**Outer Planets Assessment Group (OPAG) Feedback on New Frontiers 5 Community Announcement**

OPAG has reviewed the Community Announcement: Advance Notice Regarding New Frontiers 5 (NF5). While we concur with the bulk of the announcement, OPAG has feedback as detailed below.

**Cost Cap Scope: OPAG concurs with excluding Phase E and launch vehicle costs from the NF-5 mission cost.**

**Cost Cap Amount.** **OPAG recommends that NASA maintain the cost cap for NF-5 at $1.1B (FY22$), which is nearer to the V&V recommended level ($1.17B in FY22$) for NF-5.** The NF-5 letter indicated that the cost cap would be $900M (FY22$), excluding Phase E and launch vehicle. We note that the V&V Decadal Survey recommended the following:

"The current cost cap for NASA’s completed New Frontiers missions, inflated to FY2015 dollars, is $1.05 billion, including launch vehicle costs. The committee recommends changing the New Frontiers cost cap to $1.0 billion FY2015, excluding launch vehicle costs. This change represents a modest increase in the effective cost cap and will allow a scientifically rich and diverse set of New Frontiers missions to be carried out, and will help protect the science content of the New Frontiers program against increases and volatility in launch vehicle costs."

Note: The $1.1B (FY22$) amount recommended by OPAG is ~$73M lower than the inflation-adjusted value of $1.0B (FY15$) recommended in the V&V.

**Technology Incentives.** Extreme environmental solar power (EESP) improves solar power production at Saturn. Given that this technology should be sufficiently mature by 2030 [see for example https://gameon.nasa.gov/extreme-environments-solar-power/], we ask NASA to consider encouraging its use in NF-5, so there is no penalty for proposing it. OPAG also supports the inclusion of Heat Shield for Extreme Entry Environment Technology (HEEET). This capability is required for (for example) a Saturn probe mission.

**Foreign Contributions.** Currently foreign contributions are stated as follows:

“The value of foreign contributions remains constrained as was done for recent New Frontiers and Discovery Program AOs. The total value of foreign contributions may not exceed one-third of the PMMC for phases A-D, and the value of foreign contributions to the science payload may not exceed one-third of the total payload cost.”

OPAG recommends exploring options to relax this as appropriate (on a mission dependent basis) of the PMMC for phases A-D. Recognizing that foreign contributions (while raising the risk) can provide increased mission capability/additional science.

**Launch vehicle potential cost savings.**  Savings incurred due to alternative LV usage should be maintained for NF program improvements/augmentations.

Commercial launch service providers have demonstrated significant decreases in launch costs derived from vehicle reusability, and promise even greater savings in the future. Since launch costs for missions within programs such as Discovery and New Frontiers, though not included under mission cost caps, have been borne by the program budgets, savings in launch services costs should remain within the programs realizing those savings.

**Additional Opportunities:**

The NF5 AO is a significant opportunity to encourage the continued development of a healthy planetary science community, and we advocate that the evaluation criteria for the NF5 proposals should include factors that consider how proposed missions would foster an interdisciplinary, diverse, equitable, inclusive and accessible community. Specifically, we advocate the following to be included as part of the evaluation criteria:

1. Proposals should be encouraged to include plans to further develop the experience and expertise of early-career team members, and advance their careers especially toward mission leadership positions; and
2. Proposed mission development and science investigation plans should demonstrate that efforts have been made to create/foster a diverse mission team (preferably reflective of the diversity of NASA workforce at minimum) and that significant roles are assigned to individuals from groups that have been historically under-represented (along multiple axes including, but not limited to, racial and ethnic minorities and women) in planetary science and on planetary mission teams.

In addition, we endorse encouraging student collaboration as a path for the student participants to be effectively integrated in the science/engineering team.