

# CHANGE THE HST SOLAR SYSTEM PROPOSAL REVIEW PROCESS TO PROVIDE RELEVANT EXPERTISE IN REVIEWS

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A White Paper on the peer-review process for observing proposals with HST.  
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**Complete summary:** STScI currently uses a “hybrid” review approach to provide peer review for HST observing proposals in the other subject areas, where each proposal is evaluated by either external reviewers or by discussion panelists. For proposals in the Solar System subject area, the hybrid approach is not used, and all proposals are evaluated by discussion panelists.

The exclusion of Solar System proposals from the external review approach has two downsides: a significant limitation of relevant expertise available for reviews, and an exclusion from benefits available to communities in the other topic areas with hybrid reviews: reduced workload, broader global participation, and accommodation of reviewers with caregiver duties.

Signers of this white paper urge that STScI conduct a two-year experiment where all solar system proposals are evaluated by external reviewers, and there is no discussion panel.

**Background on current review practices.** STScI has been using the hybrid review approach for the past three years, HST Cycles 28–30 (Watkins and Peebles 2022). Among the reviewers, the highest level of satisfaction was reported by the external reviewers (Fig. 1).

In the hybrid approach, proposals are assigned to either discussion panel review or external review. The discussion panelists vote independently to triage proposals, discuss the surviving proposals, and vote again after discussion. Panelists with conflicts of interest do not participate in voting or discussion for the conflicted proposals.

Proposals subject to external review are evaluated by external reviewers, who work independently and do not participate in discussions. Scores are averaged to provide the overall ranking, with no triage (?).

For the Solar System, all proposals to the regular cycle Call for Proposals are evaluated by a discussion

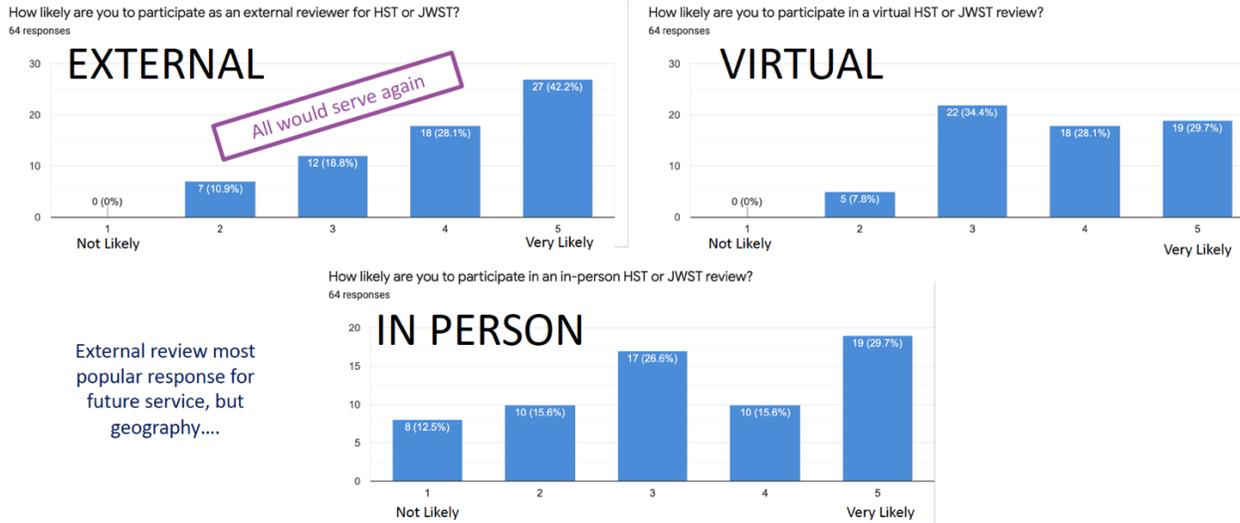
panel. For convenience, we refer to these regular cycle proposals as TAC (Time Allocation Committee) proposals, to distinguish them from Mid-Cycle proposals (which are exclusively evaluated by external reviews, for both Solar System and for other subject areas).

There is a difference in the treatment of Solar System proposals compared to other topics: Solar System proposals are reviewed by discussion panel only, while all other topics have their proposals split between external and discussion reviews. The rationale is that there are two few proposals in the Solar System category to justify more than a single panel. However, out of the 8 topics, two other topics had fewer proposals than the Solar System topic (Watkins 2022).

**Motivation for discussion panels.** Prior to Cycle 28, all HST proposals were evaluated by discussion panels. The addition of external panels for a subset of proposals—the hybrid approach—is new as of Cycle 28.

At the May 2022 STUC meeting, STScI staff stated that the main reason for retaining the discussion panels is to satisfy perceived desires of the observer community. Discussion panels are traditional, and the community respects tradition. However, Fig. 1 suggests that the subset of the community providing reviews does not value the discussion panels over external review panels. And in the case of the Solar System, the signers of this white paper agree that keeping discussion panels to keep with tradition is a secondary priority, compared to the importance of providing objective reviews based on appropriate expertise.

One perceived objective for discussion panels is to achieve a balance of science topics within the field (e.g., atmospheres, active small bodies, icy satellite plumes, auroras). But panelist discussion is not an effective tool for balancing program topics, based on the Cycle 30 experience.



**Fig. 1.** External reviews are favored by the reviewers themselves over discussion panels held either virtually or in person. In a satisfaction survey of reviewers participating in in-person and hybrid approaches, external reviewers had the highest rates of being very willing to serve again, the highest rates of being somewhat likely to serve again, and the lowest rates of being very unwilling to serve again. Some satisfaction may be related to workload (~45 proposals per discussion panelist, or ~15 proposals per external panelist). Survey presumably does not include Solar System reviewers, since external reviews of Solar System proposals are only for Mid-Cycle proposals, not for TAC proposals. Data and graphs are from Watkins and Peebles (2022).

**Results from the HST Cycle 30 panel.** Several co-authors of this paper served on the Cycle 30 Solar System TAC discussion panel. Discussion panelists for Cycle 30 were not satisfied with the balance of science topics within the field of Solar System astronomy. In many cases, panelists expressed that the expertise available for discussion of particular proposals was not well-suited to the proposal topic. Although submitted proposals and panel deliberations are strictly confidential, relevant TAC discussion policies are public knowledge, and the final selection of approved programs are public.

1. The evaluation policy is that each individual proposal be evaluated on its own merits, with no discussion of other proposals before the panel. Although this is a fair policy, members of the Cycle 30 Solar System panel found that the policy does not allow any adjustment for balance of topics.
2. Conflict of interest rules are important. But with a small group of 8 panelists covering all Solar System topics, the Cycle 30 TAC panel found that in many cases, individual proposals were reviewed by panelists with limited expertise. Conflicts of interest eliminated the panelists with the most relevant expertise to evaluate the proposed science. Any additional unavailability (due to illness or other reasons) could have additional severe effects on available expertise. Conflicts and illness do not have such severe effects on the available expertise for external reviews.

3. After all proposals are graded and a draft list of ranked proposals is generated, the evaluation policy is that any two adjacent proposals can be discussed and revoked if necessary. Proposals could not be discussed jointly if they were not adjacent in the ranking. Although this is a fair policy, members of the Cycle 30 Solar System panel found that the policy does not allow any adjustment for balance of topics (outside of the special case of two proposals adjacent in the ranking).

**Success of the hybrid approach.** In addition to the higher level of panelist satisfaction for external review panels (Fig. 1), Watkins and Peebles (2022) give additional metrics demonstrating the success of the hybrid approach: it helps manage the increased demands of the community for two major TACs per year (JWST and HST), it facilitates participation by caregivers who can provide external reviews but not attend discussion panel meetings, and it allows broader participation/representation across the global HST community. Specifically, reviewers from Asia, Oceania, Africa, and South America were able to participate in hybrid Cycle 28–30 TACs, but not the discussion-only Cycle 27 TAC.

These benefits come only from the external review component of the hybrid model.

These benefits are denied to the Solar System community, whose proposals go only to discussion panels.

In order to allow the Solar System community to share in the benefits of workload reduction, broader global participation, and caregiver accommodation, we urge that the Solar System TAC proposals be reviewed on an external basis, at least for the next two cycles.

**Large/legacy programs.** Large and legacy programs are reviewed by the full Time Allocation Committee, composed of panel chairs and other TAC members. If the Solar System science area is evaluated by external panelists with no discussion panel (as we recommend here if full hybrid mode is not supportable), then we suggest that a single Solar System community member be appointed to the TAC as an at-large member. The Solar System TAC member should have access to external review comments and grades on any Solar System large or legacy programs before the TAC, to assist the member's evaluation and presentation of the program(s) to the TAC.

**Recommendation: External reviews for Cycles 31 and 32.** Over the past three cycles, the Solar System community has missed out on hybrid/external review benefits that other topic areas have enjoyed (including workload reduction, broader global participation, and caregiver accommodation). If STScI will not support a full hybrid approach enjoyed by every other topic area (simultaneous discussion and external reviews), then we request that the Cycle 31 and 32 TAC proposals receive external reviews. After two years of external review mode, in a time-averaged sense, the Solar System topic will be hybrid.

The success of this two-year trial could be assessed by reviewer/proposer satisfaction surveys (such as those already conducted by STScI), and by measurement of programmatic balance over several cycles. Proposal science keyword statistics could be one method of measuring programmatic balance, and subjective analysis of the selected programs could be another.

Members of the Solar System community are unsatisfied with the level of expertise available for evaluation of their panels. In some cases, proposals are rated highly by non-expert discussion panelists, whose limited expertise causes them to neglect scientific flaws or unsubstantiated claims. In other cases, non-expert review comments claim weaknesses that contradict the content of proposals. Both of these biases would be reduced in the external review approach, where more targeted expertise can be applied due to the broader pool of non-conflicted reviewers available.

#### References:

- Watkins, L. (2022) ADDENDUM: Hubble Cycle 30 Proposal Selection. Space Telescope Science Institute Newsletter 39:1, <https://www.stsci.edu/content/newsletters/2022-volume-39-issue-01/addendum-hubble-cycle-30-proposal-selection>
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