

## NASA ADVISORY COUNCIL

### HELIOPHYSICS ADVISORY COMMITTEE

June 17-18, 2024

NASA Headquarters  
Washington, D.C.

MEETING MINUTES



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Paul Cassak, Chair



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Janet Kozyra, Designated Federal Officer



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*Prepared by Elizabeth Sheley  
Tom&Jerry, Inc.*

Monday, June 17, 2024

Welcome

Dr. Janet Kozyra, Designated Federal Officer (DFO) and Executive Secretary for NASA's Heliophysics Advisory Committee (HPAC), opened the meeting and introduced Dr. Paul Cassak, HPAC Chair.

Introduction of Committee Members: Overview of Agenda

Dr. Cassak observed that this HPAC meeting had full participation of the membership. He called roll and reviewed the agenda, noting that they had a full schedule.

NAC Science Committee – Recent Meeting Report

Dr. Cassak provided some background and context for HPAC from the NASA Science Committee (SC) meeting in March. The SC reports to the NASA Advisory Council (NAC), which advises NASA as a whole. It is important to know that the SC does not report to the NASA Science Mission Directorate (SMD). Instead, any SC findings and recommendations (F&Rs) must go to the NAC, which sends them to NASA leadership to convey to SMD. The March SC meeting occurred just after the release of the Fiscal Year 2025 (FY25) President's Budget Request (PBR).

There were some topics of interest to HPAC at the March SC meeting. Regarding the possible cancellation of the Geospace Dynamics Constellation (GDC), the SC was told that the mission team was preparing a report on what it would take to launch GDC this decade. A report revealed that the NASA Heliophysics Division (HPD) is a bit ahead of the other science divisions in the area of open science. There was much discussion of the Deep Space Network (DSN), and the increased HPD funding for cubesats is believed to be a possible strain on the DSN. Another Division Advisory Committee (DAC) presented a report about the mental health of their community, which was informational rather than actionable. Finally, SC discussed the wide variations in how SMD divisions run their DACs, resulting in a recommendation to make them more consistent with each other.

The NAC had not met for about a year at the time of the SC meeting, creating a bottleneck for SC F&Rs to SMD. However, the NAC met in May and the F&Rs were finally conveyed. SC has a new interim chair, Dr. Noel Bakhtian, and will be bringing in new members; the next meeting is planned for October.

Dr. Aroh Barjatya said he was surprised at the statement about cubesats and DSN, as most cubesats are closer to Earth and not in DSN range. Dr. Laura Peticolas agreed, stating that most HPD cubesats use the Near Space Network (NSN). Dr. Lisa Upton asked for examples of discrepancies among the DACs. Dr. Cassak said that the meeting cadence differs, and some meeting agendas are set by the divisions while others collaborate with the DACs themselves on the agenda. He hoped to bring in more information about this. Dr. David Brain observed that mental health is also an issue in universities. Dr. Cassak repeated that there was no action from the SC in this regard. The topic came up in another division's Decadal Survey (DS). However, he would like to address it and wondered if the professional societies might play a role.

Space Weather Council – Directions

Dr. Kelly Korreck explained that the Space Weather Council (SWC) is under HPAC and recently issued a report via a set of slides that were sent to HPAC members. Dr. Nicole Duncan, SWC Chair and an HPAC member, presented a brief summary of the slides. SWC met in February and discussed four updated tasks from HPAC, which were addressed in the report.

Task 1 had to do with the fact that there is still some confusion about who in the Federal government does what regarding space weather (SW). Dr. Duncan noted that the multiple SW committees themselves are clear about who is doing what. A possible solution for those outside the committees is a white paper delineating the roles and structures, along with outreach materials. A related concern is whether there might be a gap for SW community input to NASA directorates other than SMD. SWC will investigate coordination options. It is proving helpful to have overlapping membership among the SW committees, and SWC therefore recommends that the NASA representative to the Space Weather Operations, Research, and Mitigation (SWORM) subcommittee take this finding forward to the selection committee. SWC supports updating the SW scales, which is an issue among researchers. NASA should participate in this and ensure that the NASA SW community needs are considered. Dr. Cassak inquired about the rationale behind asking NASA to do certain things. Dr. Duncan explained that SWC only advises NASA, which does not have to take all of the recommendations. SWC would like to see NASA partner with the Office of Science and Technology Policy (OSTP).

The second task was to have a gap-filling analysis and provide recommendations on the study scope. There are many factors that complicate this task, and SWC was asking that there be consideration of costs, operational impacts, and urgency as prioritization metrics. Quantification of gaps will rely on Observing System Experiments (OSEs) and Observing System Simulation Experiments (OSSEs) during planning. NASA and the National Oceanic and Atmospheric Administration (NOAA) will need to coordinate in developing tools. There is a further need to fine-tune modeling options and draw in end users, the latter being an area in which NASA's Earth Science Division (ESD) has strong experience. It will also be important to avoid duplication of ESD efforts.

There is concern about possible data sparseness constricting SW forecasting, which calls for new approaches to data assimilation and modeling. This may include synthetic data. SWC would like the data to be more widely broadcast. Another need is for NASA to close some gaps in modeling. Dr. Duncan observed that the types of things scientists do are based on science rather than on the technology elements, which could be a gap. There needs to be stronger communication between researchers and end users as well. Although SWC advises NASA, this will require collaboration with NOAA.

The third task cited the urgent need for Human Exploration (HE) to have SW data, which constitutes a gap. There are also opportunities for SW research inherent in HE. NASA's Community Coordinated Modeling Center (CCMC) has said that modeling progress is slowed by the grant requirements. SWC therefore recommended that Federal agencies seek greater similarity in their requirements. Safe human exploration of space requires metrics that have not yet been developed. At the same time, much of the science side of the upcoming Artemis program has been through the Planetary Science Division (PSD), and the SW community needs to be better informed through HPD.

Dr. Barjatya said that timelines would be helpful. He would also like to see more sourcing of the data being used. Terms like "alternative methods" can be vague and do not state what HPD might do. Dr. Duncan said that most of the timelines came from guest speakers. SWC did not suggest much beyond identifying that certain gaps should be addressed. It is for NASA to set the priorities.

The fourth task concerned interagency coordination and Research to Operations to Research (R2O2R). Dr. Duncan noted that ESD's Applied Science Program has been renamed the Earth Action Program. It is a valuable analog for HPD's SW efforts and warrants collaboration as there are overlapping interests. In general, it will be helpful to identify where additional connections can be made in order to strengthen the SW community's work. One recommendation for bolstering connections is to encourage and support greater attendance at relevant user conferences. Another area warranting examination is professional development programs that connect researchers and end users.

Also in Task 4, SWC cited the success of ESD's implementation of a policy to include applications objectives in all directed missions. SWC recommends that NASA consider how to do this more broadly in order to expand and strengthen the basic science portfolio. SWC found that NASA collaborations with NOAA could help leverage NOAA's investments in technology development and ground infrastructure to also benefit the NASA SW community. Therefore, SWC recommends that NASA consider expanding its partnerships with NOAA in these areas.

Dr. Upton said that this reflects a great deal of work by SWC. Dr. Peticolas agreed. She said that in Task 1, the recommendation about OSTP collaboration might be changed to ask that HPD work with the NASA offices on Science, Technology, Engineering, and Mathematics (STEM) and Science Activation to accomplish that. Dr. Duncan agreed to add that.

Dr. Cassak said that while HPAC would need to vote on whether to forward the SWC report to NASA, he wanted to wait until the following day to allow members to read the full report.

Dr. Upton asked about the Task 4 finding on R2O2R and connecting researchers, specifically whether there might be a best-practices guide and any thoughts on how to make connections with end users. Dr. Duncan said that the discussion was broad but was focused on outreach. While some of this is already occurring, they did not discuss a specific program. Dr. Christoph Englert said that the national SW plan includes many specific recommendations for different agencies. He wondered about steps being taken to avoid duplication of effort. Dr. Duncan said that that is something SWC keeps in mind.

Dr. Korreck said that HPD had some lingering issues from previous SWC reports. Regarding advisory group coordination and the potential for uncertainty by those not directly involved, HPD noted that the various groups are working on a white paper to be published in Fall 2024. At the same time, it is a "best practice" to have speakers across the groups. Similarly, there is no request regarding the previous gap analysis task. For Task 3, which addresses the Moon to Mars (M2M) program, HPD is bringing in Dr. Sabrina Savage as a program scientist in SW and will hold this task for when she is up to speed.

Task 4 dealt with agency coordination. HPAC had asked that SWC continue reporting on domestic and international partnerships and coordination opportunities. HPD in turn asked that HPAC and SWC look more closely at the characteristics of an effective model of international collaboration for large scientific intra-governmental projects. If there is a successful model, it would be helpful to examine it. Dr. Duncan asked about the emphasis on international, which Dr. Korreck said would be reworded so that it will be clear that domestic efforts are also included.

There was also a request that HPD gather feedback from PIs in order to determine how to make the R2O2R program more accessible. However, the R2O2R program is being revamped, so that task will be addressed at a later date.

SWORM is currently reviewing the benchmarks, or scales, used in SW to gauge the intensity of SW events. Because NASA supports SW science, HPD is concerned about how this might affect scientific research, modeling, and observations. The Division would like HPAC and SWC to investigate where and how SW scales are used in SW scientific research, to include possible impacts on data archives, longitudinal research, modeling inputs and outputs, observational data sets, and other areas. Some of this work is already underway. It is also important to understand how the operational side affects scientific research.

Dr. Duncan thanked Dr. Korreck and HPD on behalf of SWC. Dr. Cassak said that the necessary vote would take place the following day.

R&A Program – Updates & Discussion

Dr. Therese Jorgensen is transitioning into lead of the HPD R&A program, taking over from Dr. Patrick Koehn. Dr. Jorgensen explained that HPD is still closing its panel reviews and selections from Research Opportunities in Space and Earth Sciences (ROSES) 2023 and hopes to conclude in September. ROSES 2024 is underway and some programs are planning panels. ROSES 2024 will include a new element: Artificial Intelligence Applications in Heliophysics (AIAH). This will target the use of AI tools in heliophysics in order to benefit the community and the science.

HPAC had previously asked for more information about the R&A selection rates according to scores. Dr. Jorgensen showed a graphic of accepted versus declined proposals. Although most Excellent (E) and Excellent/Very Good (E/VG) proposals are accepted, there are instances in which such proposals are declined. The reasons may reflect funding details, timelines, institutional issues, duplication with other projects, etc. At the same time, HPD is seeing increased proposal pressure in its largest programs, Heliophysics Supporting Research (HSR) and Heliophysics Guest Investigator – Open (HGIO). Specifically, HSR received 243 proposals in 2024 after getting 161 in 2023, and HGIO shot up to 180 for 2024, an increase of almost 100 from 2023. HPD hopes to look into where these proposals are originating, but the Division has limits on what information it can obtain. There are very few invalid or noncompliant proposals being submitted.

Dr. Peticolas wondered if a contributing factor might be the increased use of AI to write proposals in general. Dr. Jorgensen said that the program had encountered one such proposal that seemed authentic at first glance but did not hold up on further reading. Dr. Matina Gkioulidou asked if there might have been proposals from investigators concerned about the relatively new categorization of some extended missions as “infrastructure.” Dr. Jorgensen said that this does not appear to be a factor, but there will be a comparison of proposals with mission team membership. Dr. Upton observed that HPD has had a flat R&A budget for the last decade. She wondered if some of the increase might come from researchers needing more grants to sustain their programs. Dr. Jorgensen agreed that this could be an issue. There have been some fluctuations in funding over the years and the current number of proposals might be closer to the pre-pandemic levels. She and Dr. Koehn would try to bring the data to this HPAC meeting. Dr. Chadi Salem observed that there might have been less need for funding during the pandemic. Dr. Jorgensen added that HPD does not yet have the answers, but there may be a need to think about doing things differently.

One issue is that the higher number of proposals necessitates more panels, which creates a growing demand on both the community and NASA. No single alternative practice stands out as optimal. For example, a competitive Step 1 might shift the balance to established institutions and affect diversity on several axes. On the other hand, there are many experiments showing that removal of an annual deadline results in many fewer proposals. Other options include triage and targeted solicitations. HPD welcomes suggestions. Selection rate is an easy metric to use, but it is flawed, so another area in which the Division could use HPAC advice and input is that of developing better metrics. It is not clear how to achieve the ultimate goals of science productivity and scientific excellence. The National Science Foundation (NSF) has been looking at publications and grants, but these measures are flawed as well.

Dr. Jia Yue said that he has heard that many postdocs now have to write HGIO proposals as a result of the extended missions now categorized as infrastructure. Dr. Jorgensen said that the infrastructure change has not decreased mission funding and should not have affected postdocs, who were seldom funded on those teams in the first place. This requires further investigation. Dr. Marco Velli asked about the percentage of proposers who are NASA civil servants. Dr. Koehn said from this population, there were six additional proposals in HSR and four in HGIO, so they have had minimal impact.

Dr. Brain said that he appreciated the metrics information and, while he would like to continue including selection rate, he liked many of the potential additions. A suite of metrics would be useful if possible. Dr. Jorgensen agreed, noting that NASA was discussing which metrics might be allowed. If some of the data are made public, it could discourage less-established researchers and institutions. There has been internal discussion on how the metrics will help improve the program. Information for its own sake is not helpful. Dr. Peticolas said that there is a lot of research around how some of these metrics being shared can affect people's actions (to apply for a grant or not). There are known ways to counter these psychological effects in order not to bias selection rates. This might warrant a further discussion. Dr. Jorgensen agreed and noted that this is being examined by some summer interns. The demographic data is hard to obtain and to provide the the required justification to NASA to obtain the data. Dr. Upton said that when ROSES 2024 came out, she heard concern about programs that were not solicited, which perhaps shifts proposers to other research programs. Dr. Jorgensen said that the team hopes to determine whether this is the case.

Dr. Cassak said that Dr. Yue had a Conflict of Interest (COI) on the Internal Science Funding Model (ISFM) and was out of the room for that portion of the discussion. Dr. Jorgensen then presented slides on behalf of Dr. Reiner Friedel, who was unable to attend the meeting. She began by reviewing ISFM principles. First and foremost, these projects must be strategic and encompass activities that require a NASA facility, so they are therefore not well-suited to existing ROSES programs. They must also enable further science. Dr. Jorgensen identified the strategic elements for the HPD ISFM (HISFM) program.

For FY25, ISFM has had a major revision. The FY25 call now includes all NASA centers and encourages collaboration. Only individual civil servants who are participating in successful large ISFM projects are prohibited from proposing as PIs to the HGIO and HSR programs. Other civil servants can propose, however. The program is also shifting to an annual solicitation. Civil servants who are on funded ISFM proposals must serve on ROSES review panels. Finally, the program now has three tiers of projects. These are evaluated by individuals from NASA headquarters and the centers, in addition to external reviewers. This revision may call for some adjustments as it plays out.

A graphic on the evaluation strategy showed data on the various sizes of projects proposed by center. NASA will evaluate 37 of these proposals in July, using 3 review panels. Half of the reviewers will be from outside NASA. Dr. Cassak asked why NASA has such a strong voice in these reviews compared to other proposals. Dr. Jorgensen said that it goes back to the strategic goals. Some strategic missions will require center resources to implement. She views these as extended mission development and therefore the need for clear strategic alignment is key. Dr. Cassak said that the implication is that the community would not have the expertise to assess this, but Dr. Jorgensen disagreed. Dr. Cassak was concerned that this might open the door for an insider advantage, which NASA has tried to avoid. Dr. Jorgensen said that most of this is done openly. There is also a need to ensure the best use of NASA resources.

Dr. Barjatya asked about a Goddard Space Flight Center (GSFC) instrument that was on an Air Force mission where the data are not released. He wondered if ISFM participants will be able to use any data set that is not available to the public. Dr. Jorgensen said no. NASA also funds data archives and modeling that are not part of ISFM, but the Agency will call for civil servant assistance when needed. Dr. Peticolas asked about an NSF modeling program, which Dr. Jorgensen agreed could be a good analogue for NASA. Dr. Duncan observed that there seem to be very specific targets, and asked if those are available to the general community. Dr. Jorgensen said that she was not sure about how the targets might be listed. Dr. Duncan advised her to find a way to communicate these targets to a broader audience. Dr. Jorgensen said that HPD will explore that. This may be a topic for a future HPAC meeting. It was noted that solicitations only allow one proposal per PI, which has been an issue at some universities and which might affect opportunities for Early Career (EC) scientists. Dr. Koehn said that this is discussed periodically. In ROSES 2024, only some programs have the restriction. HPD will revisit this for ROSES 2025.



Dr. Cassak thanked the presenters.

#### DRIVE Science Centers

Dr. Kozyra began the presentation on the Diversify, Realize, Integrate, Venture, Educate (DRIVE) science centers, emphasizing accomplishments and indicators of success. Decades of research have shown that research centers provide benefits beyond those derived from normal science teams. They lead to major advancements, a larger number of citations, long-term scientific impact, and greater innovation stemming from the cross-disciplinary innovation. While there are challenges, these may be justified by the outcomes. The Toolbox Dialogue Initiative (TDI) portion of the presentation was to address this.

Heliophysics DRIVE science centers were recommended in the 2013 DS in order to focus on grand challenge topics. Grand challenges typically require about 5 years to come to fruition. Dr. Kozyra summarized the key features and listed many of the foundational reports and efforts involved in DRIVE center design. When outlining the features of a DRIVE center, Dr. Kozyra emphasized that getting the right team and achieving well-integrated membership can be a challenge.

Like NSF, NASA is using a phased approach to the centers. Phase I offers the centers \$1.3 million over 2 years in order to assemble the team, build out programs, and demonstrate that the approach can be productive. At the end of the 2 years, NASA conducts another review, then downselects for Phase II. In this phase, the Agency provides \$15 million over 5 years, with the option of a 5-year renewal. The centers are expected to conduct transformative research leading to integration, with EC and diversity elements and informal science communication. HPD selected nine Phase I centers. In 2022, three of these progressed to Phase II. They are: Consequences of Flows and Fields in the Interior and Exterior of the Sun (COFFIES), conducted out of Stanford; the Center for Geospace Storms (CGS), run by the Applied Physics Lab (APL) at Johns Hopkins University (JHU); and SHIELD, based at Boston University.

Dr. Cassak noted for the record that Dr. Eric Zirnstein had recused himself for this session.

SHIELD focuses on connecting the location of the Sun and the heliosphere in the galaxy to extreme conditions on Earth. This may help explain elements of Earth's past and present climate while connecting heliophysics to other disciplines in what constitutes a new area of science. COFFIES is broadly interdisciplinary and seeks to better evaluate the contribution of the surface dynamo. The center recently determined that much of the dynamo occurs at the Sun's near surface shear layer rather than at the tachocline. Another area of focus is possible interactions among types of dynamos, which involves looking carefully at the features of the flows and what might be causing flow activity. The team uses multiple techniques to evaluate this, which allows a quick response to new ideas. This center has already produced a number of multidisciplinary papers. CGS deals with SW. The center is looking at the Tonga volcano eruption, Alfvén wings, and extreme penetration electric fields. The teams not only observed the May 10-11 superstorm, they also modeled it so successfully that they were able to predict some of what happened.

HPD has already determined that the centers produce groundbreaking paradigm shifts and innovations that will change the nature of the science and enable rapid testing of new theories. Program challenges remain, especially when it comes to assembling and optimizing teams, providing necessary resources, and identifying measures of success. It can be hard to optimize the teams just because humans are involved. Metrics must go beyond the number of publications.

Dr. Michael O'Rourke then discussed TDI. Their research and outreach span disciplinary boundaries both nationally and internationally, with a focus on building capacity among diverse experts. TDI offers impactful dialogue-based workshops, often including follow-up reports to workshop partners and other

integrative activities and mechanisms. They engage in a research/practice feedback loop aimed at continuous improvement and innovation. Among their many partnerships are HPD DRIVE centers.

Dr. O'Rourke described the challenges in building and optimizing interdisciplinary science teams. Diverse expertise and knowledge can spur innovation. The neurological and psychological underpinnings of team science include the need for team members to feel safe and the development of expertise. Research focused on complex science has led to a better understanding of team science.

Center-based science provides an environment for fostering teams that can address complex problems. NASA has been a leader in this area with its mission teams and science centers. One challenge is how to best take advantage of the diversity of expertise without washing out the differences in perspective and understanding. When collaborators understand problems differently, they might not recognize or even acknowledge those differences. There is also the issue of false consensus bias, according to which collaborators might take themselves to be more similar than they really are. TDI helps with these communication and integration challenges through a number of steps that Dr. O'Rourke described. These include structured dialogue to address unacknowledged differences, capacity-building workshops, and follow-up that incorporates interventions as needed.

From the NASA perspective, there are both general and specific challenges. An example of the latter would be providing ideas on how to use funding. Solutions may differ from one center to the next. The Agency needs to pay attention to how the science is being conducted, keeping in mind that teamwork and team science are not the same thing – you can get along with one another and enjoy interacting without efficiently or effectively pursuing your scientific objectives. This is where the TDI workshops can prove especially useful since they can help complex science teams leverage their differences and create a scientific whole that is greater than the sum of its parts.

NASA must also identify measures of success, which again might not be the same across all centers. Nonetheless, TDI has identified, in partnership with the DRIVE Science Center leadership, five measures of success across programs:

- Transformative scientific advances;
- Empowering the scientific community;
- Impacts beyond the scientific community;
- Heliophysics workforce development; and,
- Center effectiveness.

Dr. O'Rourke explained how each of these metrics might be evaluated.

In summary, there is no single formula for success; however, there are some common challenges along with steps that can be taken to address these challenges. Such steps include dialogue and other engagement practices. Because the scientists involved in these programs typically have other work, their lessons learned will go with them to those additional projects.

Dr. Katya Verner explained that each of the three centers has at least 20 investigators, along with many other team members such as evaluators, consultants, etc. This has led NASA to use a multifaceted communications approach, which in turn creates new opportunities for scientists and researchers. The centers have worked together on visualization tools; the Heliophysics Big Year (HBY); Inclusion, Diversity, Equity, and Accessibility (IDEA) activities; and open science, software, and data development.

Dr. Farzad Kamalabadi asked about DRIVE center oversight, which Dr. Kozyra said involves an annual report and biannual site visits. Dr. Peticolas asked about how the funding compares with other HPD

initiatives and missions. The answer was that these are more comparable to sounding rockets than to spacecraft, but it depends on the mission. Dr. Kozyra would like for each center to give a presentation to HPAC in the future. Dr. Verner said that it would be good to know how HPAC envisions communicating with the community about this. Dr. Englert wanted to know of any plans to assess whether this is the model for the future or a tool in the portfolio. Dr. Kozyra replied that there are different ways of doing science and each method provides an element of depth that is needed in order to optimize science. This is HPD's first attempt at trying centers, and there is some debate about it. Dr. O'Rourke added that the commitment of the program to building team science is a key. This is new, and the list of programs doing it is short. It reflects NASA's commitment to optimizing investments. Dr. Peticolas expressed interest in learning about how much archived science data the centers use, and Dr. Duncan asked about accountability. Dr. Kozyra explained that when the science centers are evaluated, they will work with TDI to make the case for how well they are doing. Dr. Cassak noted that he was on HPAC before the centers were launched and saw the tremendous amount of work Dr. Kozyra did in their implementation.

#### Outreach – Citizen Science

Dr. Peticolas recused herself from this presentation due to a possible COI.

Dr. Elizabeth MacDonald of NASA described efforts to grow heliophysics citizen science strategically, which involves more than just outreach and education. She leads a Strategic Working Group (SWG) on the subject. As previously discussed, HPD established the HBY, with six citizen science projects. While the recent solar eclipse and May's giant solar storm are part of this, the projects are building up to the solar maximum. At the same time, ROSES 2024 includes two citizen science investigations, while there are also opportunities associated with missions. This is all part of a wider SMD effort that provides support for involved PIs.

The SWG has had many participants from within HPD. Its vision is to leverage public participation in heliophysics, and the mission is to build a strong and diverse heliophysics citizen science portfolio. Dr. MacDonald listed the six goals and corresponding steps involved in the process, then gave examples of related activities, such as ROSES opportunities. She noted that rather than waiting for the upcoming DS to provide direction, HPD saw the potential for the HBY and took the initiative. The HBY goes beyond the 2024 eclipse and heliophysics missions to incorporate 16 implementation actions designed to accomplish 6 goals. The result is a public-facing science campaign. Dr. MacDonald noted some of the newer opportunities. The effort has brought increased public engagement, including about 10 citizen science white papers submitted to the DS panels.

Dr. Susanna Finn provided details of the ROSES opportunities. While citizen science is welcome in all ROSES proposals, two recent programs call it out specifically. First is the Citizen Science Seed Funding Program (CSSFP), a 1-year, cross-divisional program meant to support citizen science projects during transitions or changes in direction. It encourages new proposers and provides about \$80,000 per award. The other opportunity is Heliophysics Citizen Science Investigations (H-CSI), which has been offered since 2022. The goal is to bring in citizen science investigations that are mature enough to produce science results and achieve proposed project goals within a maximum of 3 years. Funding runs from \$120,000 to \$160,000 annually. Both of these are reviewed under the Inclusion Plan (IP) pilot program.

Dr. MacDonald explained that the highest impact opportunities for citizen science come from missions, but these need additional support and assessment. The Electrojet Zeeman Imaging Explorer (EZIE) -Mag effort provides students with magnetometers allowing them to gather eclipse science data similar to that obtained by the larger EZIE mission. The effort includes workshops for students, educators, and others. Dr. MacDonald then presented a series of charts showing specific citizen science initiatives according to who can participate (individuals, teams, etc.), what is being studied and how, and where the activities take

place. NSF is involved in some of these. While the 2024 eclipse was the big draw, not everything has to do with the eclipse, and some tasks can be done indoors at any time.

Ms. Ha-Hoa Hamano provided data illustrating the success of NASA's outreach for the 2024 eclipse. There were letters from incarcerated individuals expressing appreciation for the opportunity to participate in eclipse science. The experience raises further questions about how the Agency might design inclusive and equitable experiences that lead to further engagement. Some of those involved in the eclipse observations were able to join by using a 1-page sheet for answering questions. The activities were informed by what NASA learned as a result of public participation during the 2017 eclipse. The work continues through science and analysis efforts, feedback to maintain the community connections, and the ongoing solar maximum campaign.

Dr. Kozyra showed a timeline of heliophysics events, noting that citizen science will be a major component in studying the solar storm that took place in May 2024. The HBY teams are bringing in new science and data products associated with each event. One goal is to knit together the photos of the aurora that resulted from the solar storm. She listed some of the new visualization tools that will integrate with open data. NASA is also looking at natural language processing to determine if it is possible to answer questions from non-scientists and to use their help in gathering data.

Dr. MacDonald presented some of the American Astronomical Society (AAS) cross-project eclipse results, then described an app that was developed at Western Kentucky University, now available on both Apple and Android devices. Lessons learned from the eclipse projects include: there is a need for clear, simple instructions; projects should provide hardware with the software already installed; live troubleshooting assistance is necessary; and people have a range of biological, psychological, and social needs when participating. She added that school teams were allowed to keep most of their equipment, with some exceptions for audio devices. A series of mini-grants enabled greater collaboration opportunities with citizens and across various agencies.

In summary, citizen science is a strategic underpinning the advancement of HBY science. The HBY is an opportunity to improve equitable design of the public experience with NASA. The goal is enhanced and sustained public engagement with NASA heliophysics efforts. The SWG would like any ideas that HPAC might have on this topic.

Dr. Upton observed that the solar maximum is at about the halfway point, with maybe another year of this level of activity. Dr. Kozyra explained that Mars was hit by a key event even greater than what happened on Earth, and the team is looking at that. Dr. Brain asked about coordination with other SMD divisions doing citizen science. Dr. MacDonald replied that each division has its own way of doing this, and there is a cross-divisional group to discuss it. Dr. Kozyra added that PSD sought her out to discuss some of the HBY work, as they want a "Big Year" for the Moon. Dr. Upton said that the portfolio is very impressive and the program has educated the public. Dr. Salem asked what citizen science might look like in the solar minimum. Dr. MacDonald said that there is more work that can continue, and the interest is large. In the absence of a huge event, the people already involved can continue participating, and do so more deeply. Dr. Upton added that some of the biggest SW events occur in the waning phase and there are many other sun activities that can be observed.

#### HPAC Discussion (Potential issues for findings and recommendations)

Dr. Cassak opened the HPAC discussion session. He reminded the Committee that they would hold the SWC report for the following day. Dr. Upton said that HPAC discussed IDEA, which is pertinent to SWC. She has spoken to women in SW who are experiencing problems, then getting brushed off when they raise the issue. Some of these women no longer attend professional meetings as a result. She wanted

to know how they can bring this to NASA when the person receives funding from or works for NASA. This issue has been successfully addressed in astronomy, and Dr. Korreck was instrumental in that.

Dr. Cassak wondered about HPAC seeking a meeting with the SMD person who leads these efforts. He would prefer to take action sooner, however. Dr. Peticolas said that this is a systemic issue in the community. If some of these things happen at meetings, there should be oversight. Dr. Upton said that the people creating the issues are still going to the meetings and conferences. Intentions are great and actions are better. Dr. Duncan said that she has had similar conversations and would like to hear how to help and advise. Dr. Salem added that there are other types of harassment to address as well, among many forms of bullying. Some people in power are aggressive and it is difficult to work with them, but sometimes there is no choice. Dr. Upton agreed, stating that while she was speaking on behalf of women, men experience this as well. Dr. Cassak said that he was involved with an NSF effort, which led to a requirement for action. Sometimes HPD supports meetings that have policies, but there is a need to ensure that the proper protections are in place. Dr. Salem said that people are getting hurt. It is easier for institutions to not get involved, but this is still happening.

Dr. Korreck shared a relevant link in the chat box: <https://missionstem.nasa.gov/filing-a-complaint.html>

Dr. Velli pointed out that it is not always clear which institution is right for which types of issues. He would assume that chairs have the ability to respond. People might be shy about going forward without being anonymous. Dr. Upton said that this was a good point. Some women go to their universities and never hear anything back. EC women in particular fear retaliation. It could be that having “messengers” or intermediaries would be helpful. It can be hard or even traumatic to speak up. There is a need to do more. Dr. Cassak noted that some people do not file complaints due to lack of confidence in the system. Dr. Velli added that there are bystander issues, though the training teaches participants on what to do if they are bystanders. Dr. Cassak said that this could be an agenda item for a future meeting and he thanked Dr. Upton for raising the issue.

Dr. Upton asked if SWC wanted more or less direction. Dr. Duncan said that the Council would like HPAC to seek HPD recommendations. Some topics are at a closure point, and the next meeting will discuss two topics in depth. At the moment, they just wanted HPAC to pass along the report. In order to make it clear that HPAC had thought about this, they voted to have a finding that the feedback is useful and will help guide the future.

Dr. Cassak then asked about R&A and the large number of proposals. Dr. Salem pointed out that it was still not clear what was behind increased proposal pressure. Dr. Upton agreed. One suggestion was to compare the number of proposals needed to fund a researcher to the number of people in the community. It might also help to tease out the role of Covid-19 in proposal numbers. Dr. Brain was not convinced of the need to focus on why this happened when there is a more immediate need to handle it. Dr. Kamalabadi countered that they need to understand the source of the strain so that this does not go on indefinitely. He wondered about community growth. Dr. Velli perceived a kind of boom-bust cycle with the number of people in the field. Large, successful missions inflate the community somewhat. Dr. Zirnshtein agreed. Dr. Brain said that while knowing the cause is important, they should look at near-term solutions such as not having a due date.

Dr. Salem thought the proposal numbers were close to those of 2019, before the pandemic created an environment that temporarily stretched some of the money. Dr. Upton agreed. The question remains as to what HPD can do with a flat budget and a growing community. Dr. Salem said that this is a dilemma. Do they let people go? Expertise takes time to develop, so eventually the field would suffer unless there is a strategy to integrate the EC people.

Dr. Zirnstein questioned whether submission levels are really similar to those from before the pandemic and Dr. Kamalabadi asked if there is a mandate to spend the same amount of review time on all proposals. Dr. Cassak said that triage was under consideration. Dr. Jorgensen added that this raises a concern that this might disproportionately hurt younger PIs, as they would not receive the feedback necessary for growth. It might help to have an anonymous Step 1. She added that Step 1s were introduced to help address large proposal numbers. Another option is to invite only those who clear Step 1, but that again raises fairness issues. It will be easier for an established researcher to do a good one, even if it is anonymous. Dr. Velli stated his belief that an extended abstract might make it harder to guess who is behind it. Dr. Galen Fowler posted in the chat that HGIO Step 1s are required to be anonymized.

Dr. Englert cautioned HPAC on moving ahead with this before HPD has a chance to investigate. One of the suggestions was to have targeted calls, which can affect innovation. Dr. Velli said that HPAC was asked for feedback and help. It might be useful to see what other divisions are doing and to identify values, like avoiding bias. Dr. Duncan agreed. She added that HPAC has discussed what the selection process means for NASA but not what it means for proposers. She thought an emphasis on Step 1s will lead to better Step 1s. Dr. Gkioulidou said she was against this, as it has been tried. There were not explanations for why proposals were rejected. Dr. Velli agreed to an extent, though Step 1s can be reviewed remotely. Dr. Cassak pointed out that there is already difficulty in staffing panels, which would complicate having thorough reviews for Step 1.

Dr. Upton asked if scientists are spending all of their time writing proposals that they are not winning. The amount of effort is already disadvantaging EC people. Dr. Yue added that reviewers must be of high quality for the system to work. Dr. Salem pointed out that one of the best ways to learn how to write a good proposal is to be on a review panel. He returned to the question of the size of the community. He was not convinced that the current number of proposals indicates growth and would like to see data. Dr. Upton said that she must win multiple proposals to fund herself, which has not been helped by inflation. Dr. Jorgensen was not sure whether HPD can tease out the numbers they were discussing, and Dr. Kozyra asked if the DS panels have studied this.

Dr. Brain advocated for the “no due date” approach over competitive Step 1s. The latter is an extra layer of review and a time tax. Other divisions have seen fewer proposals when they have had no due date. It might be more equitable. Dr. Cassak noted that NSF tried it and reverted to having due dates, but Dr. Peticolas said that that was during Covid, when there were fewer proposals to begin with. Dr. Brain explained that the approach entails a standing panel that reviews periodically. Dr. Velli thought the idea had appeal but he was not sure if it is practical or equitable. He suggested having two different due dates. Dr. Salem said that those selected for the first group could then serve on the second panel. Dr. Peticolas pointed out that there are people who need deadlines in order to get themselves organized.

Dr. Englert said that the HPD mission is not to support the community, but rather to implement the DS with the funding provided. At the same time, he did not want to minimize the issue. If funding is stable, what is the critical mass? Dr. Cassak said he was hearing that HPAC wanted to pin down the sources of the proposal pressure. He was hearing pros and cons to no due date and the Step 1 selections, with no consensus. Dr. Salem promoted the compromise solution of two due dates; others agreed with this approach. Dr. Jorgensen said that HPD would provide the historical proposal numbers the next day. Dr. Cassak said that the response to the triage idea was also mixed, and there was not much support for targeted solicitations. The mixed feelings about the options could be a finding.

Dr. Zirnstein supported the idea to identify the top five possible solutions, noting strengths and weaknesses without going into great detail. Dr. Upton said she was concerned about EC scientists feeling hopeless. There needs to be a way to mitigate that concern.

ADJOURN

The meeting adjourned for the day at 5:08 p.m.

Tuesday, June 18, 2024

Welcome to Day 2

Dr. Kozyra opened the second day of the meeting and turned it over to Dr. Cassak.

Overview of Agenda

Dr. Cassak welcomed the meeting participants and reviewed the agenda. HPAC had a lot to do in little time, so they would need to be efficient. He then introduced Dr. Joe Westlake, HPD Director.

Heliophysics Division Update and Response to Past HPAC Recommendations

Dr. Westlake said that this would be a partial update as the full update was to be presented in the Heliophysics Town Hall at noon. He wanted to focus on recommendations and reset the conversation between HPAC and HPD.

He began by identifying HPD leadership. In addition to himself, Ms. Margaret Luce is Deputy Director, Ms. Nicole Rayl is Associate Director for Flight, and Dr. Jorgensen is Director of Research. The eclipse was a big event, and Dr. Westlake presented some data on NASA activities related to it and the HBY. He thanked Dr. Korreck and others who turned this into an amazing event engaging the nation. The May 10-11 geomagnetic solar storm was another event with great impact and potential for public engagement.

Release of the next heliophysics DS is imminent, likely to occur during within the next few months. Dr. Westlake thanked the many community members who participated. The roll-out takes time. Upon release, HPD will have 180 days in which to submit a response. Subsequent actions will occur significantly later, and Dr. Westlake wanted people to be aware of that in order to adjust their expectations.

A graphic showed the mission fleet, color-coded to indicate missions by phase: prime, extended, and in development. There will be seven heliophysics mission launches between October 2024 and May 2025. The Escape and Plasma Acceleration and Dynamics Explorer (ESCAPADE) will go to Mars, and the Interstellar Mapping and Acceleration Probe (IMAP) is paired with the Carruthers Geocorona Observatory to launch together in May 2025.

He turned to the HPD responses to HPAC recommendations, beginning with recommendations from the November 2023 meeting. The first of these was a recommendation to explore all options to ensure that GDC and the Dynamical Neutral Atmosphere-Ionosphere Coupling (DYNAMIC) science is pursued to the extent possible, given the HPD budget. HPD concurs and continues to work on this internally.

Next was a recommendation in regard to the Heliophysics System Observatory (HSO) infrastructure missions. HPAC was concerned about the communications regarding the terminology change from “extended” to “infrastructure,” as the latter term seemed to imply a diminished focus on science tasks. The Committee had questions about the limits on infrastructure missions and their science teams, including whether an infrastructure mission could bring in new science questions. HPD’s response noted that some missions have needed to reset baselines and make other adjustments. While there is no pathway as such for an infrastructure mission to return to a previous mode, the expectation is that these missions will continue producing scientific observations of value to the community. One of the goals of the change is to open the data from these missions so that the broader science community can use the data as part of the R&A portfolio.

The next recommendation addressed R&A and sought more clarity on how R&A budgets are set. Dr. Westlake said that HPD follows the guidance of the DS in developing its R&A budgets. Another recommendation encouraged SWC to continue coordination with related groups throughout the government. HPD is not yet ready to commission a gap-filling analysis but will return to HPAC when this becomes feasible. The Division will continue providing updates on the M2M program at town halls and other public forums. Regarding R2O2R, discussions are ongoing with other agencies and end users while HPD works on this internally. HPAC also recommended exploring ways to simplify the R2O2R proposal process, seeking ESD input and lessons learned. HPD is continuing to work on this internally. Dr. Westlake added that while the Division is making progress, it is proving to be more of a challenge than expected.

HPAC saw a presentation on R&A proposal success rates at this meeting in response to a recommendation, and HPD hopes to be transparent in this area for the benefit of the community. HPAC also recommended that HPD assess the impact of DAPR, including potential unintended consequences. Dr. Westlake explained that DAPR data are collected and analyzed by SMD. HPAC also advised HPD to assess the impact of its IDEA activities and present the results to HPAC. This is ongoing within HPD and IDEA metrics and impact statements are included in the presentations for this meeting. A prominent example is citizen science.

Regarding HBY, HPAC recommended that activities leverage and build on existing efforts within the field; that HPD collaborate with NSF; that the outer heliosphere science community be brought in, particularly for large solar events; and that there be coordination with activities by industry elements affected by SW. This is all being addressed internally.

A recommendation about the Heliophysics Strategic Technology Office (HESTO) advised consideration of additional strategic technologies that can benefit HPD science objectives, especially where multi-disciplinary approaches are an option. Dr. Westlake said that HESTO's focus is on technology support, and he felt that this recommendation was overly specific. He would like HPAC to be more general in the future so that they do not create a COI situation. Dr. Cassak said that he was a bit surprised at this reaction because he felt HPAC was simply addressing a field of study. He asked for clarification. Dr. Westlake said that although AI and machine learning (ML) are broad fields, he saw this recommendation as pointing at physical data for on-board technology for producing ML algorithms, and it seemed almost like a proposal. It may be that HPAC and HPD need to communicate better in regard to F&Rs. He added that a lot of the ML work goes on in ROSES, not in HESTO, so a recommendation to put it in HESTO could be too specific. The comment mentioned hardware in HESTO, and he would question whether programs including hardware in HESTO do or do not include ML. Dr. Kamalabadi explained that the idea behind the recommendation was to broaden the interpretation of ML to include hardware and measurements. Dr. Westlake still saw it as a very specific technology and asked that HPAC please be careful in communicating to HPD.

The Heliophysics Digital Resource Library (HDRL) was the subject of another recommendation. HPAC recommended that HDRL continue trying to expand user search options related to specific missions, and also recommended that there be a means of searching selected proposals and their deliverables. In addition, it would be helpful for the HDRL website to track usage of data analysis tools in order to determine the usefulness of these tools within the community. HPAC further requested that HPD engage with the broader SW community on a plan to ensure SW data accessibility across the numerous datasets within and outside of the Federal government. Dr. Westlake said that this work continues. Going forward, heliophysics mission data must be open and available to the community in an accessible format. The missions provide such data.



Dr. Westlake then turned to the recommendations from the February 2024 HPAC meeting. The Committee had expressed concern about the HPD budget and priorities. Dr. Westlake said that the Division takes its priorities from the DS and works within the budget it is given. HPAC also noted that there are those in the science community who believe they must tie their proposals to “hot topics” like SW in order to be funded. This belief stems in part from the phrase “broad impact,” which is understood to be part of the evaluation criteria. HPAC recommended that HPD make this clearer. Dr. Westlake said that HPD believes it is being clear, and if there is a misunderstanding in the community, concrete examples would help the Division to address it. If reviewers on panels see deficiencies because proposals do not all tie back to SW, that is an issue, but HPD has no evidence of that. This is a perception issue in the community. Dr. Duncan observed that the budget environment leads people to worry.

HPAC praised the May 8-9 SWC Table Top Exercise (TTX), looked forward to the results, and suggested that there be more of this type of activity. Dr. Westlake agreed that it was very successful, and the document describing it will come out during the summer, with additional detail and action options to be issued later in 2024. NSF was also part of this. The exercise showed the potential impacts of a large SW event at a time when a large event actually occurred and there was a good response to the impacts.

HPAC also sought continuation of HPD’s virtual town halls and asked the Division to determine if there might be other avenues for pulling in community participation. Dr. Westlake said that the town hall at noon that same day would try to bring more attention to HPAC so the community can understand the responses and feedback options. HPD participates in other community events, and the program scientists try to be accessible.

HPAC recommended continuation of the “Science Nuggets” as a means of engaging the public and asked HPD to look at ways to simplify the submission process. Dr. Westlake agreed with this and asked HPAC and the science community to let HPD know what is in the pipeline so that the Division can share the message. A recommendation to broaden opportunities for new research projects using legacy datasets was unclear because HPD does not perceive a gap in this area. Dr. Gkioulidou explained that there is no program in which guest investigators can do data analysis with legacy data alone. They have to do modeling as well. Dr. Salem added that some of the language in HPAC’s early draft of the recommendation was more specific, but the Committee pulled back in caution. Dr. Westlake agreed that it can be hard to strike a balance. HPD could use HPAC advice here.

Dr. Westlake said that, due to a COI stemming from his previous position, he would have to recuse himself on any discussion of the recommendation about NASA’s Europa Clipper mission and the European Space Agency’s (ESA’s) Jupiter Icy Moons Explorer (JUICE), letting Ms. Luce take the lead. The recommendation was for HPD to continue discussing possible scientific collaborations between these two missions and NASA heliophysics missions, to include PSD in determining the feasibility of science during the cruise phase. HPD is working on this internally.

Another recommendation was for HPD to provide greater clarification on how the budget is determined and the ways in which DS recommendations are implemented. Dr. Westlake said that HPD uses the DS to guide its budgetary and strategic decisions. Specifically, page 131 of the 2013 DS provides decision rules and recommendations that guide the Division. He then said that it was important to distinguish between advice and oversight. HPAC is an advisory committee, while oversight comes from Congress, the White House, and other sources. HPD is happy to share its decision rules but the specifics are not something the Division can discuss.

There was a recommendation about sharing best practices on IPs, which HPD is working on internally. Another HPAC recommendation was based on concern for proposers from states that prohibit discussion

or even mention of IDEA, possibly conflicting with NASA proposal requirements. HPAC asked HPD to consult NASA legal counsel and provide guidance to those who might find themselves in these situations. Dr. Westlake explained that the NASA Office of General Counsel (OGC) advises NASA, not grantees. Proposers are responsible for dealing with these situations and are encouraged to consult the appropriate office within their institution if they are concerned about a possible conflict.

Having gone through the HPAC recommendations to HPD, the Division had some requests of the Committee. Because it takes time to go through all of the recommendations, it would be helpful to have three to five priorities to which HPD could provide comprehensive responses. Dr. Westlake reiterated the need to distinguish between advice and oversight as well. He does not plan on addressing oversight questions in the future. Finally, while accolades are nice, the most helpful F&Rs are those that focus on actionable steps. Dr. Westlake closed his presentation with a slide showing ways in which the science community can be involved.

Dr. Cassak thanked him for the presentation and feedback.

### Q&A

Dr. Gkioulidou said that she would appreciate more clarity on how to distinguish between advice and oversight. Dr. Barjatya said that his perception of the difference is that oversight has requirements but advisory groups do not require data. They can ask, but HPD can say no. He has never felt like HPAC was attempting to do oversight. In some cases, the Committee can only give advice after seeing the information. Dr. Westlake said that he wants HPAC to provide advice, and he understands that they want information in order to do so, but some of the requested information is embargoed or otherwise unavailable. Dr. Barjatya said that if HPD needs advice, then HPAC will need the related data. Dr. Upton added that there is a lot of concern because the community is suffering from 10 years of a flat budget. HPAC members hear the community react to that pressure and want to get information back to them. This is the goal, rather than providing oversight. HPAC wants to help the community understand decisions and how to weather this storm. HPAC wants to convey the community concern to HPD. Dr. Westlake said that he still has to work within the budget he is given.

Dr. Kamalabadi pointed out that the HPAC charter requires the Committee to address priorities and implementation. When Dr. Westlake replied that the priorities are specific, Dr. Upton said that the question is about the level of granularity, as the DS is broad. Dr. Westlake said that HPD uses the DS to set priorities. GDC was the fourth priority in the 2013 DS. Ahead of it were the DRIVE centers, the Explorer cadence, and R&A, all of which HPD has addressed. GDC is primary priority in the Living with a Star (LWS) program, but there are other elements in HPD. The DS is very specific about relative priorities. He added that the DRIVE initiative was larger than just the DRIVE centers. Addressing the DS within this budget has been challenging to both him and his predecessors.

Dr. Duncan said that she liked the list of priorities. People need to hear that. HPAC would like to understand the flavor of what goes into these, since they do not live and breathe this as much as HPD. Dr. Westlake pointed out that the budget process is complicated. It is a challenge, and HPD always goes back to the DS when facing challenges. For the most part, it is their bedrock. He is proud of what HPD has done under these circumstances. The launch cadence for the next year and a half is impressive, and the Explorer cadence is moving along well. The decision rules enumerate all this. The DS tells HPD where to make cuts and in what priority, though he wants to know if they miss anything.

Dr. Peticolas thanked Dr. Westlake for providing the specific DS page. Dr. Upton agreed. This is what HPAC was looking for in the HPD response. The community needs to hear these things. Dr. Westlake said that if they were to look at the budget scenarios for LWS and Solar Terrestrial Probes (STP), it would be apparent that those were going to be challenging. GDC and DYNAMIC had no fat on them. Dr. Brain

said that often, the HPAC intent is to encourage communication, not to question decisions. Sometimes, though, the lack of information leads to a need to hone the HPD messaging. Dr. Westlake said that was a good clarification.

Dr. Brain said that community people approach HPAC members, and the community is interested in what is going on with GDC. Dr. Westlake said that the FY24 GDC pause was unfortunate. In July, HPD will issue a report on how to fly GDC by the end of the decade. This will include ways to get it past 2030. The FY24 budget and the FY25 PBR came out close together. The PBR proposes cancellation of GDC due to outyear funding realities. The PBR is a step in the funding process and there are more steps to go. In FY24, GDC is progressing with instruments and other elements. As this is an election year, the level of uncertainty is heightened. HPD wants to have GDC, but it will not if Congress says it will not. Dr. Upton reminded those listening in to talk to their senators and representatives. Dr. Westlake added that DYNAMIC is linked in some ways. Its Announcement of Opportunity (AO) assumes a GDC launch, and it will be hard to do one without the other. GDC and DYNAMIC would provide a lot of amazing science that has not been available previously. He added that he is conflicted on DYNAMIC.

Dr. Cassak said that in making the distinction between advice and oversight, he would be concerned that HPAC might bite its tongue in fear of straying into oversight. He would like HPAC to speak freely and not be inhibited. Dr. Westlake said that his comment should not be taken to mean there is a problem. It is more about being effective in giving actionable advice to HPD and using HPAC member time well. Dr. Cassak said that in terms of providing a shorter list of recommendations, he does see that there is a lot of history that led to the long lists and he personally sees the need to provide a more cohesive list. However, he was concerned about setting a limit. He wondered about providing the top items while also conveying other things. HPAC wants to be able to tell him what they value but the Committee might not need a response to everything. Perhaps there could be a separate list of items that do not require HPD responses. Dr. Westlake agreed, as did Dr. Upton, who added that HPAC would like to also call out what HPD is doing well so they know to continue. Dr. Cassak said that HPAC could have a feedback section, and Dr. Westlake suggested that it be part of the report-out at the end of the meeting. Dr. Duncan said it would be helpful to know the level of specificity HPD wants.

Dr. Gkioulidou asked if there had been negative comments about DAPR and, if so, how HPD reacted. Dr. Westlake replied that the Division tries to be aware of unintended consequences. Drs. Koehn and Jorgensen want to have listening sessions, or “office hours,” at meetings and conferences. DAPR data often come from SMD and Dr. Michael New, who gets feedback from the divisions to see if the goals are being met. Dr. Jorgensen added that by 2025, she expects all of ROSES reviews to be under DAPR. Dr. Salem explained that the HPAC recommendation on HDRL was to share more information, similar to NSF. Dr. Westlake suggested that the next HPAC meeting might have a presentation on this. Dr. Zirnstein noted that the HSO recommendation was about funding of the mission teams that want to do science and publications. Dr. Westlake replied that the HSO missions are producing validated data products. Sometimes they involve science, but the primary funding for science goes through ROSES once a mission is in infrastructure. It allows for additional data sets.

Dr. Brain asked about the relationship between HPD and the Committee on Solar and Space Physics (CSSP), under the National Academies of Sciences, Engineering, and Medicine (NAEM). Dr. Westlake said that there are different limitations. CSSP cannot give advice and can only give reports when asked. HPAC advice could lead HPD to request a CSSP report. CSSP can go deeper into a topic if asked. Dr. Peticolas said that at the last couple of meetings, HPAC has requested data on the community, which CSSP might obtain. There might be a recommendation to have HPD ask CSSP some of these questions. Dr. Westlake said that that is possible.

Dr. Westlake and Ms. Elizabeth Esther provided an update on HSO. Dr. Westlake said that HPD wants to achieve the most science from HSO and has received DS advice on how to enhance the many missions that will allow the Division to enhance science outcomes and effectively operate the missions. Dr. Duncan asked what he might want from HPAC coming out of this presentation. Dr. Westlake replied that if there are comments on details within HSO that HPD might have missed, that would be helpful. The Division dealt with the mission teams in the Senior Review (SR) and is moving to decisions.

At the 2023 SR, HPD introduced a new framework for extended missions. This was to address the fact that the individual extended mission proposals lacked system-level coherence and perpetuated closed communities. The new framework is meant to develop opportunities for HSO science working groups, expand Guest Investigator funding opportunities, and broaden both community opportunities and coordination with HDRL. The result was that, of the 12 missions proposed to the SR, 4 were designated for project funding, 6 were determined to be infrastructure, and 2 were terminated due to technical issues. Because of the community pushback on the term “infrastructure,” HPD will examine terminology and definitions. Regardless, the goal is to enable the science community. With eight missions launching in the next 18 months, it is time to think about how long HPD can carry individual missions. This leads to a need for clear expectations, guidance, and a policy that does not pit missions against each other. HPD seeks community input and hopes to finalize the policy before the ROSES cycle. The goal is enhanced system-level science.

Dr. Peticolas said that the word “infrastructure” seems to ignore that extended missions use scientific practices as they go forward. There might need to be a better word that acknowledges the science. Dr. Westlake said that a mission remains a mission, and the different phases designate what they are doing. Other divisions use the term. Dr. Duncan said that the Astrophysics Division (APD) expanded having general observatories with the Medium-class Explorers (MIDEXes), which is an important corollary. She wondered if this might be what HPD was aiming at, something that becomes more of a general observatory. Dr. Westlake said that the goal is to align and have high-impact, system-level science for most of the missions. For the most part, specific science goals are addressed during the primary mission. Once out of prime phase, the additional science comes from the broader collaboration of the community across missions. No one wants to disrespect individual mission science, but the goal is to build a broader, more joint community to move forward together with shared goals. This should enhance the science. Dr. Duncan then asked how Dr. Westlake envisions supporting previously stovepiped communities when they shift to this kind of modality. Dr. Westlake replied that a lot of that will come from HPD’s handling of the ROSES program. If HPD struggles to support a particular observatory in this system, it will create further difficulties. However, the ability to obtain system-level science from the new structure will enhance what the field currently has.

The new extended mission framework involves a 3-year transition period that will begin upon the end of the prime mission phase, though there will be some exceptions for strategic missions. This will initiate a change in research funding from mission funding to a competed approach through ROSES and other calls. It opens up the science from the missions. NASA continues to fund the management, operations, and data from the missions. Each mission will then need to produce data that are of value to, and usable by, the entire community. The SRs will still evaluate mission health along with feasibility and the data archiving status. HPD has worked with the missions on ways to provide low-cost, accessible documentation. Some of the community feedback regarding the SRs has been surprising. In the extended phase, most research will be done through competed funding avenues. HPD will not use the term “infrastructure.” Dr. Gkioulidou asked if this system will apply to new missions or to all of them. Dr. Westlake said that it would be all missions subject to the SR. The timeframe depends on the mission. Dr. Gkioulidou sought more detail on how and when missions would move into the transition phase and when they would be funded under ROSES. Dr. Westlake said that the transition phase initiates a change in the research funding. HPD will communicate with each mission throughout this process. Dr. Gkioulidou asked how

much sway the SR will have in this process. She noted that some missions change orbits or there are proposals constituting a whole new mission. Her concern was fairness to all the missions going forward.

Dr. Westlake said that while this is a policy change, HPD acknowledges that each mission is unique, and they can remain unique in the extended phase. HPD will have these conversations with the missions. The SR has been asked to evaluate different missions in different ways, while the missions were asked to describe new and innovative science they might do should they continue. Now HPD is looking to have the SR examine technical feasibility, documentation and archiving, and science as part of a smaller SR process than HPD has had in the past. It will result in a lower impact on the missions themselves while making it easier to identify cases where the data are not coming in. HPD would not encourage additional information based on continuations of the same thing. He understands that a lot of work goes into developing a mission, which is part of the reason for the transition phase. There are a lot of Explorers, and HPD has been supporting some of the Small Explorers (SMEXes) for decades. There has to be consideration of whether this is the best use of funding. Dr. Barjatya said that the details of the transition phase are still not clear. Is money being taken from the mission and put into ROSES at that point, or something else? He said it was unclear as to what initiates a change in funding. Dr. Westlake explained that there would be a change in the research funding during the transition phase. HPD will talk to each mission about a ramp-down in research funding during that phase. There will be a detailed discussion with the missions about how to ensure success. The goal is to get the missions into the HSO where system-level science is being proposed. Dr. Barjatya cited the learning curve that exists for each mission and expressed concern about this moving too quickly. He still wanted more detail on what initiates a change in research funding. He did agree about not supporting SMEXes for decades, however.

Ms. Esther said when the infrastructure plan was originally rolled out, HPD thought in terms of having a 9-month transition phase, but it became clear that that would not provide the mission teams with enough time, and the teams themselves protested. Putting the framework in place with a longer transition phase allows teams to adapt to expectations. It has been good to discuss the right timeframe for each phase, and HPAC feedback would be helpful. The 3-year transition phase allows ROSES to put in opportunities relevant to that data, proposals to be submitted, and proposals to be awarded. It will help the individual missions and HPD to understand cases in which they might need to pivot in a different direction. The transition phase is built for that purpose, and the new framework establishes the expectation of the transition phase. At present, the system is set up to provide a flat budget at some point. The flat budget goes up against the slow squeeze of inflation over time, leading to difficult decisions. This allows for an understood transition phase and appropriate planning to establish system-level coherence. The transition phase is individualized from one mission to another. HPD will release a draft policy for comment in order to understand how this affects the community and describe how the transitions will work. Ms. Luce added that the prime mission is established at the beginning of a mission. The transition phase roughly aligns with the SR and the prime mission is pre-SR. Dr. Cassak said that if the transition phase depends on the mission, having a number on it can be a distraction. Dr. Westlake said that the last SR was intense. The goal is to reduce the burden and ensure the missions are ready for it.

Dr. Westlake listed the benefits of the new policy, emphasizing coherence and science return. He also reviewed the HPAC recommendation on the topic from the February meeting. Next steps will be to gather more feedback, finalize the policy, and present the policy to the community via town halls and other means. Dr. Brain said that HPD might consider the first SR following implementation as providing lessons learned that can help set parameters for the future. He also keyed in on the 3-year period mentioned under the transition phase. Dr. Westlake said that it will be important to have the conversations with the individual missions, and this will need to include the uniqueness of their data products. Ms. Rayl said that in this discussion, HPD needs to delineate better between Explorers and strategic missions.

#### Public Comment

The meeting was opened to the public for comment, but no one came forward.

HPAC Discussion (Potential Issues for Findings and Recommendations)

Dr. Cassak led HPAC in discussing possible F&Rs. He asked if there were any questions from the SWC report. Dr. Barjatya said that in the future, it would help to have more insight into what is meant by “insufficient” or “alternative means.” He would like to see examples. Dr. Duncan agreed. Dr. Salem identified a small mistake regarding an affiliation and sent it to Dr. Duncan. Dr. Cassak asked for a vote, assuming incorporation of the correction and the previous modification from Dr. Peticolas. Dr. Peticolas then proposed sending the report forward. Dr. Upton seconded the motion. All HPAC members agreed, with no dissent. Dr. Cassak said that they would send it forward.

Regarding priorities for F&Rs, Dr. Upton suggested having one about increased proposal pressure and the NASA request on how to handle the metrics. Dr. Salem agreed; he thought this might be the top item. It was determined that harassment would go onto the next meeting agenda. Dr. Peticolas said that she and Dr. Upton had feedback on the framework for HSO. The DRIVE center presentation was baseline information, and it was suggested that future meetings feature lunch presentations from individual centers; there was no recommendation. Clarification of the legacy data set issue might become too specific for this Committee, but Dr. Barjatya pointed out that HPAC had spent hours talking about it and should find a way to send something to HPD. The issue will not disappear. Dr. Upton suggested saying something like HPAC understands that there is a problem regarding legacy data and community members not being clear about proposal options, so the Committee recommends find a place for such proposals. Dr. Westlake asked HPAC to keep in mind that the concern is that proposers need clarity about inclusion of a modeling component. This would be a general statement about data analysis. Dr. Koehn explained that the current home for legacy data is in HSR. The requirement for a modeling component has been removed and proposers can use legacy data. The Global Modeling Initiative (GMI) is specifically for operating missions and HPD cannot change it. Dr. Brain pointed out that the word used in the call is “encourage.” Dr. Gkioulidou maintained that it will still be taken as a requirement. Dr. Koehn said that that is something HPD can address.

Although she was not sure where it would go, Dr. Peticolas wanted HPAC to acknowledge the changing approach to sensors. HPD might want to ensure the technology can be included in the calls. Dr. Cassak suggested addressing the definition of technology in AOs. Dr. Englert asked if the ISFM selections are published. Increased transparency would be helpful. Dr. Cassak was concerned about the evaluation committee being strongly weighted to NASA personnel rather than the community. Dr. Westlake observed that ISFM is different from ROSES. Dr. Upton asked if the new transitioning of missions from mission funding to ROSES funding will be accompanied by an increase in ROSES funding. Dr. Westlake said that it was too early to know. HPD funds its programs like the other divisions, and funding of R&A and ROSES is complicated. There are individuals involved and a cadence of multi-year awards. However, HPD would not expect to shift a large chunk of research without funding it in some way. He agreed with the observation that scientists find it increasingly challenging to obtain sufficient funding.

Dr. Cassak listed the five potential F&Rs as:

- R&A proposal pressure;
- R&A metrics;
- HSO framework;
- Legacy datasets; and,
- Definition of technology in AOs.

He asked if, regarding proposal pressure, HPAC wanted to convey likes and dislikes, with no recommendations. Dr. Barjatya thought they had agreed to ask that HPD investigate a 6- or 4-month due

date instead of Step 1s. Dr. Englert preferred to advise the Division to look at certain elements. He was not sure they were ready to make a single, focused recommendation. Dr. Upton advocated for a broad recommendation that HPD consider several possibilities, and Dr. Duncan did not feel like HPAC had come to a consensus. Dr. Jorgensen said that HPD was hoping for feedback based on what HPAC is hearing from the community, and she liked the idea of concepts to investigate. The problem that HPD is trying to solve relates to the number of reviewers and the COIs they have. Bringing in international reviewers is an option but it has drawbacks. Dr. Salem suggested that, if there are two or three calls per year, those who submit in the first round could review in the second. Dr. Jorgensen said that HPD would still consider COIs in those individuals. Dr. Yue asked about having different programs test different solutions. Dr. Westlake remained concerned that the proposal pressure might be indicative of something else that is occurring in the community. Dr. Jorgensen said she appreciated the discussion about how complex this is and the suggestions of what to examine. Dr. Zirnstein did not like the idea of trying multiple approaches at the same time. He preferred having two or more due dates. Dr. Brain suggested stating that HPAC recognizes the increasing tax on the community of reviewing proposals while also being fair and avoiding bias.

Dr. Koehn presented the proposal data that HPAC had requested, showing that HSR had the same number of proposals in 2016 and 2024, and that there were more HGIO proposals in 2016 and 2017 than in 2024. Both programs had their lowest submission numbers in 2021. Dr. Cassak assigned development of this recommendation to Drs. Peticolas, Brain, and Zirnstein. He moved the R&A metrics recommendation to the end of the list as it was not yet clear if HPAC would include it.

Regarding the HSO framework, Dr. Peticolas said that the need was for more detail about the transition phase process and the fact that it will be individualized for missions. She also cited the confusion about the 3 years spent in the transition phase and the movement into ROSES. Dr. Barjatya wondered if they should hold off. HPD was already aware of the concern. He thought the transition was the most questionable piece. He wanted HPAC to say they look forward to the draft. Dr. Englert said that management, operations, and data need to be well-defined in the draft. In particular, “data” can be read in various ways. Improved definitions will help the community going forward. Dr. Duncan cited the analogue to APD and the GI program, as well as the need to look at breaking down the stovepipes. Collaboration is not instantly understood. Dr. Westlake said that the Explorer missions are not designed to last for 20 years, but they do. While HPD does get great science from many of these missions, the question is how to handle what the missions produce in a way that makes sense. Dr. Peticolas said that she liked having the three phases but had two recommendations for changes in the transition phase. First, she would remove mention of 3 years, because people will fixate on it. HPD could cite the SR cadence instead. She would also reword “transition phase” to “the SR phase” since HPD does not seem to be strict about starting the transition at the beginning of that phase. Drs. Englert, Peticolas, and Yue agreed to draft this recommendation.

Dr. Cassak said that on the legacy data sets F&R, HPAC did not want to overstep its bounds but did want to point out that the word “encourage” in regard to HSR legacy data still might deter proposers without modeling capabilities. The recommendation would be that HPD make it clear to the community that legacy data can be supported. Dr. Gkioulidou wondered if this could be combined with another F&R, but Dr. Cassak was wary about over-explaining or creating a COI situation for HPAC members. It was important to keep this high-level. Drs. Upton and Salem were asked to write this in a form that would be actionable, emphasizing the need for clarity in order to address any community misunderstanding.

On the F&R about technology definitions and AOs, Dr. Peticolas said that HPAC might say that it has found that some of HPD’s opportunities for technology development should ensure that the terminology encompasses current sensors, etc., and is not stuck in the past. HPD should be open to emerging technologies. Dr. Barjatya was not convinced that this was necessary. While it could be that some new

technologies are not being named, they are not being excluded either. Dr. Dan Moses advised caution in calling out certain technologies and using buzzwords. He added that unless there is evidence of proposals being turned down, this is treading on thin ice. HPAC voted to delete this F&R from the list.

Dr. Cassak was not convinced they had time for a good recommendation on R&A metrics, which they could delay for another meeting. He turned to the list of comments for which there was no need for a response. His preliminary list included:

- The advice to the SWC was great. HPAC appreciated the level of specificity in the request and would like to see that in other requests.
- There were good presentations on the DRIVE centers, citizen science, and the eclipse/HBY.
- Recalibration of communications between HPD and HPAC is welcome. Nonetheless, HPAC wants to ensure that its discussions remain broad and not constricted by fear that they may be drifting into oversight.
- The report-out will include a section on “notes” that do not require a thorough response from HPD.
- Either the agenda or the presentations should embed time for questions and discussion. This may require shorter presentations.
- There is a need to ensure resonance between HPAC report-outs and what HPD hears.

Dr. Peticolas added that it was helpful to get the presentations a few days in advance, and it would be even better to receive them a week in advance if possible.

The Committee decided they had time to look further at having a recommendation on R&A metrics. Dr. Upton said it would help to compare the number of Full-Time Equivalents (FTEs) being funded to the number of proposers in the community overall. It would help determine how much work effort is being funded and if there is sufficient financial support for the community. HPD might not have access to those specific metrics, but something like them would help. Dr. Westlake that it is challenging to determine how many people are in the heliophysics community. Funding comes from more than just research grants. Dr. Upton suggested they look at the total number of individuals that have been included in proposals versus the number of FTEs that could be supported by the available funding. Dr. Westlake was not sure what HPD could do with that information. Dr. Upton said it might help to understand what is behind the proposal pressure. Is the community too large or is something else going on? Dr. Westlake said the community is funded by R&A, missions, and other sources, so the metrics might not lead to an accurate answer. Dr. Brain suggested a more general recommendation, to examine level of support in the community, breadth of the portfolio, success of the awards, and demographics. They could also track by institutions. This would help move away from measuring everything in terms of dollars, though it would be good to know salaries. Dr. Cassak pointed out that while Dr. Jorgensen was able to provide some of the metrics HPAC sought, other metrics require justification before they can be collected. Dr. Yue said it would be helpful to know the percentage of EC scientists, and added that NSF tracks papers and topics.

#### Recommendations & Findings Open Discussion

Following a work session, HPAC returned to finalize the content of its F&Rs. Dr. Cassak did note that they could continue wordsmithing after the meeting, but content needed to be finalized in open session. He began by presenting a summary of the meeting that listed the presentations. The list of findings and comments that did not require an HPD response was titled “Feedback/Notes and Requests.” Dr. Cassak read his preliminary draft. There was some discussion of one of the bullets, and HPAC acknowledged that Dr. Westlake had had to respond to recommendations made before he took on the role of Division Director. There was also a statement encouraging steps toward clearer communication between HPAC and HPD during the presentations. Dr. Brain noted that while HPAC understands HPD’s concerns about advice versus oversight, the Committee does not want to stifle discussion. In addition, one of the possible



issues regarding Q&A is that HPAC members ask their questions during the presentations. The bullet on that topic was revised.

Dr. Zirnstein read the first F&R, about R&A proposal pressure. The Committee discussed what constitutes proposal pressure, which Dr. Cassak said could include the number of funded proposals. Dr. Jorgensen said that proposal pressure was already a problem for HPD in 2016-18, and the program struggled with it then. It is resurfacing now. Further HPAC discussion addressed the meaning of “triage” in this context. Another section of the recommendation advised providing feedback to EC proposers during Step 1, especially when proposals are deemed noncompliant or are otherwise discouraged. This was moved up. However, it was also determined that feedback should be given to weak proposals regardless of the PI’s career stage. Dr. Cassak said that proposal pressure is an important situation to address, but care should be taken to avoid manipulation in order to create desirable data. Dr. Velli pointed out that sometimes the gradient of proposal quality is very fine, so a reduced number of proposals makes evaluation easier. Dr. Cassak expressed concern about triage as a possible solution.

Dr. Velli read the recommendation on the HSO extended mission framework. Aside from some wordsmithing, the Committee took the recommendation as written. It called for better communication to the community in regard to the transition phase, more precise definitions, and a comparison to what is done in other SMD divisions. The recommendation also advised HPD to take steps to support greater collaboration and less stovepiping.

Dr. Upton read the legacy data recommendation, which asked HPD to evaluate the proposal landscape and, if needed, adjust any language to make it clear that proposals using legacy data for analysis may be considered competitive and eligible for funding. There was some disagreement about the potential for HPAC members to be conflicted in discussing this. The result was some wordsmithing. Dr. Brain read the recommendation on metrics to measure the health of the R&A program. He noted that some of the language was brought forward from previous meetings. The recommendation reflected the Committee’s earlier discussion and there were no changes.

Dr. Peticolas then read a recommendation from the November meeting that did not yet receive a response from HPD. However, after some discussion, HPAC decided to withhold the recommendation for possible refinement at a future meeting.

Items suggested for the next meeting’s agenda included IDEA and harassment, a presentation from the SMD data person, and a DRIVE center talk that might take place during lunch. Dr. Upton reminded the Committee that the fall meeting is likely to include the annual Government Performance and Results Act Modernization Act (GPRAMA) performance review.

#### Report out to the HPD Director

Dr. Cassak began the report-out to Dr. Westlake by reading the summary. He then went through the new Feedback/Notes and Requests section, which consisted of findings and comments that did not require a response from HPD.

Dr. Zirnstein read the first F&R, which addressed R&A proposal pressure. In discussing the difficulty in finding reviewers, Dr. Barjatya observed that with or without deadlines, reviews will not happen immediately. Dr. Jorgensen said that there could be quarterly panels. Dr. Englert read the F&R about the HSO extended mission framework, and Dr. Upton read the legacy data F&R.

Dr. Brain read the findings on metrics to measure the health of the HPD R&A program. The finding said that four categories of metrics might be considered: level of community support; breadth of the portfolio;

demographics, such as percentage of EC scientists and number of institutions; and success of awards. A list of justifications for certain metrics previously requested by HPAC included the following:

1. R&A budget trend, which shows the extent to which the budget helps support the community;
2. Portfolio balance, indicating the level of support for various subcommunities;
3. Possible inequities in funding rates across demographic categories;
4. Proposal pressure, which has been provided; and,
5. Plans for future R&A funding.

Dr. Westlake asked that they remove the last of these, as future budgets will be no more explicit than they are now. The PBR has a line for research. Determining what is funded by looking at that number may be misleading. Dr. Brain said that the list was carried over from a prior HPAC meeting and the first three items were the higher priorities.

Dr. Cassak then listed some suggested agenda items for the next meeting: IDEA, SMD data presentation, and DRIVE center presentation. Dr. Brain pointed out that the upcoming DS was likely to have been released by time HPAC reconvened. Dr. Westlake replied that the new DS would definitely be a topic of discussion, but HPD might not be ready to respond by time HPAC meets next. Dr. Jorgensen noted that HDRL is the heliophysics archive and data initiative; SMD has data initiatives of its own. Dr. Westlake thought it would be helpful for HPAC to understand HDRL first; it was a good place for his own learning experience. Dr. Cassak said that HPAC would then start with HDRL and have the SMD data person at a later meeting.

He, Dr. Westlake, and Dr. Kozyra thanked everyone for their participation and efforts. The next meeting is likely to be in October.

ADJOURN

The meeting was adjourned at 4:57 p.m.

## Appendix A Participants

### *Heliophysics Advisory Committee Members*

Paul Cassak, West Virginia University, *Chair*  
Janet Kozyra, NASA Headquarters, *Designated Federal Officer*  
Christoph Englert, Naval Research Laboratory, *Vice Chair*  
Nicole Duncan, BAE Systems, Inc., *Space Weather Council Chair*  
Aroh Barjatya, Embry-Riddle Aeronautical University  
David Brain, University of Colorado Boulder  
Matina Gkioulidou, Applied Physics Lab, Johns Hopkins University  
Farzad Kamalabadi, University of Illinois, Urbana-Champaign  
Laura Peticolas, Sonoma State University  
Chadi Salem, University of California at Berkeley  
Lisa Upton, Southwest Research Institute  
Marco Velli, University of California at Los Angeles  
Jia Yue, Catholic University of America  
Eric Zirnstien, Princeton University

### *Other Participants*

|                     |                            |
|---------------------|----------------------------|
| Christine Bonniksen | Steven Heuer               |
| Devin Bryant        | Andrea Hughes              |
| Jessica Calles      | Vamsee Krishna Jagarlamudi |
| Michele Cash        | Seth Jonas                 |
| David Cheney        | Therese Moretto Jorgensen  |
| Katie Clark         | Graham Kerr                |
| Monte DiBiasi       | Skyler Kleinschmidt        |
| Tammy Dickenson     | Jim Klimchuk               |
| John Dyster         | Patrick Koehn              |
| Gordon Emslie       | Kelly Korreck              |
| Sylvie Espinasse    | Burcu Kosar                |
| Elizabeth Esther    | Michael Kurtz              |
| Griffin Farrow      | Danny Lentz                |
| Jamie Favors        | Jared Leisner              |
| Bashi Ferdousi      | Alfonso Avelar Lima        |
| Susanna Finn        | James Lochner              |
| Genevieve Fisher    | Margaret Luce              |
| Jeff Foust          | Liz MacDonald              |
| Galen Fowler        | Erin Mahoney               |
| Reinhard Friedel    | Tariq Malik                |
| Heather Futrell     | John Manuel                |
| Manolis Georgoulis  | Amy Marshall               |
| James Green         | Ryan McGranaghan           |
| Lewis Groswald      | Chet McLeskey              |
| Lika Guhathakurta   | Elisabeth Morse            |
| Roshanak Hakimzadeh | Daniel Moses               |
| Ha-Hoa Hamano       | Tetsuo Motoba              |

NASA Heliophysics Advisory Committee Meeting Minutes, June 17-18, 2024

Asal Naseri  
Kennedy Novak  
Jeff O'Neil  
Michael O'Rourke  
Steve Petrinec  
Robert Pfaff  
Arik Posner  
Freyja Quinn  
Carolina Ravinskas  
Nicole Rayl  
Griffin Reinecke  
Amy Reis  
Ursula Rick  
Kayla Rillo  
Tara Roberts  
Alvin Robles

Richard Rogers  
Abi Rymer  
Vanessa Salazar  
Roger Sanchez  
Abigail Sheffer  
Elizabeth Sheley  
Esayas Shume  
Ekaterina Verner  
Monica Washington  
Joseph Westlake, *Heliophysics Division*  
*Director*  
Bradley Williams  
Chauncey Wu  
Raymond Zhong  
Alan Zide

## Appendix B Advisory Committee Membership

**Paul Cassak, Chair**

West Virginia University

Christoph Englert, Vice Chair

Naval Research Laboratory

Janet Kozyra, Designated Federal Officer

NASA Headquarters

Nicole Duncan, Space Weather Council Chair

BAE Systems, Inc.

Aroh Barjatya

Embry-Riddle Aeronautical University

David Brain

University of Colorado Boulder

Matina Gkioulidou

Applied Physics Lab

Johns Hopkins University

Farzad Kamalabadi

University of Illinois, Urbana-Champaign

Laura Peticolas

Sonoma State University

Chadi Salem

University of California at Berkeley

Lisa Upton

Southwest Research Institute

Marco Velli

University of California at Los Angeles

Jia Yue

Catholic University of America

Eric Zirnstien

Princeton University

## Appendix C Presentations

1. *Space Weather Council – Direction*, Kelly Korreck
2. *R&A Program – Updates and Discussion*, Therese Jorgensen, Patrick Koehn
3. *DRIVE Science Centers*, Janet Kozyra, Katya Verner, Chet McLeskey, Michael O’Rourke
4. *Outreach – Citizen Science*, Elizabeth MacDonald, Susanna Finn, Janet Kozyra, Ha-Hoa Hamano
5. *Heliophysics Division Update and Response to Past HPAC Recommendations*, Joe Westlake
6. *Heliophysics System Observatory – Updates*, Joe Westlake, Elizabeth Esther

## Appendix D Agenda

### **Heliophysics Advisory Committee (HPAC) Meeting** NASA HQ June 17-18, 2024

Monday, June 17, 10:00AM – 5:00PM

|       |  |  |
|-------|--|--|
| 10:00 | Welcome to Day 1   | Dr. Janet Kozyra, DFO, NASA  |
| 10:03 | Introduction of Committee Members;<br>Overview of Agenda               | Dr. Paul Cassak, HPAC Chair  |
| 10:06 | NAC Science Committee –<br>Recent Meeting Report                       | Dr. Paul Cassak, HPAC Chair  |
| 10:20 | Space Weather Council – Directions                                     | Dr. Kelly Korreck, NASA  |
| 10:45 | R&A Program – Updates & Discussion                                     | Dr. Therese Jorgensen, NASA<br>Dr. Patrick Koehn, NASA,<br>Dr. Reiner Friedel, NASA                          |
| 12:00 | LUNCH  |  |
| 1:00  | DRIVE Science Centers  | Dr. Janet Kozyra, DFO, NASA<br>Dr. Katya Verner, NASA<br>Dr. Chet McLeskey, MSU<br>Dr. Michael O’Rourke, MSU |
| 1:50  | Outreach – Citizen Science   | Dr. Elizabeth MacDonald, NASA<br>Dr. Susanna Finn, NASA<br>Dr. Janet Kozyra, NASA<br>Ha-Hoa Hamano, NASA     |
| 2:25  | BREAK  |  |
| 2:45  | HPAC Discussion (Potential issues for<br>findings and recommendations) | Dr. Paul Cassak, HPAC Chair  |
| 3:25  | HPAC Work Session for<br>Writing Preparatory Material                  | Closed Session   |
| 5:00  | ADJOURN  |  |

Tuesday, June 18, 9:30 AM – 5 PM

|       |   |  |
|-------|---|--|
| 9:30  | Welcome to Day 2  | Dr. Janet Kozyra, DFO, NASA                      |
| 9:32  | Overview of Agenda  | Dr. Paul Cassak, HPAC Chair                      |
| 9:35  | Heliophysics Division Update &<br>Response to Past HPAC Recommendations | Dr. Joe Westlake, HPD Director                   |
| 10:35 | Q&A   | HPAC/HPD Director                                |
| 11:10 | Heliophysics System Observatory –<br>Updates                            | Dr. Joe Westlake, NASA<br>Elizabeth Esther, NASA |
| 12:00 | LUNCH – Heliophysics Town Hall  |  |
| 1:05  | Public Comment  | Virtual Only                                     |
| 1:20  | HPAC Discussion (Potential issues for<br>findings & recommendations)    | Dr. Paul Cassak, HPAC Chair                      |
| 1:50  | HPAC Work Session Preparatory Material                                  | Closed Session                                   |
| 3:00  | BREAK   |  |
| 3:15  | Recommendations & Findings<br>Open Discussion                           | HPAC   |
| 4:15  | Report out to the HPD Director  | HPAC to Dr. Joe Westlake                         |
| 5:00  | ADJOURN   |  |