Sounding Rocket Working Group

National Aeronautics and Space Administration

Meeting of July 1, 2014

Findings

1. Proposed New PI Reporting Policy

Summary

The Sounding Rocket working Group (SRWG) was briefed on a proposal to initiate a standardized "Low Cost Access to Space Technical Reporting Policy" for sounding rockets, balloons, cubesats, ISS payloads, and suborbital reusable launch vehicles. The SRWG suggests an alternative, less burdensome process be applied to sounding rocket missions (outlined below), since in-depth project information is already provided to NASA HQ, required financial reporting is already monitored by the Grants office, and the Sounding Rocket Program Office already includes numerous reviews in its highly acclaimed management of the program at Wallops.

Background and Alternative Proposal

At the July, 2014 Sounding Rocket Working Group (SRWG) meeting, a presentation was made regarding a proposed "Low Cost Access to Space (LCAS) Technical Reporting Policy." Although it was stated that this policy is "not to add any onerous or costly reporting requirements", in fact, it could indeed encumber the P.I. by adding numerous plans, reports, and reviews to the already significant number of technical meetings and reviews at Wallops, including the Mission Initiation Conference, Requirements Definition Meeting, Design Review, and Mission Readiness Review, as well as his/her required, periodic reporting to the Grants office necessary to receive and disseminate funds to the science team(s). Additional, proposed new reviews outlined in the presentation to the SRWG include: Project Plan, Quad Chart, Interim Review, Confirmation Review, Annual Review (every 12 months) and a Final Review.

The SRWG understands the need for close communications between the HQ program scientist and the payload teams in assessing progress, milestone completions, scheduling, and payload manifests. However, we are concerned that adding more reviews and "long-form" information will further burden the payload teams and may not provide the concise and timely information that the Program Scientist needs. Rather, the SRWG believes that the review system already in place works exceedingly well, as has been underscored by numerous panels that have reviewed the program over the years. In order to provide information more readily to NASA HQ, we propose an alternative that would be less burdensome and, we believe, provide much easier access to the status of the mission from the P.I. perspective.

The SRWG notes that detailed or "long-form" payload information is already available to NASA HQ through material provided by the P.I. and payload team via: 1) the mission proposal, 2) the Mission Initiation Conference, 3) the Requirements Definition Meeting material, and 4) the Design Review. However, this material is not very condensed and could be difficult for the Program Scientist to parse for a quick status update across his/her portfolio. Thus we propose that each PI submit to the Program Scientist a summary package at the beginning of the mission, consisting of: 1) a single slide summarizing the payload science, instrument status, and condensed milestones, 2) a top level schedule including technology milestones, and 3) notes on any technical issues and tall poles. Such a "short-form" presentation provides a concise resource that the Program Scientist might use to consolidate payload information and status across their portfolio. We further propose that an update of this material be provided at the time of the Design Review. At that time (or at any other time, if necessary), if there is an indication from Wallops that a payload is having trouble meeting its technical and schedule milestones, then NASA HQ could, in turn, request subsequent in-depth, supporting material including additional reviews. In this manner, the burden to provide more detailed information is concentrated on only those payloads that are having difficulty and levies only a light burden on missions that are proceeding on-track.

2. Delays in funding Sounding Rocket Principal Investigators

Summary

The length of time taken to establish new grants to transfer funds from NASA HQ to the science P.I. institutions is considerably greater now, with the new centralized NASA grants system, compared to past procedures where P.I. funding was administered directly by Wallops Code 810. Although the length of time to establish the grants varies among institutions, several investigators have experienced lengthy delays impacting the start of project initiation and design activities with the NASA SRPO and NSROC. In turn, these delays can be detrimental to maintaining the expedient schedules which all agree are at the core of a successful sounding rocket program. Testimonials presented at the SRWG meeting illustrated how the new system requires seemingly inordinate amounts of information typically used for high dollar NASA contracts involving satellite flight programs and are not in keeping with the spirit or practice of low cost, quick turn-around, P.I.-led, sounding rocket projects.

Background

During the past several years, NASA has shifted the management of the distribution of sounding rocket P.I. funding to a centralized grants process administered at the NASA Shared Services Center (NSSC) at Stennis Space Center. Since NSSC began overseeing sounding rocket P.I. grants, investigators have been required to supply ever greater amounts of paperwork and engage in lengthy negotiations and question-and-answer

periods with NSSC. Beginning new grants has been especially problematic, and delays in getting the grants established have led to pushing back at least one RDM (Requirements Definition Meeting) significantly. Delays have stretched into the summer, for new starts announced near the beginning of the year, while not changing any period-of-performance dates or report due dates. Thus the first year of performance can be as short as six months. Beyond the usual types of certifications, examples of the information now being required before a grant is put into place include:

- An itemization and basis of cost for all supplies and materials (quotes, bids, email quotes, invoices, catalog price pages, etc.) by year.
- Institutional government Rate Agreement as per the latest government audit report.
- Description of what will be shipped as well as shipping details -- to/from, via what method, and copy of the quote, bid, or old invoice.
- The purpose, departure/destination, mode of travel, number of travelers, number of days, per diem and any other pertinent expense such as registrations and rental cars for all domestic travel (each trip for each year).
- Miscellaneous supplies/materials amount breakout.

These negotiations seem more appropriate for complex government contracts having many deliverables and milestones than for simple grants which have reports as their only deliverables. In other words, a one-size-fits-all approach seems to be taken by NSSC despite the fact that much of the information required seems to be irrelevant to the grant as a funding vehicle for sounding rocket investigations. The SRWG is concerned that the process employed by NSSC will divert the attention of PIs and science teams, leading to a detrimental impact on science and schedules, as well as adding cost. Further, most sounding rocket investigations (particularly for Geospace) include co-investigators at other institutions who require substantial funding which now must be distributed by the P.I. institution on the same rapid schedules required to keep the program on track. (Previously, co-I science teams received their funding from Code 810 in grants separate from that of the Principal Investigator, not only expediting the funding, but eliminating possible overhead charges by the P.I. institution in their administration of co-investigator funding.)

The SRWG urges management to take a fresh look at the new procedures to send funding to rocket P.I.'s as well as co-I's at other institutions. We urge Wallops to either return to the previous process in which Code 810 administered the funding directly to the science teams or to establish new guidelines within the NSSC appropriate for sounding rocket investigations, ensuring the timely dissemination of funding to the P.I. teams, without undue paperwork and lengthy negotiations which are not in keeping with the spirit or practice of low cost, quick turn-around, P.I.-led, science investigations.

3. New Technology Roadmap

Summary

The SRWG appreciates the "higher fidelity" new technology roadmap presented by the SRPO including the division of projects within these categories: (a) science-driven, (b) SRPO/NSROC initiated, and (c) obsolescent-driven. With respect to the science-driven new technology projects, the SRWG seeks ways to best advise the SRPO and influence the prioritization of these activities undertaken by the SRPO. We also wish to find mechanisms to augment community involvement and make sure users are aware of new developments so that they may be used in future proposals.

Background

The New Technology Roadmap developed by the SRPO in conjunction with the SRWG is an excellent way to keep an eye on future needs and emerging capabilities that can benefit the sounding rocket community. We recognize that these ideas could be further delineated by their scope (some are "big ticket items" while others are modest or even small in comparison) and by whether the path to their successful development is anticipated to be relatively short and straightforward or, in some cases, lengthy and uncertain.

With respect to the science-driven new technology projects, the SRWG would like further insight into the decision process, and general resources needed, to pursue and achieve the various new technology goals. We recognize that some initiatives are led by specific, approved investigations, such as the rocket propelled sub-payload ejection mechanisms, for which NASA HQ provided specific technology development funding to one geospace P.I. team, and from which many groups have since benefited. Other initiatives, such as water recovery for high altitude telescope payloads, may require a more concentrated effort in both time and resources. Still other science-driven ideas such as the small mesospheric sounding rocket payload, have remained dormant and, in fact, are no longer listed on the roadmap.

In the past, the SRWG has provided sub-committees to assist the SRPO new technology group (e.g., for the sub-payload design work and on-board data storage development). We would like to continue in this role, but expand our involvement to advise and influence the prioritization of the science-driven new technology activities considered by the SRPO. We look forward to discussing how to best streamline the process and ensure user input to top level decisions related to these exciting new technology initiatives.

Finally, the SRWG seeks to find mechanisms to augment community involvement (outside the SRWG) in the new technology being developed by the SRPO at Wallops to allow an "on ramp" for new ideas and needs. In addition, we want to make sure that all users are aware of the successful new developments so that they may be used in future proposals.

4. Renewed Urgency for Water Recovery Systems

Summary

The sounding rocket astrophysics community remains very interested in having access to the southern hemisphere sky on a routine basis as well as establishing routine means to launch telescope payloads to higher altitudes than are permitted at the White Sands Missile Range. Over the past many years, the SRWG believed that routine southern hemisphere observations could be accomplished by a semi-permanent presence with annual launch activities in Woomera, Australia. However, we now understand that this is not realistic based on costs and restricted availability of the Woomera facility. The SRWG is encouraged that the Sounding Rocket Program Office is pursuing Kwajalein as a routine range and that water recovery of reusable payloads is a real possibility there. The SRWG urges that a concentrated effort to develop technology and operational plans to make water recovery of telescope payloads at Kwajalein and other ranges (such as Wallops) truly available. We strongly encourage the SRPO and NSROC to develop a water recovery strategy and test flight not just for BB IX missions, but for high altitude BB XI and BB XII missions as well.

Background

Many modern payloads, especially in Astrophysics and Solar Physics, are highly complex, expensive, and are usually flown multiple times. An example is the XQC payload that has flown 7 times. These payloads are recovered, often enhanced, and re-flown, dramatically increasing their scientific yield. However, until recently, recovery from BBIX vehicles was only really possible at WSMR. Recently, the SRPO and NSROC have developed new logistical scenarios that allow payload recovery at Poker, and new water flotation technology that allows for recovery from WFF. These are essential new developments that promise to allow new missions, new observing strategies, and hopefully lower range costs and logistics. Note that the advent of such water recovery systems will not displace the need to fly some payloads from WSMR particularly those requiring low particle backgrounds. However, having choices and options may reduce the pressure at WSMR (and their associated costs) and will provide critical access to the southern hemisphere sky on a routine basis. These are essential and necessary first steps in expanding range options for recovered payloads, and the SRWG heartily applauds this effort! However, we need to go further.

The SRWG believes that extensive water recovery efforts are needed to allow recovered BBIX launches from Kwajalein that would actually be a viable alternative to WSMR for low background missions while also providing some access to the southern hemisphere sky. In addition, the development of high-speed recovery systems for BBXI and BBXII would dramatically increase the science yield per launch and open up new science investigations not currently possible on a BBIX. The recent non-recoverable, end-of-life, flight of the CIBER astrophysics payload on a BBXII rocket from Wallops is a good example of this. The SRWG looks forward to sustained investment and development of recovery systems and recovery logistics that will open more ranges, and higher

performance vehicles for recovered payloads. We strongly encourage the SRPO and NSROC to develop a roadmap, with development milestones, to make water recovery of high altitude rockets at Kwajalein and Wallops a reality.

5. Concern about new procedures to enforce workplace safety

Summary

The SRWG is supportive of NASA's and WFF's goals of increasing workplace safety and mission assurance. However, both the SRWG and several non-committee community members are concerned that restrictive regulations on basic experiment operations have the potential to cause increased costs, schedule delays, and potentially to degrade the performance of the primary science instruments. The SRWG suggests increased and earlier communication from WFF and range personnel on changing safety regulations, WFF common-sense oversight on restrictive policies that could damage the low-cost/increased-risk sounding rocket operating principle, and implementation of a waiver process that relies on judgment and legacy systems that worked incident-free on many previous occasions.

Background

The SRPO, SRWG, and members of the rocket community have recently experienced increased safety oversight and new regulations from both WFF and remote launch range personnel. Although we recognize that the ability to accept increased experimental risk in the Sounding Rocket Program is distinct from concerns about safety (which should never be compromised), there is growing concern that these safety restrictions are being applied arbitrarily, sometimes very late in the mission timelines (e.g., < 6 months prior to launch). Notable instances are those related to cryogenics, payload pressure systems (e.g., payload evacuation and 'return to air' procedures), and lab calibration systems.

Many sounding rocket experiments include evacuated payloads where the cycle of 'pump down' and 'return to air' is a common part of the integration and launch exercises. Recently, safety officers from WFF, WSMR, and WSTF have started requiring multiple relief valves for standard low-pressure (~20 psi) low-pressure activities such as these. Most pressure regulators have internal relief valves, but for reasons that were not clearly identified to the experimenters, these safety systems were insufficient and additional valves were required. It is not clear that it is the prerogative of safety officers to regulate how carefully an experiment team backfills its payload. Additionally, the suggested additional hardware would have cost the experiment team several thousand dollars.

There is some concern on the SRWG that this may be a growing problem that will add risks to science payloads (and therefore compromise mission science success) and schedule adherence. Most suggestions relating to returning payloads to air impose much longer exposures to ambient conditions. Many payloads employ sensors or optical coatings that have very strict environmental requirements: as much as an extra hour or

two exposed to the high-humidity environment of WFF can significantly degrade instrument performance. The SRWG suggests increased and earlier communication from WFF and range personnel on changing safety regulations, WFF common-sense oversight on restrictive policies that could damage the low-cost/increased-risk sounding rocket operating principle, and implementation of a waiver process that relies on judgment and legacy systems that worked incident-free on many previous occasions.

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