

Solar System Advisory Committee Report Draft for STUC presentation, 8 May 2014



**Philip Nicholson
Cornell University**

HST proposals submitted: Cycles 1-21

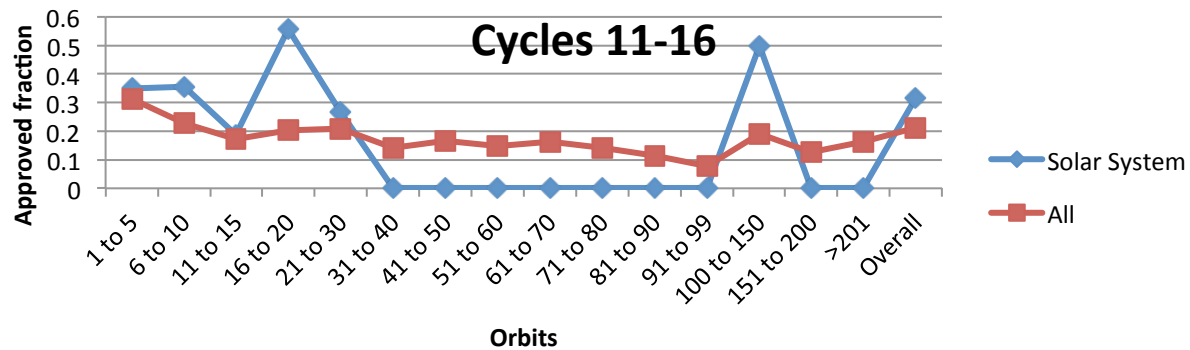
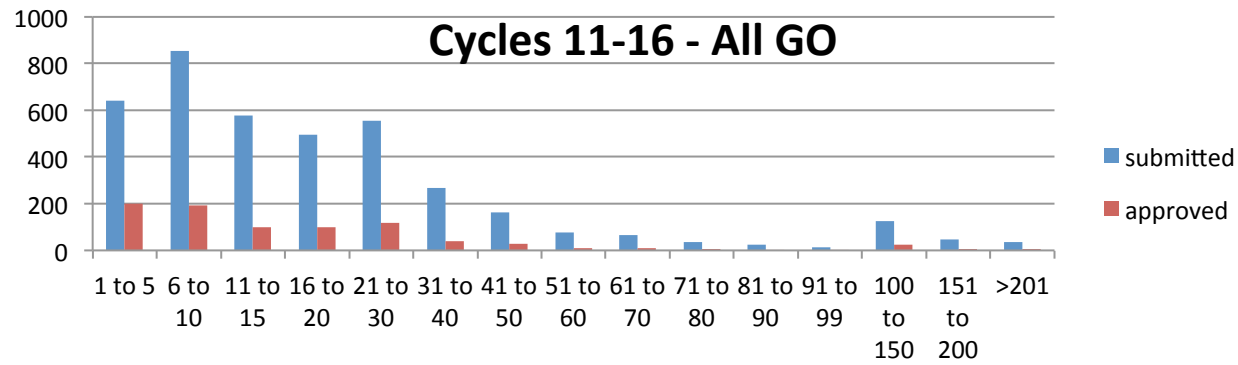
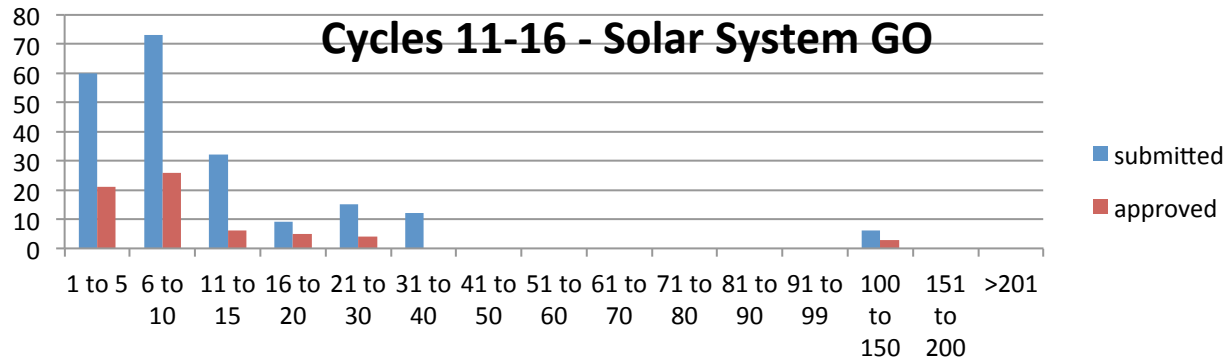
Table 4: Proposal success rates based on number of proposals submitted, including GO, SNAP, archival, and theory

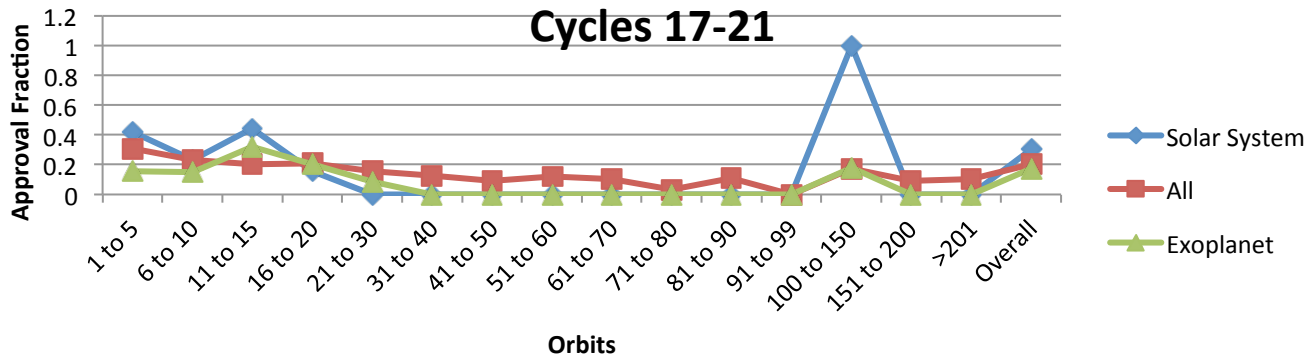
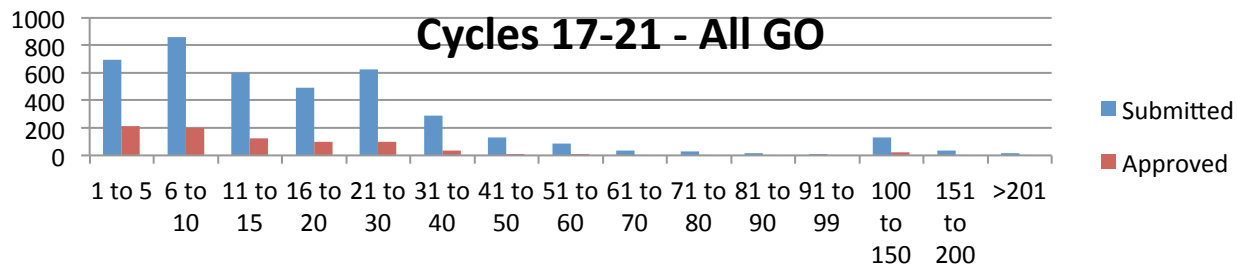
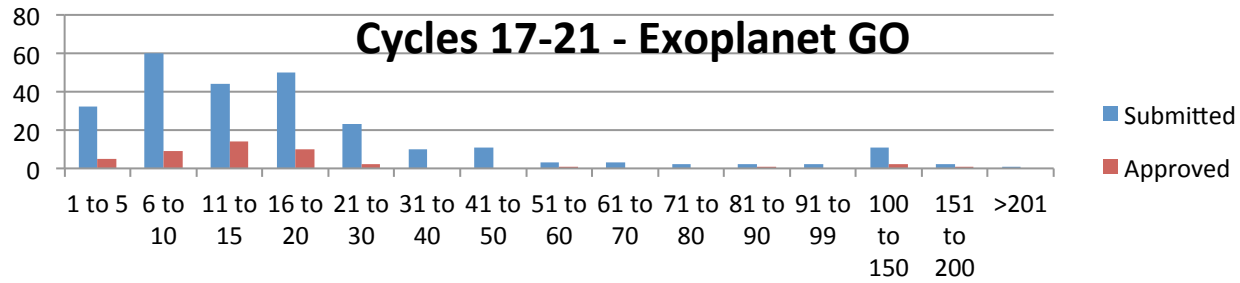
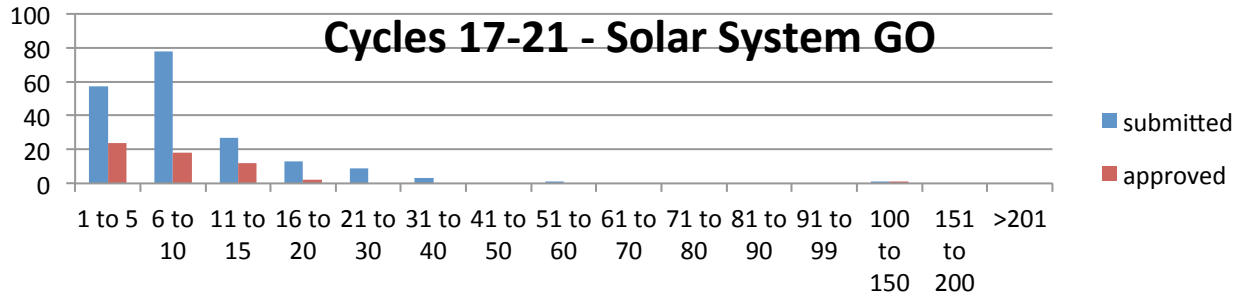
Cycle	Total Number Submitted	Total Number Approved	Success Rate R	SS Number Submitted	SS Fraction Submitted	SS Number Approved	SS Fraction Approved	SS Success Rate R(SS)
1	556	112	20%					
2	483	141	29%	46	10%	16	11%	35%
3	424	173	41%	32	8%	16	9%	50%
4	501	216	43%	46	9%	26	12%	57%
5	863	352	41%	59	7%	27	8%	46%
6	1,025	496	48%	85	8%	51	10%	60%
7	1,298	424	33%	123	9%	37	9%	30%
8	1,053	295	28%	64	6%	22	7%	34%
9	914	212	23%	49	5%	15	7%	31%
10	906	193	21%	49	5%	14	7%	29%
11	1,078	198	18%	60	6%	15	8%	25%
12	1,045	231	22%	56	5%	13	5%	23%
13	905	210	23%	58	6%	23	11%	40%
14	725	208	29%	43	6%	14	7%	33%
15	737	203	28%	40	5%	12	6%	30%
16	821	191	25%	54	7%	22	11%	41%
17	958	228	24%	43	4%	13	6%	30%
MCT	39	4	10%	1	3%	0	0%	0%
18	1,050	196	19%	45	4%	15	8%	33%
19	1,007	199	20%	40	4%	10	5%	25%
20	1,085	231	21%	48	4%	16	7%	25%
21	1,094	249	23%	49	4%	16	6%	33%
Cyc 2-21	18,010	4,847	27%	1,100	6%	393	8%	36%

GO Orbit allocations, Cycles 1-21

Table 1: GO orbit allocation statistics, *Hubble* Cycles 1–20

Cycle	Total Requested	Total Allocated	Success Rate R	SS Requested	SS Fraction Requested	SS Allocated	SS Fraction Allocated	SS success rate R(SS)	R(SS)/R
1	10,732	1,346	13%			122	9%		
2	8,169	1,380	17%	629	8%	156	11%	24%	1.4
3	6,303	1,455	23%	962	15%	172	12%	18%	0.8
4	8,289	2,505	30%	502	6%	202	8%	40%	1.3
5	14,272	3,359	23%	839	6%	253	8%	30%	1.3
6	13,543	4,574	34%	1,156	9%	421	9%	36%	1.0
7	21,734	3,304	15%	1,203	6%	160	5%	13%	0.9
8	14,005	3,314	24%	619	4%	136	4%	22%	0.9
9	17,690	2,866	16%	471	3%	96	3%	20%	1.3
10	16,236	2,920	18%	379	2%	113	4%	30%	1.7
11	24,667	3,130	13%	363	1%	79	3%	22%	1.7
12	19,674	3,150	16%	601	3%	98	3%	16%	1.0
13	17,257	4,036	24%	286	2%	70	2%	24%	1.0
14	14,190	2,948	21%	245	2%	83	3%	34%	1.6
15	14,581	3,223	22%	398	3%	220	7%	55%	2.5
16	16,078	3,164	20%	545	3%	341	11%	63%	3.4
17	20,630	3,411	17%	564	3%	193	6%	34%	2.0
MCT	26,801	1,508	6%	490	2%	0	0%	0%	0.0
18	23,096	2,578	11%	368	2%	94	4%	26%	2.3
19	18,659	2,554	14%	379	2%	50	2%	13%	1.0
20	16,681	2,802	17%	289	2%	84	3%	29%	1.7
21	19,742	3,156	16%	429	2%	118	4%	28%	1.7
Totals	363,029	62,707	17%	11,088	3%	3,260	5%	29%	1.6





Large Orbit allocations: Cycles 11-21

Table 2: Statistics for Large/Treasury GO Solar System proposals

Cycle	Submitted	Accepted	Cycle	Submitted	Accepted
11	2	1	16	2	1
12	0	0	17	2	1
13	1	0	18	0	0
14	0	0	19	0	0
15	1	1	20	0	0
			21	0	0

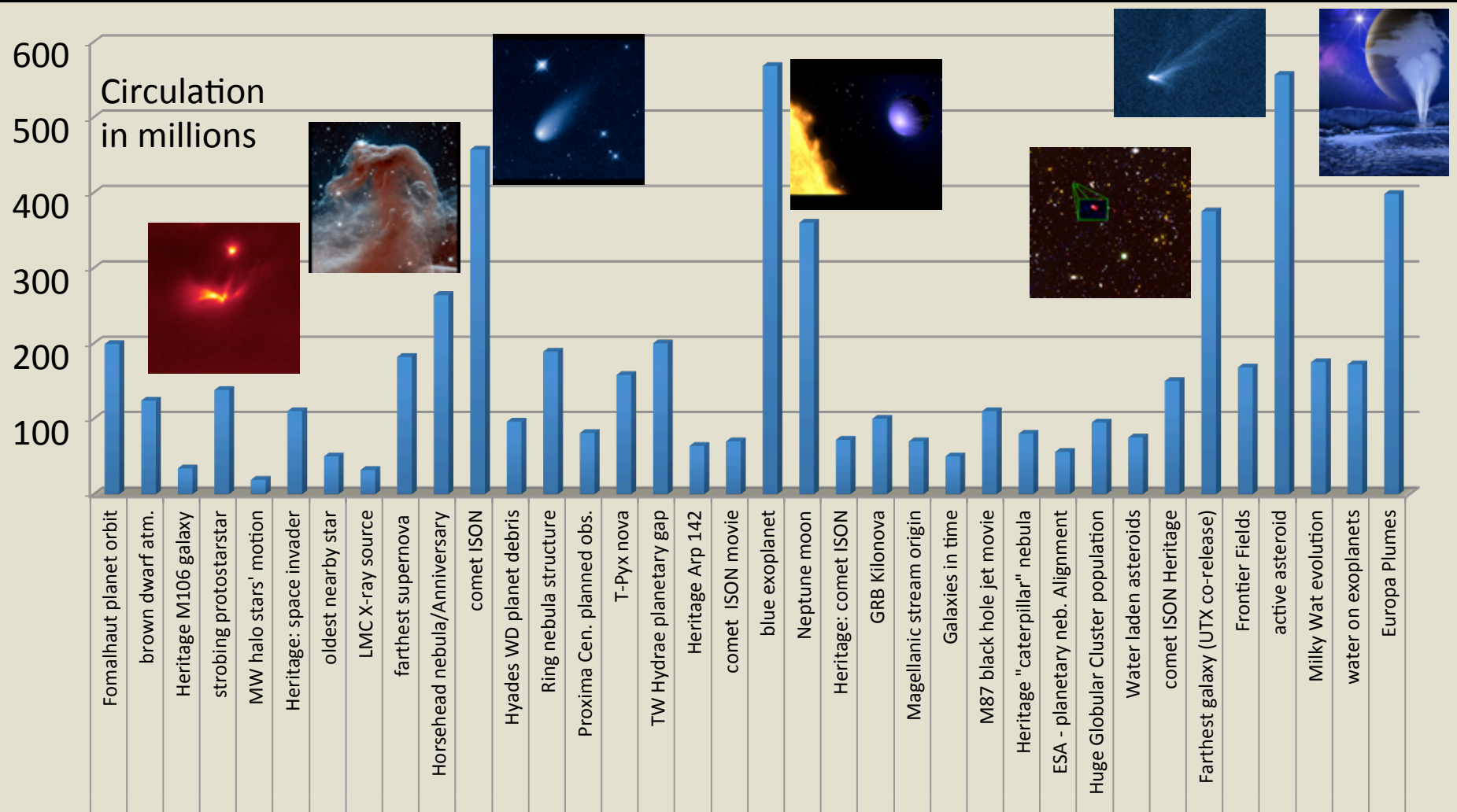
Statistical summary

There are several broad statements that one can make from these data:

- The overall acceptance fraction for Solar System proposals is higher than the average for all GO proposals, but the proposals generally request less than 15 orbits.
- Relatively few Solar System proposals requesting more than 20 orbits were submitted for review by the panels: 27 in the range 21-40 orbits were submitted through Cycles 11 to 16 but only 4 were accepted; 13 were submitted in Cycles 17 to 21 and none were recommended for approval.
- Large or Treasury GO proposals for Solar System science are also rare, but they have a reasonable success rate, with 4 of 8 recommended for approval.
- The mode of the size distribution for all submitted GO programs falls in the second smallest bin (6 to 10 orbits); the mode for the Solar System proposals lies in the same bin in early cycles, but appears in smallest bin in some more recent cycles (Cycles 16, 17 and 21; see Appendix); the mode for exoplanet proposals falls in either the 6-10 orbit or 11-15 orbit bin.
- Exoplanet proposals have a lower success rate than Solar System proposals, but garner similar total orbit allocations since the individual exoplanet proposals tend to be larger.

Hubble press releases can reach hundreds of millions of people

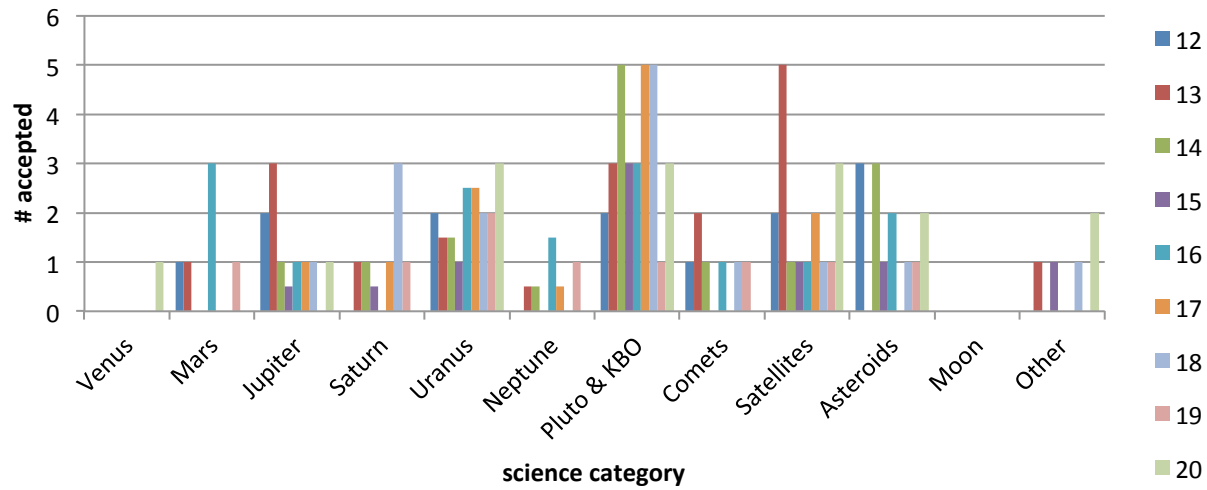
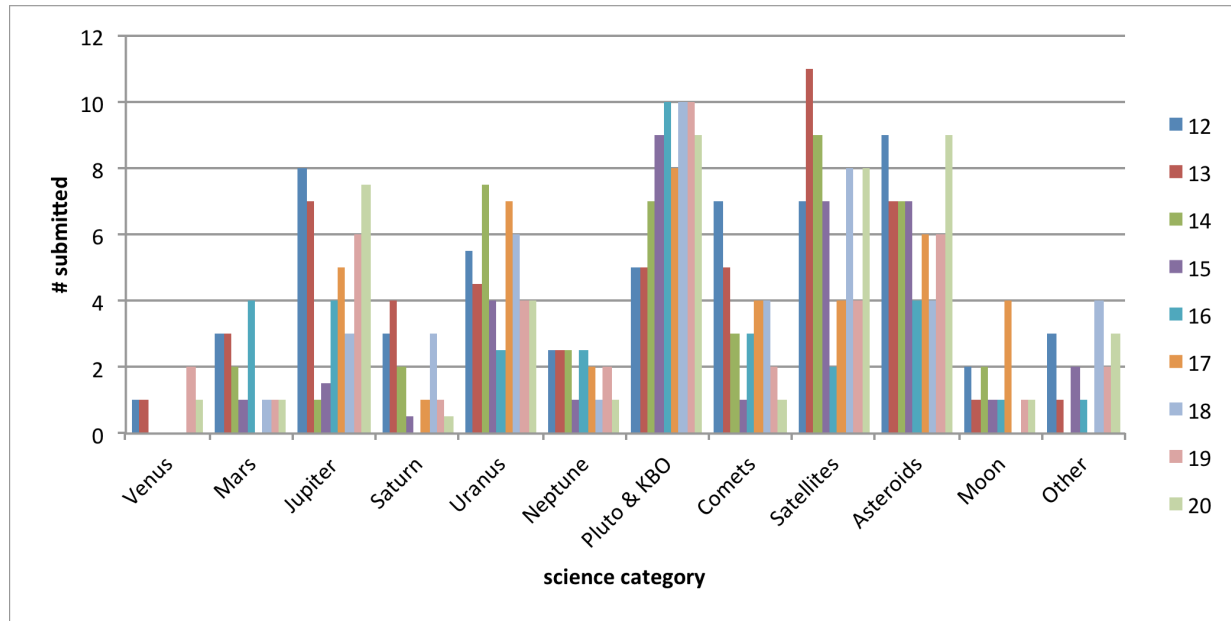
HST News Circulation - Calendar 2013 (Source: Meltwater News)



Community input & concerns:

- Interest in using HST for some areas is probably reduced by the availability of data from current NASA & ESA missions (*eg.*, Venus, Mars, Saturn), but HST remains critical for other targets (Uranus, Neptune, Pluto, TNOs, new comets, etc.), as well as for UV imaging (aurorae).
- Collaborative style of planetary science ==> fewer proposals submitted ==> smaller allocations made to HST SS panels.
- Small size of SS panel(s) and broad range of proposal subjects (planetary surfaces, atmospheres & magnetospheres; comets & asteroids, etc.) ==> lack of expertise on panels ==> poor decisions and/or ill-informed comments. Exacerbated by mirror panels since Cycle 17, which dilute expertise across 2 panels. Is the "triage" process well-informed?
- Relatively small TAC panel allocations for SS science (~80 orbits/panel?) ==> medium-size proposals (>20 orbits) are strongly selected against & rarely even submitted.

Solar System Proposal Categories



Triage: SS/EXP mirror panels

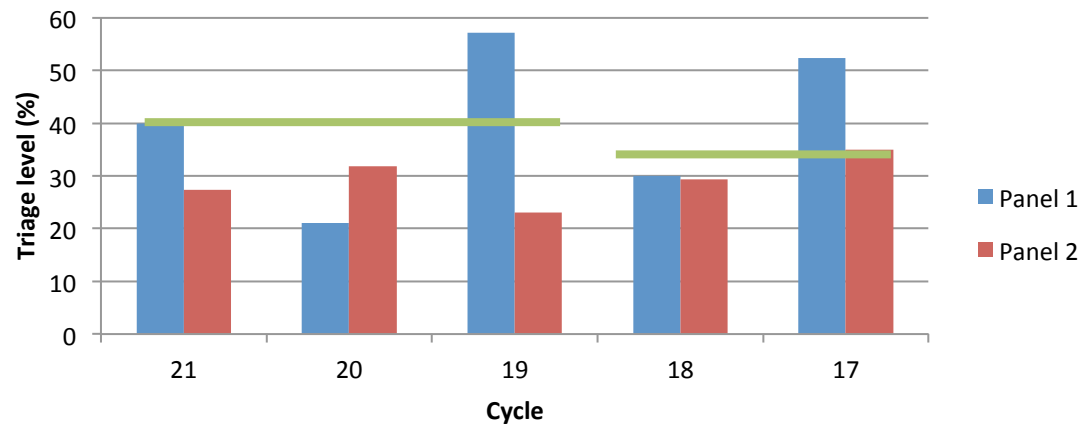


Figure 1: Triage level for Solar System proposals in Cycle 17 to 21 – the horizontal lines mark the levels set for each panel; the histograms show the fraction of solar system proposals that were marked for triage in each panel.

Median GO proposal size

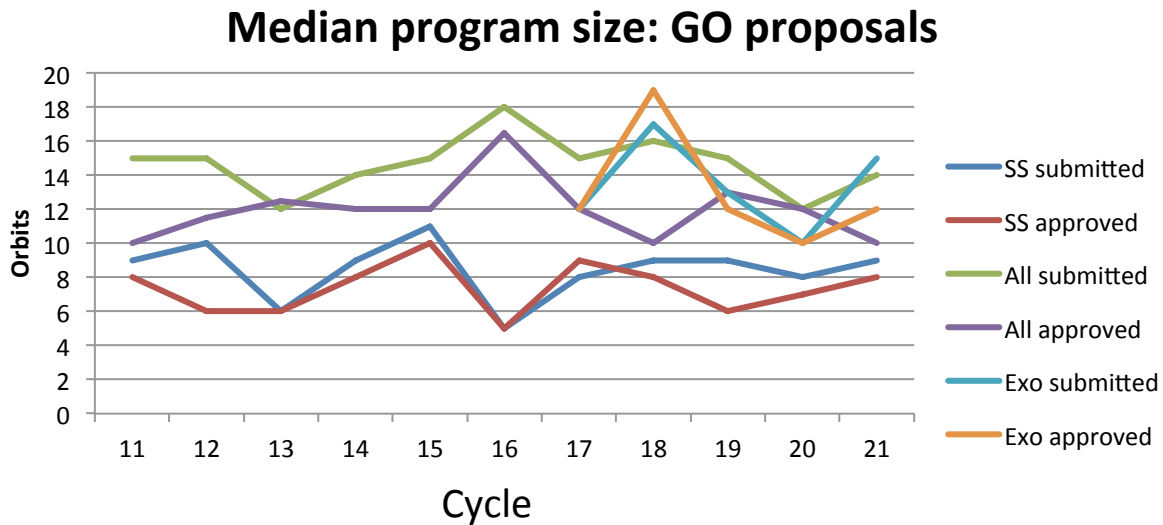


Figure 2: Median proposal size for Solar System, Exoplanet and all HST proposals - Cycles 11 through 21

Proposals to increase SS participation in HST science:

- Introduce regular "Planetary Campaigns", some of which might be linked to ongoing NASA missions & others to Decadal Survey objectives. Past examples: Comet SL-9 in 1994; IGY auroral campaign in 2013. Future example: Juno mission in 2015/16, which is short on science-grade optical instrumentation.
- Introduce "Initiatives" (like the recent UV Initiative) relevant to SS science and solicit proposals. A specific example would be regular long-term monitoring of the outer planets' atmospheres, to look for outbursts, giant storms, etc.
- Consider a new class of "Serendipity" proposals, similar to TOO proposals but with zero orbit allocation unless the planned event actually occurs. These would be community proposals, with no single PI, and geared to rare events (*eg.*, a spectacular new comet in the Hale Bopp class).

Suggested revisions to the TAC process:

- Recruit external reviewers for SS proposals, to broaden the range of expertise on the panels. Fold external comments into the triage process, if feasible.
- Limit preliminary grade assignments (used for triage decisions) to panelists with specific expertise in the relevant subject.
- Review conflict-of-interest guidelines for panels; are these too strict for scientific collaborators, given the relatively small field and frequent collaborations? Implement a system of backup reviewers in the event of COI rules excluding key panelists.
- Augment panels after proposals are received to fill "gaps" in expertise.

And one more suggestion...

- Appoint a standing Solar System Advisory C'tee, which can provide suggestions to the Director for Planetary Campaigns & Initiatives, and also ensure that these are responsive to the priorities established in the recent (& future) SS Decadal Survey report. Eventually, it is anticipated that these ideas would come from the community itself, as is the case in astrophysics.