Report of the Space Physics Data Facility Science Advisory Group

Science Advisory Group Membership: Terry Onsager, chair (NOAA Space Environment Center); Neal Hurlburt (Lockheed Martin); Larry Paxton (JHU Applied Physics Laboratory); John Richardson (MIT); Dave Sibeck (NASA Goddard); and Aaron Roberts (NASA Goddard)

Science Advisory Group Charter:

The Space Physics Data Facility Science Advisory Group has been formed as a standing committee with the goal of providing input from the scientific community on how well the Sun Earth Connection Active Archive (SECAA) is fulfilling the needs of the space physics data and model users and to provide advice on future directions. Although relatively small, the committee includes representatives from the broad space physics community, include the areas of solar, heliosphere, magnetosphere, ionosphere, and upper atmosphere.

Summary of Findings and Recommendations:

The findings and recommendations contained within this report are based on two days of presentations and discussion held at GSFC on September 28 and 29, 2005.

There are two main findings of the Advisory Group from which the majority of the recommendations follow. The first is that SECAA must clearly define its core activities and establish the benefits to the space physics community and the costs necessary to achieve these goals. The enterprise of data management is rapidly changing, and the role of the SECAA in the new environment of VxOs, Active Archives, etc. is not clear, largely because this new environment is only now in the initial stages of defining itself. We advocate that in this uncertain and evolving climate, the SECAA must assert its leadership role in the future of data management and help to define this new environment. Our second main finding is that the SECAA currently provides effective and highly valuable services, but these services primarily benefit the segment of the space physics community that studies solar wind/magnetosphere coupling. The SECAA has the capability of providing similarly valuable service across the full solar-terrestrial physics domain, and we recommend that the SECAA build on its current areas of excellence to enhance their services.

The SECAA staff gave a thorough overview of the breadth of activities that they are engaged in, and they presented a number of forward-looking concepts. The Advisory Group greatly appreciates the effort that was devoted to helping us understand the SECAA and its current working environment. The Advisory Group was pleased with the SECAA's current activities and with the opportunities that lie ahead. The cost cuts contemplated by HQ indicate that SECAA needs to demonstrate the value of its services to HQ and the community in order to secure at least constant funding. Our hope is that the findings and recommendations described in this report will give ideas and guidance that the SECAA can consider when formulating their future plans, with the goal of

building on their current strengths to enhance their services to the solar-terrestrial physics community.

The SECAA faces a number of challenges that must be addressed in the near term. The actions we feel SECAA must take include:

- Establish a charter for the organization;
- Determine how they will work with the VxOs;
- Secure funding for continuation and possible expansion of the SECAA activities;
- Take the lessons learned from their service to the heliosphere/magnetospheric community and expand their role to provide that level of service to the solar and ITM communities;
- Work with NASA HQ to define the data delivery and format requirements for future missions to insure the most cost-effective use of SECAA and NASA resources;
- Proactively work with project scientists at GSFC to assist forthcoming missions.

Findings and Recommendations:

Finding 1: In the discussions and presentations during our meeting, it was difficult to discern the SECAA's core mission. We feel that the SECAA should define and focus on a core mission. Suggestions for this core mission are given below in our recommendations.

Finding 2: With the development of Virtual Observatories, Resident Archives, Active Archives, etc., the enterprise of managing and serving mission data is rapidly changing. It is not yet known what the role of all of these different activities will be, but at a minimum their existence will change the role of SECAA and at one extreme some people are arguing that the SECAA is no longer needed. The SECAA needs to proactively help to define these emerging activities, taking a leadership role, to insure that its current valuable services, as well as those developed by the emerging, but transient Virtual Observatories are not lost as changes are made. SECAA provides a ready resource of tools and expertise for emerging VxOs. SECAA has investigated, addressed, and/or solved many of the issues that will confront VxOs. The value of SECAA in the VxO development effort must be recognized internally within SECAA and externally (in the community and at NASA HQ).

Finding 3. SECAA must establish a plan for addressing the pending loss of support that demonstrates what services will be lost as well as how that affects their future and pivotal development efforts.

Finding 4: The SECAA provides excellent services that are highly valued. For example, the SECAA is the only location where data from a large number of diverse sources can be intercompared, a capability that enhances the efficiency of space science research,

particularly "systems science" of the kind fostered by the Living With a Star program. The majority of these services, however, benefit primarily the solar wind/magnetosphere coupling scientists. Many scientists in other areas of solar-terrestrial physics are less aware of the SECAA services and benefit less from them. With the growing availability of data, SECAA has the opportunity to build on its successful areas and provide a more comprehensive set of services that benefit the full solar-terrestrial physics community.

Finding 5: Anecdotal evidence presented by SECAA appears to indicate that the effort and the cost required to incorporate a new data set into the SECAA services can vary greatly and can depend on the decisions made by the individual missions and their interest in working with SECAA. For planning purposes, the SECAA needs to quantify the expected costs involved in acquiring new data sets. More clearly defined expectations at the mission level on the eventual incorporation of new data into the SECAA would benefit the management of the SECAA. In addition, the SECAA has a key role in insuring that the existing data in the NSSDC continue to be seamlessly available. The SECAA should assist in keeping data accessible in a cost-effective manner as a "post Resident Archive" data provider. This activity could naturally merge with helping VxOs by developing reusable tools and standards and by serving recent and older data in parallel with active missions or Resident Archives. The Advisory Group has the impression that the relationship between the satellite missions, SECAA, and NSSDC is somewhat ad hoc. This relationship needs to be clearly defined especially as it appears some personnel time-share between the two activities.

Recommendations:

Recommendation 1: Define SECAA's core mission. Our suggestion is:

SECAA will provide: Integrated Access to Great Observatory Data

Currently SECAA has a number of services that are highly valuable for the solar wind-magnetosphere community, for example. This is a well established and successful foundation. This success needs to be broadened to include the full solar, solar wind, magnetosphere, ionosphere, thermosphere system, and possibly include models and model/data comparison. SECAA can provide coordination and continuity to the great observatory data environment (VxOs, Resident Archives, Active Archives, CCMC, NSSDC).

Look closely at who your current customers are and why your services have value, and apply this to other areas you can expand into. Take advantage of the local sources of expertise (Goddard, NRL, APL) to understand which new services would give the most value.

Recommendation 2: Articulate clearly SECAA's core mission, its value, and how it fits into the broader space physics community.

- Why are you unique?
- Why are you cost effective?
- How well utilized are you?
- Determine meaningful metrics that go beyond acknowledgements in journals and track these indices.
- Establish yourselves as leaders in development, rather than service providers.

Recommendation 3. Poll the user community, starting with GSFC and GSFC line managers to see whether they understand what SECAA offers, whether they value SECAA, and what SECAA must do to acquire/retain/add value.

- Review current tasks and establish priorities and program elements that demonstrate the need for a continued investment.
- What does SECAA do, how much do they cost, and does the investment reflect the return in user-perceived utility?

Recommendation 4: Create a 5-year plan that keeps the focus on the core goal of Integrated Access to Great Observatory Data. The plan should include a path to:

- Expand to the ITM community;
- Expand to the solar/heliosphere community;
- Define collaborations with the CCMC such as providing access to data and summary products;
- Develop techniques/tools for model/data comparisons;
- Define your relationship to the VxOs and the other emerging data activities;
- Define your relationship to the NSSDC – as the Virtual Observatory to the long-term permanent archival of data;
- Establish a goal to develop metrics of the value of your services.