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Field Campaign Guidelines

Revision 3

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LA Chapman

January 2016



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Office of Science, Office of Biological and Environmental Research

Acronyms and Abbreviations

AAF	ARM Aerial Facility
AMF	ARM Mobile Facility
ARM	Atmospheric Radiation Measurement
ASR	Atmospheric System Research
BER	Office of Biological and Environmental Research
COA	Certificate of Authorization
COO	Chief Operating Officer
DOE	Department of Energy
FAA	Federal Aviation Administration
IMB	Infrastructure Management Board
IOP	Intensive Operational Period
NSA	North Slope of Alaska
PI	Principal Investigators
VAP	Value-Added Products
AMF	ARM Mobile Facilities
UAS	unmanned aerial systems
UAV	unmanned aerial vehicles
VAP	value-added product

Definitions

ARM – Atmospheric Radiation Measurement Climate Research Facility (<http://www.arm.gov>), a U.S. Department of Energy scientific user facility.

ARM Climate Research Facility – The integrated infrastructure and system of instruments, network, and data system components associated with ARM sites.

ASR – The Atmospheric System Research Program was formed from the merger of the former ARM Science Program and the Atmospheric Science Program. Through a strong collaboration with ASR, ARM seeks scientific input from both ASR and the broader research community to ensure that it is responsive to the community’s observational needs.

Collaborating Program – A program joining with the ARM Climate Research Facility to pursue a specific set of objectives by providing resources and participating in active planning and executing of an ARM field campaign.

Cooperating Program – A program or agency supporting a specific ARM field campaign, for which ARM provides the resources.

External Data – Data that does not originate from within the ARM Facility; data may have been observed at ARM facilities, but processing and quality control performed by another program or agency and captured by the facility through the External Data Center. Typically, the ARM Facility would not add additional data quality efforts to data already quality controlled by another agency or program.

Field Campaign – A scheduled, collaborative field effort where DOE researchers, an outside agency, program, or individual principal investigators cooperate with ARM to acquire a data set to meet a defined research or science need. Field campaigns were previously called Intensive Operational Periods.

Intensive Operational Period Request – The request form that potential ARM Climate Research Facility users use to submit a preproposal for consideration. ARM management uses information submitted via the form to review and determine the disposition of the request to use the facility. The request form can be accessed at (<http://www.arm.gov/campaigns/propose>).

Metadata – Described as “information or data about the data.” Typically refers to information about primary data, which is usually numerical, or information describing aspects of the primary data. Such information could include instrument site information, environmental conditions under which data were acquired, and any other data needed to understand the primary data.

Near-Real Time – When referred to in textual references, this term is considered to be “with a few hours delay.”

Preliminary Data – Data that have not necessarily been subjected to review, quality control, and/or documentation by a responsible investigator. Preliminary data are not considered publishable without the coordination and concurrence of the responsible investigator. Generally applicable only to field campaign efforts where data sources beyond routine ARM data are being acquired.

Quality-Assured Data – Typically, the final form of data to be submitted to the ARM data system. This includes datastream description documentation, fully calibrated data expressed in commonly used geophysical units, quality flagged data files, and all ancillary data (metadata) needed to make the datastream understandable to a future user.

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1.0 Purpose

This document establishes a common set of guidelines for the Atmospheric Radiation Measurement (ARM) Climate Research Facility for planning, executing, and closing out field campaigns. The steps that guide individual field campaigns are described in the Field Campaign Tracking System and are specifically tailored to meet the scope of each field campaign. Important detailed information regarding these ARM field campaigns is provided in appendices to this document:

- Appendix A – Roles and Responsibilities
- Appendix B – Field Campaign Contacts
- Appendix C – Annual ARM Facility Field Campaign Proposal and Implementation Schedule
- Appendix D – Request for Proposal Formats
- Appendix D – Unmanned Aerial Systems at Oliktok Point, Alaska.

2.0 Field Campaign Process

Proposals for a field campaign can originate with any scientist. Proposed campaigns should focus on research that addresses the [ARM Mission](#) of improving the understanding and representation of clouds and aerosols in climate and earth system models, as well as their interactions and coupling with the Earth's surface. Priority will be given to proposals that 1) make comprehensive use of ARM facilities, 2) focus on strategic goals of the U.S. Department of Energy (DOE) Office of Biological and Environmental Research (BER), and 3) have the ability to improve regional or global earth system models. Proposals that coordinate with other BER community capabilities, such as the Environmental Molecular Sciences Laboratory, AmeriFlux Network, and Next Generation Ecosystem Experiments in the Arctic and Tropics are encouraged.

Types of proposals considered by the ARM Facility include:

- **Annual Facility Call** – Deployment of an ARM Mobile Facility (AMF), ARM Aerial Facility (AAF), or complex campaigns at a fixed ARM site. Facility calls are accepted and reviewed once annually by the ARM Science Board.
- **Small Campaigns** – Deployment of guest instruments at an ARM site; deployment of ARM instruments away from ARM sites; or special operations, such as enhanced radiosonde launch schedules; special instrument scanning strategies at a fixed site or mobile facility; or specific, targeted add-ons to larger, previously approved AMF campaigns. Proposals for small campaigns are accepted anytime and reviewed quarterly by the ARM Infrastructure Management Board and DOE. Specific requirements regarding unmanned aerial system operations at the third AMF at Oliktok Point, Alaska, are provided in Appendix E.

Appendix C defines the timeline and process for each type of field campaign.

A detailed description of the field campaign proposal process follows:

- Preproposals, as received through the Intensive Operational Period Request system, are recorded by the Science Liaison and communicated to the Infrastructure Management Board (IMB). An initial review of the preproposal and a response to the principal investigators (PI) will normally be communicated within 4 weeks. The communication can include a request for clarifying information, request for an abbreviated or a full proposal, and/or information regarding the review timeline. The following criteria are used in a review of the preproposal to evaluate the use of the facility, potential collaborations, costs, and logistics:
 - Level 1
 - Cost to the facility is less than \$25K.
 - IMB review/approval will be quarterly (i.e., January 1, April 1, July 1, and October 1).
 - No formal proposal is required.
 - Campaign start date will be at least 30 days after approval.
 - Level 2
 - Cost to the facility is \$25K to \$100K.
 - IMB review and a scientific peer review will be quarterly (i.e., January 1, April 1, July 1, and October 1).
 - Abbreviated proposal may be requested.
 - Campaign start date will be at least 60 days after approval.
 - Level 3
 - Cost to the facility is \$101K to \$300K
 - Scientific peer review and/or select ARM Science Board member review will occur semi-annually (i.e., April 1 and October 1).
 - Abbreviated proposal will be required.
 - Campaign start date will be at least 90 days after approval.
 - Level 4
 - Deployment of an AMF, AAF, or large fixed site campaign with costs exceeding \$300K will be considered annually during the “annual facility call.”
 - ARM Science Board review will be conducted.
 - Full proposal is required.
 - Reviews will be conducted annually.
- **Additional Notes**
 - A final preproposal submission date will be established individually by the responsible ARM site manager for proposals seeking to add instruments or measurements to previously approved large AMF, AAF, or fixed site campaign. Once a final submission date has been established, add-on requests will no longer be accepted.

- Funds for supporting non-AMF/AAF campaigns are very limited. In a given year, it is unlikely that more than one non-AMF/AAF Level 4 campaign could be supported. It may not be possible to support any non-AMF/AAF campaigns in a given year at this level depending on other commitments.

When a preproposal is accepted, the scientist may be invited to submit a “full proposal” or an “abbreviated proposal” for requests at Level 2 or higher. (See Appendix D for full and abbreviated proposal formats.) Invited proposals are delivered to the Science Liaison, who will initiate the review process. For full proposals, the review process has two primary dimensions. First, the IMB and site managers analyze the field campaign to refine and communicate costs, logistics (e.g., local, national, international), schedule, and other impacts associated with the implementation. Second, the assessment and full proposal are transmitted for review by the Science Board. The Science Liaison facilitates these communications and records and tracks all proposals and related information. The process for abbreviated proposals is similar, but the proposal is reviewed by ad hoc peer reviewers or a subset of the full Science Board.

After conducting a scientific review, the Science Board,¹ which has been established to review proposals for use of the ARM Facility, provides a recommendation to DOE program management. An important consideration is how well the proposed field campaign facilitates discovery-based research relevant to the mission of the DOE BER Climate and Environmental Sciences Division (CESD). The CESD Strategic Plan is located at <http://science.energy.gov/~media/ber/pdf/CESD-StratPlan-2012.pdf>. The Science Board uses the following criteria for its reviews of proposals:

- Scientific and/or technical merit of the project, including the likelihood that the research will lead to new discoveries or fundamental advances within its field or have substantial impact on progress in that field or other scientific fields.
- Appropriateness of the proposed method or approach. For example, are the proposed measurements and/or experimental design suitable to meet the scientific objectives?
- Competency of applicant’s personnel and adequacy of proposed resources.
- Reasonableness and appropriateness of the requested ARM resources for the proposed activity. Reviewers may be asked to comment separately on major resources requested.
- Relevance of the proposed activity to DOE BER, including relevance to ARM and/or other science programs within BER.

DOE program management reviews the recommendations from the Science Board and communicates acceptance or rejection rationale to the proposing scientist.

For approved field campaigns, the proposing scientist develops and provides a field campaign science and operations plan. For most small (Level 1 and 2) field campaigns, no science and operations plan is required. There are exceptions, however, depending on the scope, cost, or complexity of the proposed work. Approved field campaigns and experiments are planned, tracked, and implemented by the ARM Facility.

¹ <http://www.arm.gov/about/science-board>

3.0 Planning and Execution

Planning, executing, and reporting of an ARM field campaign are processes that need active tracking. The following sections delineate field campaign responsibilities and the required documentation.

3.1 Principal Investigator Roles and Responsibilities

Once a field campaign is accepted, lead PIs will be expected to complete the actions described below.

1. **Abstract** – An abstract for all approved ARM field campaigns is required before the campaign begins. The abstract will appear on an individual ARM field campaign web page.
2. **Science Plan** – A science plan is prepared by the lead scientist within 90 days after DOE’s notification of campaign approval for Level 4 campaigns (e.g., AMF and AAF deployments) and within 30 days for smaller campaigns (i.e., Levels 2 and 3). The science plan will define relationships and collaborations including ARM instrumentation, visiting instruments, aerial measurements, aerosol science and engineering, radar science and engineering, and modeling science areas. The science plan also will include a measurement priority list to identify critical measurements. The facility will make the science plan publicly available to the research community. The science plan can consist primarily of material from the project description section of the ARM field campaign proposal, if desired, but it should be updated to address any changes to the project resulting from the science and/or logistical reviews.
3. **Availability** – Lead scientists will participate in campaign planning by providing scientific guidance and input requested by the ARM site manager or ARM Technical Director to guide ARM operations.
4. **Data Submission** – Final quality-assured data for all non-ARM instruments are required to be released to the ARM Data Archive field campaign area through the External Data Center within 6 months after completion of the field campaign.
5. **Final Report** – A final report of the campaign outcome is required to complete ARM documentation within 6 months after completion of the field campaign.

3.2 ARM Facility Roles and Responsibilities

The ARM Operations and Engineering Procedure Mobile Facility Site Startup document defines the key milestones, necessary steps, and process rules required to commission and ensure successful deployment and operation of an AMF.¹

1. **Planning** – Upon DOE approval of a field campaign, formative planning and execution documents are developed to ensure that all preparations are made for a successful campaign. The site manager engages the lead scientist and members of the infrastructure to coordinate an integrated set of plans. The plans are living documents that are refined during the campaign implementation phase.

¹ <http://www.arm.gov/publications/programdocs/doe-sc-arm-14-016.pdf>

2. **Project Plan** – The project plan is an overall description of the activities and tasks required for siting a mobile facility and associated infrastructure, instruments and systems, or for deploying the aerial facility. The project plan is assembled by ARM Facility operations management.
3. **Operations Plan** – The operations plan is a sub-component of the project plan and 1) may be very brief for limited efforts; 2) may require a great deal of detail where substantial coordination is required, such as for aircraft operations or the use of hazardous devices; 3) will specify reporting requirements (e.g., aircraft operations); and 4) will specify responsibilities during the field campaign (e.g., site manager and PI roles and responsibilities). The operations plan will be drafted by ARM site operations and/or the aircraft operations coordinator. The timing for delivery of the operations plan will depend on the complexity of the campaign. For small campaigns (i.e., Levels 1 and 2), the plan should be written within 30 days after receiving DOE’s notification of campaign approval. For more complex campaigns (i.e., AMF and/or AAF deployments), the plan will be developed as soon as possible, and the schedule for developing the plan will be defined within 30 days of campaign approval. The operations plan requires the approval of the ARM Technical Director and ARM Chief Operating Officer. Site operations will coordinate with the ARM Technical Director to accommodate special hardware and data system related needs.
4. **Data Management Plans** – Data management plans document the collection and processing of data associated with a field campaign and associated technical elements, such as the establishment of communications with a remote site. AMF and AAF deployments require the following plans from the identified components of the ARM Facility:
 - **Network-Communications Plan** – Prepared by the Site Data Systems team as part of the Data Systems Plan to ensure a robust network connection to the AMF and associated components.
 - **Data Systems Plan** – Prepared by Site Data Systems team, defines the overall configuration and operational rules for the Site Data System, including the system startup sequence, operational monitoring, and shutdown sequence.
 - **Data-Processing Plan** – Prepared by the Data Management Facility for reporting, reviewing, assigning, and tracking actions necessary to establish data product delivery from the site to the ARM Data Archive.
 - **Data Quality Assessment Plan** – Prepared by the Data Quality Team, ensures quality data product delivery, determines quality assurance limits and ranges, and defines the quality assessment of data products.
 - **Value-Added Product (VAP) Plan** – Prepared by the Data Management Facility using ARM instrument data as inputs, VAP plans may be developed to fill some of the unmet measurement needs of the ARM Facility or improve the quality of existing measurements.

In addition, if the ARM Facility is operating or providing support for a guest instrument, the facility will need to develop a Principal Investigator Product Plan. This plan, which is prepared by the Data Management Facility, defines data from collaborative instruments that may be deployed around or near the experiment that belong to PI contributors.

3.3 Data Responsibilities

Data acquired must be of sufficient quality to be useful and must be documented such that users will be able to clearly understand its meaning, organization, and quality.

Final quality-assured data sets will be retained in the ARM Data Archive and will be accessible from there. Once submitted in final form, data sets will be freely accessible to the general scientific community. The only exception to “free and open” access would be a specific circumstance in which the ARM Facility purchased a limited distribution data set for the specific use of science team members.

Preliminary data are shared among field campaign participants during and shortly following the campaign. To facilitate sharing, a restricted access capability will be established by the ARM Data Archive for campaigns. Access will be limited to participants and data managers. The data policy will be governed by the [ARM data policy](#), if appropriate. Contact information for ARM data submission, processing, and access is provided in Appendix B.

3.3.1 General Guidelines for Field Campaign Data

ARM-sponsored data will be released in the following general spirit of the basic tenets of the facility:

- “Free and open” sharing of data
- Immediate processing and sharing by PIs in the field, if at all possible
- Timely release to collaborating science teams and general scientific community through the ARM data system.

Collaborating programs are encouraged to follow the ARM data protocols of timely release and free and open sharing.

All data to be submitted to the ARM data system will be accompanied by full documentation in accordance with the [data management and documentation plan](#).

Planning for field campaigns will include specific plans for data reduction, evaluation, and publication.

3.3.2 Data Processing and Handling

There are two classes of field campaign data:

- **Routine Data from Baseline ARM Measurements** – Routine ARM data (i.e., collected from fixed, mobile, and aerial facilities) are available to all participants on a free and open basis as they become available and are publishable upon receipt with acknowledgment of the ARM Facility as the source. These data are available from the ARM Data Archive.
- **PI Provided Instruments/Measurement Data** – Final data from a PI must be quality assured, documented, and released to the ARM Data Archive through the External Data Center as soon as possible after collection, but no later than 6 months from the date of completion of the field campaign.

When final data are released to the External Data Center, the data are considered publishable. Users are cautioned to confirm the data version with the responsible PI prior to publication.

If requested, the ARM Data Archive will provide registered participants with early (or preliminary) access to acquired data for the purpose of assessing data quality.

The External Data Center and ARM Data Archive will track data versions and ensure that only the latest data versions are provided to data recipients, unless earlier versions are specifically requested. Participants may release their own preliminary data to whomever they wish; however, preliminary data of other PIs will be shared only with consent from the originator of the data. All final data sets acquired during a field campaign will be made available to the External Data Center for dissemination to users through the ARM Data Archive IOP server and the ARM website.

3.3.3 Data Submission

If preliminary data exist, they will be submitted to a password-protected area of the ARM Data Archive Intensive Operational Period (IOP) server through the ARM Data Archive Manager (see Appendix B). All final data sets will be submitted to the External Data Center. The steps for delivering final data to the External Data Center are available at <http://www.arm.gov/campaigns/submitting-data>. The External Data Center will review final data sets for data content and readability, documentation, and visualization of example data. Final data sets must be viewed as stand-alone data sets and useable by the general scientific community. The point of contact is the External Data Center manager (see Appendix B).

3.3.4 Acknowledgments

The ARM Climate Research Facility should be acknowledged in publications as the origin of field studies or data used in the research. Following are guidelines for proper acknowledgments:

Publications using ARM data or facilities are asked to acknowledge that:

“Data were obtained from the Atmospheric Radiation Measurement (ARM) Climate Research Facility, a U.S. Department of Energy Office of Science user facility sponsored by the Office of Biological and Environmental Research.”

Authors should also properly acknowledge data provided by PIs or data originating from other cooperating or collaborating programs.

Investigators who receive ARM support (e.g., logistical support for guest instrument deployments or ARM mentor support) should also use the following acknowledgment:

“This research was supported by the Office of Biological and Environmental Research of the U.S. Department of Energy (under grant or contract number—if appropriate) as part of the Atmospheric Radiation Measurement (ARM) Climate Research Facility, an Office of Science user facility.”

In addition, the ARM Communications Team must be notified of any articles submitted for publication as a result of the field campaign. You may submit your articles to ARM’s publication database at <http://www.arm.gov/publications/db/submit>.

Appendix A

Roles and Responsibilities

Appendix A

Roles and Responsibilities

ARM Data Archive – The ARM Data Archive establishes and maintains an externally accessible password-protected preliminary data file area for which access can be limited to participants until the final data are released to the External Data Center. The ARM Data Archive also is responsible for keeping the online archive of final field campaign data submissions safe and making the data available to end users in a way that tracks individual requests.

Chief Operating Officer – The ARM Chief Operating Officer (COO) is responsible for ensuring efficient, effective, and continuous operation of instruments and data systems. The COO works with site managers to ensure that field campaigns are conducted in accordance with applicable DOE and national laboratory safety and security policies.

External Data Center – The External Data Center (a.k.a., the XDC) is the gateway for all final data sets from temporary, guest, or supplemental instruments being submitted for general release and for permanent retention in the ARM Data Archive. The External Data Center will ensure that the appropriate standards for data set submission have been met before data are released to the ARM Data Archive.

Field Campaign Lead Scientist – The field campaign lead scientist, also known as a Principal Investigator, is responsible for coordinating scientific activities, setting schedules, and making final decisions on the use of resources. In collaboration with the site manager, the field campaign lead scientist identifies safety issues and/or constraints of planned activities. The site manager has the final decision on safety issues. Finally, the field campaign lead scientist is responsible for the science plan, periodic reports (e.g., potentially through blogs or journals on the field campaign site), a final "findings" report, and submission of data to the ARM Data Archive through the Data Archive Manager (preliminary data) and the External Data Center (final data).

Field Campaign Participants – Field campaign participants are responsible for their own scientific efforts. In the field, each participant has the responsibility to either report their activity periodically to the site manager and other participants, or make reports to the lead scientist for integration into a larger report. Each participant is responsible for contributing to the final campaign report and making certain that data are quality assured, documented, and submitted in accordance with ARM procedures.

Infrastructure Management Board – The Infrastructure Management Board (IMB) consists of the Technical Director, COO, site managers, Data Services and Operations Manager, and Aerial Facility Manager. The IMB assesses the impacts of all requests for use of the ARM Facility and screens science requests for use of the ARM Facility prior to consideration by the ARM Science Board.

Instruments and Data Quality Coordinator – The Instruments and Data Quality Coordinator is responsible for coordinating activities related to instruments, measurements, data quality, and instrument mentor resources for the ARM Facility.

Science Liaison – The Science Liaison is responsible for coordinating the overall field campaign screening process with ARM management and serves as the communication link between the IMB and the Science Board.

Science Team Working Groups – The science team working groups are from Atmospheric System Research (ASR) working groups of scientific experts in given areas of emphasis. Working groups represent the direct interests of the science team.

Site Manager – The site manager coordinates field campaign and is responsible for integrating the support requirements indicated in each of the science plans into a field campaign operations plan and for coordinating site operations. Finally, the site manager is responsible for ensuring safe operations and has the final decision authority for scheduling and daily planning where safety is a concern.

Site Scientist – The site scientist is the key science resource in integrating a field campaign activity proposed for a given research site.

Science Translators – Science translators are the bridge between the ASR science team working groups and ARM infrastructure staff. Science translators generally address how well the infrastructure is meeting the scientific data needs of the science team, the development of value-added products, and the coordination of the scientific objectives of field campaigns. The scope necessitates close cooperation with ASR science team members, ASR science team working groups, site scientists, instrument mentors, and coordination points of contact for cooperating or collaborating programs outside of ARM. Science translators are the primary coordination points for development of final field campaign proposals coming from the ASR Science Team Working Groups.

Technical Director – The ARM Technical Director has the overall responsibility to ensure that all field campaign activities, by working with the site manager, are fully coordinated; to identify and arrange for all participants; and to ensure that all plans and documents are completed and submitted as appropriate.

Appendix B

Field Campaign Contacts

Appendix B

Field Campaign Contacts

Contacts	Name	Phone Number	Email Address
Technical Director	Jim Mather	(509) 375-4533	jim.mather@pnnl.gov
Chief Operating Officer	Jimmy Voyles	(979) 690-9846	jimmy.voyles@pnnl.gov
ASR Working Group Leaders			
Aerosol Life Cycle	Jian Wang	(631) 344-7920	jian@bnl.gov
Cloud Life Cycle	Anthony Del Genio	(212) 678-5588	anthony.d.delgenio@nasa.gov
Cloud-Aerosol-Precipitation-Interactions	Steven Ghan Rob Wood	(509) 372-6169 (206) 543-1203	steve.ghan@pnnl.gov robwood@atmos.washington.edu
Infrastructure			
Aerial Facility Manager	Beat Schmid	(509) 375-2996	beat.schmid@pnnl.gov
Archive Manager	Raymond McCord	(865) 574-7827	mccordra@ornl.gov
Data Services and Operations Manager	Giri Palanisamy	(865) 241-5926	palanisamyg@ornl.gov
ENA, AMF1, and AMF2 Facility Manager	Kim Nitschke	(505) 667-1186	nitschke@lanl.gov
Communications Team	Hanna Goss	(509) 375-3824	hanna.goss@pnnl.gov
Financial Administrator	Luci Walker	(509) 539-5105	lucille.walker@pnnl.gov
Instruments and Data-Quality Coordinator	Doug Sisterson	(630) 252-5836	dlsisterson@anl.gov
NSA Facility and AMF3 Manager	Mark Ivey	(505) 284-9092	mdivey@sandia.gov
Science Liaison and Campaign Coordination	Laurel Chapman	(630) 252-2887	lchapman@anl.gov
SGP Facility Manager	Nicki Hickmon	(630) 252-7662	nhickmon@anl.gov
External Data Center Manager	Alice Cialella	(631) 344-3286	cialella@bnl.gov

Appendix C

Annual ARM Facility Field Campaign Proposal and Implementation Schedule

Appendix C

Annual ARM Facility Field Campaign Proposal and Implementation Schedule

C.1 Proposal Schedule



December – Preproposal call announced for larger, more comprehensive proposals that require vetting by the ARM Science Board. The time span for preproposals is the current fiscal year plus 2 years (n+2). For example, the proposal call in January 2016 is for proposals taking place in fiscal year 2018. The proposal announcement is sent to the “ARM-all” mailing list and posted in periodicals; that is, *Bulletin of the American Meteorological Society*, American Geophysical Union *Eos Earth & Space Science News*, and on the [ARM News Center](#).

February – Preproposal call is closed.

Mid-February – Notifications are sent for full proposals.

May 1 – Full proposals are due.

June 15 – Infrastructure costs and logistics analysis are completed.

June 15 – Field campaign proposals and costs are sent to ARM Science Board.

August – Reviews by Science Board are due 2 weeks before Science Board meeting.

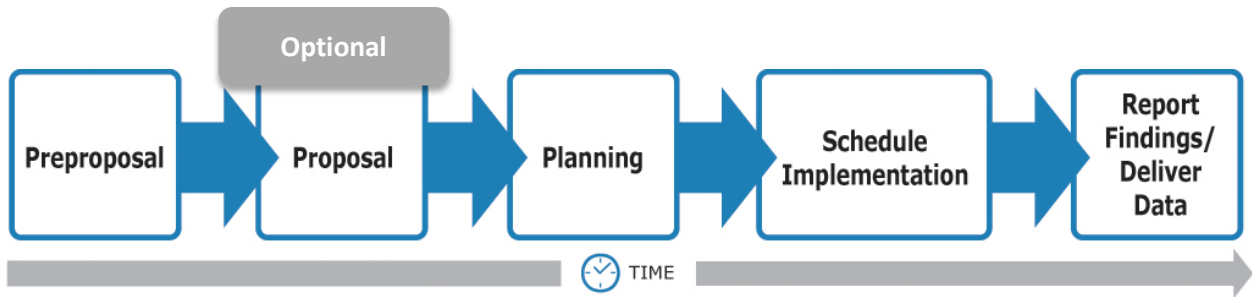
Mid-August – Science Board reviews are completed.

September – Awards for campaigns at fixed sites, ARM Mobile Facility, and ARM Aerial Facility are announced.

C.2 Implementation Schedule

1. Science and operations plans are developed.
2. Field campaign is executed.
3. Six months after end of campaign—all collaborative data submitted to the ARM Data Archive.

C.3 Small Field Campaign Request Process



1. Requests (preproposals) for smaller field campaigns are open year-round, limited by cost and potential science impact. Examples of smaller field campaigns include instrument validation or data studies that take place at one of the fixed sites.
2. Infrastructure Management Board and relevant site operations staff review proposal for impacts within 30 days of receiving it. Proposal decisions will be made quarterly during the first weeks of January, April, July, and October.
3. DOE adds additional reviewers as required.
4. Science Liaison sends acceptance or declination based on DOE recommendations.
5. Principal Investigator, operations, and associated infrastructure staff are notified of disposition.
6. Science and operations plan is developed (if requested).
7. Field campaign is planned and executed.
8. All collaborative data submitted to the ARM Data Archive within six months after end of campaign.

Appendix D

Request for Proposal Formats

Appendix D

Request for Proposal Formats

The required elements for full and abbreviated ARM campaign proposal are given below. Page limits for each proposal section are listed, where relevant. Proposals should be in 12-point font with page margins of at least 1 inch on all sides.

D.1 Full Proposal

A full proposal is expected to include the following.

1. **Cover Sheet** – Must include proposal title, names and institutions of principal investigator and co-investigators, date and location of proposed activities, and major ARM resources requested (e.g., AMF1, AMF2, AAF, MAOS, and C-SAPR).
 - All investigators listed on the cover sheet should have clearly defined roles within the proposal text.
 - ARM staff (e.g., instrument mentors, translators, developers, site operations staff, etc.) participating in their ARM roles should **not** be listed as co-investigators as ARM staff are expected to support all selected campaigns. They may be listed as co-investigators, if they are participating in a non-ARM role with external (e.g., ASR or other) funding.
2. **Proposal Abstract** (*1 page*) – An abstract suitable for publication on the ARM website should be included.
3. **Table of Contents**
4. **Project Description** (*up to 20 pages*) – The project description is the primary section of the proposal.
 - The purpose of the project description is to provide the overall science objectives of the campaign and a detailed description of how the ARM Facility instrumentation will be used to address these objectives.
 - The project description should include information, such as planned instrument deployment and configuration, scanning strategies, critical instruments, and/or flight plans necessary to understand how the measurements will address the science objectives of the campaign.
 - The project description may include a section on PI directed analysis and/or process modeling that would use the ARM Facility observations to support the science goals and objectives of the proposal. The intent of such a section is to illustrate the scientific potential of the proposed observations. **It is expected that research described in this section will be supported with external funding. The ARM Facility provides logistical support and resources for field campaigns, but does not provide research funding.** Please indicate proposed sources of external research funding and whether the funding is already secured or when funding decisions are expected.

5. **DOE Mission Relevance** (*1 page*) – A statement of the relevancy of the campaign to the mission of the U.S. Department of Energy (DOE) Office of Biological and Environmental Research Climate and Environmental Sciences Division (CESD).
 - DOE CESD Strategic Plan, <http://science.energy.gov/~media/ber/pdf/CESD-StratPlan-2012.pdf>
 - ARM Climate Research Facility Decadal Vision, <http://www.arm.gov/publications/programdocs/doe-sc-arm-14-029.pdf>.
6. **ARM Resources Required** (*5 pages maximum*) – The full proposal should describe all the ARM facilities needed to complete the campaign.
 - Include resources (i.e., facilities, instrumentation, logistical support, guest instrument support, soundings, travel support, and data products) being requested from the ARM Facility. Please note that the ARM Facility does not purchase equipment in support of individual field campaigns, nor does ARM upgrade infrastructure other than its own.
 - This section should also include:
 - Prioritization of instrument requests (e.g., critical, important, nice to have).
 - Prioritization of VAPs requested.
 - Proposed guest instrument deployments and logistical support needed.
 - Any special instrument configuration requirements (e.g., clusters, ancillary sites, or groupings).
 - Proposed special instrument operations (e.g., radar scan strategies).
 - For MAOS, indicate what measurements are most critical for your campaign, for what duration they need to be deployed, and if there are any specific expectations for any of the chemistry measurements (e.g., specific targeted species).
 - For AAF, potential payload with prioritization, proposed flight plans, and number of flight hours requested.
 - Scientists proposing an AMF or AAF deployment may include requests for travel support for the PI (or a designate) to participate in pre-campaign planning (e.g., a site visit) and/or to be present for the beginning of operations to provide scientific guidance to the ARM Facility in planning successful campaign operations. The facility will make the final determination on what travel support is appropriate to ensure a successful campaign.
7. **Collaborative Resources** (*2 pages maximum*) – Include collaborative resources (e.g., facilities, aircraft, instrumentation, and funding) being provided by other institutions.
8. **Data Management Plan** (*1 page*) – A data management plan is now requested as part of the full campaign proposal.
 - Clearly indicate what data products from PI/guest instrument deployments will be submitted to the ARM Data Archive.
 - For collaborative resources, indicate the collaborating agency's data policy and how data will be shared with the ARM community.

- Note that routine ARM data are available to all participants from the ARM Data Archive on a free and open basis as they become available while data and documentation from PI/guest instrument deployments must be submitted to the ARM Data Archive no later than 6 months after the end of the campaign.

9. References Cited

10. **Biographies** – A brief biographical sketch of principal investigator (*2-page limit*) and co-investigators (*1 page*). The role of each co-investigator should be clearly defined.
11. **Other (Optional)** – Additional appendices/information may be included; however, *note that reviewers are not required to read appendices.*

D.2 Abbreviated Proposal

1. **Cover Sheet** – Must include proposal title, names and institutions of principal investigator and co-investigators, date and location of proposed activities.
 - All investigators listed on the cover sheet should have clearly defined roles within the proposal text.
 - ARM staff (e.g., instrument mentors, translators, developers, site operations staff) participating in their ARM roles **should not** be listed as co-investigators as ARM staff are expected to support all selected campaigns. They may be listed as co-investigators, if they are participating in a non-ARM role with external (e.g., ASR or other) funding.
2. **Proposal Abstract** (*1 page*) – An abstract suitable for publication on the ARM website should be included.
3. **Table of Contents**
4. **Project Description** (*6 pages maximum*) – The project description is the primary section of the proposal.
 - The purpose of the project description is to provide the overall science objectives of the campaign and a detailed description of how the ARM Facility will be used to address these objectives.
 - The project description may include a description of PI directed analysis and/or process modeling that would use the ARM Facility observations to support the science goals and objectives of the proposal. The intent of such a section is to illustrate the scientific potential of the proposed observations. **It is expected that research described in this section will be supported with external funding. The ARM Facility provides logistical support and resources for field campaigns, but does not provide research funding.** Please indicate proposed sources of external research funding, and whether the funding is already secured or when funding decisions are expected.
5. **DOE Mission Relevance** (*1 page*) – A statement describing the relevancy of the campaign to the mission of the U.S. Department of Energy (DOE) Office of Biological and Environmental Research Climate and Environmental Sciences Division (CESD).
 - DOE CESD Strategic Plan, <http://science.energy.gov/~media/ber/pdf/CESD-StratPlan-2012.pdf>

- ARM Climate Research Facility Decadal Vision, <http://www.arm.gov/publications/programdocs/doe-sc-arm-14-029.pdf>.
6. **ARM Resources Required** (*2 pages maximum*) – The full proposal should describe all the ARM facilities needed to complete the campaign.
 - Include resources (i.e., facilities, instrumentation, logistical support, guest instrument support, special instrument scanning strategies, enhanced soundings, data products, etc.) being requested from the ARM Facility. Please note that the ARM Facility generally does not purchase equipment in support of individual field campaigns or upgrade infrastructure other than its own.
 7. **Data Management Plan** (*1 page*) – A data management plan is now requested as part of the campaign proposal.
 - Clearly indicate what data products from PI/guest instrument deployments or offsite instrument deployments will be submitted to the ARM Data Archive.
 - For collaborative projects, indicate the collaborating agency’s data policy and how data will be shared with the ARM community.
 - Note that routine ARM data are available to all participants from the ARM Data Archive on a free and open basis as they become available while data and documentation from PI/guest instrument deployments must be submitted to the ARM Data Archive no later than 6 months after the end of the campaign.
 8. **References Cited**
 9. **Biographies** – A brief biographical sketch of principal investigator (*2-page limit*) and co-investigators (*1 page*). The role of each co-investigator should be clearly defined.
 10. **Other (Optional)** – Additional appendices/information may be included; however, *note that reviewers are not required to read appendices.*

Appendix E

Unmanned Aerial System Operations at Oliktok Point, Alaska

Appendix E

Unmanned Aerial System Operations at Oliktok Point, Alaska

E.1 Summary

This appendix addresses unmanned aerial systems (UAS) requirements for the DOE Office of Science deployment of the third ARM Mobile Facility (AMF3) at Oliktok Point, Alaska, operated by the ARM Facility's North Slope of Alaska (NSA) site. Topics addressed include UAS mission planning and documentation, risk assessment, airworthiness determination, operation authorization, and training requirements for the UAS operators and observers. In addition to the requirements discussed, each field campaign, or intensive operational period (IOP), involving a UAS must be approved by the DOE Office of Science in accordance with ARM field campaign requirements listed previously in this guidance document.

UAS operations at Oliktok Point may be conducted in the Federal Aviation Administration (FAA) designated Restricted Area R-2204, Warning Area W-220, or the transition area between R-2204 and W220. Sandia National Laboratories manages R-2204 and W-220 for the DOE Office of Science and is the designated point of contact with the FAA for R-2204 and W-220 during flight operations. In the context of this procedure, UASs include all categories of unmanned aerial vehicles (UAVs) that are operated from a ground base under direct operator control or autonomously under the supervision of an operator. Examples include fixed-wing and rotary-wing vehicles (no matter what size or capability), moored balloons, and free balloons. UAS operations are governed by DOE Order 440.2C, Aviation Management and Safety; DOE Office of Aviation Management guidance (DOE G 440.2B-2A); and FAA Regulations.

UAS operations at the NSA sites require Sandia National Laboratories-approved UAS aviation safety documentation and mission-specific authorization. UAS operations within Restricted Airspace R-2204 at Oliktok Point do not require a FAA Certificate of Authorization (COA) for each vehicle and mission. Operations outside R-2204 require an FAA COA. Each UAS must have an airworthiness certification. UAS flights are limited to line-of-sight by an observer and require that the UAV execute a lost link procedure when communication with the control station is lost. All members of the flight crew (e.g., operators, observers, or payload specialists) must be trained and demonstrate UAS-specific operation competency.

E.2 Obtaining Approval and Executing UAS Operations at Oliktok Point

Following are requirements that must be satisfied by organizations wishing to obtain approval and execute UAS operations at Oliktok Point:

1. Submit an IOP Request at <http://www.arm.gov/campaigns/propose>. Describe the proposed UAS mission in memorandum form, including the purpose of the operation, descriptions of proposed flights (e.g., duration, frequency, etc.), UAS to be used, dates, and location, and submit the mission description to the NSA Facility Manager or designee.
2. At a minimum, certify the UAS to the requirements of MIL-HDBK-516B and document the certification or an alternate standard approved by DOE Office of Aviation Management.
3. For operations outside R-2204, complete and submit a COA application to the FAA and obtain FAA approval of the COA.
4. Complete the Sandia National Laboratories Aviation Safety Documentation. Attach the FAA-approved COA (if required) and the airworthiness determination for the UAS to the aviation safety documentation and submit it to the NSA Facility Manager or designee.
 - The aviation safety documentation is reviewed by the Sandia Aviation Safety Subject Matter Expert who, in consultation with the DOE Sandia Site Office and the DOE Office of Aviation Management, determines the level of approval required for the aviation safety documentation.
 - The NSA Facility Manager, or designee, informs the Anchorage Air Traffic Control Center (ZAN) and the North Slope aviation community of planned UAS operations and, as required, the activation of R-2204 and W-220 for UAS operations in accordance with the FAA Restricted Area Letter of Procedure and Notifications.
5. Upon request from the NSA Facility Manager, or designee, provide a signed user agreement to the NSA Facility Manager or designee. There are four variations of this user agreement, and the agreement chosen will depend on user (e.g., federal or non-federal and/or proprietary or non-proprietary).
6. Obtain approval of the IOP Request from the ARM Infrastructure Management Board. Submit required documentation to the ARM Facility (e.g., IOP abstract documentation).
7. Provide the Sandia UAS liaison or safety officer with documentation of FCC-approved spectrum authorization.
8. Identify the billeting and infrastructure requirements for the planned UAS operation to the NSA Facility Manager or designee.

9. Prepare a written flight plan that describes the track, speed, altitude, duration, estimated start and stop times, objective of each flight, UAS identifier, and flight crew names and assignments, and present completed plan to the NSA Facility Manager, or designee, for review and approval. In consultation with the Sandia safety officer, prepare a brief safety plan that covers user-specific safety issues.
10. Prior to each flight, brief the flight crew and NSA Facility Manager, or designee, on the flight objectives, flight plan, roles and responsibilities, and emergency procedures, and verify the ability of each member of the flight crew to perform their assigned duties.
11. Prior to each flight, execute the pre-flight checklist to verify ground station control of the UAV, payload functionality, and weight and balance.

Following are steps to be taken after approval to conduct UAS operations has been granted:

1. Conduct the flight in accordance with the flight plan.
2. After the flight, debrief the flight crew with regard to achievement of flight objectives and opportunities for improvement.
3. Share data collected via the ARM Data Archive within 6 months of campaign completion.
4. Complete field campaign requirements.
5. Notify ARM Communications Team of publications resulting from the field campaign.



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