

Astrophysics Division Town Hall - January 11, 2022 Q&A

Q: Are there any plans to rebalance the R&A proposal funding to achieve more uniform selection rates

A: No. Research and Analysis (R&A) funding is balanced across program elements to address all areas of astrophysics research in a strategic manner. Just because an area gets fewer proposals does not mean it is strategically less important. We seek input from the Decadal Survey and our advisory committees (e.g., Astrophysics Advisory Committee) on the appropriateness of our strategic balancing between R&A elements.

Q: what was the url to the Finest fellowship you mentioned

A: The cross-divisional solicitation:

<https://nspires.nasaprs.com/external/viewrepositorydocument?cmdocumentid=807862&solicitationId={87947100-56AE-C4DC-C511-0349862D658A}&viewSolicitationDocument=1>

The division-specific details are in the table:

https://nspires.nasaprs.com/external/solicitations/summary.do;jsessionid=ue54qL_Kd2iCXxu6D7-evChzawEFmR-91wWelBWETt4thNeT7z3jN!-216158539!wnp1.nasaprs.com!7006!-1!660411788!wnp2.nasaprs.com!7006!-1?sollId=%7B87947100-56AE-C4DC-C511-0349862D658A%7D&path=&method=init

Q: The starting of the 6m IOU-ST was conspicuous by its absence in your presentation - a top recommendation of Astro202. Are the probes being considered as strategic missions flagships or are all large missions still competing to be the first flagship

A: The Future Great Observatory is covered in slides 32-35 of the presentation, and since it was not readily named in Astro2020 we referred to it only as a 'Future Great Observatory'. Currently NASA is commissioning the James Webb Space Telescope

and building the Nancy Grace Roman Space Telescope. With two Great Observatories under development, now is not the time to start a third. Nevertheless, NASA is taking the Decadal Survey's recommendation seriously, beginning with the Great Observatories Maturation Program, which will begin in a few years once Webb and Roman are further along, and the budget is available to start the Great Observatories Maturation Program.

Consistent with the Decadal Survey, the Probes are being treated as strategic, PI-led missions.

Q: While JWST is supposed to last significantly more than 10 years, fuel is still finite. Will there be push from NASA to work on technological developments to allow remote refueling of missions like it On what time-scales

A: Webb was designed with a 5-year lifetime and 10 years of fuel (albeit with conservative margins built in), so it was not "supposed to last significantly more than 10 years". In all likelihood, it will last well beyond 10 years in large part because of better-than-threshold performance from the ESA-provided Ariane V launch vehicle. Its life-limiting event is therefore now probably electronic component failure rather than running out of fuel for station-keeping and momentum unloading.

NASA has spent some effort to demonstrate prototype refueling of missions on orbit (see the Robotic Refueling Mission; Orbital Express). NASA does plan for the possibility of having such capabilities in the future; Roman was designed from its early days to be robotically refuelable. If such a capability becomes available, Roman and other future Astrophysics missions certainly can make use of it.

Q: Will demographic information also be released for NASA's science engagement staffing and funding

A: No. There is no labor category for "science engagement" to charge against. It is a generalized term with many interpretations.

Astrophysics Probes just limited to FIR and X-ray

A: The Decadal Survey recommended FIR, X-ray, and microwave missions as priorities for a competed Probe line. NASA is implementing those Decadal Survey recommendations.

Q: Can you break down the 20 proposals received into the number of Missions and MO

A: The number of proposals received in response to the 2021 MIDEX and MO Announcements of Opportunity (AOs) was roughly equal for each category.

Q: Regarding funding for JWST GO vs the rest of the astrophysics portfolio - is there balance between GO funding to optical/IR community (HST and JWST) relative to all the other missions at shorter wavelengths.

A: NASA provides appropriate GO funding for each mission. Therefore the distribution of GO funding among different wavelengths depends on what missions are currently operating.

Q: How is the angular momentum management on JWST going Is the "solar sail" being used

A: The mission is operating nominally during commissioning, including the management of angular momentum. The "Aft Flap" that is used to balance solar torque has been deployed.

Q: Will Astrophysics division support opportunities for science as part of the Artemis Lunar program, e.g., instruments, MoOs

A: All Artemis and lunar landed science opportunities are open to astrophysics

proposals and they come with their own science funding. The Astrophysics Division is fully supportive of astrophysics proposals being proposed to Artemis and lunar opportunities for peer review and possible funding. Astrophysics-funded opportunities (e.g., Pioneers, MOs) also allow proposals that leverage NASA's planned lunar infrastructure and capabilities.

Q: HST seems to be nearing its lifetime, and its optical/UV capabilities are unmatched are there plans to upgrade its lifetime (via, e.g., servicing missions) to improve its overlap with missions such as, e.g., JWST

A: We estimate that the Hubble Space Telescope (HST) orbit is good until ~2035, and NASA will continue to operate Hubble as long as possible as a Great Observatory. Individual components are aging and failing, but the Observatory has extensive redundancy. There are currently no plans for an additional servicing mission.

Q: Does NASA have more plans to incorporate climate change mitigation, tracking, education, and communication moving forward ex tracking carbon footprints of missions, hosting brainstorming sessions for how to engage, as is the case of IDEA

A: The Science Mission Directorate will continue all its peer reviews in a virtual format, in part to reduce the carbon footprint associated with the traditional mode of flying reviewers to a single location to perform the proposal review.

Q: Will the ISFM program continue Will it grow, stay the same, or become smaller In your budgets, which bucket is it considered a part of

A: Since February 2021, ISFM (Internal Scientist Funding Model) is now a permanent program. ISFM is continuing with solicitations of white papers from NASA Centers for a new funding cycle, FY23-FY25. We expect the program to continue to maintain its "prime constraint," which is maintaining a constant fraction of research funding (both competed and directed/ISFM) awarded to NASA centers, so that ISFM investigations are never funded at the expense of the community. Note that ISFM is not a funding

line; funding of successful ISFM programs comes from approved research programs like ADAP, ATP, APRA, SAT, etc.

Q: Can you give more details on the TDAMM committee Timescale Composition

A: A Time Domain Astrophysics and Multi-Messenger (TDAMM) science advisory group will be formed following broad community, interagency, and international input regarding the pressing science questions to be addressed in TDAMM over the next decade. The first step in obtaining community input will be a TDAMM workshop in August 2022.

Q: How is a 6-year Stage 2 for a new flagship consistent with the Astro2020 guidance to start formulation this decade Isn't Stage 3 included in the Great Observatories Maturation Program

A: Yes. The Town Hall charts had an error on them. The 6-year estimate in the Decadal Survey covers both Stage 2 and Stage 3.

Q: What are the resulting concrete actions for a more equitable field from the ATP 2021 Inclusion Plan review

A: The outcome of the Astrophysics Theory Program (ATP) 2021 Inclusion Plan pilot program will be presented at the next [Astrophysics Advisory Committee](#) (APAC) meeting on March 30-31, 2022. Based on initial positive feedback from the astrophysics community on the ATP-2021 Inclusion Plan pilot program, more Astrophysics program elements of ROSES-22 (to be released on/around February 14, 2022) will require Inclusion Plans. During the first year of the pilot (ROSES-21), the peer reviews of the Inclusion Plans had no impact on selections, but were provided to PIs for their use. In the second year (ROSES-22), the Inclusion Plan reviews will have no impact on selection, however selected PIs will be required to revise unacceptable Inclusion Plans before funding will be released. In the third year (ROSES-23), Inclusion Plan reviews will impact selection decisions, as recommended by the Astro2020 Decadal Survey.

Q: Is there sufficient coordination and collaboration with DoE and NSF-physics, particularly for science above 10 keV

A: NASA Astrophysics, NSF Astronomy and Physics, and DOE High Energy Physics discuss coordination and collaboration frequently. However most collaborations arise from the science community. All three Agencies welcome proposals from science teams that draw from communities supported by any and all of the Agencies, as long as proposals address science objectives that the Agencies have in common..

Q: Are there any further thoughts yet on the likely schedule for an astrophysics Probe mission, as endorsed by the Astrophysics Decadal Survey

A: The Probe AO Community Announcement was released on January 11, 2022 and can be found here: https://explorers.larc.nasa.gov/2023APPROBE/pdf_files/NNH22ZDA008L.pdf . This includes the draft schedule. NASA expects to release a Probe AO in January 2023. Comments are due by March 15, 2022.

Q: How will costs be controlled for a multi-decadal >6-m class mission Why won't it crowd out other missions like JWST did

A: The James Webb Space Telescope did not “crowd out” other missions. NASA has, since the mid-1980’s spent between 50-70% of its astrophysics budgets on flagship mission development in any given year. Towards the end of Webb development NASA was spending the equivalent of 55% of the astrophysics budget on Webb, and it was never as high as 60%. The long Webb development time did delay the start of the next large mission (Roman), but it did not “crowd out” smaller missions nor did it decrease the funding that goes to the research community (GO funding or R&A grants). See Paul Hertz’s July 15, 2019, presentation to the [first meeting of the Astro2020 Decadal Survey](#), charts 58-59.

Q: If DEI, especially for early career researchers, is viewed as important when will NPPs become classified as employees

A: The NASA Postdoctoral Program (NPP) is a NASA-wide program that places postdoctoral fellows at NASA Centers. Granting employee status would require making them civil servants, which is not consistent with the objectives of the NPP. We are interested in any feedback regarding the benefits that are granted to NPP fellows, and whether they fall short of employee benefits appropriate for early career researchers.

Q: THESEUS was not selected by ESA in July 2021 and this was not captured in the Astro2020 report - what is headquarters' plan

A: NASA's implementation of the TDAMM recommendation of Astro2020 will take into account the international landscape for TDAMM-relevant missions and will be an international initiative that considers missions led by NASA with partner contributions or partner-led missions with contributions from NASA. With that in mind, NASA welcomes missions that address THESEUS science through its MIDEX program. NASA also welcomes suggestions for partner-led missions to which NASA could consider a contribution (see SMD's [policy on initiating contributions to international partner-led missions](#)).

Q: Is there any prospect for rethinking full cost accounting for ASD folks where it doesn't make much sense

A: No. It is [NASA policy to perform full cost accounting](#). No exceptions will be made for astrophysics.

Q: Will increasing the number of Probes be considered, including possibly an explicitly Multimessenger probe call

A: NASA plans to implement the Decadal Survey's recommendation for a Probe call. The [Probe AO Community Announcement](#) was released on January 11, 2022. Comments are due by March 15, 2022. Increasing the number of Probes would require additional budget for NASA astrophysics beyond the current outyear planning budget.

Q: Why isn't there a well-defined cost cap for flagships like probes

A: Flagship missions, being those specified with a set of explicit science goals from a Decadal Survey, are not cost-capped because the science goals are taken to be their defining characteristic, not the price point. Probes, in contrast, have been recommended without a single set of explicit science goals but rather a range of possible goals; accordingly, they will be cost-capped to provide the greatest scientific outcome at the specified price point.

Q: How is inflation factoring into budget projections and items?

A: NASA executes all its missions in real-year dollars, and always accounts for mission costs accordingly. Hence, a mission cost quoted by NASA will incorporate all the inflation extrapolations necessary across the mission lifetime. In the case of a flagship-scale mission as was recommended by Astro2020, this means that the NASA Real Year budget number will appear perhaps 50% higher than a fixed FY20 cost estimate as used in the Astro2020 Decadal Survey.

Q: Is SMD paying attention to recent developments in large reusable rockets Are parametric cost models in need of an update

A: NASA's parametric cost estimates for missions are sophisticated tools that rely on historical costs to develop space flight hardware. The launch vehicle is usually a relatively small portion of the overall mission lifecycle cost. Well into mission development, and long after parametric estimates are superseded by more detailed cost planning, a launch vehicle is procured, which ensures a competitive cost for the launch

capability required. As a result, NASA is able to benefit from advances in launch vehicles that were not available at the beginning of mission planning. If, over time, the availability of reusable rockets were to result in demonstrated cost reductions to develop space telescopes, then such new historical costs will naturally be included in the cost model database.

Q: What is NASA's plan for SOFIA, now that its termination has been recommended in the decadal survey report

A: SOFIA will not be part of the 2022 Astrophysics Senior Review per a January 14, 2022, letter from the Astrophysics Division Director to the SOFIA project. NASA is engaged in a discussion with DLR regarding the SOFIA mission, given the Decadal Survey Report recommendation. We anticipate that NASA and DLR will make a joint determination regarding SOFIA within a month (i.e., by mid-late February). SOFIA will carry out its full FY22 science operations if it is included in the FY22 appropriation.

Q: When will the report regarding the investigation to change JWST's name by NASA be published

A: The agency is aware of the recommendation we've received from our Astrophysics Advisory Committee (APAC) that NASA publish a report, and we are considering that recommendation. If there is an update we will make sure to share it with the APAC and the community.

Q: will support be provided for PIs to review the inclusion plan

A: The proposed budget for any proposal to NASA, including those that include Inclusion Plans, should include the proposed level of effort (i.e., labor FTEs) and the proposed other direct costs (i.e., supplies, equipment, travel) that are required to accomplish the goals of the investigation as a whole. If elements of the Inclusion Plan contribute to those costs, they should be included in the budget and budget justification.

Q: ESA now has a Director of Commercialisation. Will NASA create any similar post(s) for managing private industry partnerships

A: NASA has an [Office of Partnerships](#), and the Office of Partnerships has a Director.

Q: The IXPE mission will make its data public a short time after taking it. Will there be funds for analyzing the data Will the ADAP program earmark a funds for the support of IXPE analyses

A: As with other NASA flight missions, analyses of publicly-available IXPE data will be eligible for funding under the Astrophysics Data Analysis Program (ADAP) beginning with ADAP 2022. Traditionally, we have not established a “set-aside” or “earmark” for new mission data entering the ADAP, and there are no plans to do so for IXPE. However, the availability of new data products always creates the opportunity to propose new science that was not possible previously, and that naturally affords those proposals a modest competitive advantage in the peer review process.

Q: I am an early career scientist (postdoc). I'd like to know how to construct NASA proposals to collaborate with ESA following their Voyage2050 report and given our Decadal survey.

A: For hardware collaborations, please refer to the SMD [policy for initiating contributions to international partner-led missions](#). For science collaborations, proposals for funding to join the science team of a partner-led mission are accepted in the Astrophysics Research and Analysis (APRA) element of ROSES starting in ROSES-2022; formerly these proposals had their own ROSES element (see Appendix D.13 of ROSES-2020).

Q: When will the next AO's for a MidEx and SMEx be announced

A: The Decadal Survey recommended that the Explorers cadence remain the same at ~4 per decade (2 SMEX, 2 MIDEX, and 4 MOs). Thus we anticipate the next SMEX and MO opportunity will be ~spring 2024 and the next MIDEX and MO opportunity will be ~fall 2026.

Q: The lifetime historic science impact of a mission does not seem to correlate with cost -- why not many more midex/probes

A: You need to provide data to support your assertion. Hubble is arguably the most scientifically productive science project in the history of humanity. It also cost about the same as the James Webb Space Telescope in inflation-adjusted dollars. Since the relative science value of large vs medium vs small missions is inherently subjective, NASA looks to the Decadal Survey to provide advice on program balance. Astro2020 recommended ~4 small missions (Explorers) per decade, ~1 medium mission (probe) per decade, and <1 large mission (future great observatory) per decade. NASA intends to implement the balance recommended by the Decadal Survey.

Q: Is SMD keeping in mind ESA selections (and rejections) which were made presumably after the Astro2020 report was written

A: Yes.

Q: What is the FY phasing throughout this decade of the GOMTMP for the ~6m IROUV flagship (\$800M) vs the IR and X-ray (\$400M)

A: The current NASA budget proposals were formulated before receiving the 2020 Decadal Survey. Future NASA budgets, starting with the FY24 NASA budget request, will be informed by the recommendations of the 2020 Decadal Survey.

Q: Is Headquarters too risk averse with small concepts Why not allow for economies of scale with a ~9/10 success rate

A: NASA sets its level of risk tolerance as appropriate for different classes of missions. For our smallest missions, i.e., for sounding rockets, balloons, and cubesats, we actually target a 70% success rate. For larger and more expensive missions, NASA accepts less mission risk and requires space flight project management practices that ensure higher certainty of mission success. Recently, SMD has approved new Mission Assurance Requirements (MAR) for Class D missions (like SMEX and MO missions) that significantly reduces the flight project requirements.

Q: How will the NASA Bridge program be structured Current bridge programs are mostly located at universities, which NASA is not

A: The SMD bridge program will support bridges between universities and NASA Centers. This is a new program in FY22, and its initiation awaits approval by COngress of an FY22 appropriation.

Q: What is the timeline for the NASA dedicated TDAMM missions This was a top priority, above the probe call

A: As NASA anticipated the Probe recommendation, we were prepared to move on it when the Decadal Survey was received. TDAMM was not an expected recommendation, so NASA is not prepared to initiate dedicated TDAMM missions even though the Decadal Survey prioritized TDAMM above Probes. NASA is prioritizing missions that support TDAMM and are funded out of existing programs. NASA's participation in the Israeli-led ULTRASAT mission and the selection of the Pioneer-class Starburst address two of the highest priorities for TDAMM identified in Astro2020, with missions to be launched mid-decade. TDAMM relevant proposals are also under consideration in the cubesat and Explorer programs.

Q: Has COVID impacted the MIDEX proposal review process When are Step 2 selections expected to be announced

A: Currently COVID has not impacted the schedule for the 2021 MIDEX review process. The plan is still to proceed to Step 2 downselections in Q1 CY2024 as delineated in the 2021 MIDEX AO.

Q: Is NASA willing to speed up the notional timelines outlined in the Decadal

A: NASA timeline for implementing Decadal Survey recommendations is highly dependent on the budget. Without an increase in the Astrophysics budget top line, the notional timelines in the Decadal Survey cannot be accelerated.

Q: Are there plans to increase funding to theory and computation as suggested by the 2020 decadal report

A: Increases in the research budget, including increases in the theory and computation budgets, will be addressed through the annual budget formulation process.

Q: Will JWST continue observing after the fuel runs out and it drifts away from L2 i.e. like Spitzer did.

A: Yes, that is a possibility. There are no plans to turn off the instruments when Webb is no longer able to maintain its L2 halo orbit. By then, Webb will be part of the NASA Senior Review process and community input on any plans for continued operations under different modes will be used to decide on how to best use Webb resources.

Q: Does the lack of information about SOFIA and the Decadal's recommendation

imply that its Senior Review will go forward

A: SOFIA will not be part of the 2022 Astrophysics Senior Review per a January 14, 2022 letter from the Astrophysics Division Director to the SOFIA project.

Q: How does NASA plan to address the difficulty in retaining software engineering expertise due to high industry salaries

A: NASA is constrained in the salaries that it can offer to civil servant employees. Many of the software engineers for NASA projects are provided through industry contractors, and these contractor organizations can offer competitive salaries.

Q: What is NASA's thinking about the decadal recommendation for space-based cosmic microwave background observations

A: The Decadal Survey made a clear recommendation that NASA consider a Probe mission for CMB observations in the second round, subject to any reprioritization by the next Decadal Survey, should that occur before the second Probe AO. The Decadal Survey prioritized ground-based CMB projects and research for the 2020s. For the near future, technologies for a space-based CMB mission are compliant within APRA, and PI-led proposals may compete in suborbital-class, Pioneer, or Explorer solicitations.

Q: You just had on the slide that NPP base will increase form 60k to 70k, but ORAU just presented that the increase will only be to 63k

A: Both statements are true. The base stipend for NPPs will increase from \$60k to \$63k with the start of the NPP-2 contract (1-February, 2022). The base stipend for NPPs will increase from \$63k to \$70k at some point; we do not have a firm date for this change at this time.

Q: Are there any guidelines for mass and orbit for the NASA supplied probe launch vehicle

A: The Probe AO Community Announcement was released on January 11, 2022 and can be found here:

https://explorers.larc.nasa.gov/2023APPROBE/pdf_files/NNH22ZDA008L.pdf .

Specific questions or comments about mass and orbit guidelines should be submitted for consideration as the draft Probe AO is developed. Comments and questions are due by March 15, 2022.

Q: The restriction on probe wavelengths is drastically detrimental to advancing transformative science in a timely manner, as the latter requires IR and UV data. Will NASA mitigate that to some degree in the planning of other future space missions, e.g., MIDEX class missions

A: NASA plans to continue to allow any proposal that is responsive to the Astrophysics Division's science goals to be reviewed in Explorers calls.

Q: Anonymous review demonstrates increased equity for JWST programs, is there a plan to review equity of the budget allocation

A: The Space Telescope Science Institute plans to use the Financial Review Committee process that is used for Hubble. Ideas for its improvement should be forwarded to the JWST Users Committee.

Q: Does diversity, equity, and inclusion apply to non-US citizens as well Why or why not?

A: Inclusion, diversity, equity, and accessibility (IDEA) applies to all participants in NASA's programs, regardless of race, color, religion, national origin, sex, gender

identity, sexual orientation, pregnancy, status as a parent, marital status, age, disability (physical or mental), family medical history or genetic information, political affiliation, military service, citizenship status, or any other non-merit-based factor.

Q: If NASA decides to go back to soliciting ATP every year will it increase the funding to allow for reasonable selection rates

A: NASA will consider increasing funding per the recommendations of the Decadal Survey. The Decadal Survey recommended increasing the Astrophysics Theory Program (ATP) funding by 30% and reverting to annual solicitations. Currently ATP has a \$12M annual budget and a 22% selection rate with biannual calls. Reverting to annual solicitations would result in an 11% selection rate. Increasing the budget by 30% by the end of the decade would result in a 28% selection rate for biannual calls at the end of the decade, but only a 14% selection rate for annual calls.

Q: What are NASA's plan for the NASA/NSF EPRV Program given the recommendations from Astro2020

A: The Decadal Survey did not provide specific recommendations regarding the EPRV Program. NASA and NSF will continue working together to implement the recommendations of the National Academies' Exoplanet Science Strategy report.

Q: How will Astrophysics Probes missions be selected and managed Will a PI be required to select a NASA center prior to competition

A: Astrophysics Probe missions will follow the Explorers Program review and selection process. The development of the mission will be managed by the Explorers Program Office at GSFC. The 2023 Probe AO is an open competition, and there is no requirement for NASA (Center) participation.

Q: RE Great Observatories plan stages. What is the trigger to determine when stage 2 is complete When all technologies are TRL 5 or 6, for example

A: One of the tasks during Stage 1 is to develop the entry and exit criteria for Stage 2. We have not done that yet.