



Science Policy Issues

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Science Mission Office

STUC Meeting
25 April 2013

Topics

- MCT Programs revisited
- Programmatic issues
 - Default proprietary time for HST programs
 - Solar System Science
 - Joint HST-XMM programs
 - JWST preparatory programs



MCT Programs Revisited

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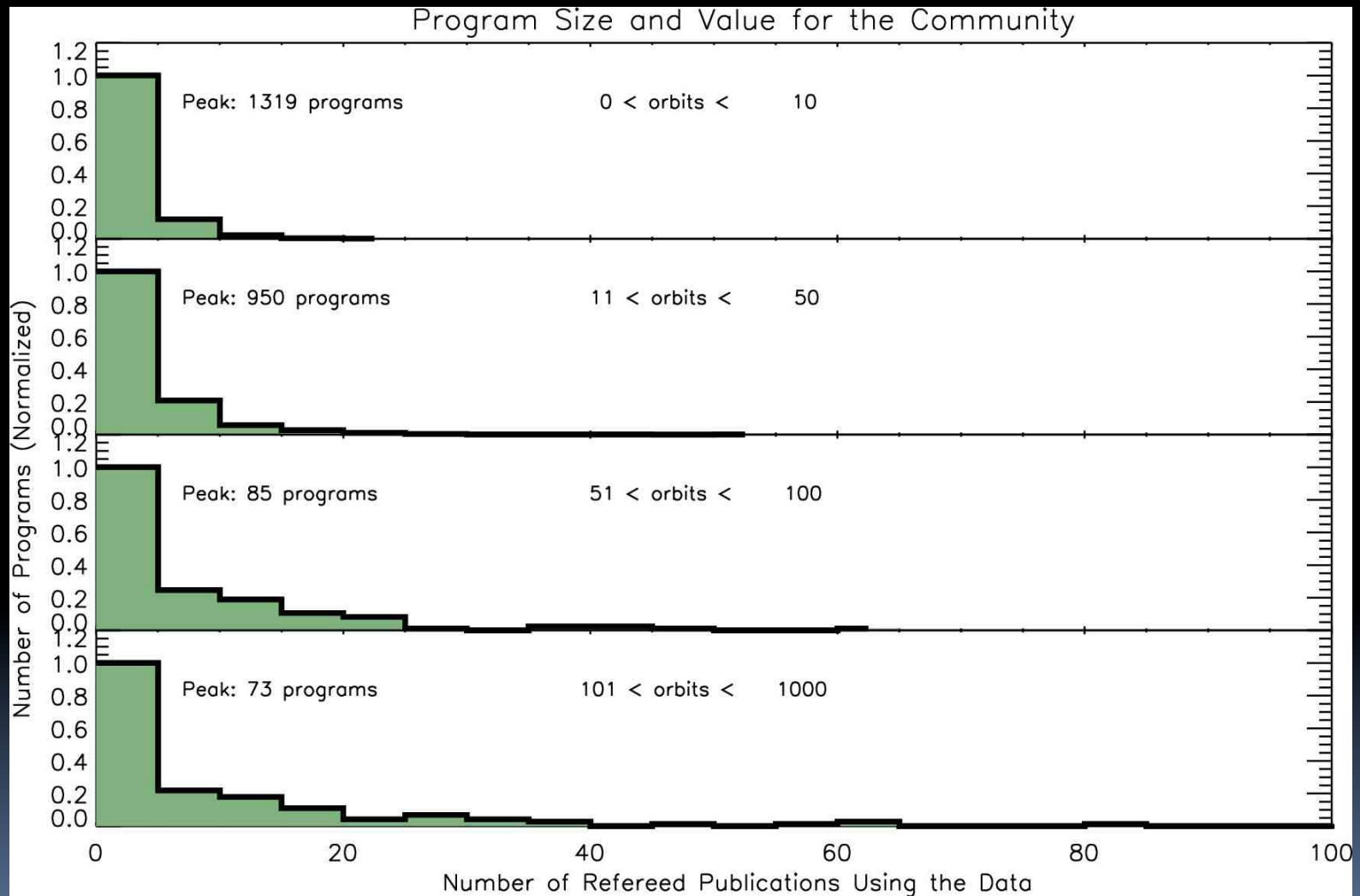
The original MCT programs

- Original call in August, 2009
- Separate proposal review in January 2010
- Four proposals awarded time in three programs
 - CLASH - multicolour imaging of 24 galaxy clusters
 - CANDELS – tiered imaging for galaxy evolution
 - CLASH/CANDELS high-z SNe program
 - PHAT – multicolour imaging of $\frac{1}{4}$ of M31
- ~2250 orbits, Cycles 18-20
 - ~1,500 GO, ~750 DD time
 - GO time taken from the Large allocation
- No MCT programs in Cycle 21
 - 900-1,000 orbits for Large programs

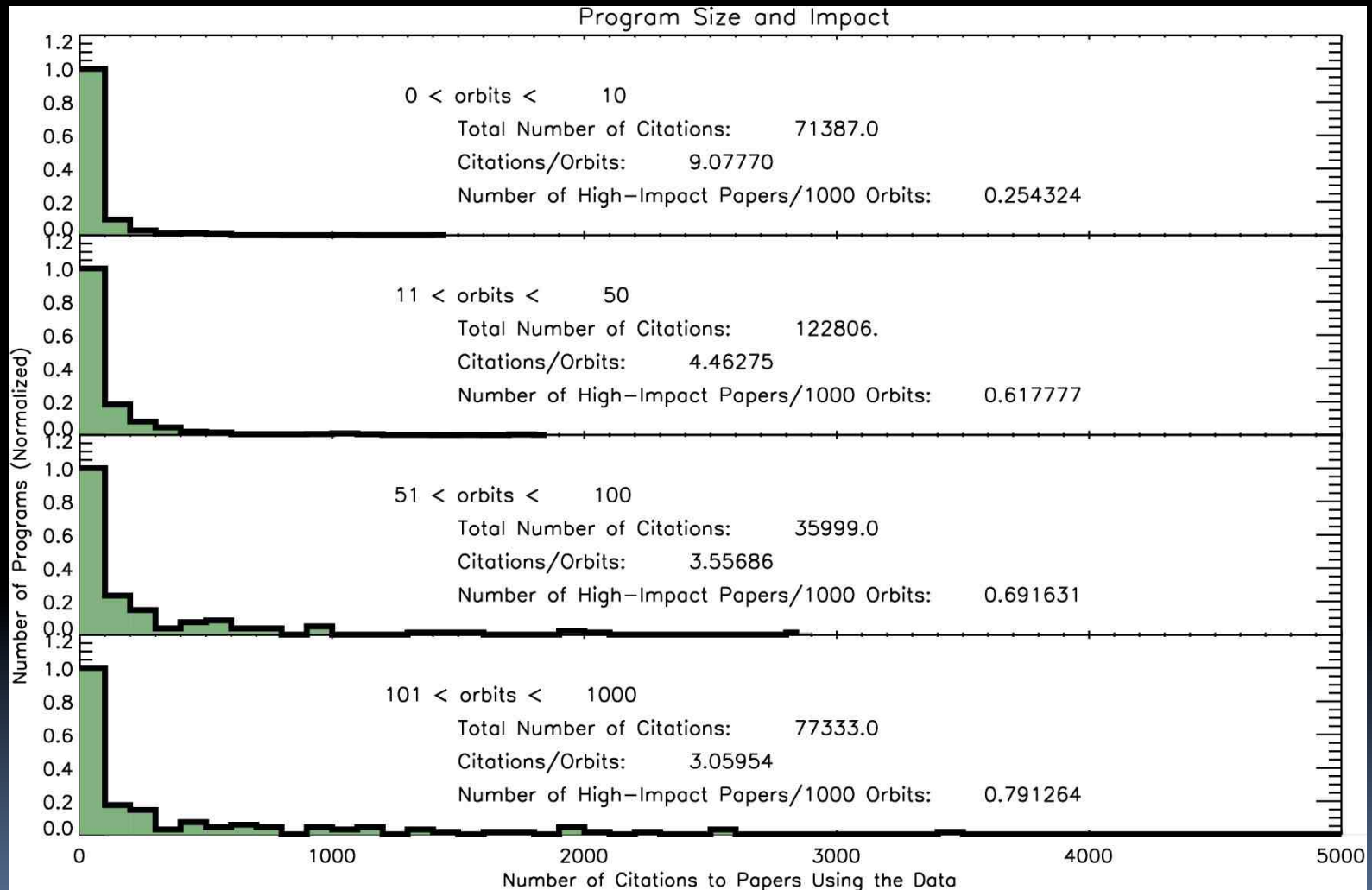
Are MCT programs worthwhile?

- Analysis of HST programs (Apai et al, 2010, PASP) shows that
 - Small programs produce more papers per orbit, but individual papers have relatively low impact
 - Large programs produce fewer papers/orbit, but more papers per program, and generally have a higher impact (more citations)

Publications by program size



Citations by program size



Are MCT programs worthwhile?

- Analysis of HST programs (Apai et al, 2010) shows that
 - Small programs produce more papers per orbit, but individual papers have relatively low impact
 - Large programs produce fewer papers, but with higher impact (more citations)
- Current MCT programs:
 - CANDELS: ~40 papers published or submitted
 - CLASH: ~20 papers published or submitted
 - PHAT: ~8 papers published or submitted
 - Still too early to assess full impact

Another MCT call?

- Original MCT concept was received with some skepticism in the community....
- But as the programs progressed, questions were also raised regarding whether we might consider another call
 - In particular, Cycle 18-20 MCT programs are all imaging programs
- To explore community interest, we issued a call for white papers on potential MCT topics in mid-2012 in conjunction with the call for input for the HDF Initiative
 - White papers on 8 scientific topics were received

Suggested MCT Topics


- Constraining dark energy through observations of ~ 100 SNe at $0.6 < z < 0.8$
- Reverberation mapping of multiple AGN
- A Virgo cluster survey
- Large-scale structure at $z > 2$ through a multi-colour wide-field (1-2 sq. deg.) survey
- Galactic Centre near-IR imaging survey
- Characterising the circum-galactic medium at $z < 0.4$
- Imaging survey of $z > 1.5$ galaxy clusters
- Spectroscopic survey of transiting exoplanets

Implementation

- Issues:
 - HST is now 4 years past SM4; growing risk of instrumental failure in the course of a large multi-cycle program → any program would need to be structured to take that into account in maximising the science return
 - DD time applied to Frontier Fields program → MCT-like programs must be drawn from GO time.
- Potential approach
 - Establish category of Very Large Programs (300-500 orbits)
 - Reviewed through standard TAC process
 - Select 0 or 1 program
 - Execute within a single cycle

What next?

- Very Large Programs could be implemented in future cycles
 - ~500 orbits for VLP, ~500 for Large/Treasury?
 - Draw time from small & medium programs?
- We would like advice from STUC on two questions:
 - Do the research topics suggested for MCT programs merit considering a Very Large Program option in Cycle 22 (or 23)? and/or
 - Does this category merit further exploration with the community?



Programmatics

Default proprietary time for HST programs

Proprietary time

- What is the purpose of proprietary time?
 - Established to protect the intellectual property rights of the scientists who developed the proposal, competed successfully for observing time and implemented the scientific program.
 - Designed to give the proposal team a reasonable opportunity to reduce, analyze and publish their observations without jeopardy of their efforts being pre-empted by a competing team.
- What is the purpose of (inter)national observatories?
 - To support scientific endeavours within the community as a whole
 - To maximise the scientific return by maximising data access


The proprietary period set for observations made with international observatories represents a balance between the benefits to the proposal team and the benefits to the community as a whole

Proprietary time on HST

- Current defaults
 - 12 month proprietary time for Small/Medium
 - 0 months for Large programs
 - 0 months for Treasury programs
 - Proprietary time can be requested for Large/Treasury programs – justification is reviewed and approved/rejected by the TAC

Proposed action

- HST is aging
 - We want to maximise the opportunity for the community to capitalise on HST observations.
 - A 12-month proprietary period limits community access
 - Cycle 21 proposal deadline is March 1 2013
 - Over half of the Cycle 19 observations (March-September, 2012) remain proprietary
- We propose reducing the default proprietary period for Regular GO Programs to 6 months
 - Maintains protection for the proposal team
 - Enables almost all of Cycle N-2 observations to be publicly available at the Cycle N deadline



Programmatics

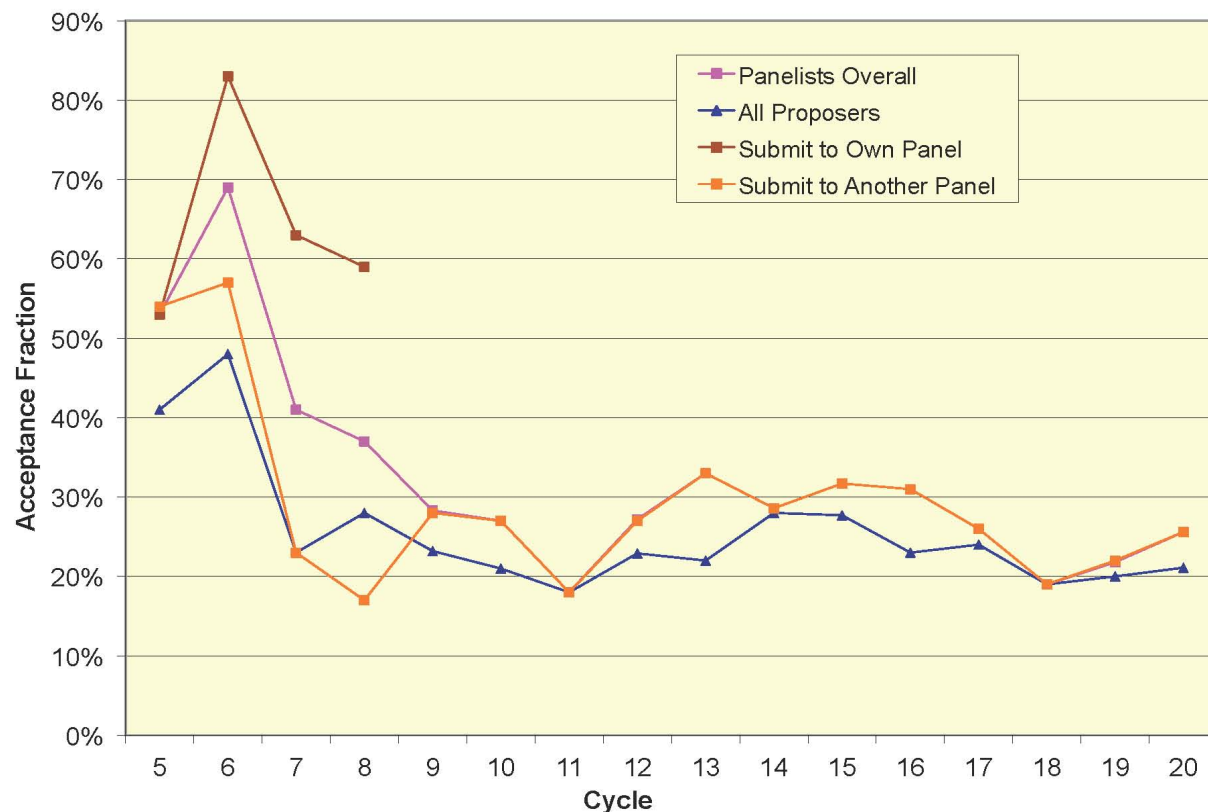
Solar System science with HST

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Background

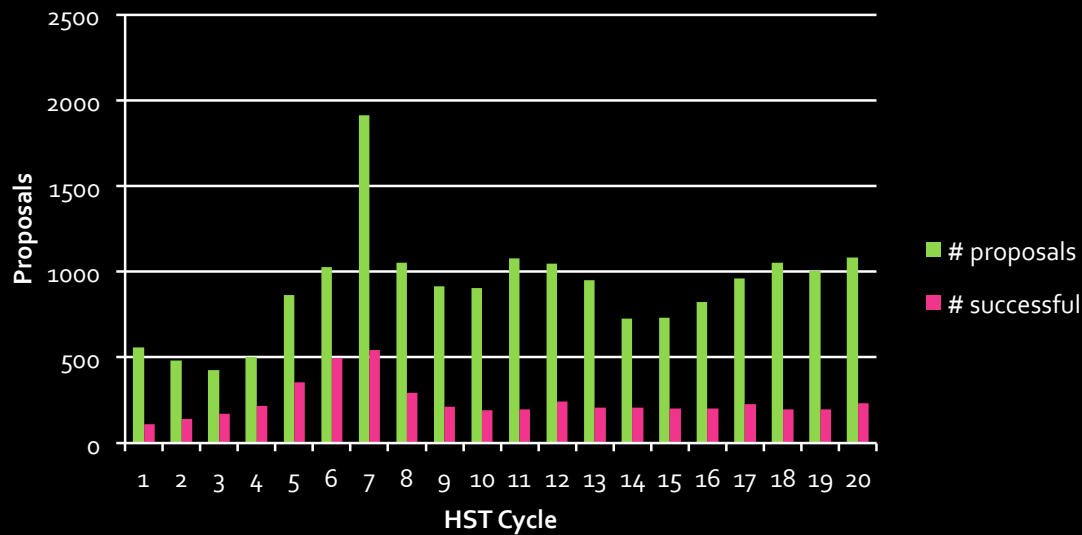
- Solar system observations have played a key role in the HST science program since the outset
 - e.g. Shoemaker-Levy 9, Jupiter/Saturn IHY, KBO surveys
- Community Interest has waned in more recent cycles
- Frustration has been expressed wrt the TAC process
 - Solar System was a single panel through Cycle 16; merged with Exoplanets & circumstellar disks to give mirror panels in Cycles 17-20
 - Concerns over breadth of expertise on panels & limited access to observing time

Why mirror panels?



- Serving on the panel that evaluates your proposal increases your chances by ~250%, even if you leave the room.

Overall HST statistics

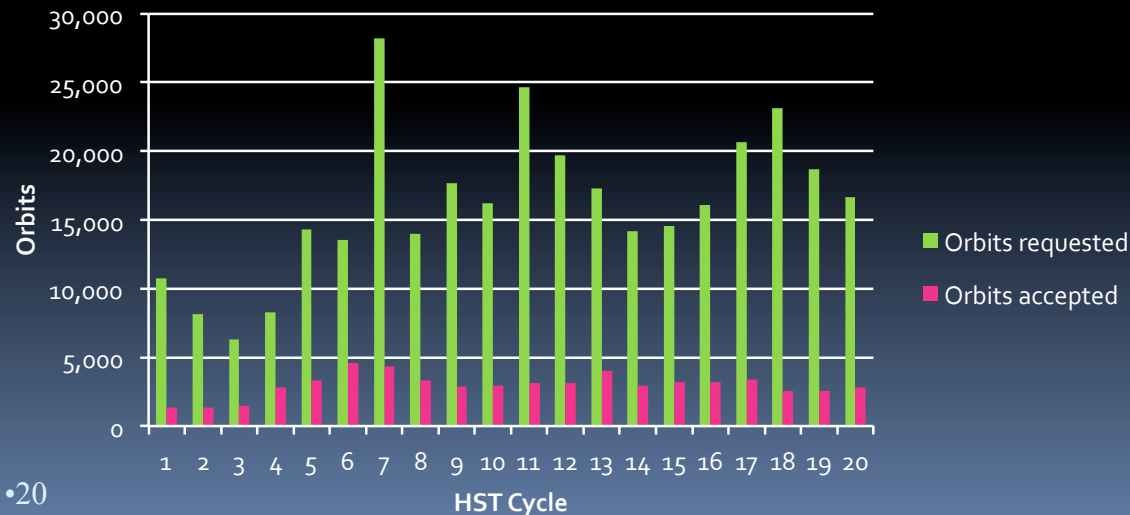


What's the proposal and orbit pressure for all HST proposals and for Solar System proposals?

Cycle 7 statistics include Cycle 7N & 7AR

MCT not included

Cycle 16 Supplementary call not included

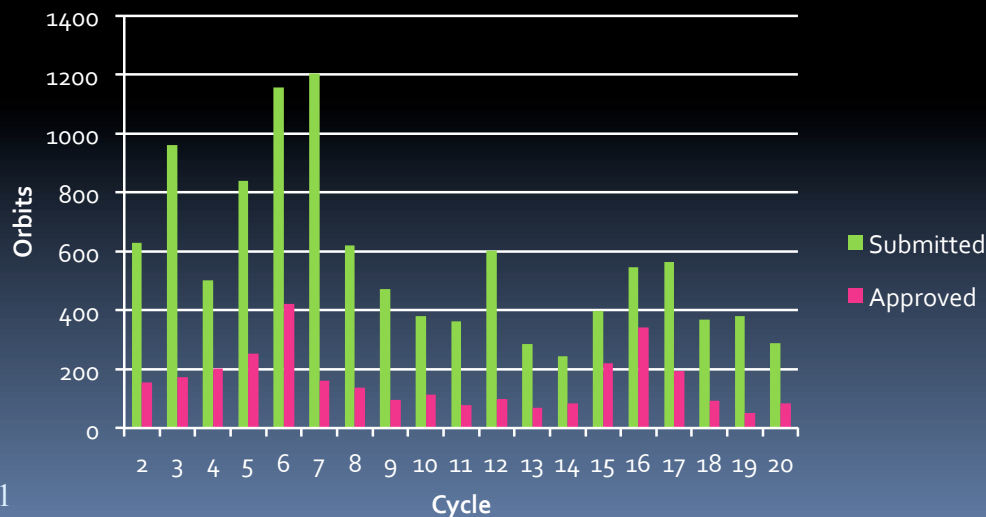
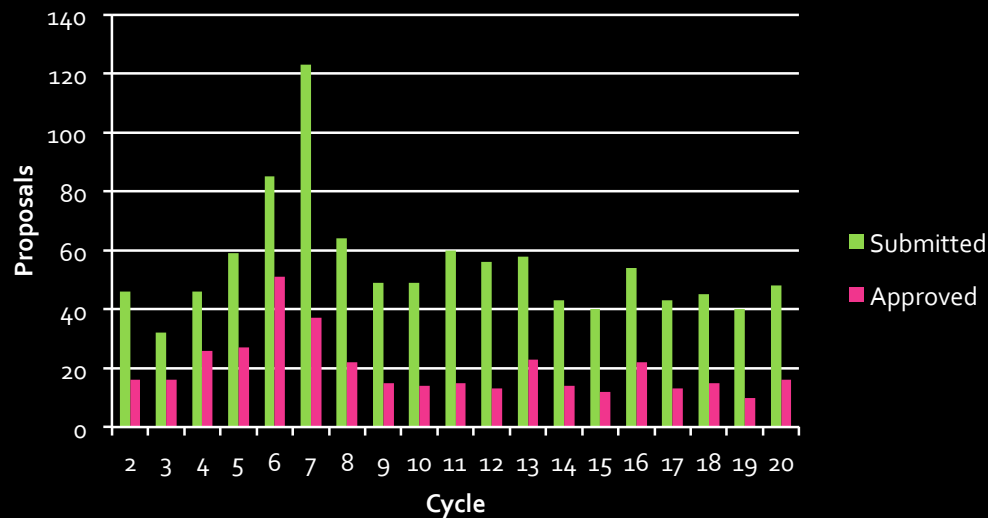


Proposal oversubscription ranges from ~6:1 to ~3:1

Orbit oversubscription ranges from ~9:1 to ~3:1

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Solar System statistics



Cycle 1 SS submission statistics are not available

Cycle 7 statistics include Cycle 7N & 7AR

MCT not included

Cycle 16 Supplementary call not included

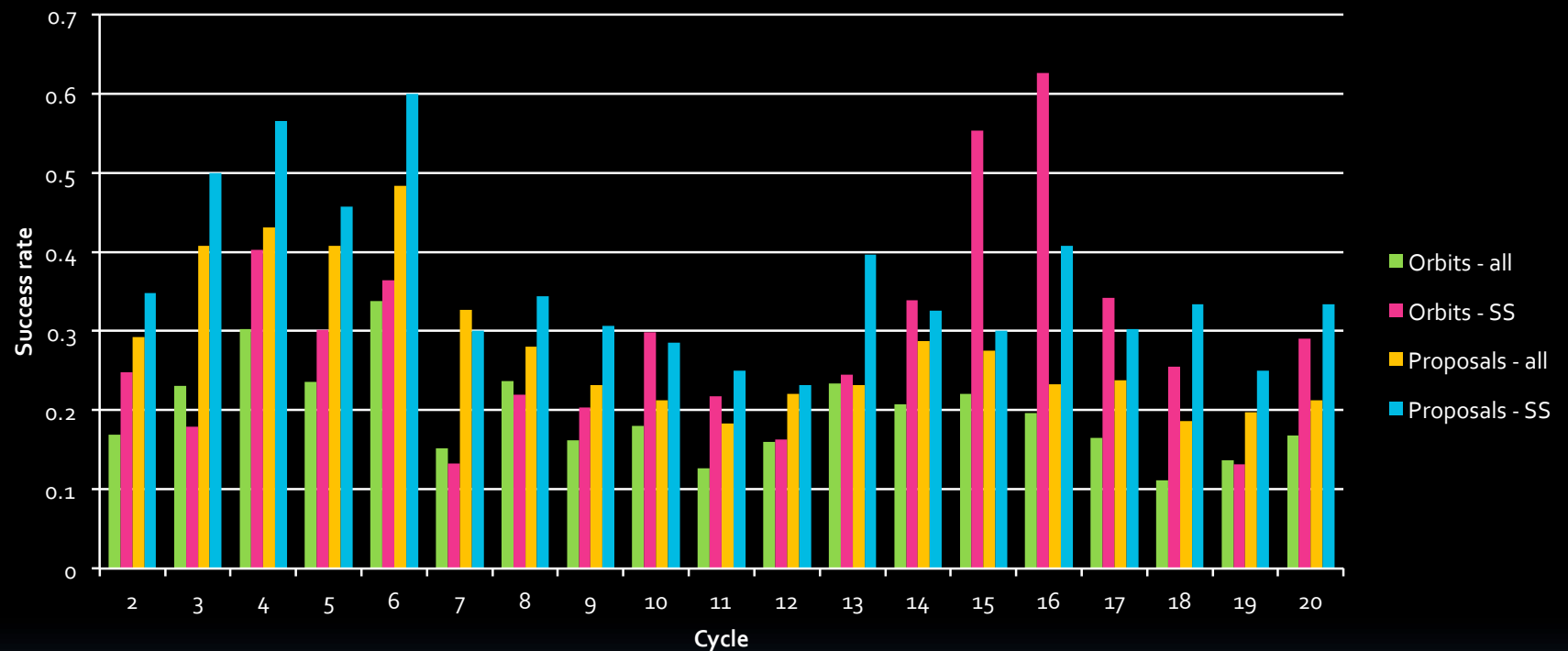
Proposal oversubscription ranges from ~4:1 to ~1.5:1

Orbit oversubscription ranges from ~6:1 to ~3:1

$N(\text{proposals}) \sim 40\text{-}50/\text{cycle}$ since Cycle 9

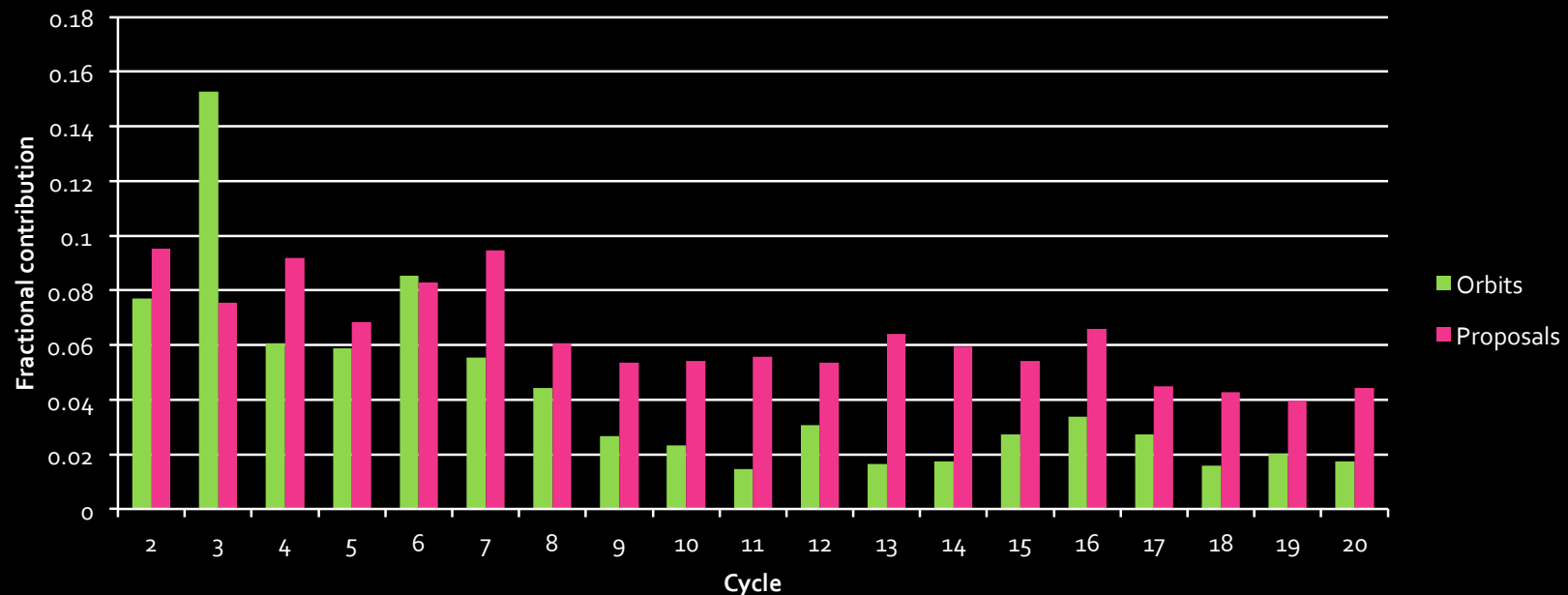
$N(\text{orbits}) \sim 400 \pm 150/\text{cycle}$ since Cycle 9

Success rates



- Success rate = $N(\text{submitted})/N(\text{approved})$
- Solar system proposals have generally maintained a higher success rate than average, both by proposal and by orbit.

Proposal pressure




- Fractional contribution = $N(\text{submitted SS})/N(\text{submitted all})$
- Solar system proposals contribute ~5-6% Cycles 8-16; ~4% since SM4
- Orbit requests represent ~2-3% of total since Cycle 9

Summary & Proposed Actions

- Solar System science has maintained a higher than average success rate in recent cycles, but..
- The overall proposal pressure, in terms of orbits requested and total proposals, has declined.
- Are there other proposal mechanisms that might be better suited to planetary observations?
 - e.g. “campaigns” – series of smaller programs targeting a single object
- Are there changes to the review process that might aid in selecting Solar System proposals?
 - e.g. additional external reviews

We intend to establish a working group to poll the Solar System community and provide recommendations on potential adjustments to the TAC process.

Goal is to provide feedback at the next STUC meeting




Programmatics

Joint HST-XMM programs

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Background

- HST has supported a joint observing program with XMM in Cycles 20 & 21
 - 30 orbits available to XMM TAC for allocation
 - 150 ksec available to HST TAC for allocation
 - Program continuation contingent on community response
- Result to date
 - Cycle 20: 30 orbits allocated by XMM, 0 ksec by HST
 - Cycle 21; 30 orbits allocated by XMM, 9 proposals for 596 ksecs to be considered by HST TAC
- XMM has requested that the joint program is extended through Cycle 22
 - We support that proposal, but encourage further review after the results from Cycle 21 become available



Programmatics

Preparatory programs for JWST

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Background

- JWST is scheduled for launch in October, 2018
 - STScI has an obligation to maximise its scientific productivity
- JWST instrumentation is focused on observations at near- and mid-infrared wavelengths
 - Potential for limited observations $6,000 < \lambda < 10,000 \text{ \AA}$
 - No capabilities at shorter wavelengths
- HST is clearly well placed to provide high-resolution supporting optical/UV observations
 - The aim is to maintain HST operations through 2020, but...
 - HST's status 5 years hence is a matter for speculation.
 - HST observations alone may not be scientifically competitive in current cycles.
- How can we provide an opportunity for such observations in advance of JWST's launch?

Proposal mechanisms

- JWST preparatory programs
 - GO proposals for observing time in support of future JWST programs
 - Science ranked with other GO proposals, but orbits taken from a separate, limited pool (~100 orbits?)
 - Requires a separate proposal for JWST time
- Joint HST-JWST proposals
 - Potential reciprocal arrangement with JWST in future cycles
 - Contingent on HST functionality
 - Analogous to Joint HST-Spitzer/Chandra/XMM proposals; proposal submitted to prime observatory
 - Science ranked with other GO proposals
- STScI welcomes input from the STUC on this issue

Summary

- MCT Programs
 - We request input from STUC on whether to offer a new opportunity for Very Large Programs on HST
- Proprietary Time
 - We recommend reducing the default period to 6 months
- Solar System programs
 - We intend to establish a working group to investigate potential mechanisms for better enabling Solar System science with HST
- Joint HST-XMM programs
 - We recommend continuing the joint program through Cycle 22 (do we?)
- Preparatory observations for JWST
 - We request input from the STUC on mechanisms for enabling HST observations in support of JWST science programs