ARM Lead Mentor Selection Process

DL Sisterson

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Work supported by the U.S. Department of Energy, Office of Science, Office of Biological and Environmental Research
## Acronyms and Abbreviations

<table>
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<tr>
<th>Acronym</th>
<th>Expansion</th>
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<tbody>
<tr>
<td>AMF</td>
<td>ARM Mobile Facility</td>
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<tr>
<td>ARM</td>
<td>Atmospheric Radiation Measurement (Climate Research Facility)</td>
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<tr>
<td>ASR</td>
<td>Atmospheric System Research</td>
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<tr>
<td>DQ</td>
<td>Data Quality</td>
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<tr>
<td>DQPR</td>
<td>Data Quality Problem Report</td>
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<td>DQR</td>
<td>Data Quality Report</td>
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<td>MAOS</td>
<td>Mobile Aerosol Observing System</td>
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<tr>
<td>NSA</td>
<td>North Slope of Alaska</td>
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<td>OSS</td>
<td>Operations Support System</td>
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<tr>
<td>SGP</td>
<td>Southern Great Plains</td>
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<td>TWP</td>
<td>Tropical Western Pacific</td>
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1.0 Background

The Atmospheric Radiation Measurement (ARM) Program was created in 1989 with funding from the U.S. Department of Energy to develop several highly instrumented ground stations to study cloud formation processes and their influence on radiative transfer. This scientific infrastructure provides for fixed sites, mobile facilities, an aerial facility, and a data archive available for use by scientists worldwide through the ARM Climate Research Facility—a scientific user facility.

The ARM Climate Research Facility currently operates more than 300 instrument systems that provide ground-based observations of the atmospheric column. To keep ARM at the forefront of climate observations, the ARM infrastructure depends heavily on instrument scientists and engineers, also known as Instrument Mentors. Instrument Mentors must have an excellent understanding of in situ and remote-sensing instrumentation theory and operation and have comprehensive knowledge of critical scale-dependent atmospheric processes. They also possess the technical and analytical skills to develop new data retrievals that provide innovative approaches for creating research-quality data sets.

Each instrument has a designated Lead Mentor, who may also designate associate mentors. The ARM Facility is seeking the best overall qualified candidate that can fulfill Lead Mentor requirements in a timely manner.

2.0 Key Roles and Responsibilities

**Instrument Coordinator:** The responsibilities of ARM Instrument Coordinator include the following:

- Select and coordinate Lead Mentors for facility instruments
- Supervise the operational and calibration protocols and documentation for all facility instrumentation
- Supervise instrument performance and suggest improvements in operating and calibration procedures for all facility instruments
- Work with the ARM Managers to recommend instrumentation based on Atmospheric System Research (ASR) Working Group measurement needs
- Develop budgets for Lead Mentor efforts and instrument needs
- Manage spending progress relative to the established budget
- Utilize ARM-wide administrative and business procedures and practices
- Develop and maintain ARM-wide databases and reporting requirements.

**Lead Mentor:** An ARM Lead Mentor has the primary responsibility for the mentorship of an ARM instrument. The high-level responsibilities are summarized below and the detailed responsibilities are provided in Appendix A. The Lead Mentor may use their ARM funds for support of associate and/or assistant Mentors. The ARM Lead Mentor shall provide a list of names of the all personnel and a brief description of their responsibilities to the ARM Instrument Coordinator. The updated resumes of the Lead Mentor and the personnel supported by Lead Mentor funding shall be provided annually to the ARM Instrument Coordinator as part of contract renewal of funding.
The ARM Instrument Coordinator shall be notified immediately by the Lead Mentor or Lead Mentor’s institution in the event that an ARM Lead Mentor cannot fulfill their responsibilities. The ARM Facility has implemented an ARM Lead Mentor Selection policy that requires all new or replacement ARM Lead Mentors to be vetted through the ARM Lead Mentor Selection Committee that is chaired by the Instrument Coordinator.

The high-level responsibilities that must be conducted in a timely manner for Lead Mentors include the following:

- Develop the technical specifications for instruments and spare components procured for the ARM Facility
- Develop procedures for instrument operations (e.g., daily rounds, maintenance, and calibration)
- Assess instrument status and data quality
- Manage instrument repairs
- Work with ARM data systems personnel on data product requirements that include the specification of appropriate operating ranges and associated flags when data fall outside of that range that provide an indication to the Data Quality (DQ) Office and science data users regarding obvious data quality problems
- Utilize ARM-wide administrative and business procedures and practices.

3.0 ARM Lead Mentor Selection Policy

The ARM Climate Research Facility’s policy with regard to Lead Mentors is to identify, evaluate, and select the best qualified candidates that have recognized research and/or equivalent demonstrated hardware/software experience with instrument or similar instrument systems and are able to perform the to perform Lead Mentor duties in a timely manner.

3.1 ARM Lead Mentor Selection Process

The implementation of ARM Lead Mentors is accomplished by the selection process provided below.

1. ARM Lead Mentor selection process:
   - The ARM Instrument Coordinator has the overall responsibility for the instrument mentorship selection process, except for the ARM radar mentorship selection process.
   - The ARM Chief Operating Officer has the overall responsibility for the ARM radar mentorship selection process.
   - A list of qualified candidates from throughout the community is identified, resumes are obtained, and information is distributed to the members of the Lead Mentor Selection Committee for review and approval.
2. Selection criteria:
   - Candidates have recognized research and/or equivalent demonstrated hardware/software experience with instrument or similar instrument systems.
   - Candidates are able to perform Lead Mentor duties in a timely manner.

3. Candidate replacement:
   - At times, Lead Mentors will need to be replaced due to retirement, resignation, or on rare occasions, performance issues.
   - The ARM Instrument Coordinator shall be notified immediately by the Lead Mentor or the Lead Mentor’s institution in the event that the Lead Mentor cannot fulfill their responsibilities.
   - The ARM Lead Mentor selection process will be used to determine the best-qualified replacement candidate.

4.0 ARM Lead Mentor Selection Committee

The ARM Lead Mentor Selection Committee is composed of the ARM Instrument Coordinator (Chair), the ARM Technical Director, the ARM Chief Operating Officer, the ARM Data Quality Office Manager, and the ARM site managers of the fixed sites and mobile facilities. The ARM Instrument Coordinator is responsible for assembling resumes of qualified candidates and distributing the documents to Committee members for review prior to a meeting. Meetings will be arranged by the Instrument Coordinator and will be conducted by conference calls or in conjunction with other meetings where members are present. After review and discussion, the Lead Mentor is selected by simple majority vote of a meeting that achieves quorum. The Chair casts the tie-breaking vote if needed. If the Lead Mentor candidate is from the institution of the Chair, the Chair will be disqualified as the tie-breaker and the Technical Director will cast the tie-breaking vote.

Current Committee Members (February 2013 to present):

Instrument Coordinator (Chair)/SGP Site Manager: Doug Sisterson (Argonne National Laboratory)

Technical Director: Jim Mater (Pacific Northwest National Laboratory)

Chief Operating Officer: Jimmy Voyles (Pacific Northwest National Laboratory)

Data Quality Office: Randy Peppler (Oklahoma University/Cooperative Institute for Mesoscale Meteorological Studies)

NSA Site and AMF3 Manager: Mark Ivey (Sandia National Laboratory)

TWP Site and AMF1 Manager: Kim Nitschke (Los Alamos National Laboratory)

AMF2 Manager: Nicki Hickmon (Argonne National Laboratory)

MAOS Manager: Stephen Springston (Brookhaven National Laboratory)
Appendix A - ARM Lead Mentor Specific Responsibilities
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The Lead Mentor has the primary responsibility for the ARM instrument mentorship. The high-level responsibilities are summarized below and the detailed responsibilities are provided in here. The Lead Mentor may use their ARM funds for support associate and/or assistant Mentors. The Lead Mentor shall provide a list of names of the all personnel and a brief description of their responsibilities to the ARM Instrument Coordinator. The updated resumes of the Lead Mentor and the personnel supported by their Mentor funding shall be provided annually to the ARM Instrument Coordinator as part of contract renewal of funding. The ARM Instrument Coordinator shall be notified immediately by the Lead Mentor or the Lead Mentor’s institution in the event that the Lead Mentor cannot fulfill their responsibilities. The Lead Mentor replacement will be determined in accordance with the ARM Lead Mentor Selection policy.

The Lead Mentor responsibilities are critical and given in detail below:

Operations

- Supervise the operation of instrument systems to ensure that consistently high-quality data are archived.
- Review the data from the instrument frequently, and provide a monthly assessment in the Instrument Mentor Monthly System.
- Respond to Site Operations technicians’ requests for guidance with the operation and maintenance of the instrument system in a timely manner.
- Use the Data Quality Problem Report (DQPR) process to alert the Site Scientist Team and Site Operations Team to problems with the instrument.
- Carry out site visits as necessary and practical for inspections and service that are beyond the scope of Site Operations technicians. Enter visit and instrument-related information in the Site Access Request system and Operations Support System (OSS).
- Submit Instrument Mentor Monthly System reports following the format and guidance provided by the Instrument Coordinator.
- Maintain the ARM Instrument webpage information, instrument vendor information, and ARM instrument handbook for the instrument system(s) following the established format.
- Perform calibrations as needed, and/or provide procedures and schedules to Site Operations or a third party so that calibrations can be performed. Record calibration procedures, schedules, inputs, and results in OSS under the relevant system/component/site category.
- Identify, confirm, and document (in OSS) classifications of all export-sensitive (International Traffic in Arms Regulations and Export Control Classification Number) components and systems related to areas of instrument responsibility. Coordinate with the research site Operations team to manage and export issues related to instrument systems and components.

Data Quality

- Write and/or complete documentation for the instrument on the ARM Instrument web page. This web page serves as ARM’s “statement of expectation” for the instrument. To ensure data quality, this...
documentation includes the quality control procedures and applicable visual displays used by the Lead Mentor and provided to the DQ Office for inclusion into the DQ Wiki used to document quality control processes.

- Assess the data quality for the instruments, and make that information available to the Data Quality Manager, or make the data quality methodology for the instrument available to the Data Quality Manager so that the DQ Office may properly assess the data.

- Conduct data quality analysis and assessment based on information, if possible, beyond min/max/delta checks. This information includes results obtained by the Data Quality Manager and the Site Scientist. Information may include intercomparisons with data from other instruments or with higher-level ARM Facility data products such as value-added products. Information may include data quality color designations (green, yellow, red, white, or black) to be displayed for data users within Data Quality Reports (DQRs). The Mentor will have final approval on all data quality issues.

- Use the ARM web-based Data Quality Explorer, available at dq.arm.gov, to report information about the quality of data in a particular datastream. The Data Quality Explorer displays diagnostics of the quality of all data generated by the ARM Facility. The responsibility of who provides the statement of data quality will be negotiated individually between the Data Quality Manager and the Lead Mentor. The Lead Mentor is responsible for helping provide the diagnostics used by the Data Quality Explorer to assess data quality.

- File web-based DQPRs to document instrument performance issues and DQRs when necessary, or provide the information to the Data Quality Office to do so.

- Issue DQPRs, as needed, to the appropriate Site Manager who is responsible for coordinating corrective maintenance and/or troubleshooting. The Site Manager, Site Scientists, and Data Quality Office monitor the DQPRs until problem resolution has been reached. Included within the DQPRs will be recommendations and/or instructions by the Lead Mentor for prescribed corrective maintenance and/or troubleshooting activity to resolve the problem. These DQPRs may result in the issuance of DQRs and Corrective Action Reports. The DQ Office will be copied when DQPRs are submitted and then closed. The DQPR is a component of the DQ Explorer inspection, assessment, and reporting system.

- Ensure that instrument calibration procedures are properly designed for the specific system and that they are carried out. The Lead Mentor will either (1) perform calibrations as needed, working with the Operations Team, or (2) provide calibration information, schedule, and procedure to Site Operations for implementation. The calibration results and relevant metadata will be recorded in the OSS under the relevant system/component/site category.

**Value-Added Data Analysis**

- Analyze the raw data obtained by the instrument to assess data quality and to produce value-added data products as required.

- Optimize data products as negotiated with the ASR Science Working Group(s) and Instrument Coordinator.

- Maintain, improve, or implement retrievals as negotiated with the ASR Science Working Group(s) and Instrument Coordinator.
Engineering

- Define specifications for new or revisions to existing instrumentation and work with ARM Instrument Coordinator, Operations Manager, and Technical Director to procure and integrate instruments at ARM research sites.
- Define and articulate plans for instrument sustainability. This includes the evolution of existing instrumentation, instrument spares, and the introduction of new instrumentation and measurement techniques.
- Develop new instrumentation specifications.
- Participate in relevant ASR Science Working Groups.
- Participate in, or lead, Instrument and Measurement Groups.
- Enter Engineering Change Requests.
- Plan, track, and coordinate instrument installation at the ARM Research Site (Engineering Change Order, Project Guide Plans, Project Readiness Review, and Baseline Change Request).
- Work with software developer(s) to complete data collection and ingest (Birth of a Datastream) tasks.
- Provide maintenance and troubleshooting training to Research Site Operations.
- Document instruments, including links to vendor information, on ARM web pages and provide an Instrument Handbook.
- Define and document Calibration Procedures and Calibration Schedules. Having an absolute calibration, traceable to National Institute of Standards and Technology, ISO-17025, or SI standards, is preferred. Instruments that are relatively calibrated need to include the analytical rationale.

ARM Travel and Meeting Participation

ARM Operations (each year). Topics:
- Instrument training
- Instrument calibrations
- Instrument Team Meetings

ASR Science Team Meeting (as relevant). Topics:
- Instrument and measurement performance (poster)
- Science Working Group participation

Relevant ASR Science Working Group Meeting (as relevant). Topics:
- New instruments to address unmet measurement needs
- Instrument upgrades to maintain or improve performance life cycle
- Supplemental engineering effort (new instrument development, upgrades, maintenance, etc.)
- Supplemental operations effort (calibration, reprocessing, maintenance, etc.)
• Analysis to support retrievals and value-added processing.

One domestic professional development meeting (as relevant). NOTE: Foreign travel meetings require pre-approval. Topics:

• Science related to ARM instruments
• Improved performance and/or capabilities of ARM instruments
• Improved algorithms used by ARM instruments.