

Joint UCAR/AMS Committee Report on Activities, Findings, and Recommendations

1. Introduction

The purpose of this document is to report findings and recommendations of the Joint UCAR/AMS Committee on Interactive Computer Display Systems. The report focuses briefly on the status of these systems at the present time and proposes a strategy to pursue future development and utilization of these systems in the atmospheric sciences community. Because the community is only in the initial stages of application of these systems for teaching and research, the committee is recommending cautious, flexible strategies that include application and experimentation with several levels of capabilities to address a variety of needs. Underlying this approach is the supposition that scientists and administrators bear the primary responsibility for the determinations that must be made about the most appropriate fit between available systems and identified research and teaching needs.

2. Background

The initial meeting of a Joint UCAR/AMS Committee (created in response to the 1977 meeting of Heads and Chairmen sponsored by the American Meteorological Society (see BULLETIN, 59, 619–622)) occurred on 24 August 1978 at Madison, Wis. The discussions centered on the utilization of video computer systems for teaching and research in the atmospheric sciences, information exchange regarding events in Washington of interest to the atmospheric sciences community, and information exchange regarding curricula. These three issues were central to the two resolutions that had been adopted by the heads and chairmen. At this August meeting of the Joint Committee the members recommended that “a national strategy for upgrading university research and teaching” be the umbrella for future discussions. While all three issues were discussed at the initial meeting of the UCAR/AMS Committee, the major focus was on the need for the use of video computer systems. The Committee felt that immediate and highest priority ought to be assigned to this topic since these systems promise to be an important new resource in research and teaching.

In support of the work of the Committee, a survey of the atmospheric science community was conducted during 1978 to determine the present availability of resources and projected needs for these types of systems. The survey revealed that a large majority of the respondents viewed the potential for these systems to

be promising. However, the survey also revealed that the atmospheric science community was not adequately informed on the strengths, limitations, capabilities, and costs of the display systems. As a consequence a special session sponsored by the Joint UCAR/AMS Committee was held at the 1979 AMS Annual Meeting in Reno, Nev., to inform the atmospheric science community about the current situation on computer display systems. Also discussed was the status of the current federal government system that distributes meteorological information to the community. Participants in this session at Reno were presented with the findings of the Committee at that time, including a set of proposed strategies. Subsequently, these findings and strategies were revised and are described in the following pages. As stated earlier, the strategies assume that departments and individual scientists must determine their research and teaching needs at the university level prior to seeking federal funding for the acquisition of any hardware. The strategies also emphasize that NSF and/or other government agencies should provide funding for proposals that substantiate a real need for these systems to meet important research objectives, but that the major portion of the long-range cost of these systems will be software development, not purchase of hardware.

In addition to deliberations about the Interactive Video Computer Display Systems, the Joint UCAR/AMS Committee became deeply involved in discussions about changes portended for the networks used to provide weather data to the university community for teaching, research, and forecasting purposes. These changes clearly could have a profound effect on the atmospheric sciences community, and are outlined in the following pages as well.

3. Findings

During its discussion and investigation of the availability of and need for interactive video computer display systems, the Committee found the following:

- 1) Complete assessment of the potential for use of interactive computer display systems in the research and teaching environments will require a substantial period of experimentation, individual innovation, and learning by the atmospheric sciences community. There is considerable promise and interest, but a precise statement of needs and opportunities cannot be made at this time.

- 2) Four levels of capability are usefully distinguished. In order of increasing complexity they are:
- A video tape playback system displaying pre-recorded material, such as case studies.
 - A call-recall terminal displaying a limited menu of current maps or prerecorded sequences.
 - An interactive system allowing computation and modified display on demand.
 - A network of interactive computer display systems accessing a common data base and centralized analysis facility.

In cases b) through d) access to real-time information (over the telephone lines) is a significant incremental cost.

- At this time it appears likely that levels a) and b) will be most useful for undergraduate teaching, with level c) for graduate teaching and research.
- Computing technology quickly becomes obsolete, and systems should be conceived and designed accordingly. At levels c) and d) software development accounts for most of the cost.
- The national strategy for the next five years should be flexible and modestly supportive. It should allow university groups with initiative and well-justified applications to acquire and operate a diversity of individual systems, yet in an environment encouraging the exchange of software and data bases, and with provision for outsiders to gain meaningful firsthand experience of the potential of these systems. Significant sharing with other disciplines on a local basis may be feasible.

4. Recommendations

Based on these findings the Joint UCAR/AMS Committee proposes the following recommendations:

- Equipment and software at levels a) and b) be obtained from commercial vendors.
- Long-term funding for a limited number (perhaps 10-20 in 1985) of research oriented groups using interactive techniques (levels c) and d)), and developing teaching applications where local insight and demands justify it.
- Regular workshops with participants from such active groups, aimed at standardizing concepts of system architecture and definitions of module interfaces, as well as providing an effective forum for stimulating the exchange of software.
- Designation of one or more groups as centers with responsibility for making opportunities available to visitors for hands-on experience on a state of the art system. This should permit the preparation

of videotaped material for use at home on projects of special interest to the visitor. Demonstrations for classroom use may, in particular, require extended or repeated visits. Such centers should maintain a direct interface with an academic department since demonstrations for classroom use are an intended product. Additional funding and appropriate priority determinations may be necessary to discharge this responsibility.

- A program enabling and encouraging interested faculty and research workers to visit such centers to gain firsthand experience. Such experience should be a prerequisite for funding a new system.
- Costs of real-time communications and data access should be justified by the individual groups requiring them.
- Mechanisms should be developed for the easy distribution in delayed time of processed data and videotaped material in suitable formats.

5. Future availability of real-time data to the university community

In addition to proposing recommendations regarding the development of interactive video computer display systems, the Committee became involved in discussions of impending changes in the current atmospheric information distribution network. Apparently the changes are related to the development of the Automation of Field Operations and Services (AFOS) system created for the National Weather Service (NWS). As AFOS becomes operational within the NWS, many of the weather communications circuits now available to the university community either will no longer be available or will be available at increased costs. The proposed NWS External User Policy, distributed 15 December 1978, indicates that NWS use of teletypewriter services A, C, and O will be phased out in early 1981, NAMFAX and FOFAX will be discontinued by January 1980, and NAFAX will be terminated in January 1983. Further, FAA will remove services C and O in 1980, and apparently will no longer provide service A by sometime in the 1983-84 time frame.

The primary NWS data flow will occur through a national data line known as the National Distribution Circuit (NDC). Of concern to the university community are the opportunities for access to the NDC. The External User Policy of the NWS does not provide for direct access to the NDC. Rather, NWS plans to ". . . procure a special computer system in 1979 which will act as a buffer to provide users an access to the operational weather and river information that flows on our NDC." This buffer would have ports available for lease to private enterprise data distribution companies, which in turn would sell the data in a variety of possible formats to nongovernment users. In the

Joint Committee's view two aspects of the proposed new data delivery system are the source of greatest immediate concern to the university community:

- 1) Policies regarding buffer port leasing, regulation of distribution companies, and hardware standardization have not been well formulated by the NWS.
- 2) Costs to the user of real-time data may greatly exceed present day costs, increased costs that cannot be easily borne by the universities.

In order to communicate to the NWS the extreme concern of the atmospheric sciences community, a special meeting with Dr. George Cressman, then Director of the National Weather Service, was held during the 1979 AMS meeting in Reno. In addition to apprising Dr. Cressman of their concerns, participants in the meeting were informed of a meeting called by the NWS to review the proposed External Users Policy. UCAR also was asked to work with the NWS to emphasize the concerns of the community and to work towards a solution.

Following the Reno meeting, the NWS convened its review session in Washington, D.C. in late January 1979 to examine the proposed user policy regarding planned changes in the data distribution network. At that time formal complaints were lodged with the NWS regarding the evident lack of consideration for the impact on the atmospheric research community of the proposed changes.

In addition, based on requests from numerous Member institutions, UCAR staff and members of the UCAR/AMS Committee have been discussing the issue individually with NOAA and NWS officials.

Apparently in response to these discussions and pressures, a letter from Dr. Richard E. Hallgren, Director of the National Weather Service, was recently sent to private companies seeking to be contractors with NWS for distributing atmospheric data. The

letter mentioned a delay in the program, citing three reasons:

- We have delayed the scheduled operations status of AFOS.
- The number of applicants for service company status far exceeded our estimates, and
- In light of the first two reasons and the results of our January meeting and subsequent individual contacts, we feel we must review the proposed policies with NOAA Headquarters."

Apparently the concerns voiced by the research community are being heard. Activities by the UCAR/AMS Committee, UCAR, and members of the community will continue in an effort to understand the policy, influence it where possible, and ease its impact on the users.

Joint UCAR/AMS COMMITTEE

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Amelia Earhart Fellowship Awards

The Amelia Earhart Fellowship Awards are offered annually by Zonta International, a service organization of executive women in business and the professions, to women for graduate study in aerospace related sciences and engineering. Qualifications for the Fellowships are a bachelor's degree in a science preparatory for advanced study and research in a suitable area of science or engineering; a superior academic record and evidence of potential; and acceptance by a graduate school providing recognized courses in the particular field of study. Anticipated application of graduate studies is also of concern.

Since 1938, when the Amelia Earhart Fellowship Awards were established by Zonta International as a memorial to its famed aviation pioneer member, 253 Awards have been made

to women scientists and engineers from 22 countries. Eighty-two graduate students have received grants for one year, 37 for two years, 28 for three years, four for four years. The 253 Awards, representing a total of \$802 400, are supported by members of 750 Zonta clubs in 46 countries. These fellowships, awarded to some of the first women to undertake graduate programs in aeronautical engineering, are now supporting women's studies in the fields of astrophysics, space medicine, environmental law, aviation education, meteorology, astronomy, astronautics, and biophysics.

Applications for the \$5000 Fellowship may be requested from: Zonta International, 35 East Wacker Dr., Chicago, Ill. 60601. Applications for Fellowships for the following academic year must be received by 1 January. The current deadline for receipt of applications is *1 January 1980*.

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