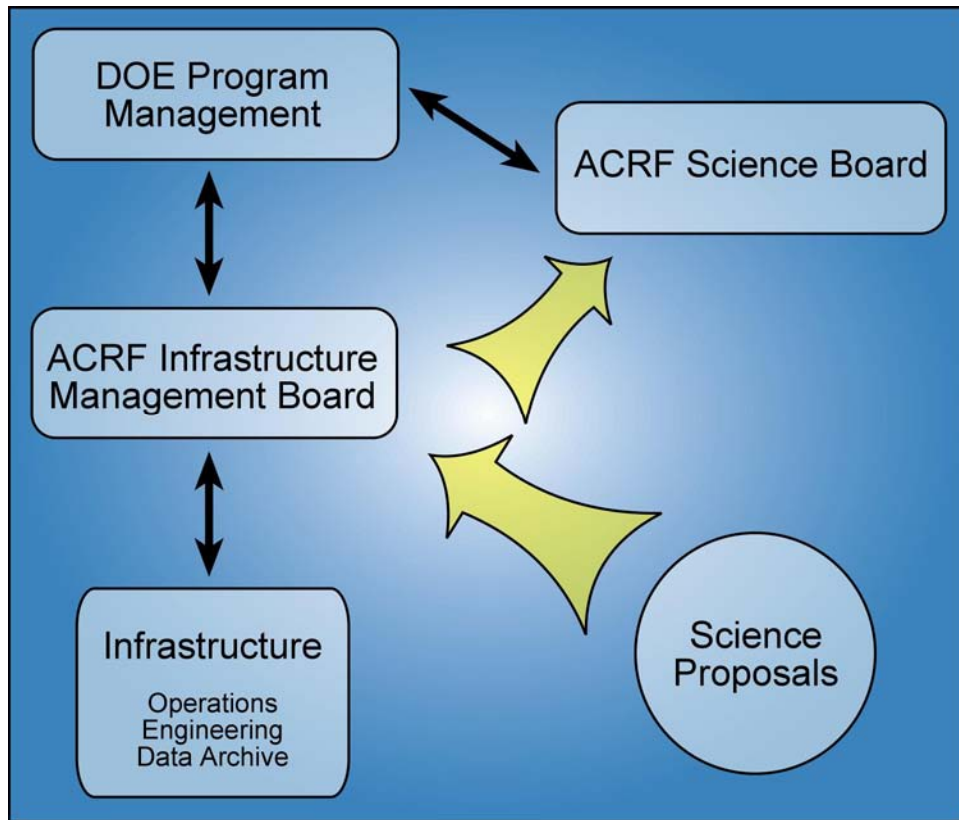


Figure 2. ACRF Management Structure.

5.1 DOE ACRF Program Manager

The DOE Program Manager directs and empowers the ACRF budgeting, planning, coordination, and management of activities within the ACRF structure.

5.2 ACRF IMB

The IMB is responsible for the overall ACRF budget that is proposed to the DOE Program Manager for review and approval. Budgets are determined based on the expected allocation of funds from the DOE Program Manager's office and the proposed costs of operating the user facility infrastructure and the proposed costs associated with science requests. The IMB assesses the impacts of all requests for use of the ACRF. The IMB and the ARM Chief Scientist coordinate the screening of science requests for use of the ACRF before consideration by the Science Board and provide information regarding the feasibility and costs associated with the requests. Once a request has been sent to the Science Board for evaluation, the IMB provides to the Science Board detailed information regarding costs and resource use and potential impact on the ARM Program needs at the ACRF. The IMB determines budget allocations for AMF development and deployment, IOPs at the fixed sites, and individual user requests. Budgets are

tracked and maintained by the ACRF Administration Office. The IMB Charter can be found in Appendix B.

The IMB membership consists of the ACRF Technical Coordinator, the Operations Manager, the Archive Manager, and the ACRF Science Liaison. The positions are described below.

5.2.1 ACRF Technical Coordinator

The Technical Coordinator is the Chair of the IMB and is the primary point of contact for the ACRF. The Technical Coordinator is responsible for coordinating the evaluation of the costs, logistics, and other requirements associated with full proposals for IOPs at the ACRF before they are brought before the Science Board for discussion. The Technical Coordinator works with the ACRF Science Liaison on discussions regarding projects that are under consideration by the Science Board. The Technical Coordinator provides the engineering services required for the operation and enhancement of the facility. The Technical Coordinator is responsible for overseeing the implementation of user requirements with the Operations Manager, the Archive Managers, and the ACRF Science Liaison. The Technical Coordinator is also responsible for making sure that DOE user facility policies (<http://www.sc.doe.gov/ober/facilities.html>) are followed.

5.2.2 Operations Manager

The Operations Manager is responsible for ensuring efficient, effective, and continuous operation of instruments and data systems. The Operations Manager helps to develop cooperative relationships with international, regional, and local governments to develop and operate sites, both fixed and mobile. The Operations Manager ensures that field operations are conducted in accordance with DOE and laboratory applicable safety and security policies. The Operations Manager is responsible for maintaining the User Reporting system.

5.2.3 Data Archive Manager

The Data Archive Manager is responsible for the proper storage and access of all user facility data.

5.2.4 ACRF Science Liaison

The ACRF Science Liaison is responsible for coordinating the overall IOP screening process within the IMB. The Science Liaison serves as the communication link between the ACRF IMB and the ACRF Science Board. The Science Liaison works with the IMB to promote the use of the ACRF by the external scientific community and to resolve user issues that might arise regarding external science projects conducted at the ACRF.

5.3 ACRF IMB Support

Support to the ACRF IMB is provided by the ACRF Facility Support Administrator and the Financial Administrator. The positions are described below.

5.3.1 ACRF Support Administrator

The ACRF Support Administrator assists with the processing of preproposals and proposals for use of the ACRF. The ACRF Support Administrator is also responsible for assisting with administrative issues related to the DOE requirements for national user facilities. This includes such tasks as preparing facility statistics and processing foreign visitor requests. The ACRF Support Administrator attends the annual DOE user facility Administrator's meeting along with a member of the ACRF IMB to keep abreast of new policies for DOE user facilities.

5.3.2 Financial Administrator

The Financial Administrator is responsible for working with the IMB to formalize and track the integrated ACRF budget plan.

6.0 Logistics for Users

The ACRF is managed as a DOE user facility despite its geographic displacement from major DOE installations. DOE guidelines for visitors and access are followed in all cases. Formal procedures are used to accommodate ACRF users at the ACRF sites. Activities at the ACRF fall under the DOE's safety and security policies. Therefore, requests for visits and data accounts on user data systems by foreign nationals require substantial lead time for approval.

Several major types of activities conducted by ACRF users include:

- A request for data from the Archive
- A visit to a site (real or virtual)
- An IOP.

6.1 Requests for Archived Data

Any scientist can request data from the Archive. The request process includes the creation of an "Archive account." The creation of Archive accounts is user-initiated by way of the Archive user interface accessible from the ARM website. This account creation provides ACRF information about how to contact the user (email, phone number, etc.) and how they are affiliated (educational status, institutional status, etc.). The Archive keeps detailed records about data requests that enable future reports about "who uses the data, how much and which types of data,

and from which locations and time periods.” The Archive also generates monthly reports summarizing the data volumes requested and the size of the active user community. Data from both routine and IOP measurements are accessible, and data access is monitored by Archive operations.

6.2 Site Visits (Real or Virtual)

A request for a site visit or an account on a site data system is submitted using the Site Access Request System (SARS). The SARS is a collection of web-based tools used by ACRF to provide advance notice of onsite visits to site managers to coordinate support. The system also provides the means for applicants to request, and for administrators to manage, access to onsite and offsite computer facilities (virtual access). Using the SARS allows ACRF users the ability to communicate their needs easily to ACRF site managers and operations staff for site support and network or remote access. It also provides a method of continuing communications with ACRF personnel if requirements change or if unforeseen complications or issues arise. Several types of Site and Computer Access Requests can be made. All forms are found on the ARM website (www.arm.gov) and should be submitted online.

6.2.1 Physical Onsite Visit Request

A physical request submission (SARS form) is required to visit an ACRF site. Advance notice of a site visit through this form is necessary to ensure the safety of onsite visitors, to help provide support during the visit, and to make the experience of the visitor as productive and pleasant as possible. This form also is necessary for scheduling the activities of site staff.

6.2.2 Request to Connect a Visiting (onsite) Device (PC or instrument) to an ACRF Network

A special form is used for requesting access to an ACRF network. A SARS form is also used for requesting permission to connect a PC, instrument, or other device to an ACRF site network, whether the requester will be present at the site or not.

6.2.3 User Account Request

A User Account Request submission is required to request a user account on a system at the Data Management Facility (DMF) or at an ACRF site. The DMF is the recommended location to get near real-time access to ACRF data streams. The accounts at ACRF sites are intended to provide local onsite support for visiting scientists and engineers using the facilities for scientific research, for ACRF infrastructure staff or for users requiring access to local instruments. These accounts are approved for a limited time frame.

6.2.4 Remote (offsite) Network Access to any Instrument or Computer System at an ACRF

This type of submission should be used to request network access to a system located at an ACRF from a location outside the facility.

6.3 Intensive Operational Period

An IOP is a research activity that is proposed, planned, and implemented at one or more research sites. Any ACRF activity that requires an augmentation in the routine data acquisition operation of a site is designated an IOP for management purposes. Management procedures related to IOPs are described on the ACRF website. Research activities are designated as IOPs if they have the potential to change the routine operational procedure at any of the research sites, even for a short period of time. The support of guest instrumentation at a research site is considered an IOP. A major field experiment that might include ships or aircraft activities at or near a research site requires extensive planning of a year or more. Deployments of the AMF are also characterized as IOPs. Information and guidelines about proposing IOPs can be found at http://www.arm.gov/acrf/submit_proposals.stm. To request changes in routine data acquisition or to test and validate new instruments, the IOP preproposal form is required. The preproposal process is shown in Appendix C. The IOP preproposal form can be found on the ACRF web page (www.arm.gov) under IOP.

Although it is a policy to disallow the loan of spare ACRF instruments to users, the IOP preproposal form should be used for a case-by-case review of unusual circumstances involving ACRF instruments.

IOP preproposals are routed to the ACRF Science Liaison, who contacts the ACRF IMB and the ARM Chief Scientist for preproposal screening. Preproposals to participate in ARM-related IOPs are also referred to the appropriate ARM Science Working Group. The IMB is responsible for reviewing IOP preproposals and related facility infrastructure needs and recommending whether or not a full proposal should be requested. IOP preproposals are categorized based on the level of logistical and financial support requested and the extent to which the request might impact ongoing scientific activities. The Lead Scientist on a preproposal is notified within several weeks after submitting the preproposal as to whether a full proposal will be requested or not. Once a full proposal is submitted, the IMB provides further information regarding costs and logistics for presentation to the ACRF Science Board. Proposals are reviewed by the ACRF Science Board based on scientific merit and the feasibility and costs associated with the ACRF. The Science Board then makes a recommendation to the DOE Program Manager on the scientific merit and priority of the proposed research.

7.0 ACRF User Reporting Requirements

All data and data products that result from ACRF supported research are generally archived (with appropriate documentation) in the ARM Data Archive. ARM-supported data are required to be submitted and are maintained as part of the permanent ARM Data Archive. Other data resulting from the use of the ACRF are archived by the collaborative agreement with the ACRF, especially if the data can be useful to a broader scientific community. The data policy for the ARM/ACRF Program is derived from the policies of the U.S. Global Change Research Program (USGCRP), which encourages “free and open” access to data and research results.

Data from instruments temporarily installed at a site can also be temporarily archived and made available to a limited group of researchers who are in collaboration with the Principal Investigator. This restricted sharing of data is only temporary. In the long term, this Archive provides access to all data and data products developed through the ARM Program. It includes data from IOPs and from special studies at each of the sites and deployments of the UAV and the AMF. Data submitted to the Archive undergo strict review to ensure that only high confidence data are accessible from the Archive. This requires that data are of known, reasonable and documented quality, and available in a timely manner.

Data archival and release for the ARM Program and for the ACRF are pursuant to the U.S. Global Change Research Program as described on the USGCRP website. Available at <http://www.usgcrp.gov>

- Continuing commitment to the establishment, maintenance, validation, description, accessibility, and distribution of high-quality, long-term data sets.
- Full and open sharing of the full suite of global data sets for all global change researchers.
- Preservation of all data needed for long-term global change research.
- Data archives that include easily accessible information about the data holdings, including quality assessments, supporting ancillary information, and guidance and aids for locating and obtaining the data.
- Use of national and international standards to the greatest extent possible.
- Provision of data at the cost of reproduction to global change researchers in the interest of full and open data access.
- For programs in which selected principal investigators have initial periods of exclusive data use, data should be made openly available as soon as they become widely useful. In each case, the funding agency should explicitly define the duration of any exclusive use period.

8.0 Education and Communications

In support of the ACRF goal to reach a broader national and international research community, its Education and Communications Outreach Programs are providing support to develop educational materials and activities at each host site and to increase awareness of the ACRF activities and relay research progress and results through a variety of communication products and events. The ACRF provides for educational and outreach opportunities at each of its three sites.

8.1 Education Program

The overall goal of the Education Team is to develop basic science awareness and increase critical thinking skills in environmental science and climate change for K-12 students at the three ACRF sites. To fulfill this goal, the Education Team is developing materials and activities designed to

- Provide enhanced education materials and content to K-12 students using research data gathered at ACRF facilities at the host sites
- Engage K-12 students in collaborative research projects with site scientists that dynamically enhance the math and science curricula of the participating schools
- Train teachers through in-services and workshops to prepare them to provide new education materials to students
- Educate the host communities about the ARM Program and other scientific activities ongoing at the ACRF through public meetings, kiosks, and special events
- Present the work of ACRF researchers to the public at the host sites.

The educational efforts require that science education needs of schools at each host site be identified and addressed individually to provide the most benefit to existing science curricula. These unique cultures pose various challenges to an integrated approach to education. To meet these challenges, the Education Team has been successful in providing lesson plans, educational materials, and information kiosks that incorporate climate science as well as basic scientific knowledge and perspectives. Ongoing development of culturally relevant lesson plans, teacher training, and presentation materials make up a new set of lesson plans for each site. These materials include updated kiosks in Barrow, Alaska, and new kiosks in Nauru and Manus. In addition, each year the SGP Outreach Group at the Oklahoma Climatological Survey produces new professional development courses for teachers and hosts science fairs to facilitate interactions between K-12 students and ARM Site Scientists. ACRF educational activities represent an outstanding opportunity to benefit educators and students. ACRF encourages visitation to the climate research sites and use of ARM Archive data by educators and students or

the use of the Education Program website (<http://education.arm.gov>). Requests for educational site visits may be made directly to the Site Managers using the Site Access Request Form.

The DOE also supports a related program, the Global Change Education Program that provides research funding to graduate students for research on issues associated with global environmental change. More information on this activity can be found at <http://www.atmos.anl.gov/GCEP/>. ARM/ACRF data available from the Archive are readily available to successful applicants of this DOE Program.

8.2 Communications Program

The high visibility of the ACRF requires a focused plan for communicating its scientific results and successes. Developing awareness of ACRF activities and the ARM Program and relaying scientific results and successes to key audiences are the primary goals of the ACRF Communications Program. To this end, the ACRF Communications Team develops materials that provide up-to-date information on instrumentation, data, and project results from ongoing science at the ACRF sites. They routinely develop prompt and comprehensive responses to inquiries and information requests from scientists and agency personnel, and publicize successful ARM/ACRF research stories in appropriate venues. The Communications Team writes, designs, and updates the <http://www.arm.gov> website to include current events and activities at ACRF sites, new research results, and a compilation of summaries of published ARM research results or other significant ARM accomplishments. In addition, the Communications Team makes presentation materials available for ACRF users and for ARM scientists to use at meetings and other scientific venues. Information about ARM/ACRF communication products and the ACRF Communications Team can be found on the ARM website at <http://www.arm.gov/publications/>.

Appendix A

Charter for the ACRF Science Board

Objective of the ACRF Science Board

The objective of the ACRF Science Board is to promote the Nation's scientific enterprise by ensuring that the best quality science is conducted at the U.S. Department of Energy (DOE) user facility known as the Atmospheric Radiation Measurement (ARM) Climate Research Facility (ACRF). The goal of the ACRF is to serve scientific researchers by providing unique data and tools to facilitate scientific applications for improving understanding of climate science.

Function of the ACRF Science Board

The function of the ACRF Science Board is to review proposals for use of the ACRF. These proposals may be submitted by the ARM Science Team or by any other interested users of the Facility, including U.S. government agencies engaged in scientific research, colleges and universities, and other interested international scientific and educational bodies. The Science Board will coordinate with the ACRF Infrastructure Management Board to assess the availability and resource requirements of the proposed facility usage. While the ACRF does not provide direct funding for scientific research, small amounts of funding might be provided to allow the facility to assist with logistics, the development of data streams and archiving, and other activities associated with the facility usage. The ACRF Science Board will consider facility usage proposals in a timely manner to assist the scientific investigators with their proposals for funding from their prospective funding agencies.

Examples of proposals that will be considered by the ACRF Board include the conduct of intensive operational periods (IOPs) at the ACRF, especially requests associated with use of the ARM Mobile Facility (AMF). The Board may set up specialty teams to address particular issues under its mandate, e.g., logistics associated with use of the AMF.

ACRF Science Board Members

The ACRF Science Board consists of eleven members. The Board is chaired by a respected scientist in the field of climate science or a related science who is appointed by the DOE ARM Program Manager. In addition to the Chair, the Science Board includes the ARM Chief Scientist, four members from the ARM Science Team Executive Committee who represent the interests of the ARM Program and five members who represent the interests of the broader scientific community. One of the members from the latter group represents the DOE

Atmospheric Science Program. All Board members will serve a term of 2 years and this term is renewable. To have the members serve overlapping terms, some members may initially be selected to begin as a second year member with his or her term automatically renewed for 2 more years (i.e., the member is initially appointed to serve for 3 years). The DOE ARM Program Manager will approve all Science Board members.

The DOE will provide financial support for the ACRF Board. Board members will have their costs reimbursed through agreement with the DOE.

ACRF Science Board Meetings and Communications

The Board will meet at a minimum once a year and in addition it may meet at such times and places as determined by its members. Most communications are expected to take place via email and conference calls. The Board will work by consensus of its members and disputes will be mediated by the Chair in conjunction with the DOE ACRF Program Manager. Additional technical experts may participate in Board deliberations at the invitation of the members. The ACRF Support Administrator will be responsible for organizing meetings and teleconferences of the Science Board. The ACRF Science Liaison will serve as the Executive Secretary for the Science Board and will keep the minutes of the Board Meeting and serve as the liaison between the ACRF IMB and the ACRF Science Board.

Appendix B

Charter for the ACRF Infrastructure Management Board

Objective

The overall role of the ACRF Infrastructure Management Board (IMB) is to provide budgets for the ACRF and to assess facility needs and usage. The objective of the IMB is to provide fair and equitable distribution of available funds between the fixed site facility infrastructure costs, intensive operational periods (IOPs) and special projects, and the ARM Mobile Facility (AMF) development and deployment. The IMB also assesses and proposes budgets for the future needs of the ACRF. The IMB plays a critical role in the effort to significantly increase the number of users of ACRF beyond ARM Science Team members to help to fulfill the DOE mission for ACRF to be a successful national user facility. An important function of the IMB is to ensure that the distribution of facility funds allows for the increase of new users without inhibiting the achievement of ARM scientific progress.

Function of the ACRF Management Board

The IMB is responsible for the overall ACRF budget that is proposed to the DOE Program Manager for review and approval. Budgets are determined based on the expected allocation of funds from the DOE Program Manager's office and the proposed costs of operating the user facility infrastructure and the proposed costs associated with science requests. The IMB assesses the impacts of all requests for use of the ACRF. The IMB coordinates the screening of science requests for use of the ACRF prior to consideration by the Science Board and provides information regarding the feasibility and costs associated with the requests. Once a request has been sent to the Science Board for evaluation, the IMB provides to the Science Board detailed information regarding costs and resource use and potential impact on the ARM Program needs at the ACRF. The IMB determines budget allocations for AMF development and deployment, IOPs at the fixed sites, and individual user requests. Budgets will be tracked and maintained by the ACRF Financial Administrator.

Membership of the ACRF Management Board

The IMB will consist of the ACRF Technical Coordinator (voting), the Operations Manager (voting), the Archive Manager (voting), and the ACRF Science Liaison (voting). The IMB is supported by the ACRF Support Administrator (non-voting).

The ACRF Technical Coordinator is the Chair of the IMB and is the primary point of contact for the ACRF. The Technical Coordinator is responsible for coordinating the evaluation of costs, logistics, and other requirements associated with full proposals at the ACRF before they are

brought before the Science Board for discussion. The Technical Coordinator will work with the ACRF Science Liaison on discussions regarding projects that are under consideration by the Science Board. The Technical Coordinator is responsible for overseeing the implementation of user requirements with the Engineering, Operations, and Archive, the Science Liaison, and the user facility Support Administrator. The Technical Coordinator provides the engineering services required for the operation and enhancement of the facility. The Technical Coordinator is also responsible for making sure that facility policies are followed.

The Operations Manager is responsible for ensuring efficient, effective, and (to the extent possible) continuous operation of instruments and data system; ensuring cooperative relationships with international, regional, and local governments, and ensuring that field operations are conducted in accordance with DOE, laboratory, applicable safety and security standards. The Operations Manager is responsible for maintaining the User Reporting System.

The Archive Manager is responsible for the proper storage and access of all user facility data.

The Science Liaison serves as the Liaison between the IMB and the ACRF Science Board. The Science Liaison works with the Technical Coordinator to promote the use of the ACRF by the external scientific community and to resolve user issues that might arise regarding external science projects conducted at the ACRF.

ACRF Coordination

Science requests to use the ACRF will be submitted via the preproposal process. The ACRF Science Liaison has overall responsibility for the IOP preproposal process. The ACRF Support Administrator documents and tracks the preproposals and forwards them to ACRF IMB for screening before they are brought to the Science Board for review and evaluation. The ARM Chief Scientist participates in the screening process. In addition, the Site Manager and Site Scientist for that site (or those sites) who is (are) involved in an ACRF request may participate. Once a science request has passed the screening process, a full proposal is requested. The science project will then be brought to the Science Board for consideration and will also be forwarded to the IMB to assess the cost impact of the proposed work. All science requests will be tracked and their status updated as needed. The ACRF Support Administrator will be responsible for working with the Technical Coordinator and the Science Liaison to organize meetings and teleconferences of the IMB and the Science Board. The Support Administrator is also responsible for assisting with the reporting of user facility performance metrics, reports, and other reporting requirements set by the DOE Program Manager.

Appendix C

ACRF IOP Request, Approval, and Implementation Process

An intensive operational period (IOP) is a research activity, which is proposed, planned, and implemented at one or more research sites. The fixed and mobile sites are collectively referred to as the ARM Climate Research Facility (ACRF) and include the following:

- Southern Great Plains
- Tropical Western Pacific
- North Slope of Alaska
- ARM Mobile Facility (AMF)
- Unmanned Aerospace Vehicle (UAV).

In addition, the UAV is a platform that can be used to support experiments at the fixed sites, in conjunction with the AMF, or in support of other research activities independent of the ACRF. Requests for use of the UAV are handled through the ACRF IOP request process. When the UAV is requested the DOE UAV Program Manager, the UAV Project Manager, and the UAV Chief Scientists are included in the screening and decision process. (See Figure C.1.)

More information about the ACRF can be found on the ARM website at <http://www.arm.gov>. To learn more about the ACRF review process, see the IOP Request, Approval, and Implementation flowchart (Figure C.1). The following numbered paragraphs refer to the numbered blocks shown in the flowchart

- 1.0 The Scientist submits a “preproposal” to summarize the scope and intent of the research (1 to 2 pages), including the ACRF sites that are, or could be, involved and the collaborating research institutions. Relevancy to the ARM or ACRF missions should be noted.
- 2.0 Preproposals are recorded by the ACRF Support Administrator and communicated to the Infrastructure Management Board (IMB), the ARM Chief Scientist, and relevant Site Scientists. An assessment of the experiment is made that includes the possible participation between fixed sites, the AMF, and the UAV. Experiment assessments include costs, relevance, and schedule; thereby resulting in a determination of impact. The ACRF Science Liaison, a member of the IMB, will communicate the results of the assessment to the proposing scientist.
- 3.0 When a preproposal is accepted, the scientist is invited to submit a “full proposal” that includes the following:
 - Proposal abstract, limited to one page

- Science plan
- Proposed schedule
- Description of the support requested from the relevant site
- Detailed budget.

4.0 The full proposal is routed to the ACRF Science Liaison, who initiates the IOP review process. The review process has two primary dimensions—a science review, performed by the ACRF Science Board, and a review of costs, logistics, and schedule, performed by the IMB. The ACRF Science Liaison facilitates these communications, including the involvement of relevant Lead Scientists. This process is tracked and recorded by the ACRF Support Administrator.

5.0 The IMB provides an analysis of the IOP to refine and communicate costs, logistics (local, national, international), schedule, and other impacts associated with the implementation. In performing this step, the IMB communicates with the Science Liaison, Science Board, and relevant Lead Scientists as required.

6.0 The ACRF Science Board was established to review ACRF proposals. The Science Board will coordinate with the IMB to assess the availability and requirements of resources for the proposed facility usage. An important consideration is how well the proposed IOP (i.e., experiment) facilitates discovery-based research relevant to the ACRF Mission Statement. The final recommendations of the Science Board are communicated to the appropriate DOE Program Manager.

7.0 The appropriate DOE Program Manager, ARM and/or UAV, reviews the recommendations from the Science Board and communicates acceptance or rejection rationale to the Science Liaison. The Science Liaison communicates the disposition of the full proposal to the proposing Scientist and the IMB.

8.0 The IMB plans, tracks, and implements approved IOPs and experiments.

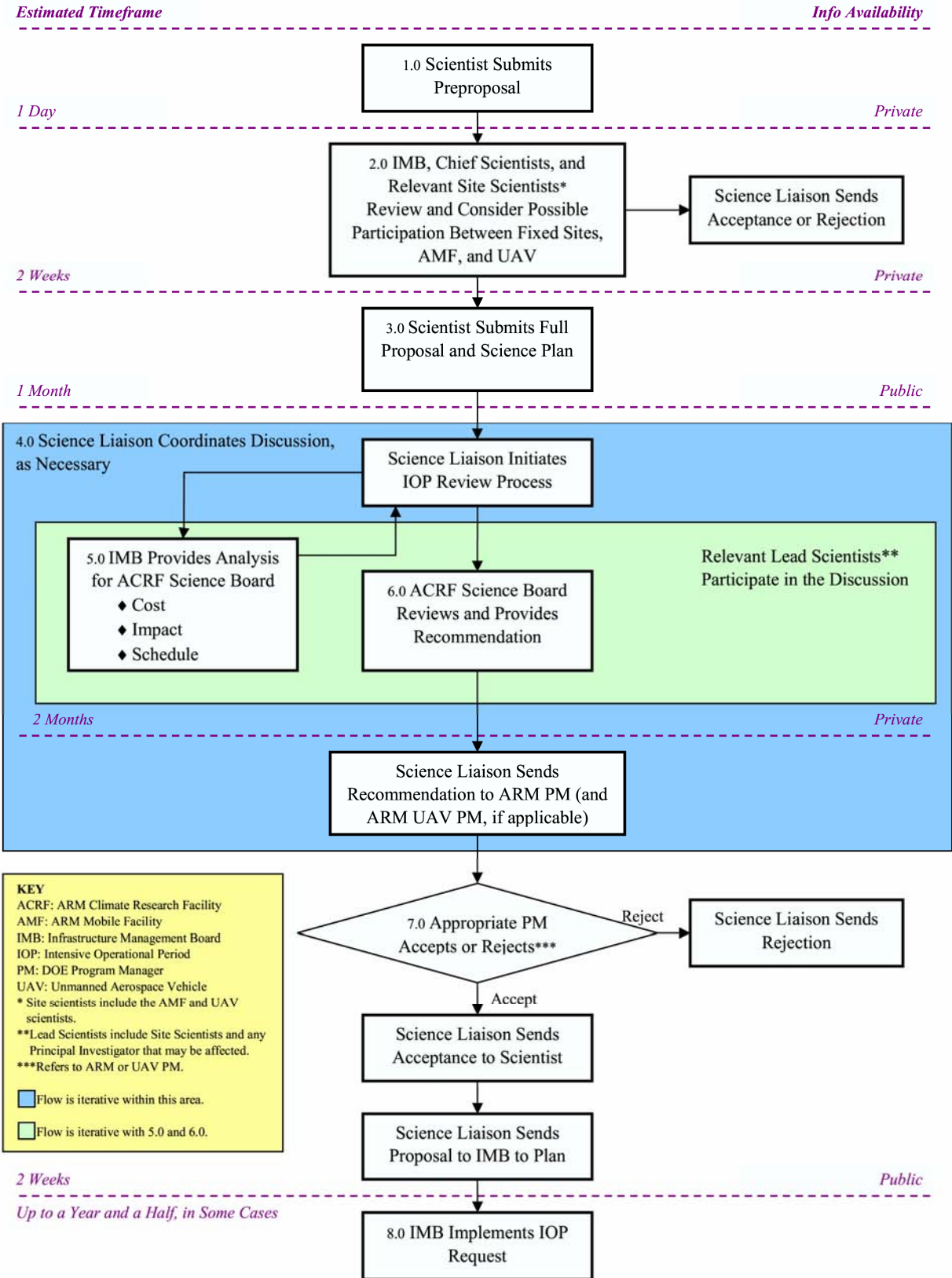


Figure C.1. IOP Request, Approval, and Implementation Process