

GSFC Space Sciences Directorate (SSD) Visiting Committee Report

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Visiting Committee Charter

“The Director of Space Sciences Directorate (SSD) of the Goddard Space Flight Center (GSFC) is Jonathan Ormes and his Deputy is John Dalton. The SSD Visiting Committee meets every year or so, and provides the Director with advice and guidance on running the Directorate, helping to make sure they are both doing the right things and doing things right. Our Visiting Committee Chair, currently Gary Melnick, serves on the Center’s Visiting Committee. The Chair of the Center Visiting Committee is Tom Young. The guidance obtained from the Visiting Committees at all levels in GSFC is extremely valuable.

Each year the SSD asks our Visiting Committee to review one of our three laboratories and provide general guidance for operating the Directorate as a whole. This year we are adjusting to the transition to full cost accounting, a new financial management structure, e-government initiatives, new personnel policies, etc. There are lots of changes going on at once and the need for external review is more acute than usual. The laboratory “in the barrel” this year is the Laboratory for Astronomy and Solar Physics (LASP), currently under the leadership of Dr. Bill Oegerle. Dr. Oegerle assumed his current position at the beginning of 2003 and has now had enough time to benefit from this review. LASP is undertaking new initiatives to study dark energy and search for extra-terrestrial planets in the astronomy area as well as the ongoing Living with a Star program and other new missions in the area of solar physics. The SSD and LASP seek advice on how best to make sure we are properly maintaining our competence and enabling the Nation’s space science programs in these areas.”

EXECUTIVE SUMMARY

The scientific productivity of LASP is impressively high. However, there are looming changes to the work environment that could affect productivity unless properly managed. Specifically, the Visiting Committee urges the Space Sciences Directorate to continue to monitor the effects of Full-Cost Accounting (FCA) as measured by changes in the: success-to-failure ratio of proposals submitted to sources external to GSFC; staff retention statistics; recruiting difficulty; and, research publication statistics. The shift to FCA must allow that resources be managed in a way that provides support for key individuals during periods when research- or mission-connected charge numbers are not otherwise available. Because every research activity or facility lacking full external support cannot be retained without an

unacceptable increase in the overhead rate, it will be necessary for the Space Sciences Directorate to conduct periodic evaluations to determine its current core competency requirements. The money required to sustain innovative research and unique facilities will have to come from the same, well-managed SSD funds. The Committee feels strongly that failure to maintain seed money for innovative ideas will eventually erode GSFC's place as a national leader in many mission-enabling technologies.

The Committee also recommends that steps be taken to repair the apparent breaches that are developing between some scientists and engineers and between some scientists and managers. The notion that technically challenging missions can succeed while compartmentalizing, and hence isolating, scientists, engineers, and managers is contradicted by history. The Space Sciences Directorate must work to reduce and/or eliminate the barriers separating scientists, engineers, and managers. Co-location, if not re-badging, of engineers within the Space Sciences Directorate will help. Supporting scientists to remain vigorously involved with managers in programs beyond their initial phase will also be helpful.

The ability to increase the number of new SSD hires is tied directly to the retirement rate. The Visiting Committee endorses the efforts taken to increase the appeal of the emeritus program as a means of fostering retirements. The Committee urges the Space Sciences Directorate to continue these efforts. For staff not fully engaged in research or mission support, and for recently retired staff, the Committee recommends that these individuals be assigned to mentor new employees or employees who choose to undertake new and demanding responsibilities, such as that of a Project Scientist. Research hires made at a level equivalent to assistant professor or higher should receive start-up funds. The Visiting Committee recognizes that providing such funds puts further strains on SSD financial resources. However, failure to do so will slow the rate at which young scientists can become fully productive, particularly in an FCA environment where equipment and travel expenses must now have an associated charge number.

The Visiting Committee urges the Space Sciences Directorate, while working with the responsible parties within the Center, to expedite solutions to the remaining Integrated Financial Management (IFM) problems. Persistent problems with IFM are placing unreasonable burdens on the staff, prohibiting some grant holders from obtaining basic financial information, and generally sapping morale.

Last, but certainly not least, the Visiting Committee joins the staff in expressing our gratitude to Jonathan Ormes for his superb stewardship of the Space Sciences Directorate and we extend our wishes for a long and happy retirement.

INTRODUCTION

The Visiting Committee met between January 20 and 22, 2004, at GSFC. During the first half of Day 1, Jonathan Ormes reviewed the state of the Space Sciences Directorate with the Committee. The Committee then heard a number of science presentations representing work

from throughout the Directorate followed by a one-hour, off-the-record meeting with available Senior Level employees. Day 1 concluded with a reception to which all SSD staff were invited.

On Day 2, the Committee heard about the diverse research activities ongoing within LASP. Day 2 concluded with a second off-the-record discussion, this time with available new hires. Day 3 was spent assembling notes and summarizing the Committee's findings for Jonathan Ormes and the Center Director, Al Diaz.

This report is divided into two main sections: General Comments and Issues & Recommendations. The Committee's findings are based upon a combination of material circulated prior to the meeting, information formally presented during the meeting, and the off-the-record comments of employees with whom we met.

GENERAL COMMENTS

The Visiting Committee continues to be extremely impressed with the breadth and depth of the scientific endeavors within LASP – our focus this year. The quality of the work presented is, without doubt, world class. The Wilkinson Microwave Anisotropy Probe (WMAP), which has received much well deserved publicity during the past year, is only one of many successful missions conceived and developed at GSFC. The Laboratory remains a vital force in astronomy across a wide array of disciplines, including solar physics (e.g., the Living with a Star Initiative and its flagship mission, Solar Dynamics Observatory - SDO; the STEREO/SECCHI coronagraph – COR1); the Normal incidence EXtreme Ultraviolet Spectrometer – NEXUS; the sounding rocket-borne Extreme Ultraviolet Normal Incidence Spectrograph – EUNIS; the developing Virtual Solar Observatory; NASA/ESA Solar and Heliospheric Observatory – SOHO; Transition Region and Coronal Explorer – TRACE; and Ramaty High Energy Solar Spectroscopic Imager - RHESSI), ultraviolet astronomy (e.g., Galaxy Evolution Explorer – GALEX), optical astronomy (e.g., Advanced Camera for Surveys/HST and Wide Field Camera – 3/HST), infrared astronomy (e.g., InfraRed Array Camera – IRAC/Spitzer; James Webb Space Telescope – JWST), and cosmology (e.g., WMAP and the Absolute Radiometer for Cosmology, Astrophysics, and Diffuse Emission – ARCADE).

In addition to the above ongoing projects and programs in development, the Committee is encouraged by LASP mission studies aimed at keeping GSFC at the forefront of astronomy in the next decade. Among these are extrasolar planetary imaging missions, such as the Extrasolar Planetary Imaging Coronagraph (EPIC), the Fourier-Kelvin Stellar Interferometer (FKSI), the Terrestrial Planet Finder (TPF), the Joint NASA/DOE Dark Energy Mission (JDEM), and several NASA Vision Missions – Single Aperture Far-Infrared Telescope (SAFIR), the Submillimeter Probe of Evolution of Cosmic Structure (SPECs), and Stellar Imager (SI). We congratulate all of the scientists, engineers, and managers at GSFC and its partners for a year of very significant advances in instrumentation and research of exceptional value to the astronomical community.

That these achievements continued apace during Jonathan's tenure is not an accident. The Committee believes, and the staff with whom we met unanimously concurred, that Jonathan, the Lab Chiefs, and the Branch Heads have worked hard to preserve an atmosphere that fosters the intellectual freedom, creativity, and innovation needed to make these scientific achievements possible. The Committee wishes to express its appreciation to Jonathan for the positive work accomplished under his leadership as Director and we wish him all the best in his upcoming retirement. As discussed below, the challenges ahead are many and the Committee hopes that Jonathan's successor will continue to nurture an atmosphere that is favorable to research and innovation.

In order to deal with the challenges ahead, it is critical that a planning and prioritization process exist. The Visiting Committee is pleased that the Directorate has undertaken a process of strategic planning. Furthermore, the Committee endorses the major new science initiatives to study dark energy and extra-solar planets, even though some projects may need to be phased out in order to free up the needed resources.

As some mature projects run their course and new programs are begun, the Committee wishes to express in the strongest terms possible that the formula for success which has worked so well to date – namely the active involvement of scientists in all phases of a project's execution – be preserved. This sentiment is also shared among those SSD scientists with whom the Committee met. Beyond their role as originators of new ideas that lead to missions, scientists also possess a considerable body of knowledge and experience vital to mission success. The benefits of this involvement have been demonstrated on COBE and WMAP and are presently being demonstrated on JWST, to name but a few examples.

The Committee perceives that the close historical working relationships between some SSD scientists and Code 500 engineers is being put at risk by a drop in both the number of engineers badged to the Space Sciences Directorate and the number of engineers that are co-located with the science staff. Because the cohesion between scientists and engineers is so important to GSFC's mission, this gap must also be closed.

Without doubt, the uncertainties surrounding the implementation and future outcomes of full-cost accounting (FCA) dominate staff concerns. Whether these concerns will ultimately prove justified is unclear – it's still too early in the process. However, whatever changes FCA may bring, the Committee believes that it is paramount that the Space Sciences Director, working with the Center Director, find a means separate from direct project support to fund internal research and development and to maintain unique facilities. The Committee recognizes that achieving this goal, while simultaneously keeping the overhead rate low, will require a combination of creative thinking and tough decisions.

The aging of the workforce is another challenge to be faced. Unfortunately, for the foreseeable future, the rate at which younger talent can be recruited will be set by the rate at which present staff retires. This problem is by no means unique to GSFC, but it must be addressed. The Committee applauds the ongoing effort within the SSD to examine its emeritus program with the goal of making it more appealing. New hires could benefit

greatly from emeritus program mentors with relevant experience. In addition, for those recruits hired at the GSFC-equivalent of an assistant professor, start-up funds would both hasten and smooth their transition to becoming productive members of the Goddard scientific staff.

The Committee is concerned that recruitment or promotion of talented mid-career GSFC staff to senior management positions at GSFC may not be possible under the newly modified rules for Senior Executive appointments. The Committee hopes that these rules will be modified, or other means found, so that the very successful tradition of appointing outstanding experienced space scientists to Lab Chief positions in the Space Sciences Directorate can be continued. In particular, the Committee hopes that the appointment of William Oegerle to the Senior Executive Service will soon be completed.

Finally, the Committee heard widespread complaints about the significant increase in the bureaucratic workload shouldered by the staff as a result of the new Integrated Financial Management (IFM) software adopted by the Center (and NASA). The Committee, along with the staff, hopes that these IFM-related problems will diminish as the software is improved and the staff grows more accustomed to its use. However, the situation at present is unsatisfactory and problems must be rectified in a timely manner or this issue could seriously affect staff morale. Toward this end, the Committee endorses the ongoing SSD efforts to lessen the IFM bureaucratic burden on staff.

ISSUES & RECOMMENDATIONS

Financial Matters: Full-Cost Accounting (FCA):

The implementation of Full-Cost Accounting and the Integrated Financial Management system have combined to produce great anxiety within the scientific staff.

Regarding FCA, the major concerns are:

- The staff perception that, under FCA, internally generated proposals will be less cost competitive with non-GSFC generated proposals leading to a reduction in grant and contract awards. Any significant drop in the number of grant or contract awards will be cause for concern, but apprehension about GSFC competitiveness is further heightened by the need among civil servants to now charge part of their time to a contract or grant.
- Inappropriate use of overhead funding to support scientists who are not contributing to major thrusts of the Space Sciences Directorate.
- Support for important, and often unique, facilities (e.g., Detector Development Lab and Detector Characterization Lab) is unclear in the new FCA environment.
- Support for key people who may suffer a lapse in funding support.

- High overhead rates that may further erode the cost competitiveness of GSFC proposals. In the recent past, reported fluctuations in the overhead rate have made budget preparations and financial planning more difficult.

Recommendation #1: The Committee recommends that the Center Director's office, working with the Space Sciences Directorate, closely monitor the success of the science enterprise under FCA. Some of the metrics for measuring success or failure include: proposal success/failure ratio pre- and post-FCA; staff retention statistics; recruiting difficulty; research publication statistics; overhead rates as compared with major proposal-generating competitors. The continuing health of the Directorate depends on ensuring that the transition to FCA proceeds without any serious disruptions to research. The intent of this recommendation is to provide the Directorate with a path for assessing the transition to FCA. It may be the case that for some research areas prompt corrective action should be taken to assist in the transition.

Recommendation #2: The Committee recommends that the use of overhead funds be carefully monitored. Such funds should be used to support valued scientists who are contributing directly to the work of the Space Sciences Directorate. Overhead funds should not be used to support scientists whose work does not contribute in a direct way to major thrusts of the Space Sciences Directorate.

Recommendation #3: In concert with the ongoing efforts to identify GSFC core competencies, ways need to be found to maintain key facilities. (This may require dollars to support contract workers in addition to providing FTP's.)

Recommendation #4: The Committee recommends that an external audit of cost and methodologies of Center operations be conducted to seek areas for reducing cost and improving efficiency. The audit and consequential actions should be conducted in a manner that does not further burden lab members.

Recommendation #5: Much of the staff anxiety is generated by the uncertainties surrounding FCA and its implementation. The Committee recommends that the Space Sciences Director actively and routinely communicate to the staff FCA implementation plans.

Recommendation #6: The Center, and the Space Sciences Directorate in particular, should do a better job of educating the broader astronomy community about their achievements. Added awareness of GSFC capabilities could lead to increased collaborations with outside groups. The infusion into the Center of funds from externally-led projects could be of extra importance in a FCA environment.

Comments: The Visiting Committee endorses the intention within the Space Sciences Directorate to maintain a healthy IR&D budget. Such funds, often unobtainable elsewhere, provide the seed money for innovative ideas that, hopefully, will lead to

successful proposals for external funds. The Committee also notes that there remains some lingering confusion about the proper use of the new FCA account numbers. Concern about this issue does not rise presently to the level requiring a recommendation because we expect that such problems will diminish naturally as the staff becomes more acquainted with FCA and, we hope, the necessary guidance is provided by the Directorate. However, if not diligently addressed, staff problems adjusting to the FCA procedures could become a much more serious issue.

Financial Matters: Integrated Financial Management (IFM):

The major concerns surrounding IFM are:

- Rather than streamlining financial matters, the staff with whom the Committee met report that IFM has resulted in a marked increase in their bureaucratic workload – i.e., it is harder to perform routine financial tasks now than before IFM was in place. At present, the IFM software is apparently not operating entirely as planned and, as a result, much time is spent learning unadvertised work-arounds.
- The financial transparency promised by IFM has not been realized. In fact, quite the opposite is sometimes true; staff members report that the visibility into their contract and grant accounts is far less than in the past – so much so that budgeting on smaller grants is often very difficult. Without insight into accounts, PI's cannot exercise proper control over their projects.

Comment: The Committee assumes that Goddard management is aware that problems remain with the implementation of IFM and is working diligently to correct these problems. Criticism of IFM among the staff would have been greater except that most staff members assume that management is working to correct problems and hope that present shortcomings will soon be resolved. Failure to do so soon will not only reduce productivity but also increase frustration.

Scientist-Engineer Interactions:

Many of the great achievements at GSFC have been forged through close working relationships between scientists and engineers functioning in tight collaboration. Any impediments to the establishment of these close working relationships concern the staff and the Visiting Committee (and should concern the Center).

Recommendation #7: The Committee is very worried about the perceived growing gap between Science and Engineering Directorate personnel. Specifically, the hard-earned and often specialized expertise among engineers who have worked closely with scientists risks being lost by the increasing physical and bureaucratic fences being erected between these Codes. The Committee recommends that the co-location of engineers within the Space Sciences Directorate be increased. This need should be

incorporated into the planning for and the allocation of space within the new Space Sciences building.

Project Scientists:

During the previous Visiting Committee meeting, a number of Project Scientists complained that fulfilling the responsibilities of this job left little time to pursue independent research. This reality diminishes the appeal of being a Project Scientist among active scientists. Furthermore, the recruiting of scientists could be inhibited by fear that coming to GSFC may effectively limit and impair their research careers. It was not clear to the previous Visiting Committee how much of this problem was due to increasing demands upon Project Scientists and how much was due to inexperience in this role. To remove any ambiguities that may be causing added stress among present Project Scientists and to aid recruitment, the Visiting Committee fully endorses the ongoing effort to better define the roles and responsibilities of a Project Scientist. It is hoped that a clearer definition will result in a better use of their required project time and their available independent research time. The Committee also believes that experienced Project Scientists should serve as mentors to individuals new to this role.

Retirees and Mentoring:

The demographics within the Space Sciences Directorate indicate that the average age of the workforce is about 50 years old and increasing. Because the number of full-time civil service positions is presently capped, and will remain so for the foreseeable future, new hires can be added only at the rate at which current positions are vacated. The Visiting Committee applauds the ongoing efforts within the Space Sciences Directorate to make retirement a more appealing option for those who qualify.

Staff who have recently retired, or experienced staff not fully engaged in research or mission support, could provide the much needed function of mentoring new hires and individuals who have moved into new roles of importance to the Center, such as the role of Project Scientist. Mentoring may also be particularly helpful to younger staff who have the added burden of adapting to the requirements imposed by FCA and IFM.

Recommendation #8: The need for effective mentoring is now of greater importance in the new FCA and IFM environments. This program should be rigorously implemented. The Committee recommends that senior staff members who are not fully occupied in research or mission support be assigned to mentor new hires (see below) and other staff who assume new positions within the Space Sciences Directorate for which they have no previous experience (e.g., Project Scientist). Furthermore, the Committee recommends that recent retirees who wish to retain a connection with the Center be encouraged to serve as mentors. To enhance the effectiveness of this program, the Committee endorses the effort by the Directorate to develop a set of mentoring guidelines that informs mentors of what might be helpful to offer, and mentees of what is available. (It may

provide useful feedback to the mentoring program if mentees are asked to comment on the effectiveness of the program during their first annual review.)

New Hires:

Hiring the best young people is always a highly competitive process. For those new scientists hired at the equivalent of an assistant professor level or higher, space and startup funds for setting up new labs are increasingly important inducements. Such offers are commonplace in academia. With access to start-up funds, new scientists will be able to jump-start their ability to conduct research. It is in GSFC's interest, as well as that of the new hires, to accelerate their ability to contribute.

The need to meet the demands of FCA and IFM only increases the need for startup funds. In a FCA environment, it may be essential that new researchers, who have not yet had an opportunity to apply for and receive external grants, have ready access to funds for the purchase of hardware, travel, etc. These resources must be supplied at the outset and protected from budget cuts since they are, in essence, part of the hiring contract.

Recommendation #9: The Center should provide start-up funds for new hires that assume positions at a level corresponding to the academic rank of assistant professor or higher. These funds could be crucial for allowing a new researcher to make an effective start, particularly in a FCA environment, and may be a necessary recruiting inducement.