

**The Atmospheric Radiation Measurement  
Program Infrastructure Review Report (AIR):  
Summary of Recommendations**

January 2001

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

## **The Atmospheric Radiation Measurement Program Infrastructure Review Report (AIR): Summary of Recommendations**

The Atmospheric Radiation Measurement (ARM) Program Infrastructure Review committee feels that the organization of the ARM Infrastructure must change as the amount of required work grows and budgets remain fixed. The current structure may not lend itself to the more efficient operation that will be needed. The current ARM Infrastructure is **site centric**; that structure served ARM well in its early years of development but is one that has become limiting. The committee recommends that the Infrastructure be changed to be **science centric**. The proposed organization is really more an **evolution** than a **revolution** since it is a direction that aspects of the Program are already moving towards naturally. This report outlines a set of recommendations that can serve as a plan for this migration of the Infrastructure.

The multi-Department of Energy (DOE) laboratory cooperation in ARM is one of the Program's greatest strengths, but also has led to inefficiencies. We hope in our recommendations to maintain the multi-laboratory involvement but we recognize that roles may need to be revised to achieve efficiencies.

The Infrastructure should be, where appropriate, integrated into the scientific structure of the program by means of the creation of Scientific Focus Groups. These new Scientific Focus Groups would foster "end-to-end" ownership, from identifying the scientific need for a measurement, fielding an instrument, designing and implementing data collection, quality control, and value-added products, through to the use of the data in research and publications. The new Scientific Focus Groups would consist of members of both the Science Team and Infrastructure and would have co-chairs from each. The Science Team co-chairs would become members of a new Scientific Focus Group Executive Committee (replacing the STEC); the Infrastructure co-chairs would become members of a new Infrastructure Management Team (replacing the ARM Management Team).

The committee specifically recommends that the individual sites' Data System Teams, Program Offices and Operations Teams be replaced by ARM-wide Operations and Engineering Groups. The managers of these new groups also would be members of the Infrastructure Management Team (IMT). The ARM Chief Scientist would chair the Scientific Focus Group Executive Committee. The ARM Technical Director would chair the IMT. The ARM Program Director and Science Director would offer guidance to both groups. These groups would report regularly and publicly to the ARM community.

From our examination of the existing structure, we conclude that roles and responsibilities are not clearly defined and the chain of command is blurry, at best. The new structure we propose more clearly defines all of these and should result in greater productivity and efficiency.

A primary mission of the ARM Infrastructure is to produce a “legacy data set” that is invaluable for research on global change. We are particularly concerned about the coordination and completeness of the quality assurance information describing ARM data. We recommend creating a new position of “Data Quality Manager” who would report directly to the Chief Scientist and Technical Director.

Our recommended changes have many implications, some beyond the Infrastructure:

- All members of the Science Team should be required to be active participants in at least one of the new Scientific Focus Groups.
- These Scientific Focus Groups would have “virtual budgets”, revised annually by the Program Management. Virtual budgets would allow the Scientific Focus Groups to become “customers” for ARM products and to pick and choose among those products to achieve maximum scientific return. Among those products would be: Intensive Operational Periods, aircraft services, intercalibration exercises, IDPCs, value-added products, quality measurement experiments, algorithm development, new instruments, instrument upgrades or repairs, guest investigators, computer upgrades, and external data products. Products not chosen by any Scientific Focus Groups would become candidates for termination.
- A new position of “Data Quality Manager” should be created.
- The Site Scientists would focus solely on scientific support for site operations. Their present research would become part of the Science Team peer review process, and their outreach activities should be transferred to Program management. Depending on their functions, members of the Site Scientist teams would become members of either a Scientific Focus Group or the Engineering or Operations Groups.
- The Scientific Focus Group Executive Committee, chaired by ARM’s Chief Scientist, should be made up of the Science Team co-chairs of the new Scientific Focus Groups, with the ARM Technical Director and the Data Quality Manager as *ex officio* members.
- The IMT, chaired by the ARM Technical Director, should be made up of the Infrastructure co-chairs of the new Scientific Focus Groups and the managers of the Engineering and Operations Groups, with the ARM Chief Scientist and the Data Quality Manager as *ex officio* members.
- The Site Advisory Committees and the Archive Users Group should be dissolved.
- The present Site Data Systems and the External Data Center data system should be made as similar as possible, and should be concerned only with collecting, packaging (ingest into netCDF) and forwarding data to the ARM permanent-data repository. Should a portion of the data system fail at one site, it should be possible to replace it easily with spares from another site.

- All further data processing should be done in the same environment to ensure that the format of data from identical instruments at different CART sites comes to the end user looking as identical as possible. Developers writing new collections, IDPCs or value-added products should not have to change their code because the data were collected at a different CART site (except to account for the different environmental conditions at the sites).
- The functions of the current Site Program Offices should be moved to the Engineering and Operations Groups. Differences among the sites should be minimized as much as possible.
- The functions of the current Data and Science Integration Team and the Instrument Team should be distributed among the new Scientific Focus Groups, and the Engineering and the Operations Groups.

The ultimate success of our recommendations depends strongly on Infrastructure and Science Team members accepting and supporting this new plan and upon strong leadership from the Chief Scientist, the Technical Director, and Department of Energy's Program Office.

Individuals selected to co-chair the new Scientific Focus Groups and manage the Operations and Engineering Groups must understand and believe in the new structure. ARM has been fortunate to have an extremely talented and dedicated group of people within its Infrastructure; the ARM staff must be informed so they can see that the new structure will enable them to function better and will provide more rewarding work.

Our concept should be implemented in its entirety rather than in individual pieces so that the plan's integrity can be maintained. However, it will be necessary to plan a transition and phased implementation. Within our report we enumerate the changes that we believe can be made within the first six months, the first year, and the first two years. We feel strongly that the transition should be as rapid as possible and that changes not completed by the second year would likely not be made.