Keeping Hubble Productive

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STUC meeting, April 6, 2011

OUTLINE

- General Approach
- Various Metrics we Track
- A Specific Case - Publication Statistics
- Final Thoughts and Questions (e.g., what are the main bottlenecks for your getting science out quickly ?)

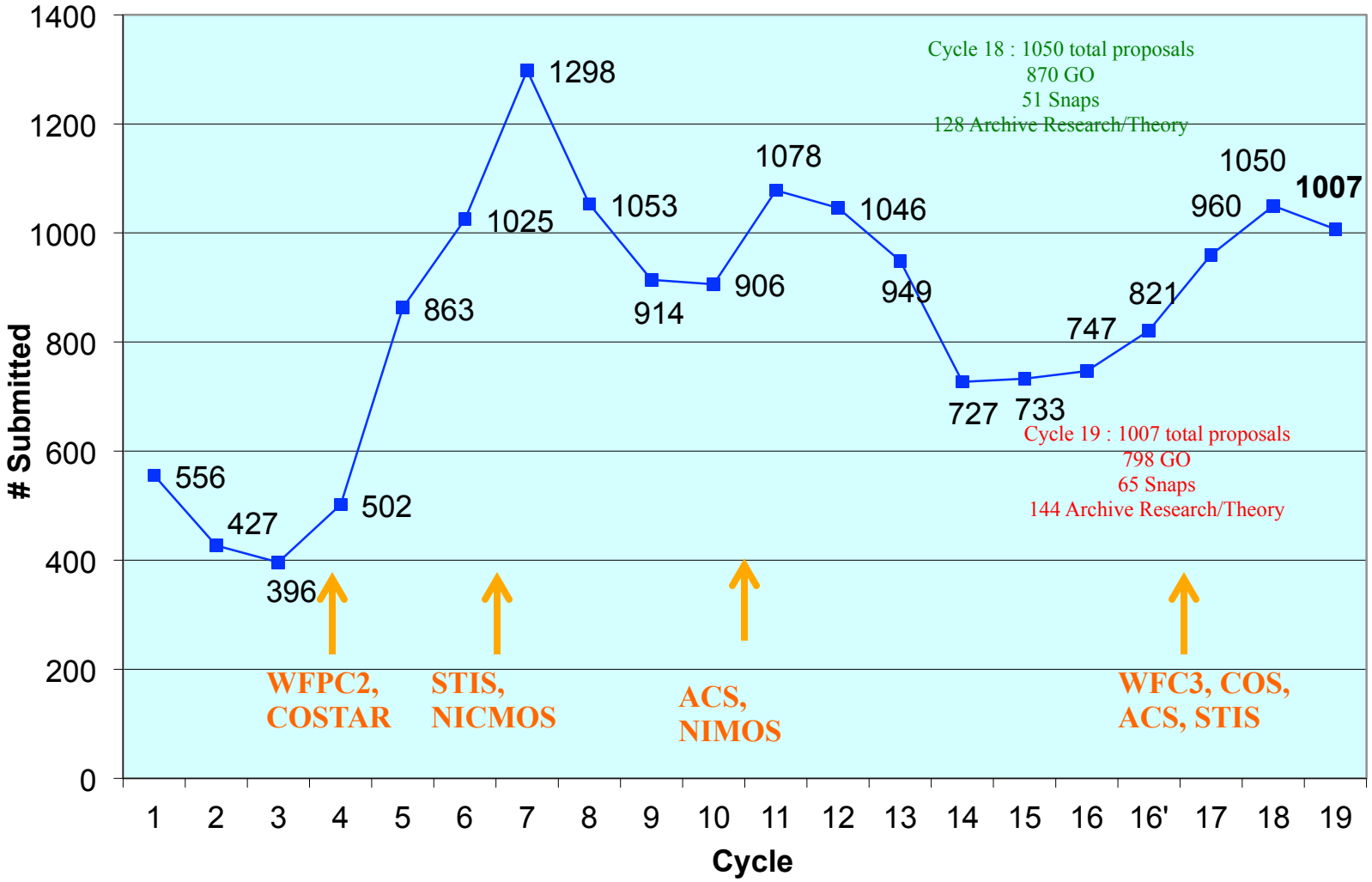
General Approach
(Some Early Thoughts about the Senior Review)

- Demonstrate that Hubble is at the peak of its capabilities.
- Show that it is healthy and is likely to last another 5 or 10 years.
- Use metrics to demonstrate that Hubble is continuing to produce great science.
- Show that we are continually looking for ways to maximize science from Hubble.

Various Metrics we Track

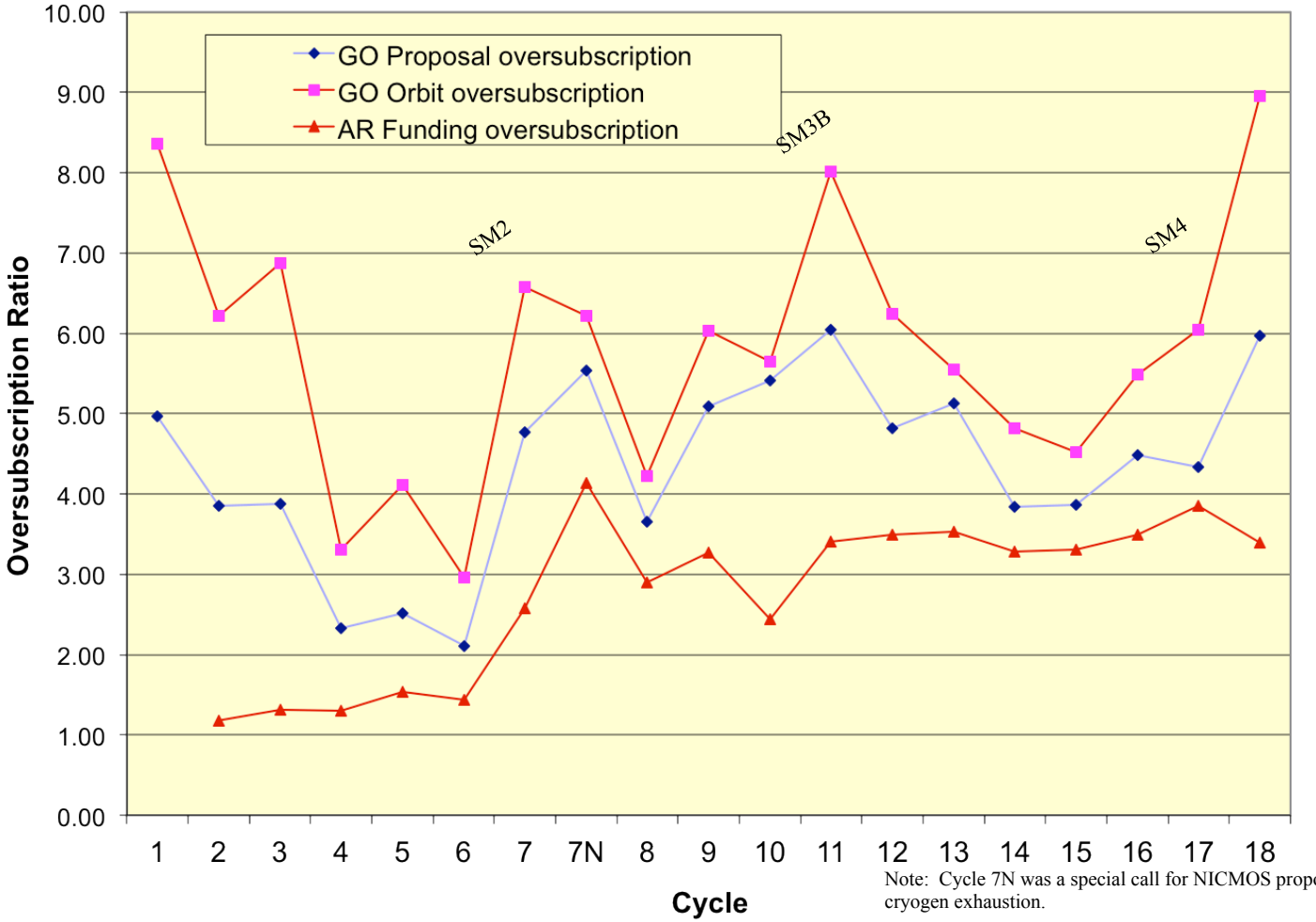
- Proposal statistics (oversubscription ~9, as high as it has ever been).
- Citations/paper are as high or higher than other missions.
- Paper statistics – still rising (this will be the focus of much of this discussion).
- Archival science continues to increase.
- Education (e.g., number of students supported)
- Davidson statistics (Hubble dominates the Science News metrics)

Proposal Submissions by Cycle



HST Oversubscription Rates

- GO oversubscription (time, proposals) in Cycle 18 is at an all-time high



Note: Cycle 7N was a special call for NICMOS proposals prior to cryogen exhaustion.

The number of citations per paper is higher for Hubble data than typical papers.

Here are some numbers based on MAST missions.

Note that this is a Log scale.

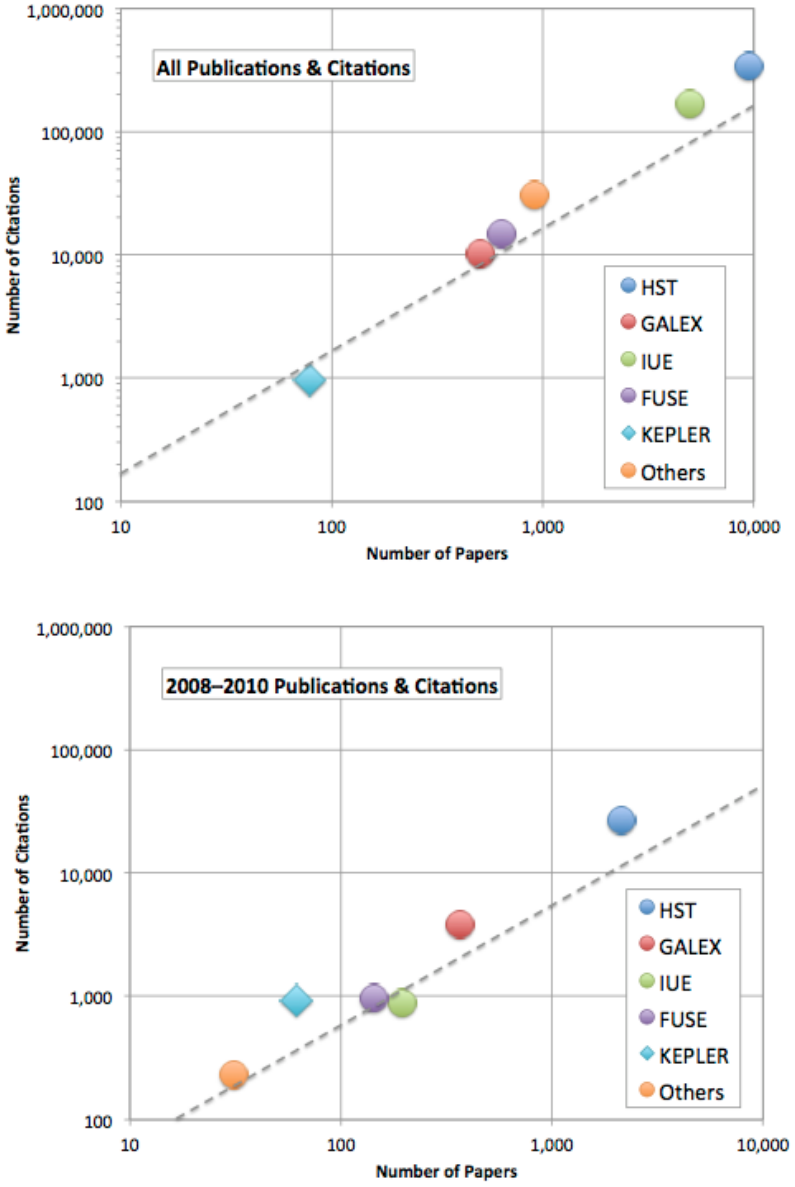
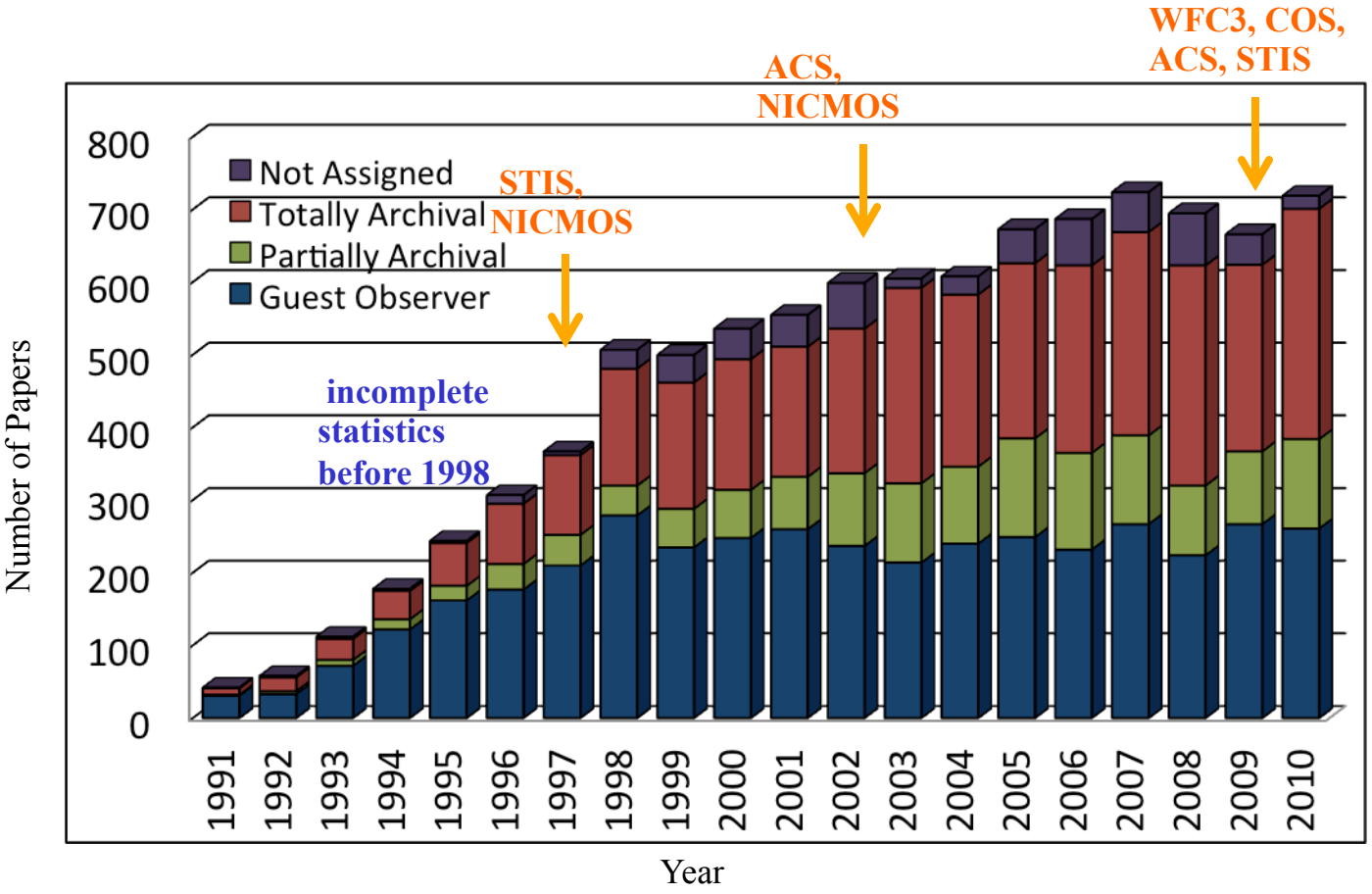


Figure 6: Publications and citations for MAST missions over the past 3 years (bottom) and all years (top). The diagonal lines represent the average number of citations for all refereed astronomical papers published in 2008–2010 (6 citations/paper), and 1978–2010 (17 citations/paper).

Increasing HST Publication Rates

- 9424 papers based on HST data (1991-2010), 719 papers in 2010
- Archival research is a growing source of HST science productivity
- An important question is whether this will continue to rise (e.g., due to inclusion of WFC3 and COS) or remain flat.



"Totally Archival" means that the paper uses only HST datasets that were not proposed by the authors.

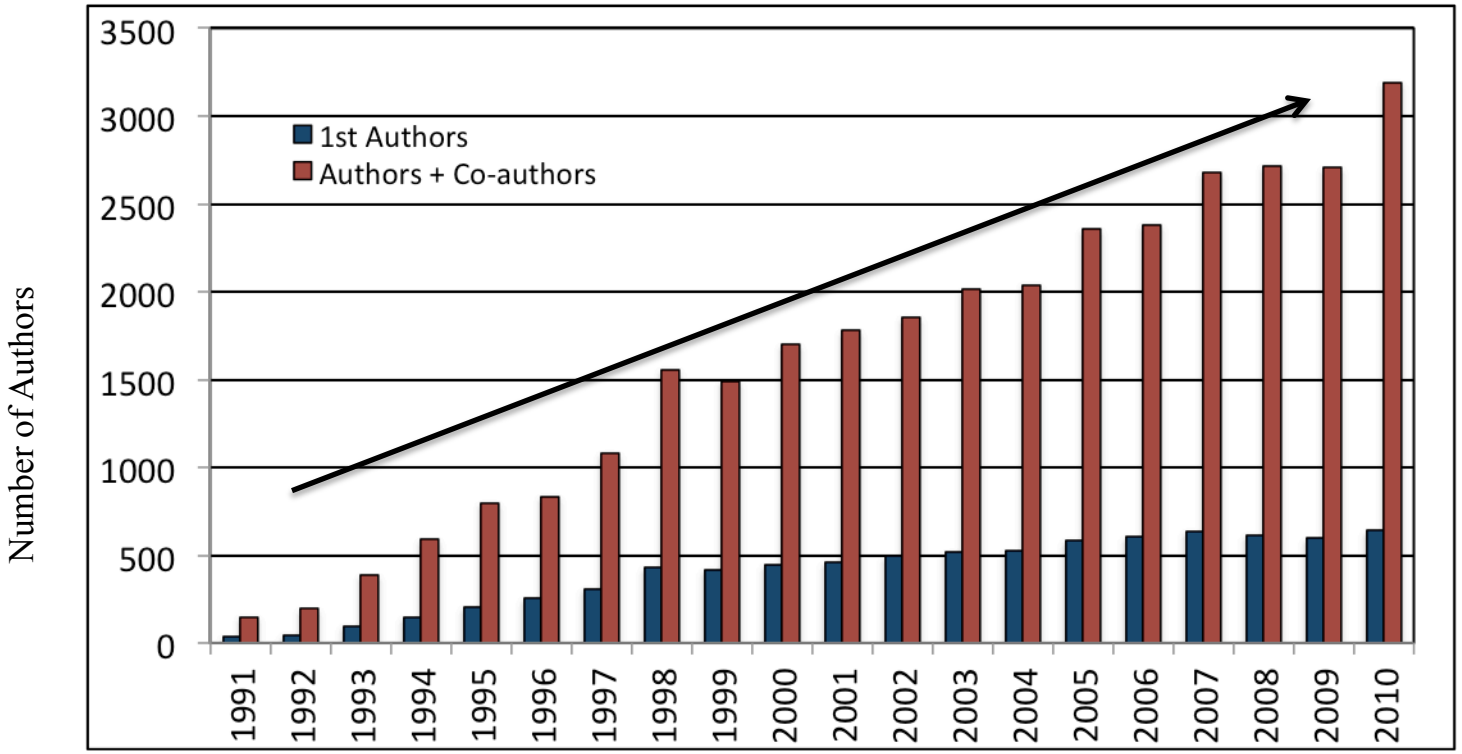
"Partially Archival" means that the paper uses some HST datasets that were proposed by the authors and some that were not.

"Guest Observer" means that the paper uses only HST datasets that were proposed by the authors.

"Not Assigned" means that the paper does not fit neatly into one of the above categories.

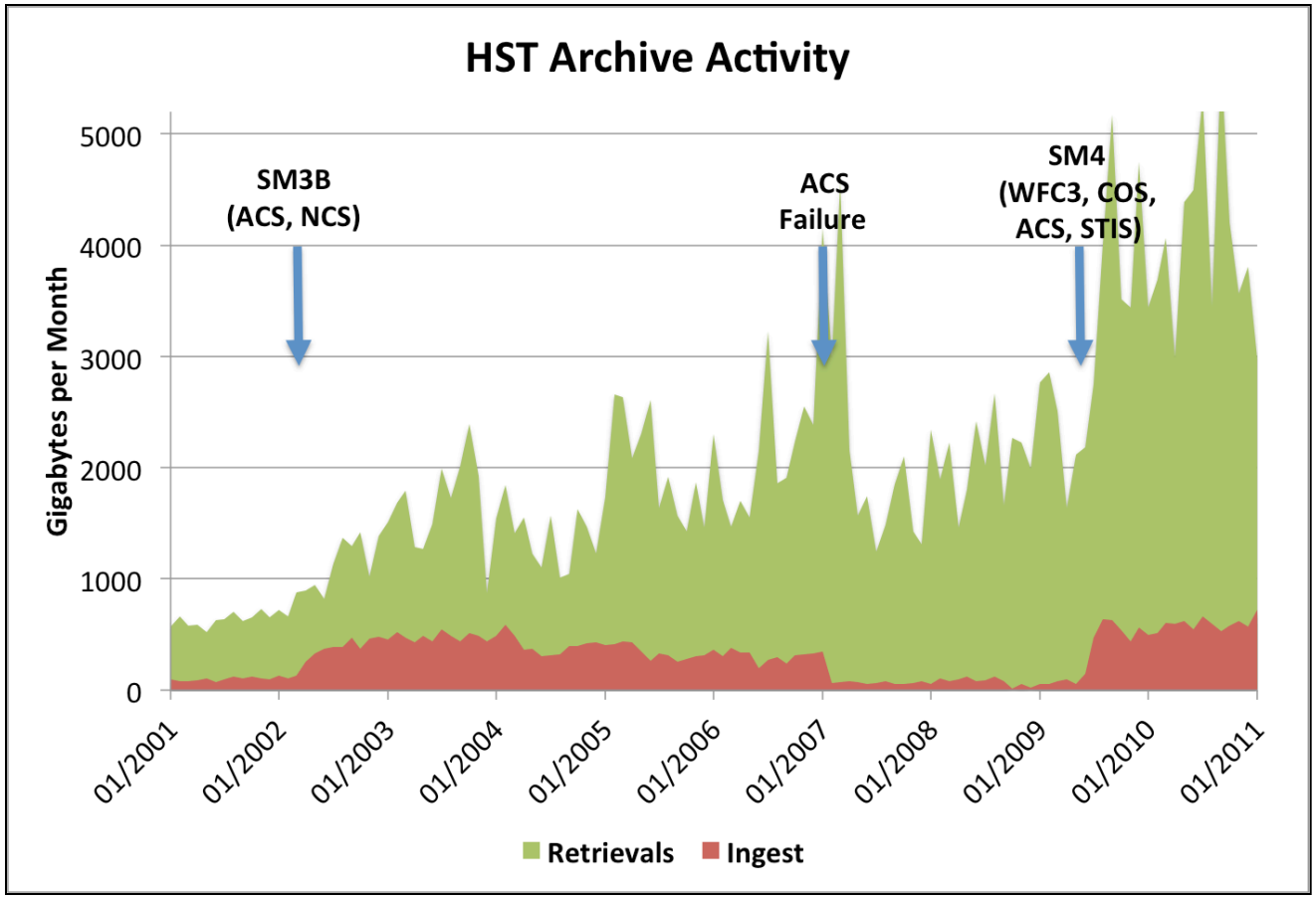
HST Authorship is Growing

- Reflects great interest in Hubble data
- Reflects increasing size of Hubble collaborations
- In 2010, there were 3192 Hubble authors (639 unique)



HST Archival Data are in High Demand

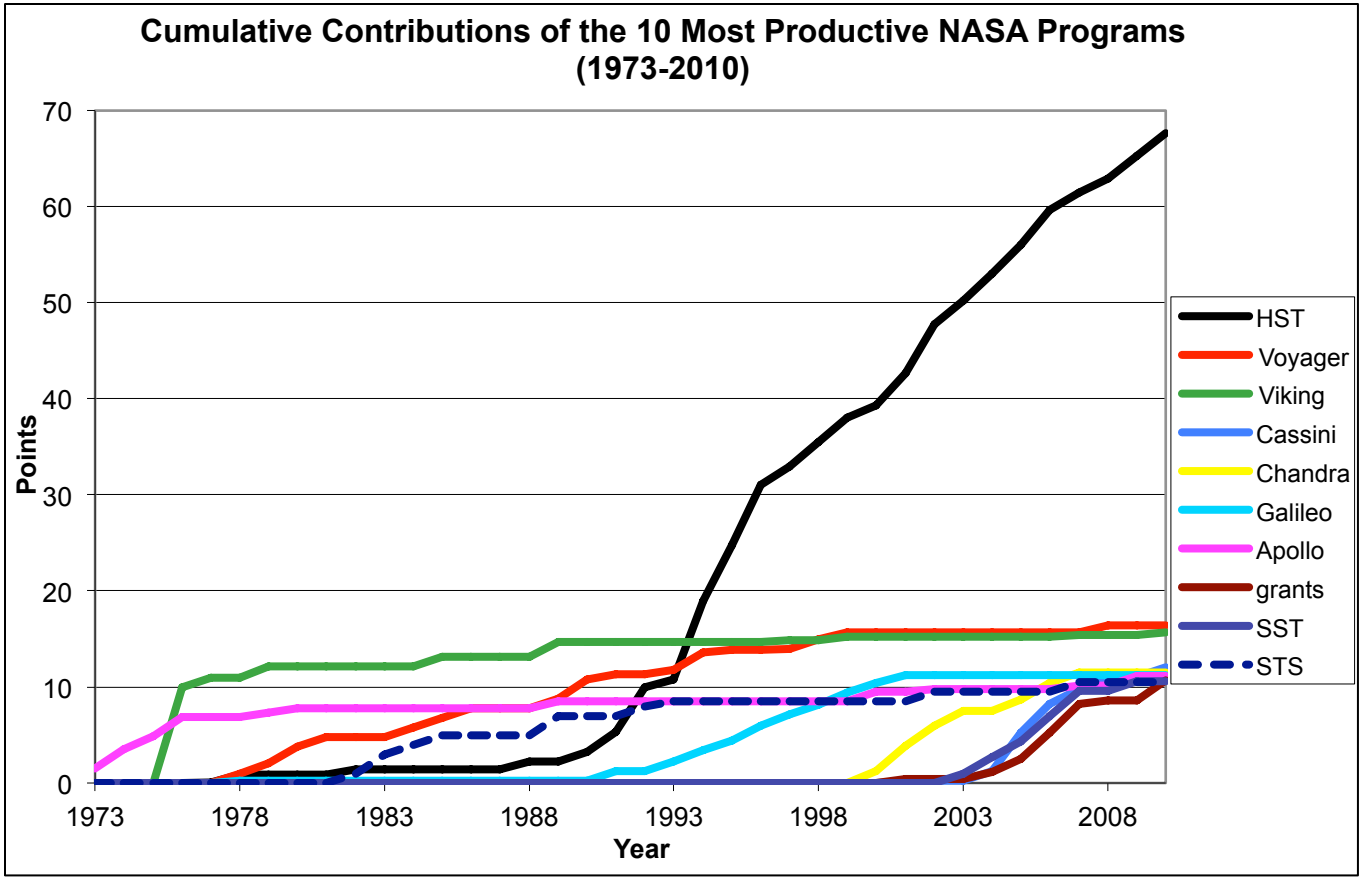
- HST archive is ~48 TB (end of 2010)
- HST archive retrievals doubled after Servicing Mission 4



>10,000 registered archive users

HST is NASA's Highest Science Impact Mission in the News Media

- 2010 Davidson Science News Metric
  - Independent measure of science impact in the news media
  - HST impact continues to increase, and shows no sign of leveling off



Generally, a mission has a rapid rise for just 2-5 years. Hubble's 20 year rise is unprecedented.

A Specific Case – Publication Statistics

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Lessons from a High-Impact Observatory: The *Hubble Space Telescope's* Science Productivity between 1998 and 2008

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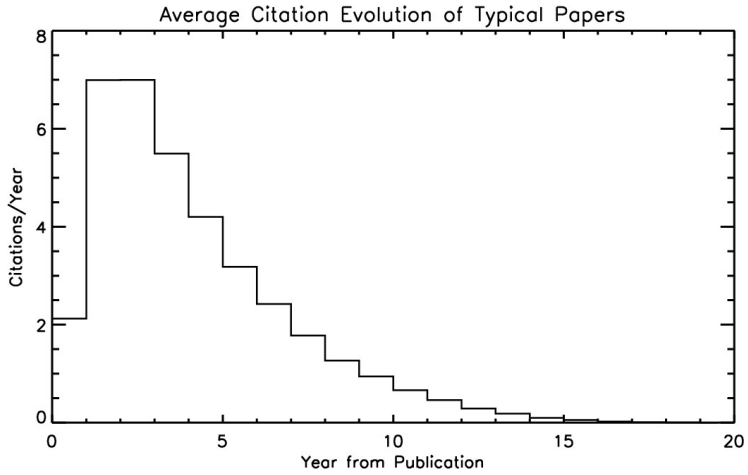
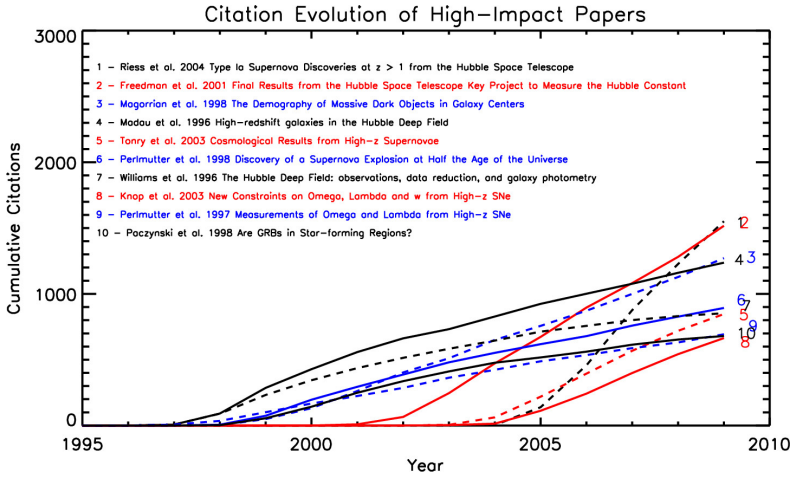
ABSTRACT. Almost two decades of continuous operation of the versatile and productive *Hubble Space Telescope* (*HST*) provide uniquely well-documented, robust statistics to study the scientific impact of a major astronomical observatory. We compiled a detailed database of refereed articles that use *HST* data for analysis and show it to be >95% complete. This *HST* Publication Database is publicly available and searchable: it contains more than 8700 articles, cited more than 300,000 times in the literature. By cross-linking this data set with our extensive proposal database and NASA's ADS service, we are able to trace the evolution of ideas from the proposal stage through the observations and publication steps to the final impact on the astronomical literature. Here we present a detailed study of *HST's* performance, including the temporal evolution of the publication rate, the citation statistics, the relative contributions from different program types, the time allocation strategy, and the relative contributions of the *HST* instruments. We also discuss the properties of typical and very highly-cited articles. By analyzing this complete and well-characterized database, we identify five key features that contribute to the productivity and high impact of the observatory: (1) the time allocation policies; (2) the well-characterized *HST* archive; (3) the breadth of science projects ranging from the solar system to cosmology; (4) the Director's Discretionary time allocations; (5) the large international user community and its involvement in the observatory's functions. In addition, we find the following general characteristics. Following its launch, *HST's* productivity has been steadily increasing; 8 yr after launch, *HST* reached equilibrium between the incoming data volume and the number of published articles that are based on those data. The overall productivity, however, is still steadily increasing due to the increasing number of archival articles. We find that small programs produce more citations per orbit than large programs, but only large programs have the potential to lead to very high-impact articles and data sets with lasting legacy value. We find that while typical *HST* articles receive the largest number of citations 2–3 yr after publication and exhibit a subsequent decline, the most-cited articles show a qualitatively different citation history. Together these results provide a detailed picture of *HST's* science productivity and identify key characteristics that contribute to making *HST* a high-impact observatory.





A Closer Look at Paper Statistics

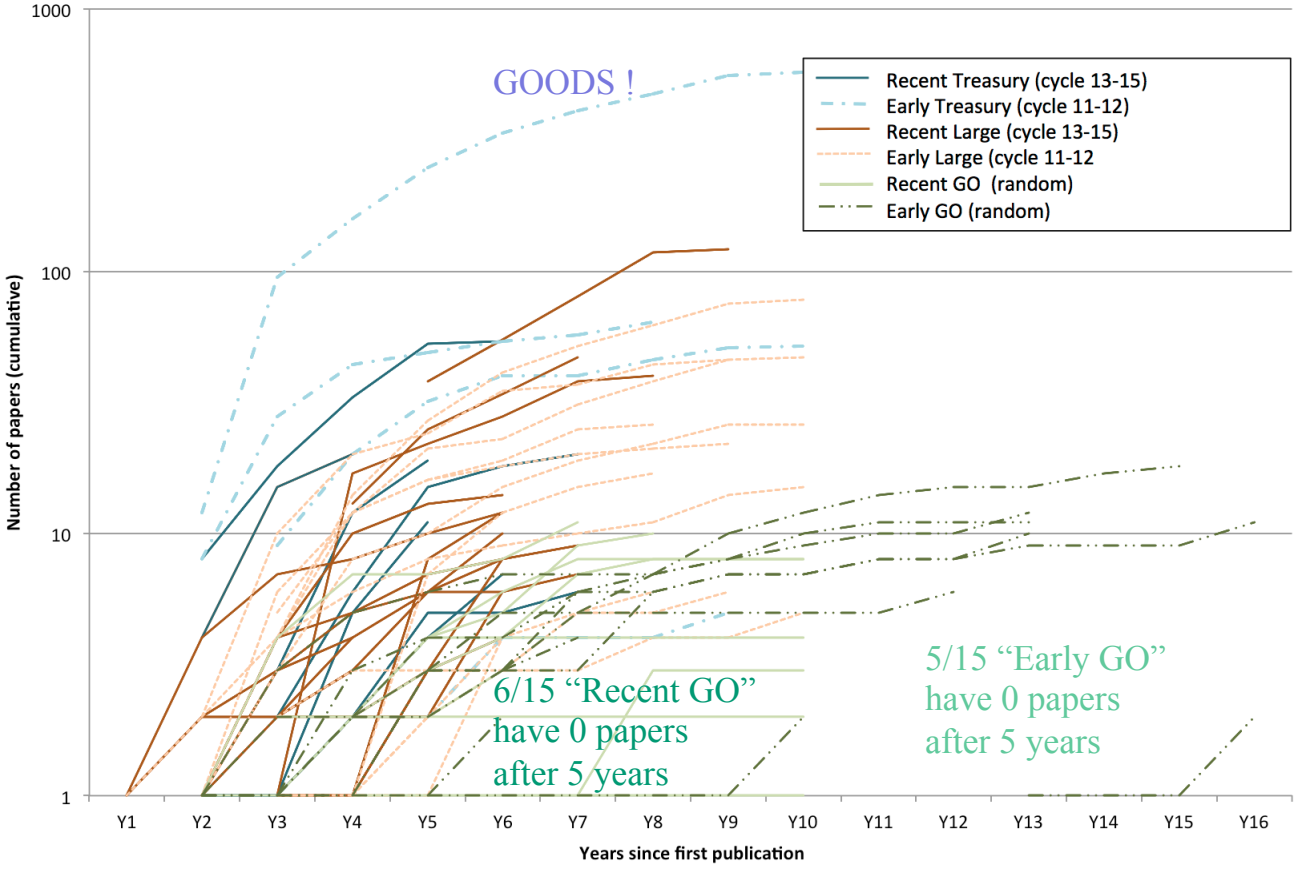
We break the proposals into the following subsets:

Treasury (blue)
Large (orange)

random GO (green)

and by

Early (dashed)
Later (solid)

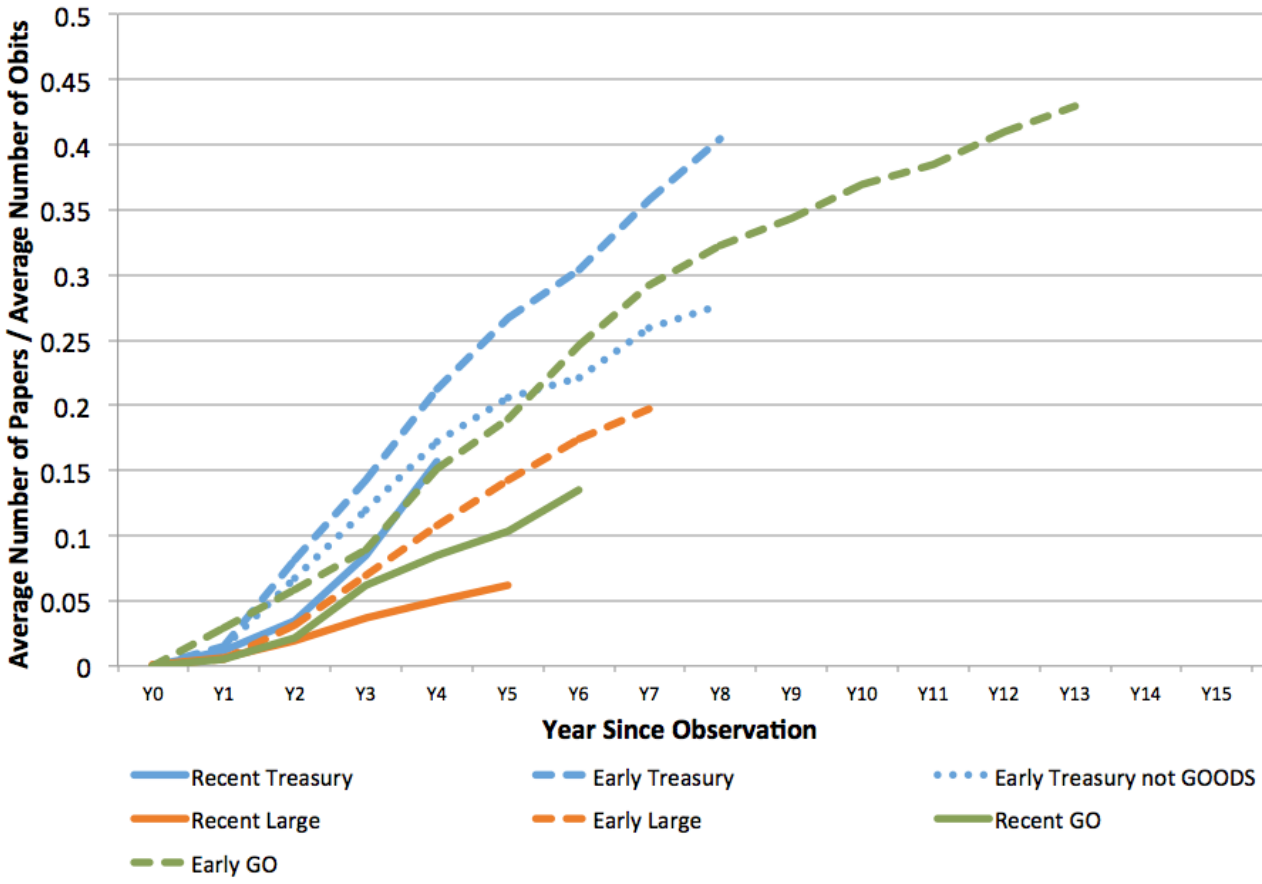


A Closer Look at Paper Statistics

We normalize by the number of orbits and plot the mean profiles.

Tentative conclusions:

1. GOODS is doing something right ! (are large numbers due to catalog or images?)
2. There may be a trend of fewer papers for recent projects.
3. The dispersion from highest to lowest is quite large
4. It appears that Large projects underperform relative to Treasury and GO.



The Data Base

	Proposal(s)	Orbits (exter	Orbits (sumn	First Date	Y0	Proposal(s)	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11
2	P 10915		218	218	9/8/06 14:39	P 10915	0	0	3	12	19						
3	P 10861		164	42	11/21/06 9:06	P 10861	0	0	1	5	11						
4	P 10775	Treasury - recent	134	131	2/20/06 11:16	P 10775	0	8	18	33	53	54					
5	P 10530		200	200	8/8/05 4:07	P 10530	0	0	2	6	15	18	20				
6	P 10403		62	62	1/8/05 18:09	P 10403	0	0	1	2	4	7					
7	P 10246		104	104	10/11/04 17:25	P 10246	0	1	1	2	5	5	6				
8	P 9822,10092		590	590	10/15/03 6:08	P 9822,10092	0	0	0	0	38	55	80	118	121		
9	P 9803		144	144	8/30/03 19:41	P 9803	0	8	28	44	49	54	57	64			
10	P 9455,9974,10094	Treasury - early	110	63	8/21/02 16:54	P 9455,9974,10094	0	0	0	0	2	4	4	4	5		
11	P 9420,9973		73	80	10/14/02 0:55	P 9420,9973	0	0	9	20	32	40	40	46	51	52	
12	P 9425,9583		398	411	7/4/02 4:54	P 9425,9583	0	12	95	159	248	336	410	476	559	574	
13	P 10889		128	128	7/24/06 10:41	P 10889	0										
14	P 10862		128	129	1/13/07 7:47	P 10862	0	4	15	20							
15	P 10842		190	80	5/29/06 3:02	P 10842	0										
16	P 10816		128	96	8/9/06 20:28	P 10816	0	1	2	3							
17	P 10802		208	208	7/31/06 15:28	P 10802	0	0	0	2	3						
18	P 10632		204	204	6/17/05 0:11	P 10632	0	0	2	3	6	10					
19	P 10610,10704,10989		144	108	6/1/05 20:28	P 10610,10704,10989	0	0	2	2	2	6					
20	P 10556		109	109	8/9/05 16:45	P 10556	0										
21	P 10551		101	89	9/26/05 1:32	P 10551	0	2	3	4	6	8					
22	P 10505	Large - recent	97	97	9/12/05 16:18	P 10505	0	0	0	1	3	8					
23	P 10496		219	223	7/2/05 15:58	P 10496	0	0	1	1	8	12					
24	P 10429		114	114	1/17/05 3:05	P 10429	1	2	2	4							
25	P 10424		126	126	3/13/05 10:05	P 10424	0	1	4	10	13	14					
26	P 10265		107	113	8/30/04 14:18	P 10265	0	1	3	5	7	8	9				
27	P 10226		0	35	7/5/04 7:09	P 10226	0	0	0	1	3	4					
28	P 10222		450	17	7/19/04 14:06	P 10222	0	0	0	0	0	0	1				
29	P 10189,10339,10340		420	295	9/13/04 10:38	P 10189,10339,10340	0	0	0	13	25	34	47				
30	P 10182		152	150	8/16/04 8:41	P 10182	1	4	7	8	10	12					
31	P 10176		116	230	7/2/04 10:55	P 10176	0	0	1								
32	P 10135		55	54	8/9/04 14:14	P 10135	0	1	4	5	6	6	7				
33	P 10134		126	126	6/21/04 4:21	P 10134	0	0	1	17	22	28	38	40			
34	P 9879,10106		110	110	6/26/03 13:14	P 9879,10106	0	0	0	0	8						
35	P 9865		-1	74	9/15/03 11:30	P 9865	0	0	1	1	2	4	5	6			
36	P 9793		40	40	9/22/03 18:09	P 9793	0	1	6	12	16	19	25	26			
37	P 9750,10466		112	111	6/9/03 13:31	P 9750,10466	0	0	0	1	1	4					
38	P 9744		110	112	8/18/03 21:16	P 9744	1	2	10	20	24	35	37	44	46		
39	P 9728	Large - early	60	105	6/2/03 2:00	P 9728	0	0	0	1	7	12	15	17			
40	P 9727		60	96	4/2/04 1:59	P 9727	0	0	0	1	2						
41	P 9500		125	125	9/14/02 15:15	P 9500	0	0	5	12	21	23	31	38	46	47	
42	P 9453		126	126	7/25/02 14:18	P 9453	0	1	4	6	8	9	10	11	14	15	
43	P 9433		125	125	12/23/02 1:08	P 9433	0	0	1	1	2	3	5	5	6		
44	P 9405		145	145	7/24/02 9:32	P 9405	0	2	4	12	16	18	20	21	22		
45	P 9401		100	100	12/25/02 18:39	P 9401	0	0	4	14	27	41	52	62	75	78	
46	P 9382		118	117	5/13/02 1:31	P 9382	0	0	2	3	3	3	3	4	4	5	
47	P 9352		134	133	6/13/02 0:10	P 9352	0	1	3	8	10	15	19	22	26	26	
48	P 10150		18	18	3/18/05 9:54	P 10150	0	0	1	2	4	4	4	4	4	4	
49	P 10152		73	23	9/12/04 7:55	P 10152	0	0	0	0	0	0	1	3	3	3	
50	P 10154		16	16	11/14/04 2:44	P 10154	0	0	0	2	4	6	8	8	8	8	
51	P 10156		5	5	2/17/05 16:20	P 10156	0	0	0	1	1	1	1	1	1	1	
52	P 10158		24	24	7/22/04 13:59	P 10158	0	0	2	2	3	4	7	8	8	8	
53	P 10159		7	7	11/10/04 0:37	P 10159	0										
54	P 10160	GO - recent	6	6	8/6/04 7:22	P 10160	0										
55	P 10161		2	2	3/25/05 13:04	P 10161	0										

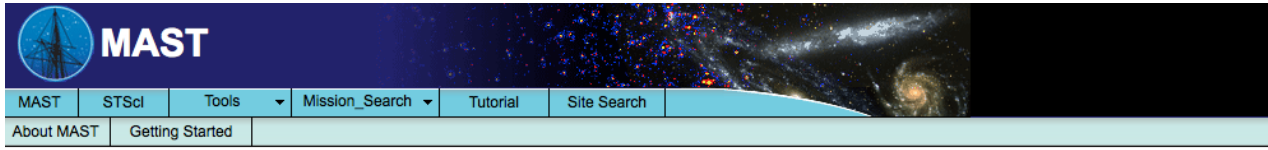
15	P 10842		190	80	5/29/06 3:02	P 10842	0													
16	P 10816		128	96	8/9/06 20:28	P 10816	0	1	2	3										
17	P 10802		208	208	7/31/06 15:28	P 10802	0	0	0	2	3									
18	P 10632		204	204	6/17/05 0:11	P 10632	0	0	2	3	6	10								
19	P 10610,10704,10989		144	108	6/1/05 20:28	P 10610,10704,10989	0	0	2	2	2	6								
20	P 10556		109	109	8/9/05 16:45	P 10556	0													
21	P 10551		101	89	9/26/05 1:32	P 10551	0	2	3	4	6	8								
22	P 10505	Large-Early	97	97	9/12/05 16:18	P 10505	0	0	0	1	3	8								
23	P 10496		219	223	7/2/05 15:58	P 10496	0	0	1	1	8	12								
24	P 10429		114	114	1/17/05 3:05	P 10429	1	2	2	4										
25	P 10424		126	126	3/13/05 10:05	P 10424	0	1	4	10	13	14								
26	P 10265		107	113	8/30/04 14:18	P 10265	0	1	3	5	7	8	9							
27	P 10226		0	35	7/5/04 7:09	P 10226	0	0	0	1	3	4								
28	P 10222		450	17	7/19/04 14:06	P 10222	0	0	0	0	0	0	1							
29	P 10189,10339,10340		420	295	9/13/04 10:38	P 10189,10339,10340	0	0	0	13	25	34	47							
30	P 10182		152	150	8/16/04 8:41	P 10182	1	4	7	8	10	12								
31	P 10176		116	230	7/2/04 10:55	P 10176	0	0	1											
32	P 10135		55	54	8/9/04 14:14	P 10135	0	1	4	5	6	6	7							
33	P 10134		126	126	6/21/04 4:21	P 10134	0	0	1	17	22	28	38	40						
34	P 9879,10106		110	110	6/26/03 13:14	P 9879,10106	0	0	0	0	8									
35	P 9865		-1	74	9/15/03 11:30	P 9865	0	0	1	1	2	4	5	6						
36	P 9793		40	40	9/22/03 18:09	P 9793	0	1	6	12	16	19	25	26						
37	P 9750,10466		112	111	6/9/03 13:31	P 9750,10466	0	0	0	1	1	4								
38	P 9744		110	112	8/18/03 21:16	P 9744	1	2	10	20	24	35	37	44	46					
39	P 9728		60	105	6/2/03 2:00	P 9728	0	0	0	1	7	12	15	17						
40	P 9727	Large-Early	60	96	4/2/04 1:59	P 9727	0	0	0	1	2									
41	P 9500		125	125	9/14/02 15:15	P 9500	0	0	5	12	21	23	31	38	46	47				
42	P 9453		126	126	7/25/02 14:18	P 9453	0	1	4	6	8	9	10	11	14	15				
43	P 9433		125	125	12/23/02 1:08	P 9433	0	0	1	1	2	3	5	5	6					
44	P 9405		145	145	7/24/02 9:32	P 9405	0	2	4	12	16	18	20	21	22					
45	P 9401		100	100	12/25/02 18:39	P 9401	0	0	4	14	27	41	52	62	75	78				
46	P 9382		118	117	5/13/02 1:31	P 9382	0	0	2	3	3	3	3	4	4	5				
47	P 9352		134	133	6/13/02 0:10	P 9352	0	1	3	8	10	15	19	22	26	26				
48	P 10150		18	18	3/18/05 9:54	P 10150	0	0	1	2	4	4	4	4	4	4				
49	P 10152		73	23	9/12/04 7:55	P 10152	0	0	0	0	0	0	1	3	3	3				
50	P 10154		16	16	11/14/04 2:44	P 10154	0	0	0	2	4	6	8	8	8	8				
51	P 10156		5	5	2/17/05 16:20	P 10156	0	0	0	1	1	1	1	1	1	1				
52	P 10158		24	24	7/22/04 13:59	P 10158	0	0	2	2	3	4	7	8	8	8				
53	P 10159	GO-Recent	7	7	11/10/04 0:37	P 10159	0													
54	P 10160		6	6	8/6/04 7:22	P 10160	0													
55	P 10161		2	2	3/25/05 13:04	P 10161	0													
56	P 10165		8	8	11/1/04 9:14	P 10165	0													
57	P 10166		6	6	9/23/04 21:52	P 10166	0													
58	P 10167		15	17	3/16/05 4:44	P 10167	0	0	0	2	2	2	2	2	2	2				
59	P 10169		27	27	9/8/04 9:18	P 10169	0	0	2	2	4	5	9	10						
60	P 10170		20	15	7/16/04 22:29	P 10170	0	1	1	2	2	3								
61	P 10172		8	8	1/23/05 0:01	P 10172	0													
62	P 10173		97	92	8/9/04 17:32	P 10173	0	1	4	7	7	8	11							
63	P 5300		0	11	4/9/94 17:19	P 5300	0	1	1	2	2	3	6	6	7	7	8	8	10	
64	P 5302		0	30	2/2/95 9:02	P 5302	0	0	0	1	1	1	1	1	1	2				
65	P 5303		0	8	3/18/94 6:49	P 5303	0	1	2	2	3	3	4							
66	P 5304		0	17	9/12/94 2:32	P 5304	0	1	1	3	4	4	6	7	10	12	14	15	15	
67	P 5305		0	4	1/18/95 23:34	P 5305	0													
68	P 5306	GO-Early	0	12	12/21/94 5:26	P 5306	0	0	0	0	0	1								
69	P 5307		0	7	9/3/94 19:31	P 5307	0	0	0	0	1	2								
70	P 5308		0	28	5/26/94 10:10	P 5308	0	1	3	5	6	7	7	7	8	9	10	10	12	
71	P 5309		0	15	10/29/94 22:34	P 5309	0	1	1	1	3	5	5	7	8	10	11	11	11	
72	P 5310		0	4	11/14/94 1:40	P 5310	0	0	0	0	0	0	0	1						
73	P 5311		0	6	8/7/94 13:53	P 5311	0	0	1	1	3	3	5	5	5	5	5	6		
74	P 5312		0	18	8/21/94 15:57	P 5312	0	1	1	2	4									
75	P 5313		0	12	2/13/95 1:24	P 5313	0	0	1	2	2	3	3	6	7	7	8	8	9	
76	P 5314		0	3	1/28/95 3:38	P 5314	0													
77	P 5315		0	23	11/26/95 4:14	P 5315	0	0	0	0	0	0	0	0	0	0	0	0	1	

The TALL page: http://archive.stsci.edu/hst/tall.html

We maintain what we call the "TALL" page, which provides a focal point for finding treasury and large proposals, and the papers they have written, and also provides an incentive for getting papers out in a timely manner.

The TAC is informed of this page as part of their instruction.

Does it make sense to do something similar for other types of proposals?



HST Treasury, Archival Legacy and Large Proposals

Several special types of programs were created for the Hubble Space Telescope beginning in Cycle 11. Chief among these are the Treasury, Archival Legacy and Large programs. The goal of these programs is to increase the scientific impact of HST, in part by providing sets of high-level science products to the astronomical community that are useful for addressing multiple scientific topics. MAST also encourages the contribution of high-level science products from all HST programs and from other MAST based missions.

Please consult the guidelines for contributing high-level science products for more information. You may see a complete list of all high-level science products archived at MAST and also search for a variety of criteria to find HLSP of interest. You may also be interested in more information about download options.

Below are three tables listing the three types of programs. *The planned orbit counts may not be completely accurate especially for multi-cycle programs. *These tables are compiled on the fly and may take a few seconds to load.*

Treasury Programs

Click on column heading to sort.

First Cycle for the Program	Proposal Number(s)	Title	PI	Planned External Orbits*	Planned Parallel Orbits*	Program Website	MAST Website / HLSP	Number of Papers Associated with Program
18	12278	Advanced Spectral Library Project: Cool Stars	Ayres, Thomas R	146	0	http://casa.colorado.edu/~ayres/ASTRAL/	-	0
18	12099	Supernova Follow-up for MCT	Riess, Adam	202	202	-	-	0
18	12065, 12066, 12067, 12068, 12069, 12100, 12101, 12102, 12103, 12104	Through a Lens, Darkly - New Constraints on the Fundamental Components of the Cosmos - I	Postman, Marc	474	474	http://www.stsci.edu/~postman/CLASH	In Preparation	0
18	12060, 12061, 12062, 12063, 12064, 12440, 12442, 12443, 12444, 12445	Galaxy Assembly and the Evolution of Structure over the First Third of Cosmic Time - I	Faber, Sandra M	793	793	http://candels.ucolick.org/	http://archive.stsci.edu/prepds/candels	0
18	12055, 12056, 12057, 12058, 12059, 12070, 12071, 12072, 12073, 12074, 12075, 12076, 12105, 12106,	A Panchromatic Hubble Andromeda and	Dalcanton, Julianne	834	828	-	In Preparation	0

The Tall Page – Treasury Proposals

15	10915	ACS Nearby Galaxy Survey	Dalcanton, Julianne	218	295	http://www.nearbygalaxies.org//dashboard/home	http://archive.stsci.edu/prepds/angst/	19
15	10861	An ACS Treasury Survey of the Coma cluster of galaxies	Carter, David	164	164	-	http://archive.stsci.edu/prepds/coma/	11
14	10775	An ACS Survey of Galactic Globular Clusters	Sarajedini, Ata	134	0	http://www.astro.ufl.edu/~ata/public_hstgc/	-	54
14	10530	Probing Evolution And Reionization Spectroscopically {PEARS}	Malhotra, Sangeeta	200	200	-	http://archive.stsci.edu/prepds/pears/	20
13	10403	Ultraviolet Imaging of the UDF	Teplitz, Harry	62	0	-	http://archive.stsci.edu/prepds/udfuv/	7
13	10246	The HST survey of the Orion Nebula Cluster	Robberto, Massimo	104	104	-	http://archive.stsci.edu/prepds/orion/	6
12	9822, 10092	The COSMOS 2-Degree ACS Survey	Scoville, Nicholas	590	0	http://cosmos.astro.caltech.edu/	http://archive.stsci.edu/prepds/cosmos/	103
12	9803	Deep NICMOS Images of the UDF	Thompson, Rodger I	144	144	-	http://archive.stsci.edu/prepds/udf/	64
11	9455, 9974, 10094	Mid-Ultraviolet Spectral Templates for Old Stellar Systems	Peterson, Ruth C	110	0	-	-	5
11	9425, 9583	The Great Observatories Origins Deep Survey: Imaging with ACS	Giavalisco, Mauro	398	0	http://www.stsci.edu/science/goods/	http://archive.stsci.edu/prepds/goods/	386
11	9420, 9973	Intensive Coverage of the Eta Carinae Event in 2003	Davidson, Kris	73	0	http://etacar.umn.edu/	http://archive.stsci.edu/prepds/etacar/	34

HST Bibliography Search Results

15 papers were found

Click on column heading to sort

Bibcode	First Author	Co-Authors	Title	Paper Type	Citations	HST Programs	Instrument(s)	GO AR
2011ApJ...727..100W	Wofford, Aida	Leitherer, Claus; Chandar, Rupali	*Ultraviolet Spectroscopy of Circumnuclear Star Clusters in M83*	Science	2	11360 7577 8785	STIS WFC3	AR
2011ApJ...727..115C	Crockett, R. Mark	Kaviraj, Sugata; Silk, Joseph I.; Whitmore, Bradley C.; O'Connell, Robert W.; Mutchler, Max; Balick, Bruce; Bond, Howard E.; Calzetti, Daniela; Carollo, C. Marcella; Disney, Michael J.; Dopita, Michael A.; Frogel, Jay A.; Hall, Donald N. B.; Holtzman, Jon A.; Kimble, Randy A.; McCarthy, Patrick J.; Paresce, Francesco; Saha, Abhijit; Trauger, John T.; Walker, Alistair R.; Windhorst, Rogier A.; Young, Erick T.; Jeong, Hyunjin; Yi, Sukyoung K.	*Anatomy of a Post-starburst Minor Merger: A Multi-wavelength WFC3 Study of NGC 4150*	Science	0	11360	WFC3	GO
2011ApJ...727L..31S	Schawinski, Kevin	Treister, Ezequiel; Urry, C. Megan; Cardamone, Carolin N.; Simmons, Brooke; Yi, Sukyoung K.	*HST WFC3/IR Observations of Active Galactic Nucleus Host Galaxies at $z \sim 2$: Supermassive Black Holes Grow in Disk Galaxies*	Science	0	11359	WFC3	AR
2011AJ....141...14S	Straughn, Amber N.	Kuntschner, Harald; Kümmel, Martin; Walsh, Jeremy R.; Cohen, Seth H.; Gardner, Jonathan P.; Windhorst, Rogier A.; O'Connell, Robert W.; Pirzkal, Norbert; Meurer, Gerhardt; McCarthy, Patrick J.; Hathi, Nimish P.; Malhotra, Sangeeta; Rhoads, James; Balick, Bruce; Bond, Howard E.; Calzetti, Daniela; Disney, Michael J.; Dopita, Michael A.; Frogel, Jay A.; Hall, Donald N. B.; Holtzman, Jon A.; Kimble, Randy A.; Mutchler, Max; Paresce, Francesco; Saha, Abhijit; Silk, Joseph I.; Trauger, John T.; Walker, Alistair R.; Whitmore, Bradley C.; Young, Erick T.; Xu, Chun	*Hubble Space Telescope WFC3 Early Release Science: Emission-line Galaxies from Infrared Grism Observations*	Science	3	10530 11359	ACS WFC3	GO

Caveats

As with all uses of paper and citation statistics, one needs to keep in mind that there are various reasons for the large spread. For example:

1. People's publication record.

2. Field of study (e.g., size of the audience – cosmology vs. planets)

3. PI vs. Archival value – A certain data set might only be interesting to specialist rather than many people (e.g., stellar templates vs GOODS)

4. High Risk – Sometimes a high risk/high payoff observations will not pan out and there is nothing to write a paper about.

The idea might be to provide a gentle incentive to both reward people with better publication records via the TAC process, and encourage people to publish their Hubble results in a timely manner.

For example, we might develop a "TALL" page for all proposals which the TAC could consider when discussing "tie breakers" in the grey area.

A Conscious Attempt to Keep Paper Statistics High

An Example: WFC3 SOC Early Release Science - Paper Progress

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WFC3 SCIENTIFIC OVERSIGHT COMMITTEE

Group Paper Progress

****

		July 2010	Jan 2011	Mar 2011	
I	Accepted	6	10	13	
II	Submitted	4	6	3	
III	In Circulation/ Review	6	1	3	
IV	Papers in Preparation	33	33	37	
V	AAS Abstracts	22	31	31	
VI	"Other authors"			8	(+ 13 from above = 21 total)

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(I) *Accepted/Published*

"Progressive star formation in the young galactic super star cluster NGC 3603," G. Beccari et al., 2010, ApJ, 720, 1108 (4 citations)

"The Luminosity, Mass, and Age Distribution of Compact Star Clusters in M83 based on HST/WFC3 Observations," R. Chandar et al., 2010, ApJ, 719, 966 (13 citations) …

Another Example: COS Science Team GTO Published Papers

	2009	2010	2011
Published Refereed Articles:	2	15	24
Non-refereed Publications:	3	48	64

Final Thoughts and Questions

1. Are the number of papers likely to go down due to the larger percentage of large and treasury proposals?

   - Based on our quick look, the number of papers/orbit are about the same for Treasury and GOs, so hopefully no, but we will monitor.

   - The large programs appear to underperform. We need to try to understand why (proprietary period ? – fewer "High Level Science Products" ? – smaller budgets ? …)

2. Are there other ideas to explore, for example:

   - In the TAC process (Key Projects, "GRISM UDF", …)

   - Archives (e.g., an ALL-HST-SKY catalog, …).

3. What are the main bottlenecks in your ability to get papers out quickly (and what can STScI do to help).