

Dear Dr. Charles Kennel:

I am writing to report on the meeting of the Astrophysics Subcommittee of the NAC. The Astrophysics Subcommittee met in Washington, DC on 6-7 July 2006. During our meeting, we were addressed by Senator Schmitt, Administrator Griffin, Associate Administrator Cleave and Rick Howard (the current Acting Director of the Astrophysics Division).

Astronomy & the Moon

NASA's planned return to the Moon has the potential to eventually enable research in astronomy. The Subcommittee was charged with assisting NASA in its efforts to identify the most exciting astronomy enabled by this major initiative. An important step in this process is the community workshop on November 28-30 at Space Telescope Science Institute.

We have the following recommendations:

- NASA needs to more fully engage the astronomy community in the process of identifying exciting lunar program-enabled astronomy. It would be useful to request white papers from the community and to have a session at an upcoming AAS meeting where representatives from the Exploration Initiative describe potential lunar opportunities.
- Any lunar astronomy program must be high priority science that competes scientifically with other SMD missions. Major projects in lunar astronomy should be evaluated as part of the decadal process and be initiated only if highly ranked relative to other opportunities in astronomy.
- NASA should explore early science possibilities, such as improving lunar ranging measurements. NASA should engage the "fundamental physics" community in identifying these programs.
- NASA should explore the use of the Earth-Moon L1 point as part of the lunar program. L1 is an excellent site for deployment and testing of satellites and is a platform that would bring the solar system into our economic sphere. Missions such as Lifefinder could utilize L1 robot (+human) assembly before transferring to the Earth-Sun L2.

We are assembling a lunar astronomy working group consisting of members of the subcommittee, members of the STScI meeting organizing committee, and the broader community. John Mather and Alan Dressler will serve as members of the task force.

Space Interferometry Mission (SIM)

In his July 6 speech to the assembled subcommittees, Administrator Griffin announced plans to severely cutback on the Space Interferometry Mission (SIM). While the details are embargoed, SIM is moved out of phase B and will become a technology development program and will be assessed in the upcoming decadal survey.

The decision to significantly delay SIM is a major decision with major scientific impact. This decision will delay the detection of nearby Earth-like planets by many years and will cede leadership in astrometry and space interferometry to Europe. The Subcommittee recognizes that decision was driven by budgetary constraint and programmatic decisions.

The Subcommittee is concerned that another major mission decision was made without consultation with the scientific community. Like the initial announcement of the cancellation of SOFIA, there was no opportunity for community discussion and input in the decision. The Astrophysics Subcommittee is available to provide NASA management with scientific input prior to announcing major changes to the science program.

The Search for Earth-like Planets

The search for Earth-like planets, a major component of NASA 2006 strategic plan, should remain a major scientific goal for NASA. The McKee/Taylor report (AANM 2000) sets four strategic goals including “the search for life beyond Earth, and if it is found, determine its nature and distribution.” The report noted that “this goal is so challenging and of such importance that it could occupy astronomers for the foreseeable future”. The President's vision explicitly calls for NASA to "conduct advanced telescope searches for Earth-like planets and habitable environments around other stars.”

With the downsizing of SIM, it is essential that NASA continue to support exoplanetary science. The Subcommittee recommends the following:

- NASA should restore the TPF Foundation Science and the Michelson Fellowship programs.
- NASA should restore planet finding technology development programs at Centers and Universities.
- NASA should explore opportunities for involving US scientists in GAIA.
- Both the SIM and TPF programs require sufficient funding so that they can both be fully evaluated in the upcoming decadal survey. For both programs, it is important to preserve vital technical capabilities.
- NASA should support ground-based testing of instrumentation to advance technology for planet finding.

The Subcommittee endorses the suggestion of an Exoplanet Task Force, sponsored by either the AAAC or the NAS. The task force should consider whether the scientific case for the previously recommended SIM and TPF missions has changed in light of both recent scientific advances and planned ground-based and space-based instrumentation.

Science Plan

The Subcommittee reviewed an early version of NASA science plan and its priority list. We have the following recommendation for revisions to the science plan:

- JWST should be listed as top priority (ahead of HST SM4).
- Other missions should be listed in order of projected launch date, since it is important to provide adequate funding for missions in development in order to ensure timely launches and to minimize cost overruns. However the committee did not make detailed comments given that the list was already out-dated following the SIM/SOFIA decisions. We ask to see and comment on the revised list as soon as it is available.
- Following the Decadal Survey recommendations, we urge NASA to re- assess HST costs unrelated to SM-4 with a view towards a leaner/cheaper mission.
- We urge NASA to provide technical evaluations and costing for LISA, CON-X, JDEM, black hole finder, inflation probe, TPFs and SIM. We support the suggestion of external review (e.g., Langley). For the Beyond Einstein missions, the evaluations should be done within the next 12-18 months, so that NASA can identify the mission order for the potential pre-2010 start.

EPO

The Subcommittee reiterates its support for closely linking scientific research, education and public outreach. The subcommittee was concerned that the EPO goal in new Discovery A/O has dropped to 0.5% from the 1-2% level of on-going missions. At an upcoming meeting, we would like to be briefed on EPO efforts within SMD and its relation to the Education office.

Astrophysics Budget Crisis

NASA astrophysics program has been suffering through a significant budget crisis. This crisis has led to the loss of Explorer missions, major cutbacks in SIM, reduction in R&A, and delays in realizing Beyond Einstein program. As the recent Space Science Board report noted, these problems are agency-wide. However, budgetary pressures are particularly severe in astrophysics due to three major factors: (1) the loss of shuttle delayed SM4 and added roughly 1 Billion dollar in additional costs over the decade; (2) JWST has had significant cost growth and (3) a declining budget for astrophysics. While the science budget is growing slowly, astrophysics budget is declining from 1.5 Billion to 1.3 Billion over 2005 - 2011.

Congress is now considering supplementing NASA's budget to cover some of the costs associated with the loss of the Shuttle. If these new funds are available, we encourage the Agency to allocate some of these resources to the astrophysics program as it has been one of the parts of the agency impacted by the Shuttle loss.

Sincerely yours,

David Spergel for the Astrophysics Subcommittee