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BOX 8.1. Vital Statistics of the NSIDC DAAC

History. The NSIDC DAAC was created in 1991. Its operations are
almost completely merged with those of the NSIDC and WDC for
Glaciology, which has been disseminating data since 1957.

Host Institution. CIRES, University of Colorado in Boulder, Colorado.

Disciplines Served. Cryospheric and polar science; data are available on
snow cover, freshwater ice, sea ice, glaciers, ice sheets, and ground
ice.

Mission. To serve communities identified by the Mission to Planet Earth
Strategic Enterprise Plan by providing easy and reliable access to EOS
satellite data, ancillary in-situ measurements, and any necessary base-
line data, model results, and relevant algorithms relating to cryospheric
and polar processes.

Holdings. The DAAC holds 1 TB of heritage data sets and anticipates
receiving 15-18 GB of data per day from the AM-1 platform via the
GSFC DAAC.

Users. There were 506 unique users in FY 1997, not including unregis-
tered users who access the ftp site.

Staff. In FY 1998 the DAAC had 27 FTEs and 6 ECS contractors.

Budget. Approximately $4.1 million in FY 1998 (including DAAC costs
and ECS-provided hardware, software, and personnel), increasing to
$4.7 million in FY 2000.

the ECS. With regard to the first, the DAAC currently has funding for 33 FTEs,
although several positions are vacant, and the DAAC will have to add 20 more
FTEs over the next few years.

The Panel to Review the NSIDC DAAC held its site visit on March 4-5,
1998. The following report is based on the results of the site visit and on sub-
sequent e-mail discussions with the DAAC manager in June through September
1998.

HOLDINGS

The snow and ice data archived and distributed by the DAAC (see Box 8.2)
are a critical resource for the cryosphere research community. The need for
existence. Apparently the joint group was not as effective as either the ASF or the NSIDC DAAC might have wished, and separate user working groups for the two DAACs were formed. The outcome, in the panel’s view, was that the NSIDC DAAC gained an effective User Working Group, but at the cost of losing synergy with the ASF DAAC.

Recommendation 1. The NSIDC DAAC should sponsor joint activities with the ASF DAAC, such as joint meetings of the User Working Groups, on issues of mutual interest. In the panel’s view, such an act of leadership would be beneficial to the polar sciences.

Interaction with the Scientific Community

The NSIDC-WDC-DAAC complex has a long and impressive history of responding to the needs of snow and ice researchers. Active involvement on the part of technical personnel in the acquisition and development of data products, and the close juxtaposition of the external support function with active faculty and student in-house research, have resulted in an understanding of the *modus operandi* of scientific research on the part of the technical staff and in a proactive attitude. The panel notes that this cooperative and proactive attitude is a strong positive attribute and that the in-house scientific competence adds value to the data sets. The cryospheric and polar science research communities will continue to increase their use of satellite remotely sensed data, as scientists who are not currently among the remote sensing specialists recognize the value of the data products and become users. Such an expansion of the number and diversity of users can well be accommodated by the DAAC.

Although the DAAC clearly has an excellent relationship with its scientific users, the review showed that visitors and outside collaborators play a relatively small role in the DAAC’s operations. Among the reasons given were a lack of available space and computer equipment for visitors, as well as a tendency for in-house scientific staff to do the “value-added” work such as (1) synthesizing data sets, especially data sets of the same variable but from different time periods and/or regions; (2) reformatting and gridding data sets to facilitate user access; and (3) providing quality control and producing “clean” versions of data sets that were originally contaminated. The HARA Arctic upper-air sounding data set is an example of an NSIDC-enhanced data set that benefited a large segment of users. At present, the NSIDC tends to do this type of work when an in-house researcher needs the value-added data set. Hence, this work is often driven by external funding of in-house projects. This does not guarantee that the tasks undertaken are those most needed by the community. Visitors at the DAAC, who could contribute to such efforts, would bring a nice “external drive” into this process.

The DAAC would benefit in several ways from a more active visitor program. First, it would be able to tap into the scientific expertise and data set usage experi-
ence of the broader community, which is more diverse than even a high-quality in-house staff can possibly be. Feedback from external scientists working at the DAAC will almost certainly be more substantive than feedback from remote users. Second, a strong visitor program would foster the community's stake in the DAAC and would counter any perception of its being a "closed shop" or competitor. Finally, visitors would disseminate first-hand information about the DAAC, its holdings, and its products, thereby enhancing the visibility of the DAAC.

Possible vehicles for enhancing external collaboration include dedicated resources (e.g., workstations, space, travel funds) for visitors and a wide solicitation of visitors. In addition, collaborative ties could be fostered through joint research proposals by NSIDC DAAC personnel and outside scientists. The latter strategy represents a significant step beyond the practice of sending representatives to a workshop and submitting a proposal to serve as the data archive for a particular program (e.g., NSF's Arctic System Science initiative).

Recommendation 2. To broaden the scope of its interaction with the scientific community, the DAAC should sponsor a visiting scientist program with adequate space and should foster new collaborations with outside researchers.

User Services

The panel was impressed with the high level of user services that the DAAC provides to its customers. The balanced suite of analyzed products and data sets offered by the DAAC is much to the benefit of its clients. It also has an active CD-ROM publications program and services a significant number of regular subscribers. Subscribers to a series generally receive multiple products during a year. This is counted as a single request.

The method of counting requests is realistic in that the DAAC counts only requests for which it does work and supplies something to the user. It does not justify itself on soft figures such as hits on a Web site or requests that result in a simple referral to another center. Given the method of counting, the servicing of 1,500 to 2,000 requests a year (including more than 500 subscriptions) indicates that the DAAC is heavily used.

DAAC policy is that all requests receive a response within 24 hours. This does not mean that requests are always completed within 24 hours but that the request is acknowledged and the user receives information on how and when the data or information will be provided. This policy has contributed to a very positive relationship between the DAAC and its users.

Polar Grids

The ECS software employs rectangular projections for gridding data. Rect-
angular projections, however, are inappropriate for high-latitude regions because of the distortion in horizontal distance, which becomes increasingly severe toward the poles. At the pole, the calculations fail. Consequently, polar projections are essential to the cryospheric and polar science communities. The National Snow and Ice Data Center has developed the Equal Area Scalable Earth grid, which has been adopted by the community for the Polar Pathfinder data sets. However, if EOS data are not translated into polar grids, the DAAC (and NASA) will completely fail its user community.

At the time of the review, the DAAC had tried unsuccessfully for five years to make support of polar grids a requirement of the ECS. An instrument team had also submitted a request to the ESDIS Resource Allocation Board for funding to develop a polar grid. A subsequent discussion between the panel and the ECS contractor revealed that ECS contractors have begun to address the problem, and the panel urges ESDIS to ensure that this critical functionality is developed and fully tested before launch.

**Recommendation 3.** To ensure that the needs of the cryospheric and polar science communities are met, ESDIS should require that the capability to generate polar grids be incorporated into the ECS prior to launch of the AM-1 platform.

**TECHNOLOGY**

**General Philosophy**

The NSIDC DAAC seeks to balance the risks of prematurely adopting "cutting-edge" technology with the benefits that more modern systems provide. The DAAC therefore tries to be "sufficiently modern" with regard to hardware. The panel agreed that this is a sensible approach.

**Hardware**

The network topology and communication infrastructure seem sufficiently modern to meet the needs of the DAAC for the foreseeable future. The storage capacity of the StorageTek PowderHorn (300 TB) for on-line storage and archive is more than sufficient to handle the legacy data (1 TB) and the new data expected over the 10-year life cycle. The server and workstation configuration are currently adequate to meet the needs of the DAAC, although the number of workstations available for non-DAAC use (i.e., visiting scholars) was raised as an issue (see Recommendation 2).
ment and interdisciplinary science teams and attend team meetings, the DAAC feels it does not have much influence over the data management plans.

SUMMARY

The NSIDC DAAC contributes well to the strategic goals of the Earth Science Enterprise by facilitating research that will lead to fundamental contributions to cryospheric and polar science. Two important factors have helped the DAAC implement its mission: (1) it has a strong vision of serving its science community; (2) it is collocated with two other major cryospheric-polar data centers, the NSIDC and the WDC for Glaciology. With regard to the first, the DAAC has an excellent relationship with its cryospheric and polar science user communities. Indeed, the DAAC is embedded in the science community, an accomplishment that few data centers are able to achieve. Its success in this regard comes in part from understanding who its users are and what data they need. A better understanding of how the data are used, however, would further improve the DAAC’s service to its customers. In addition, joint activities with the ASF DAAC would help the NSIDC DAAC develop closer ties with scientists who use synthetic aperture radar data in the polar regions.

The second factor for the DAAC’s success, the collocation and intermingling of DAAC operations with the NSIDC and the WDC for Glaciology, not only leverages NASA’s investment but also has practical benefits for the DAAC. The DAAC can take advantage of lessons learned by the older data centers, and it has access to a wide variety of ancillary data and in-house scientific expertise. Such in-house resources, however, come with the risk of becoming a closed shop, and the DAAC and its sister centers would benefit from a strong visiting scientist program.

The DAAC’s relationship with its host institution, CIRES, is also good, in part because of the strong involvement of a faculty member, Roger Barry, in the DAAC. The DAAC’s relationship with NOAA’s National Geophysical Data Center, on the other hand, seems pro forma and the potential for a stronger, beneficial relationship has yet to be realized. A better relationship with NOAA could help smooth the transition for the long-term archive of NSIDC DAAC data.

One of the greatest challenges facing the DAAC is accommodating limitations in the ECS that will make it difficult for the DAAC to satisfy the needs of the polar science community. For example, the latest version of the ECS does not provide subsetting capabilities or polar grids, although the DAAC and the ECS contractor are taking steps to remedy these deficiencies. Although the DAAC appears to know what needs to be done to be ready for launch, a better near-term plan and schedule to transition from Version 0 to the ECS would help ensure the DAAC’s readiness for the AM-1 platform.