Sounding Rocket Working Group

National Aeronautics and Space Administration

Meeting of June 11, 2013

Findings

1. Strong Concern Regarding Program Vitality (Letter sent to NASA HQ)

The SRWG wrote a letter to NASA Headquarters (Dr. V. Elsbernd, Director, Acting, Heliophysics Division) expressing our strong concern regarding the impact of the projected funding profile for NASA's sounding rocket program. A copy of this letter is included in the Appendix of these Findings.

2. Establishing Kwajalein and Woomera as "Routine" Rocket Ranges

Summary

The SRWG applauds Wallops for their very successful rocket campaign in Kwajalein carried out in Spring, 2013. We reiterate our strong support for establishing both Kwajalein and Woomera (Australia) as rocket ranges to which NASA sounding rocket missions may be carried out on a routine basis.

Background

NASA's recent sounding rocket campaign in Kwajalein in the Spring, 2013, involved four sounding rockets launched within a two-week window. The launches were a complete success and underscore the expert technical and management capabilities of the SRPO/NSROC team in executing these missions at a remote site. The need for a routine launch range at low latitudes to carry out NASA sounding rocket launches can not be overstated. Indeed, Geospace phenomena at low, middle, and high magnetic latitudes are each distinct, and a dedicated rocket launch range at low magnetic latitudes is an essential component of a system-wide Geospace Observatory with sounding rocket capabilities. A launch capability from Kwajalein is consequently imperative for the Low Cost Access to Space (LCAS) program. Not only does the Kwajalein range offer access to equatorial aeronomic and electrodynamic processes in the ionosphere/thermosphere/mesosphere system, it also conveys with it access to the Altair radar, the equivalent of an NSF class-1 facility. The potential for discovery science at Kwajalein is thus unusually high. Consequently, the SRWG urges the SRPO to maintain their vital infrastructure and capabilities at Kwajalein and treat launch opportunities at this site as those of a regular, established launch range.

Similarly, the SRWG has also expressed on several previous occasions its support for a permanent range in the Southern Hemisphere with land recovery, such as that provided by the Woomera rocket range in Australia. Such a rocket range would facilitate, in particular, astrophysics sounding rocket launches to provide coverage of the southern hemisphere sky -- for example, to provide viewing access of the Magellanic Clouds. We appreciate the continued efforts of the SRPO to re-establish its capabilities to launch and recover sounding rocket payloads from Woomera. Despite the new constraints communicated to us at the last meeting, such as those involving local mining operations, we urge the SRPO to maintain their dedication to working out these challenges, with the ultimate goal of facilitating routine sounding rocket launches at the Woomera range.

3. Success Criteria Guidelines and Examples

Summary

Minimum and comprehensive success criteria lie at the center of the relationship between the PI and the SRPO/NSROC, yet there are few established guidelines for formulating such criteria. Such guidelines would be particularly useful for new P.I.'s. The SRWG suggests that guidelines and examples of success criteria, to which the SPRO concurs, be made available to the user community.

Background

Minimum and comprehensive success criteria lie at the center of the relationship between the PI and NSROC. Few guidelines are supplied for formulating them, however, and the possibility of writing criteria that are difficult to interpret, satisfy, or even evaluate post flight, exists. Tying criteria to flight dispersion statistics, for example, is a flawed practice that implicitly guarantees failure for some number of missions. Criteria that do not reflect actual scientific requirements or that simply cannot be satisfied pose a dilemma for PIs and NSROC alike and could, in principle, lead to missed launch opportunities or even mission failures. The common practice of softening criteria post flight undermines the integrity of the process.

The SRWG finds that examples of well-formulated success criteria to be used as templates should be drafted and made available to sounding rocket investigators. The SRWG would be very willing to provide comments on such guidelines and provide examples from past missions that were deemed particularly useful and effective by both the P.I. and the SRPO.

4. Continued Development of Recovery Systems

Summary

The SRWG applauds the recent work by NSROC and SRPO on water recovery systems

at Wallops and land recovery logistics at Poker. We strongly encourage the further development of recovery systems for all ranges and for the full "stable" of NASA's launch vehicles including recovery systems for the high speed BBXI and BBXII vehicles.

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 which recently carried out its 7th flight from WSMR. These payloads are recovered, often enhanced, and re-flown, dramatically increasing their scientific yield. However, until recently, recovery using the BBIX was only routinely possible at WSMR. Recently, SRPO and NSROC have developed new logistical scenarios that allow payload recovery at Poker, and new water flotation technology that allows for recovery of this type of payload from WFF. These are essential new developments and will allow new missions, new observing strategies, and hopefully lower range costs and logistics. This will not displace the need to fly payloads from WSMR since lower latitude launches are essential for some Astrophysics payloads, especially those requiring low particle backgrounds. However, having choices and options should significantly reduce the logjam at WSMR. These are essential and necessary first steps in expanding range options for recovered payloads, and the SRWG heartily applauds this effort.

The SRWG further recognizes the need to extend water recovery efforts to allow recovered BBIX launches from Kwajalein that would actually be a viable alternative to WSMR for low background missions. In addition, the development of recovery systems for the higher apogee and hence, high-speed re-entry BBXI and BBXII vehicles would dramatically increase the science yield per launch (due to the increased "hang time") 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 from Wallops is a good example of this. The SRWG looks forward to sustained investment and development of recovery systems and logistics that will both open more ranges, and enable the use of higher performance vehicles for recovered payloads.

NASA Sounding Rocket Working Group

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17 June 2013

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This letter expresses the strong concern of NASA's Sounding Rocket Working Group (SRWG) regarding the impacts of the projected funding profile for NASA's sounding rocket program. If the current projection comes to fruition, the science productivity of the program will be greatly reduced and the viability of the program will be severely threatened. Further, such a budget will also undermine the experience-base and technology innovation required to accomplish many of SMD's research goals.

As revealed to the SRWG at its meeting of June 11, 2013, the current funding projection for NASA's sounding rocket program shows essentially constant levels through at least 2019 without any adjustment for inflation. Simply put, while the funding profile for sounding rockets is flat, the cost of launching sounding rockets is not and the current rate of launches cannot be sustained. Furthermore, increased safety and scheduling restrictions at launch ranges such as the White Sands Missile Range and the Poker Flat Research Range in Alaska as well as the increased costs of rocket motors, underscore the need to *augment* the buying power of the sounding rocket budget, rather than allow it to diminish beyond its ability to sustain the program.

The sounding rocket program has only recently returned to viable funding levels after over a decade of drastic, program-threatening funding deficiencies. In order to survive those periods, the program exhausted stocks of rocket motors and other expendable flight equipment such that there are presently no backups or spares that could be used for further cost savings. In addition, the loss of personnel due to these cutbacks has significantly reduced the experience base in the program. Thus, while the program was sufficiently rescued to remain afloat at the present time, its position has been weakened such that it does not have the ability to respond to further funding deficiencies without an immediate loss of productivity.

The SRWG has been informed that one of the first impacts of the restrained budget resources will be to end the use of non-US rocket ranges. This will end a key hallmark of the rocket program -- to launch rockets where the research requires the measurements -- whether it be in the earth's cusps in Spitzbergen, Norway, or observing the southern

celestial sphere from Australia. Further, we are told that by FY19, even launches at Poker Flat, the US high latitude launch launch site for auroral studies, will be eliminated as a NASA launch site.

We are painfully aware of the limitations imposed by the current fiscal environment. However, numerous NASA scientific advisory groups and the National Research Council Decadal Survey for both Astrophysics and Heliophysics have concluded that NASA's Sounding Rocket Program should be strengthened and preserved, not allowed to decrease beyond viability. We thus believe that every effort should be made to provide adequate funding for the Sounding Rocket Program both at the present time and in the years ahead, so that it may continue to provide, rapid, low cost research platforms to meet the nation's scientific, technological, and educational needs.

Sincerely,

NASA Sounding Rocket Working Group

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