

## **Sounding Rocket Working Group**

National Aeronautics and Space Administration

Meeting of July 7-8, 2020

### **Findings**

#### **1. Support for the SRPO and NSROC during the COVID-19 Crisis**

##### *Summary*

The SRWG recognizes the very difficult situation posed for experimental scientific research by the COVID-19 crisis that has engulfed the entire world. Given the challenges posed by the requirement that everyone work at home and carry out design and planning meetings virtually, the SRWG appreciates that the SRPO and NSROC have kept the best interests of the sounding rocket program at the forefront at all times. They have managed to keep all approved missions viable and intact, while deftly juggling mission priorities and optimizing a somewhat fluid launch manifest. Importantly, they have paid attention to the health and well-being of all employees and ensured that salaries are covered, despite the fact that some work must be put on hold. In conjunction with our program leaders at NASA HQ, we salute the SRPO and NSROC for their continual embrace of the unique and exceptional contribution of NASA's Sounding Rocket Program to the nation's space research goals, carrying forth its vitally important experimental activities despite the adverse environment in which we are all currently immersed.

##### *Background*

The SRWG recognizes the very difficult situation posed for experimental scientific research by the COVID-19 crisis that has engulfed the entire world. In particular, research projects that involve teams of persons -- scientists, engineers, technicians, managers -- are very difficult to carry out particularly where hardware has to be designed, fabricated, and tested prior to the actual launch of the experiments in space. No better example is that of sounding rocket missions where a research project is carried out as a result of a team effort of a wide range of dedicated personnel, often in remote areas of the world.

Though still in the throes of the very challenging situation posed by the COVID-19 virus, NASA's Sounding Rocket user community, represented by the Sounding Rocket Working Group, would like to pause and express its appreciation and support for the SRPO for its steadfast commitment to carry on the program, maintaining a keen eye for optimizing schedules and keeping teams together, while focused on the end goal of launching a large manifest of approved research rockets when conditions are safe for all involved. In particular, we are impressed that the SRPO and NSROC have been able to quickly and efficiently adapt to working at home with team meetings, design reviews, and engineering design work carried out virtually to ensure an optimum path

forward when teams are allowed to return to their labs and when NASA allows its engineers and other staff members to return to the Wallops Flight Facility. This includes a safe, detailed, viable plan for deployment and field operations at sites such as White Sands Missile Range. Importantly, the SRPO and NSROC have paid attention to the health and well-being of all employees and ensured that salaries are covered, despite the fact that some work must be put on hold.

The SRWG further appreciates the degree to which the SRPO and NSROC have kept the best interests of the program at the forefront, managing to keep all missions viable and intact. We know that juggling rocket launch priorities is particularly challenging, given that some launch conditions are seasonal, and some launch ranges are more challenging to reschedule. Recognizing that attention to competing demands and interests is not easy to manage, we commend the SRPO for steering the good ship Sounding Rockets so deftly during these difficult times.

## **2. Strong Support to Elevate the Priority for Sounding Rockets During Stage 3**

### *Summary*

The COVID-19 crisis has understandably slowed the progress of many research projects at NASA as employees and university groups must work at home, and instrument fabrication and test have been put on hold. Nevertheless, some NASA experimental programs are being allowed to go forward, and in this light, the SRWG strongly advocates that NASA elevate the priority of Sounding Rockets during “Stage 3”. Ever mindful of health and safety and careful not to exert “pressure” on research groups that do not feel comfortable returning, we nevertheless believe that if sounding rocket projects could have a significant higher priority, the current Stage 3 restrictions would then enable the more timely launches in Astrophysical, Solar, and Geospace research (provided health, safety, and comfort factors are met) to regain their momentum and continue to advance NASA’s vital role in cutting edge scientific research.

### *Background*

The worldwide COVID-19 crisis has understandably slowed the progress of many research projects at NASA, particularly as employees and university groups must work at home. Furthermore, in the majority of cases at both government labs and universities, laboratory work and instrument fabrication and test have been put on hold. Nevertheless, the SRWG is aware that some NASA experimental programs are being allowed to go forward, and in this light, the SRWG strongly advocates that NASA elevate the priority of Sounding Rockets during stage 3. Specifically, with respect to the NASA Framework for Return to On-Site Work (11 June 2020), the SRWG urges that all suborbital projects that can proceed safely be designated “mission critical” so that on-site work, integration, and launches may occur.

Such designation will enable those projects with launch dates in the coming 1-2 years (and for which health, safety, and individual comfort factors are met) to keep on schedule, which is particularly important for timely research projects that seek to solve pressing scientific problems with a wide range of implications for research in their respective fields. Although the Wallops Flight Facility has been recently designated a “Stage 3” NASA facility permitting machine shop

work and wiring of payloads, integration and other mission related activities are not allowed to proceed without their status being elevated. Experiment teams seek a similar status to enable instruments to be concurrently built and tested in government and university labs, provided their institutions allow for such activities. Enabling as many missions as feasible to go forward helps maintain a reasonable launch manifest, in keeping, insofar as possible, with the programmatic pace put forward by the approvals of new missions, a feature of the program that benefits all disciplines, Astrophysics, Solar, and Geospace. It also enables the timely development of instruments which are anticipated prototypes for upcoming satellite missions and also affords some PhD students the opportunity to complete timely research for their theses.

Ever mindful of health and safety and of not exerting “pressure” on research groups that do not feel comfortable returning, should the priority of sounding rocket projects be significantly elevated, the current Stage 3 restrictions could enable those qualifying rockets within the program to regain their momentum in the Astrophysical, Solar, and Geospace research communities.

### **3. Welcome Package/Guidelines for New PI’s**

#### *Summary*

The SRWG applauds the SRPO’s effort to create an “Orientation Plan” which would welcome new Principal Investigators and show them “the ropes” as they navigate the many options and capabilities afforded by the Sounding Rocket program at the NASA Wallops Flight Facility. It will also help explain the various “rules of the road”, both informal and formal, required by the program for all P.I.’s, including establishing minimum success criteria and risk “trade-offs”. Such a welcome package, including a kickoff meeting and informal discussions, will lead to enhanced communications between the PI and the SRPO and Mission Manager, and promises to ensure a fruitful and rewarding experience for the P.I. as he/she carries out scientific research within NASA’s exciting and dynamic sounding rocket program.

#### *Background*

Principal Investigators of NASA Sounding Rockets carry forth a responsibility to ensure a successful research program that involves coordinating scientific experiments, built at the PI and co-investigator institutions, with payloads and launch support provided by the NASA Wallops Flight Facility. Whereas some new P.I.’s are already familiar with the program through previous work including graduate school research, they may not be aware of many of the program’s capabilities, options, and requirements. Furthermore, they may not be familiar with their expected interactions with their payload team (and mission manager) as well as the program’s “milestone” meetings involving the Mission Initiation Conference, Requirements Definition Meeting, Design Review, and Mission Readiness Review. Among their new responsibilities will be to establish comprehensive and minimum success criteria for their research rocket and to report on whether such criteria were met after the mission operations are complete. In addition, since one of the features of the sounding rocket program is that it enables a certain degree of risk with respect to the success of an experiment hardware, new P.I.’s may benefit from discussions of risk “trade-offs”, particularly when illuminated by past experiences of previous programs.

To this end, an “Orientation Plan” or “Welcome Package” would be a most welcome tool to help the new P.I. learn the ropes. The SRWG applauds the SRPO’s effort to create an “Orientation Plan” that would welcome new Principal Investigators and help them navigate the many options and capabilities afforded by the Sounding Rocket program at the NASA Wallops Flight Facility. It will also help explain the various “rules of the road”, both informal and formal, required by the program for all P.I.’s. Such a welcome package, including a kickoff meeting and informal discussions, will lead to enhanced communications between the PI and the SRPO and Mission Manager, and promises to ensure a fruitful and rewarding experience for the P.I. as he/she carries out scientific research within NASA’s exciting and dynamic sounding rocket program.

At its most recent meeting, the SRWG learned of plans for the SRPO to develop such a package and to this we give our resounding support. We comment here on just a few of the ideas put forward in the charts shown at the meeting and look forward to a more comprehensive guide upon which we might not only comment, but perhaps offer feedback as “beta testers”.

An early meeting/teleconference held between the PI, SRPO and NSROC personnel, shortly after the award is announced is acutely needed. Discipline scientists and program officials at NASA HQ may also wish to join such a “kick off” meeting. New PIs, especially those without any past involvement with the sounding rocket program, need to be made aware of the fine details of the project timeline and the need of crucial paperwork. For example, the Sounding Rocket Handbook currently calls for the PI to introduce during the MIC any involvement of foreign nationals, but with current TAA procedures taking months to complete, information and action on foreign national involvement should be taken even earlier. We recommend that this initial meeting/teleconference should be initiated within 10 business days of the award announcement and the PI should be given the Orientation Plan at that time, along with a Wallops Point of Contact.

The SRWG agrees with the contents of the Orientation Plan as outlined in the presentation during the Summer 2020 SRWG meeting. In fact, with rapidly changing technology development as well as personnel turnover at SRPO and NSROC, such an orientation plan that brings all the concerned parties together will not only help new PIs but also seasoned PIs who might have been inactive in the sounding rocket community just for a few years. In particular, some of the newer PIs on the SRWG look forward to “beta testing” the Orientation plan draft and providing feedback. The SRWG members are available to read and provide feedback on any draft materials that may be forthcoming in the next months.

#### **4. Keeping the Sounding Rocket Handbook Up to Date**

##### *Summary*

The Sounding Rocket User’s Handbook is an essential document that is particularly useful for both new and experienced P.I’s who may not be familiar with all of the current technical capabilities and options afforded by the program. Maintaining an updated version of this handbook, however, poses a burdensome and time-consuming task, making new releases infrequent and rapidly obsolete. To help redress this, we suggest that the SRPO implement an approach where the

Handbook is divided into sections, which would be maintained as “live documents” by subject experts in “close to real-time” as new capabilities are added and old capabilities are retired.

### *Background*

It has been long noted that maintaining an updated version of the Sounding Rocket Handbook is a burdensome and time-consuming task, making new releases infrequent and rapidly obsolete. Accordingly, we suggest that the SRPO implement a “live document” approach to the Handbook, in which sections would be kept up to date by subject experts in close to real-time as new capabilities are added and old capabilities are retired.

The various sections of the Handbook already align with the organizational structure at WFF, so a straightforward approach might be to have a staff member in each department become responsible for keeping the applicable section up to date. Ideally, it would not require a significant amount of work to maintain the document, since changes could be captured while implementation is still in the planning stages, with the details fresh in people’s minds and relevant supporting documents readily available. If feasible, these segments could be accessible to PIs in an online format, for example, via a password-protected webpage. Assembling the sections and formatting them for a new public release of the Handbook would become largely secretarial and could be carried out with a regular cadence to keep the public handbook up to date.

The current plan to have a primer for new PIs (see Finding 3) that gives them an overview of programmatic structure and expectations removes the necessity for addressing those topics in the Handbook, and this could simplify the structure to allow it to become a reference source for detailed descriptions of technical capabilities.

To achieve these goals, we suggest:

1. Decide what portions of the current Handbook are unnecessary or can be simplified given the existence of the new “Orientation/Welcome package”.
2. Divide the current Handbook into sections that match the WFF organization and put them online, or at least in some easily editable location.
3. Each group could assign someone to be responsible for updating their section. If they wish, they could subdivide it and assign different persons to be responsible for each subsection.

The SRWG recognizes the challenges involved in keeping the Users Handbook up to date, given the rapidly changing capabilities and technologies inherent to the program. We nevertheless encourage the SRPO and NSROC to implement a means to keep the material current and accessible, insofar as possible.

## **5. Cryogenic Safety Training**

### *Summary*

The SRWG recognizes the need to follow and document cryogenic safety training for participants in NASA missions and field campaigns. However, we stress that the specific training requirements and their documentation must remain flexible so that the payload teams can satisfy the requirements without undue burden. Specifically, cryogenic training requirements should be satisfied by either: (1) formal and/or informal training programs at the experimenters' home institutions, or (2) formal cryogenic safety training at the Goddard Space Flight Center or the Wallops Flight Facility. Subsequent to the committee meeting, SRWG discussions with the GSFC acting chair of the Cryogenic Safety Committee indicate that this flexibility is indeed specifically allowed by GPR 8710.7C.

### *Background:*

The SRWG appreciates the presentation on new procedural cryogenic safety requirements. We were surprised, nevertheless, to learn during the July 2020 meeting that the latest revision to the cryogenic safety GPR (8710.7 revision C) specifically prohibited alternative training approaches and that only in-person training at the Goddard Greenbelt campus would be allowed. The SRWG subsequently sought clarification from the acting chair of the cryogenic safety committee at GSFC (one SRWG member is also a member of the cryogenic safety committee). Apparently, there has been a misunderstanding. GPR 8710.7 was specifically modified in 2020 (revision C) to include alternative training opportunities to satisfy the cryogenic safety training requirement. Options include both formal and informal training at non-NASA institutions, remote training, online training, and in-person training at the WFF or GSFC campuses. The details of the specific training requirements for each payload and the acceptable forms of documentation (email statement from PI, training certificates, etc.) can be negotiated between the payload team and the WFF representative on the cryogenic safety committee (currently Mr. Nick Noporat). The SRWG believes that this approach is sufficiently flexible that it will not introduce an undue burden on the experiment teams. We look forward to hearing additional details on the implementation of this requirement.

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