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The Public Impact of Hubble Space Telescope

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Our preliminary investigation regarding the impact of the Hubble Space Telescope, conducted using sources that primarily relate to the US public, indicates that this NASA mission has wide name recognition and enjoys wide public support. Several gauges of HST impact were examined ranging from internet accesses to the news media. HST appears to hold a particular fascination for much of the public audience and also contributes to the general public understanding of science in both formal and informal education areas.

Introduction

This report was crafted in support of the *Hubble Space Telescope Second Decade Committee's* deliberations regarding the optimal future use of HST, and for long term planning for operation of NASA's Next Generation Space Telescope (NGST). Our report is a preliminary investigation of the impact of NASA's Hubble Space Telescope, primarily on the US public. The study was conducted in parallel to analyses of the importance of HST within the astrophysics research community, especially as reflected through scientific publications.

We have constructed several rough gauges to measure the public influence and name recognition of the HST mission, which appears to hold a particular fascination for much of the public audience. We report on several metrics; the numbers of articles and reports published in newspapers, magazines and in the television media; the number of books published on HST results and history; some demonstrative web statistics; the use of HST images in current introductory astronomy textbooks; and finally, the "Science News Metric" assembled by Dr. G. Davidson (TRW). When possible, we compare the numbers for HST with numbers for other NASA missions or other topics of interest to the public.

Coverage in the Media

We have examined references to HST in a variety of media. First, we have listed in Table 1 below, the number of articles on HST, both science and technical, based on a search of the comprehensive media reporting database, LEXIS/NEXIS. This database is commonly used to accumulate metrics regarding numbers and types of media coverage across the full range of sources from newspapers and broadcast media to periodicals and journals of interest to the general public. The numbers in Table 1 show that HST has

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had a steady presence in the public eye over the prolonged period following the correction for the HST primary mirror curvature error.

As a comparison, Table 2 lists the reporting on the Compton Gamma Ray Observatory over the same period. We have chosen Compton for this purpose because first, it is the *only* other NASA mission of the Great Observatory class currently in operation, and it enjoys some name recognition with the public. Compton is an astrophysics based NASA mission that appears in news articles from time, capturing public interest through coverage of exciting new discoveries. Table 2 also contains the report for several other of the most publicly influential NASA missions.

Table 1. HST Media Coverage

Year	Newspaper references to HST	Magazine references to HST	Broadcast Media: general references to HST	Broadcast Media Servicing Mission	Broadcast Media Total
1994	900	250	632	242	874
1995	660	150	450		450
1996	645	145	702		702
1997	790	185	1500	2477	3977
1998	800	164	924		924

Table 2. Other NASA Missions

Year	Compton Newspapers	Compton Magazines	Compton Broadcast Media	Voyager Newspapers	Voyager Broadcast Media	Mars Pathfinder Newspapers	Mars Pathfinder Broadcast Media
1994	24	25	2	314	37	39	12
1995	25	18	10	546	26	73	17
1996	38	43	5	545	55	624	1544
1997	75	36	14	507	73	4076	12676
1998	49	24	12	454	52	900	973

Media coverage for HST has been consistent since 1994

Discussion of Media Coverage

The occurrence of HST in the printed media is relatively constant (with perhaps slight growth) since 1994, while Broadcast media coverage enjoyed a spurt in 1997. We attribute this to the public release of the Hubble Deep Field data and the Second HST Servicing Mission. As can be seen in the tables, HST has generated approximately 16 times the number of articles and TV reports as Compton and must maintain quality material to retain public attention.

Media Web Sites

Related to coverage by the printed and TV media are the supporting web sites from those organizations. The media websites provide additional information about newsworthy or otherwise interesting topics to web users. These sites are growing in importance for the media to increase the shelf-life value of their reporting, augment printed and broadcast information with supplementary graphics, video and audio materials and to understand their user base. For example, the web site ***cnn.com*** has ~200 pieces which refer to HST over about 2 and a half years, with 4 articles on Compton and 1 on Kitt Peak (the 1 article on Kitt Peak is actually a Compton result with supporting observations from HST). Similarly the New York Times (NYT) web site has 66 articles on HST with 5 on Compton (the NYT web site is newer than CNN).

Media coverage is a direct measure of public interest, where traditional polling and statistical sampling are now augmented with media website use analysis

Another single data point relating to public interest in HST was a 1998 CNN "quick poll" asking if HST was worth the investment. This poll was linked off of the ***cnn.com*** webpage containing science and technology reports. 98% of the over 17,000 individuals voted "yes", certainly a great improvement in public opinion since the early 1990's. The quick poll does demonstrate that the public associates "good news" with HST.

National Public Radio

The National Public Radio (NPR) audience is known to be an important segment of the public audience for science and technology because NPR listeners are active in many societal issues such as education and funding of science. The NPR listening community communicate regularly with their US congressional representatives, and regularly exercise their right to vote in elections [Ref 1, 2, 3]. National Public Radio produces coverage of science and technical issues in several venues, first in the hourly news, but also in several special programs including ``Sounds Like Science" and "Science Friday". In the past 2 years, NPR has produced about 120 pieces containing references to HST, with a handful referring to Compton.

Public Interest Reflected through Media Coverage

The statistics regarding media use of information on HST demonstrate that HST provides interesting material for the full range of media treatment, and is a persistent topic deemed worthy of coverage by TV, radio and written media. Reporters and journalists are obliged to "sell" their stories to Senior Editors who in turn keep a watchful eye on public interest and demand for news. Therefore the amount of cover-

age a topic gets in the media is some measure of public interest (although there are of course notorious exceptions).

Public interest in specific topics is largely determined through polling and statistical samples. However, statistics are necessarily less precise regarding viewer or readership preferences for TV, radio, and printed media. For example, a newspaper publisher cannot determine accurately why individuals purchase specific newspapers and what articles are actually read. Fortunately for editors, publishers and broadcasters, user interest in subjects covered on media websites can be measured directly and compared to other user polls. Therefore, while one might argue that websites are not used by 100% of the population to gather information, website use is in fact a strong measure of interest in a large segment of the population. A recent study [Ref. 1] indicates that 41% of adults in the US use the internet, and the audience is drawn increasingly from "ordinary" citizens. The 1998 report by [Ref. 4] indicates that 85% of the 7.4 million U.S. public schools have some internet access and 44% of the nation's classrooms have access to the internet, while 75% of all classrooms have at least on computer in the classroom.

HST internet presence continues to grow with a current hit rate of over 17million per month, doubling in the last year.

Popular Books Published

We regard book publishing as demonstrative measurement of public interest in HST, since the investment in both the effort of the author and the commitment of the editor and publisher in quality books is fairly high. We tallied the number of popular books published on HST and also on the Palomar Observatory in three different ways: by searching the ***amazon.com*** website, by using the Johns Hopkins University Bookstore search engine and by searching the archives of the Eisenhower Library on the Hopkins Campus.

We found a total of 29 published books with the major theme being HST (titles and authors given in Appendix 1). Four of these are listed within the ``50 best seller science books" at ***amazon.com***. Several books are ranked very highly in the ***amazon.com*** ``sales index" which is a dynamically computed, direct measure of public interest in the book[1]. In comparison, there are 4 books published on Palomar Observatory, several on Kitt Peak and 2 on ESO. Six popular books have been published on the Voyager mission, 1 on the Viking mission to Mars and more than 30 on the International Space Station.

It is gratifying that the books on HST that are high on the sales index category are representative of the true accomplishments of HST, and that more notorious *albeit* dubious books have fallen low on this scale.

[1]As an orthogonal comparison of a cultural icon, there are approximately 120 books published on Elvis Presley. Note also that according to *The Economist* (August 1997), there are over 50,000 professional Elvis impersonators worldwide, approximately 5 times the number of professional astronomers worldwide. Therefore the ratio of books to practitioners is approximately preserved.

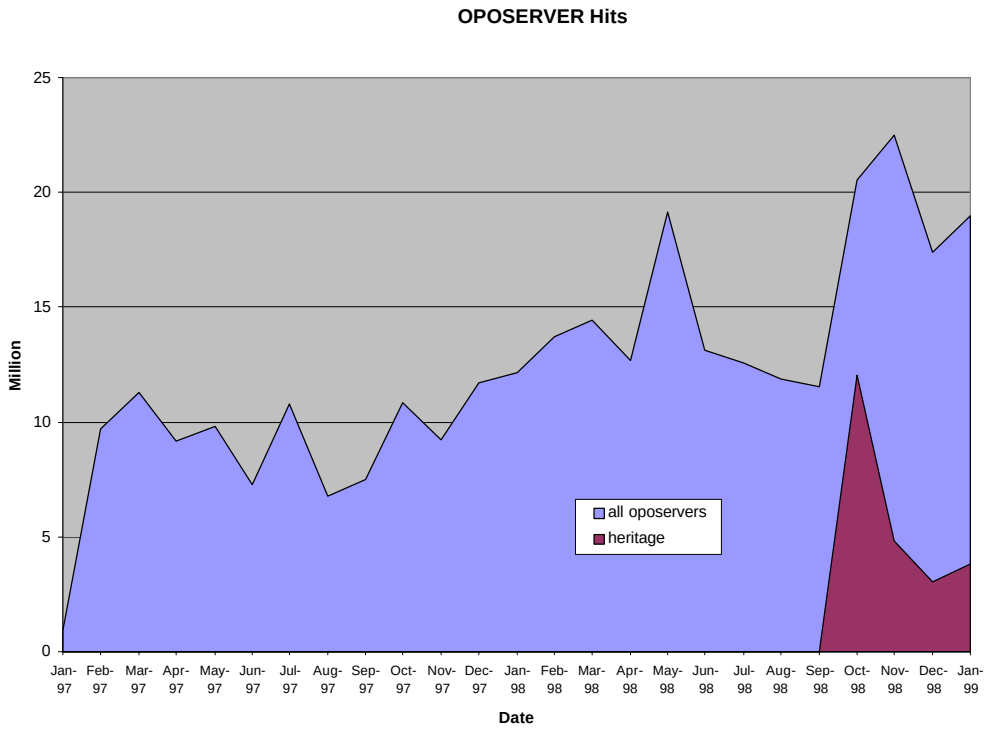
Internet Presence

We examined the web statistics for access to public materials produced from the Office of Public Outreach (OPO) at Space Telescope Science Institute (STScI). Figure 1 shows the web hits tracked since January 1997, when the OPO implemented a separate server (***oposite.stsci.edu***) and was able to track web hits in greater detail than had been accomplished with the general STScI website. Note that the publication of the Eagle Nebula (M16) release (November 1995) is not included in this metric, but the web hits at the time of the M16 release were about a half a million a month.

Figure 1, and the top press releases for the period 1996- February 1999 are the HDF North, Galaxy Collisions, the Planetary Nebulae gallery and SN 1987a shocks (Table 3).

The total hits for the 2 year period is approximately 300 million. By comparison, the Mars Pathfinder mission, which was the most visible scientific web event to date, enjoyed a total of 700 million hits for the (short) life of the mission. The HST public site currently sustains about 17 million hits per month, a number that continues to rise, having doubled in about 14 months.

The trend for the website is that the web hits steadily increase as more of



We examined the web site statistics in a number of ways, one of which was the total accesses as a function of press release. The statistics are presented in

the public gains internet access and as the visibility of the site rises. The Hubble Heritage program has had an additional positive influence on the use

of material on the website. Also noteworthy is the fact that our public site, ***oposite.stsci.edu*** has active referrals from approximately 23,000 other sites as of the beginning of February , 1999.

Public Interest by News Release Subject

There are a number of ways that public interest in particular topical areas can be measured, but the most straightforward method is to relate Web access statistics. Table 3 lists the 25 most frequently accessed HST press releases (PR), tabulated since 1995. The releases are in order of Web "hits" and percentage of the total hits on the PR portion of the site. Also listed is the amount of information transferred in GigaBytes.

The Web statistics indicate that by far, the Hubble Deep Field (HDF) observation has caught the most public attention over the last few years. The Web statistics are complicated by the fact that the public access to the internet has been increasing dramatically so that the subjects of press releases issued in 1998 are naturally higher than those of previous years. Rather than create some artificial normalization factor, these statistics are simply presented at face value.

Deeper and more extensive analysis of media reports and other public dissemination mechanisms are beyond the scope of this current article. However a few conclusions can be drawn: first, the HDF has had significant impact on the public, education and the scientific community (as evidenced through examination of scientific citations in the professional literature). The other topics that receive wide public interest are, not surprisingly, those which have been represented through the most engaging imagery. Other subjects of intense public interest are not highly correlated with what the scientific community considers most important from a research perspective, since many of those topics represent astrophysical concepts probed through a wide range of instrumentation in addition to imagery. Black holes do continue to hold public fascination, as do investigations of solar system objects, particularly Mars.

Other Internet Sources

We used various search engines to further investigate the prominence of HST in web materials. For example, approximately 30,000 independent web pages have references to Hubble Space Telescope (not necessarily hyperlinks), excluding the STScI and obvious NASA sites. A few of these sites are referrals to science sites such as data archives *etc.*, but by and large, the references are to HST public materials.

In comparison, Mars Pathfinder turns up on about half as many non-NASA web sites. Similarly, most references to the International Space Station appear to be from NASA or affiliated contractors, with few from non-related sites[2].

[2] Our orthogonal reference indicates that there are about the same number of web sites mentioning Elvis Presley as mention HST. So a website-to-practitioner ratio is higher for Hubble.

Table 3. OPO Press Release (PR) Web Statistics for Feb 1996 - Feb 1999

Rank	Hits-million	%	GBytes	%	Release#	TOPIC
1	4.46	4.0%	361.13	6.0%	1996-PR#1	HDF- North
2	3.18	2.8%	464.80	7.8%	1997-PR#34	Galaxy Collisions
3	3.05	2.7%	151.93	2.5%	1997-PR#38	Planetary Nebulae
4	2.85	2.6%	190.84	3.2%	1998-PR#8	SN 1987a shocks
5	2.50	2.2%	204.97	3.4%	1998-PR#19	Candidate Planet (TMR-1C)
6	2.43	2.2%	87.84	1.5%	1995-PR#44	M16
7	2.42	2.2%	1103.88	18.4%	1998-PR#14	Centaurus A
8	2.25	2.0%	17.97	0.3%	1996-PR#38	Cartwheel Galaxy
9	2.22	2.0%	8.92	0.2%	1996-PR#22	Crab Nebula Movie
10	2.18	2.0%	8.56	0.1%	1996-PR#23	Eta Carinae
11	1.98	1.8%	48.06	0.8%	1996-PR#29	Galaxy Building Blocks
12	1.91	1.7%	73.64	1.2%	1998-PR#4	Jupiter Aurora
13	1.78	1.6%	5.98	0.1%	1996-PR#9	Pluto Surface
14	1.70	1.5%	51.70	0.9%	1998-PR#32	NICMOS HDF - North
15	1.62	1.5%	8.44	0.1%	1997-PR#9	Mars (Pathfinder Weather)
16	1.61	1.4%	1280.26	21.4%	1998-PR#41	HDF South
17	1.47	1.3%	36.25	0.6%	1998-PR#28	Hubble Heritage
18	1.39	1.2%	30.27	0.5%	1996-PR#13	Helix Nebula
19	1.39	1.2%	8.99	0.2%	1997-PR#28	NGC 6251 Black Hole
20	1.26	1.1%	5.08	0.1%	1997-PR#15	Mars Cloud Cover
21	1.25	1.1%	13.31	0.2%	1995-PR#45	Orion Protoplanetary disks
22	1.25	1.1%	2.80	0.1%	1995-PR#47	NGC 4261 Black hole
23	1.20	1.1%	4.97	0.1%	1996-PR#35	QSO host galaxies
24	1.17	1.1%	28.57	0.5%	1997-PR#25	CL 1358+62 Lens
25	1.06	0.9%	31.45	0.5%	1998-PR#22	NGC 7053 Black Hole

Educational Resources

Pre-college (K-12)

Assessment of the incorporation of HST materials into educational resources is of clear interest to us, but more difficult to quantify. We know colloquially from exposure to pre-college as well as university level materials, and interaction with numerous educators at professional meetings, that use of HST images and information is pervasive.

We have observed for the last 4 years that a plethora of materials - books, posters, leaflets and CD ROMs made available to teachers contains material that originated from the HST mission. These materials are available from a variety of sources including the federal agencies, commercial firms and various non-profit organizations.

OPO itself distributes over 100,000 hard copy educational materials of each product created, and usually 3 products per year are made available, specifically linked to K-12 mathematics, science and technology education standards. Again, the HDF education materials (actually hard copy and online modules) are popular because the public (including students and teachers) are fascinated with the subject, and the educational resources

based on the HDF data are directly liked to middle school mathematics education standards.

Of wider distribution are the electronic educational materials that are obtainable at a range of granularity, from individual images to more fully developed modular multimedia activities. The recipients of the curriculum support materials are teachers, and therefore each product (electronic or hardcopy) is used to educate 30 - 100 students per teacher per year. This means that, at a minimum, ~10 million K-12 students have some exposure to HST material at least once each year.

College Level Materials

Likewise, materials at the college level contain HST references and materials. We do not have ready access to college level courseware other than some materials that are available on the web or brought to our attention. University professors that teach both majors and non-majors courses routinely obtain slide sets and video clips from us, but also use resources directly from the web and their own research.

Looking, for example, at the most popular of the Astronomy 101 textbooks (Table 4), gives a tangible metric. We found that anywhere from 15% to 25% of the astronomical images in the textbooks are from the Hubble Space Telescope, while approximately 30% to 50% of astronomical images are from NASA missions, and the remaining 40% to 50% are from ground based facilities. Given that there are between 200,000 and 300,000 students taking Astronomy 101 in the United States every year, this number plus the pre-college represents a major impact on the general college (non-majors) student population.

Table 4. Textbook Content

Author	*HST*	*NASA*	*Ground Based*
Arny (1998)[1]	20%	30%	50%
Chaisson & McMillan (1999)[2]	20%	39%	41%
Kauffman (1996)[3]	24%	33%	43%
Seeds (1999)[4]	25%	30%	45%
Snow & Bwornsberger (1998)[5]	15%	47%	38%

Notes to Table

[1]*Explorations: An Introduction to Astronomy*, Thomas T. Arny, McGraw Hill, 1998.

[2]*Astronomy Today*, Eric Chaisson & Steve McMillan, Prentice Hall, 1999.

[3]*Discovering the Universe*, William J. Kaufmann III & Neil F. Comins, W.H. Freeman & Company, 1996.

[4] *Foundations of Astronomy*, Michael A. Seeds, Wadsworth Publishing Company, 1999

[5]*Universe: Origins and Evolution*, Theodore P. Snow & Kenneth R. Brownsberger, Wadsworth Publishing Company, 1997

Informal Science Education

Materials such as slide sets, videos and electronic materials disseminated to science museums and planetaria currently dominate the support provided directly from OPO to informal science education. Numerous other organizations and agencies also duplicate and provide materials that often contain HST data and information. The tally of this segment of the population is ill-

defined at present and therefore not well measured.

The "Science News Metrics"

A review of the accomplishments of NASA missions is an annual event, and at least one study was initiated by the Office of Space Science in 1993 to address this requirement. A full treatment of the parameterization of the performance metrics is beyond the scope of this article, but can be found described in "The NASA Performance Plan" [Ref. 5].

Science News is a periodical that contains reports on a wide variety of science and technical topics. The periodical does subject the reports to some light "peer review", and is fairly staunch in maintaining a policy that the material that does get reported in *Science News* has the flavor of uniqueness, is a scientific advancement or is a breakthrough. Therefore, most of the material in *Science News* does have scientific and technical integrity whilst being presented in a publicly marketed periodical of interest to a general, *albeit* science interested audience.

HST was the single most productive NASA mission of 1998, providing 1.2% of scientific discoveries worldwide

In one issue each December, *Science News* publishes a summary of accomplishments reported in all fields of science for the prior calendar year (c.f., Ref. 6). This summary is the basis of the original NASA study dubbed "The Science News Metric", and has been analyzed by Dr. G. Davidson (formerly of NASA and now of TRW).

Davidson reviews the *Science News* report, and considers only science and technical accomplishments (not noteworthy or newsworthy events such as "end-of-mission" for a particular satellite or other such events). Davidson uses a weighting system to ascribe appropriate credit to each mission for each scientific or technical result quoted in the end of year summary. Therefore, for cases in which multiple missions were used to obtain a result, he assigns fractional credit according to the amount that each mission contributed to the accomplishment.

Davidson notes that the strengths of the "Science News Metric" are several. First, the metric is independent of both NASA and astronomy and it compares items across many science and technical disciplines. Further it tends to correlate well with metrics based on publications in scientific journals, citation indices and other metrics commonly used by the scientific community. The potential weaknesses of this metric, as Davidson notes, are that *Science News* review process is not as rigorous as that used for a professional, refereed scientific journal and a year-end-summary may not provide enough objective perspective. Finally here is some randomness in incidence of discoveries quoted in a given year.

According to Davidson's latest evaluation, *HST was the single most productive mission of 1998, providing 1.2% of scientific discoveries worldwide*. As a broad category, space science contributed 5.3% of the world-wide discoveries in 1998. Amongst the top NASA missions, Hubble Space Telescope ranked first with Voyager, Viking, Space Shuttle (including Spacelab, Attached Payloads, *etc.*), and Apollo following.

This trend has been pervasive for several years, and HST rose quickly to the top ranked spot after the "repair" servicing mission. A review of the cumulative metric compiled over the 1973-1997 period showed HST ranked first, Viking second, Voyager 3rd, Galileo 4th and Compton 5th.

Ancillary Commercial Use

The demand and potential for use of HST imagery and ``pedigree" is so far unmeasured, but one test point is the number of requests for use of HST images received by STScI from external organizations and individuals. On a regular basis, STScI has about 20 requests per week for images, video clips, animation and graphics. This is the lower limit to the actual amount of usage of this material in the commercial sector, since many organizations decline to provide information on their access and use of the items.

Examples include use of HST images as a background for advertisements, mentioning of a relationship to HST to demonstrate technical know-how, precision or experience in scientific or technical issues, or to demonstrate the quality of a product. For example, one advertisement on IDL referred to the quality of the corrective optics for HST as a result of the high integrity of the IDL software system.

Discussion

We conclude from our survey of a number of relevant measures that public interest in the Hubble Space Telescope is currently very high and positive. HST materials are pervasive on the web, in the media, in printed materials and in educational resources. In addition to specific uses and positive references to HST, Hubble appears to be a popular symbol of quality, integrity and the human drive for discovery. Therefore some of the impact of the Hubble mission appears to be sociological as well as raising the awareness and interest of the public in science endeavors.

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Appendix 1

Popular Books on the Subject of Hubble Space Telescope

1. 1985 Space Telescope (1. Franklyn Branley 2. David Ghitelman)
2. 1987 The Space Telescope - First Book Series (Christopher Lampton)
3. 1987 Space Telescope New True Books (Dennis Fradin)
4. 1989 Alice and the Space Telescope (Malcolm Longair)
5. 1989 Exploring the Universe with Hubble Space Telescope (Valerie Neal)
6. 1990 The Space Telescope: Eyes Above the Atmosphere (George Field)
7. 1991 Hubble Space Telescope (N91-17839) (V. Neal)
8. 1992 Hello Hubble! The Hubble Space Telescope (Carole Marsh)
9. 1992 The Hubble Space Telescope - Missions in Space (Gregory Vogt)
10. 1994 Space Trials: The Hubble Space Telescope Story (Eric Chaisson)
11. 1995 Adventure in Space: The Flight to Fix the Hubble (Elaine Scott, Margaret Miller)
12. 1995 A Journey Through Time: Exploring the Universe with the Hubble Space Telescope (Jay Barbree, et al)
13. 1996 Gems of Hubble (Jacqueline Mitton, Stephen Maran)
14. 1996 Hubble: A New Window to the Universe (Daniel Fischer, et al)
15. 1997 The Hubble Space Telescope - True Books - Space (Paul Sipiera, Diane Sipiera)
16. 1997 Hubble's Universe: A Portrait of Our Cosmos (Simon Goodwin)
17. 1997 Through the Eyes of Hubble: The Birth, Life, and Violent Death of Stars (Robert Naeye)
18. 1998 Close Encounters: Exploring the Universe with the Hubble Space Telescope (Elaine Scott)

19. 1998 The Hubble Deep Field: Proceedings of the Space Telescope Science Institute Symposium, Held in Baltimore, Maryland May 6 - 9, 1997 (STScI, et al)

20. 1998 Hubble Revisited: New Images From the Discovery Machine (Daniel Fischer, et al)

21. 1998 Hubble Vision: Astronomy with the Hubble Space Telescope (Carolyn Collins Petersen, John Brandt)

22. 1998 The Hubble Wars: Astrophysics Meets Astropolitics in the Two-Billion-Dollar Struggle over the Hubble Space Telescope (Eric Chaisson)

23. 1998 Hubble Vision: Further Adventures with the Hubble Space Telescope (Carolyn Collins Petersen, et al)

24. 1999 An Earthling's Guide to Deep Space: Explore the Galaxy Through the Eye of the Hubble Space Telescope (Carolyn Sumners, Kerry Handron)

25. 1999 Hubble Space Telescope: Exploring the Universe Countdown to Space (Michael Cole)

26. 1999 Hubble Space Telescope (Above and Beyond) (Jon Eric Hakkila)

27. Universe in Focus: The Story of the Hubble Telescope (Stuart Clark)

28. Hubble Space Telescope & the High Redshift Universe (World Scientific Publisher)

29. Hubble Time: A Novel (Tom Bezzi)

OTHER:

1. 1990 Hubble Space Telescope/Cassette (Stephen Maran)

2. 1996 Hubble Space Telescope CD-ROM Archivec/M&W/Ww/Rental

3. 1997 Cal 98 Space: Views from the Hubble Telescope

4. 1997 The Hubble Library of Electronic Picture Books CD ROM

5. 1998 Cal 99 Space Calendar: Views from the Hubble Telescope

6. Amazing Hubble Telescope - NASA Space Series VHS Tape

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[7] Office of Public Outreach, Space Telescope Science Institute, Web site: http://www.stsci.edu/pubinfo/PR.html

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The Hubble Space Telescope (often referred to as HST or Hubble) is a space telescope that was launched into low Earth orbit in 1990 and remains in operation. It was not the first space telescope but it is one of the largest and most versatile, well known both as a vital research tool and as a public relations boon for astronomy. The Hubble telescope is named after astronomer Edwin Hubble and is one of NASA's Great Observatories, along with the Compton Gamma Ray Observatory, the Chandra X-ray The Hubble Space Telescope, as imaged during its last and final servicing mission. The only way it [+] can point itself is from the internal spinning devices that allow it to change its orientation and hold a stable position. But what it can see is determined by its instruments, mirror, and design limitations. It has reached those ultimate limits; to go beyond them, we'll need a better telescope. NASA. The Hubble Space Telescope has provided humanity with our deepest views of the Universe ever. It has revealed fainter, younger, less-evolved, and more distant stars, galaxies, and galaxy Hubble Space Telescope, the first sophisticated optical observatory placed into Earthâ€™s orbit. Some of its many triumphs included the Hubble Deep Field, a photograph of about 1,500 galaxies revealing galactic evolution, and the discoveries of Hydra and Nix, small moons orbiting the dwarf planet Pluto.Â Hubble Space TelescopeLearn about the Hubble Space Telescope's impact on astronomy. Â© Behind the News (A Britannica Publishing Partner). Hubble Space Telescope (HST), the first sophisticated optical observatory placed into orbit around Earth. Earthâ€™s atmosphere obscures ground-based astronomersâ€™ view of celestial objects by absorbing or distorting light rays from them.