Amateur Astronomers and the Hubble Space Telescope

Astronomy is unique among the sciences with regards to the large, widespread, and competent community of amateur scientists that has always played a significant role in advancing the field. Amateur astronomers still frequently make contributions to astronomical research, because some types of observations are ideally suited to the capabilities of amateur astronomers, and impractical for the oversubscribed telescopes at major observatories. Amateur astronomers are also an important link between front-line astronomical research and the general public, including science teachers, students, and the taxpayers who fund the research.

Since the very beginning of the Hubble Space Telescope (HST) project, NASA and Congress were interested in finding ways for amateur astronomers to participate in HST research. The director of the Space Telescope Science Institute (STScI), Riccardo Giacconi, decided to allocate some of his "Director's Discretionary" time to amateur observing programs. In December 1985, the leaders of seven national amateur astronomy organizations met at STScI in Baltimore to discuss the participation of amateur astronomers in the HST project:

- Janet Mattei, American Association of Variable Star Observers (AAVSO)
- John Westfall, Association of Lunar and Planetary Observers (ALPO)
- George Ellis, Astronomical League
- Jesse Eichenlaub, Independent Space Research Group
- Gerald Persha, International Amateur-Pro Photoelectric Photometry (IAPPP)
- David Dunham, International Occultaion Timing Association (IOTA)
- Stephen Edberg, Western Amateur Astronomers

This group became the Amateur Astronomers Working Group (AAWG), which solicited all HST amateur proposals and performed their preliminary reviews. In all, there were 13 approved amateur HST programs (see below).

On August 7, 1986, Riccardo Giacconi announced the new HST amateur observing program at the Astronomical League's annual convention. The following are excerpts from his announcement....

> "Observing time on Space Telescope will be at a premium. An offer of HST observing time to amateur astronomers, therefore, is not lightly made. Yet I am making this offer to you today. I expect that amateur astronomers will use HST to ask refreshingly new questions and that your findings will, as they always have, make a real contribution to the advancement of astronomy."
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> "Amateur and professional astronomers share a great commonality of interests. We aid each other. In the past, the progress of astronomy was largely the work of amateurs. Rather than emphasize the differences between professional and amateurs in a field such as astronomy where the distinction is so thin, let us emphasize instead our common thirst for knowledge, our love of nature, and our appreciation of the beauty and mystery of the universe. And let us join efforts to share these feelings with people everywhere."
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> "The dazzling discoveries by scientists remain curiously sterile unless they become assimilated in the general culture and become part of the intellectual heritage of mankind. Amateur astronomers have always been instrumental in providing that link and their impact on general education has been enormous. Particularly today when new astronomical knowledge is accumulating at such a rapid rate, the connection between forefront research and education should be stronger than ever."

The "formal" HST amateur program is ending. The final HST amateur program will execute in August 1997. Reductions in funding and staff at STScI have made it increasingly difficult to support amateur program development and data analysis.

However, many more amateur astronomers have also been involved in HST research in an informal and indirect manner by conducting coordinated ground-based observations for HST users. For example, amateurs have monitored targets such as variable stars -- either as part of ongoing efforts (by AAVSO) or in some cases as part of special observing campaigns for specific HST programs. Coordinated amateur observing campaigns have triggered HST target-of-opportunity observations of novae and comets, and provided important multimode data for objects being observed by HST.

This type of collaboration between amateur astronomers and HST users could expand for the benefit of both with a relatively small amount of facilitation. Even if only a few HST programs each year are suitable for amateur collaboration, past experience shows that this is enough to engage a large number of amateur astronomers.

It is hoped that relatively passive facilitation could lead to more and currently unimagined forms of amateur-professional collaboration in the future, and maintain the important link between amateur and professional astronomers in the HST mission.

Hubble Space Telescope observing programs by amateur astronomers

The amateur Hubble Space Telescope (HST) observing programs listed below are now all completed -- the last program executed in August 1997. Using the ID numbers included below, you can view abstracts and datasets for these programs.

Round 1:

- "SO2 concentration and brightening following eclipses of Io",
  Jim Secosky (science teacher, NY), WFPC1 program 2798 in April-June 1992, Icarus 111

- "Oort Cloud comet UV emission in Nova Cygni 1992",
  John Hewitt (educator, CA), WFPC1 programs 2797 and 4208 on 13 August 1992

- "Detection of protoplanets through super-resolution of T Tauri stars",
  Ana Larson (accountant/teacher --> now PhD!, WA), WFPC1 program 2799 (cancelled due to spherical aberration problem)

- "Magnetic fields of peculiar A-type variable stars",
  Pete Kandefer (electrical engineer, CT), GHRS program 2800 on 1 June 1992

- "Imaging the arc in the galaxy cluster 2244-02",
  Ray Sterner (computer scientist, MD), WFPC1 program 2801 on 25 April 1992

Round 2:

- "A galaxy-quasar association displaying an anomalous redshift",
  Karl Hricko (science teacher, NJ), WFPC1 program 4750

- "Transition comets -- UV search for OH emission in asteroids",
  Harald Schenk (civil engineer, WI) and Jim Secosky (teacher, NY), FOS program 4784

  Sky & Telescope photo of Secosky and Schenk planning observations with Max Mutchler at STScI, 1993

- "Dynamics of binary asteroids",
  Ben Weiss (college student, MA), WFPC1 program 4764, Icarus 137

- "UV emission spectrum of the Lagoon Nebula (M8) an HII region",
  Nancy Cox (nurse, CA), GHRS program 4805

- "Titan's atmosphere and evolution",
  George Lewycky, (computer programmer, NJ), GHRS program 4790

Round 3:

- "Lyman-alpha spectra of discordant redshift system PKS-1327-206",
  Dennis Tye (computer programmer, CA), FOS program 5654 in January 1996

- "The deuterium/hydrogen ratio of the local interstellar medium",
  Bill Alexander (chemist, WV), GHRS program 5650, August 1994 to March 1995, ApJ 470

Round 4:

- "Morphology of the active nucleus and radial filaments of NGC 1808",
  Jim Flood (chemist, NJ), WFPC2 program 6872 on 14 August 1997

This talk was given by Max Mutchler and Harald Schenk at the 188th Meeting of the American Astronomical Society in Madison, Wisconsin on 13 June 1996, and again by Max at the 190th AAS Meeting in Winston-Salem, North Carolina on 10 June 1997.

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