



Proposal Instructions and Application Form for  
Amateur Astronomer Use of the Hubble Space Telescope

## AMATEUR PROPOSAL TO USE HUBBLE SPACE TELESCOPE

### Overview

All amateur proposals to use the Hubble Space Telescope (HST) must describe a self-contained and well defined scientific program, and must include a discussion of the methods for obtaining and analyzing data in order to achieve the scientific goals of the project. The principal investigator (PI) will be expected to understand the goal(s) of his or her proposal and to publish the results in the scientific literature. This program is open to all United States citizens who do not have an advanced degree in astronomy.

Amateur proposals will be judged largely on the basis of scientific merit, by the method of peer review, by members of the Amateur Astronomer Working Group (AAWG). This committee of leading U.S. amateur astronomers consists of representatives of the American Association of Variable Star Observers, the Association of Lunar and Planetary Observers, the Astronomical League, the International Amateur-Professional Photoelectric Photometry, the International Occultation Timing Association, and the Western Amateur Astronomers. After screening by the AAWG, a small group of finalist recommendations will be sent by the AAWG to the Space Telescope Science Institute (STScI) for technical feasibility studies, after which those to observe with HST will be selected. Amateurs receiving time on HST will be invited to STScI to fine tune their instrument configurations and operating modes in order to achieve the most meaningful results; they will also have the support of STScI in the analysis of their data.

The original news release from NASA and STScI points out that "a few hours of observing time" has been reserved for amateur astronomers by Dr. Riccardo Giacconi, director of STScI. Dr. Giacconi further states that he expects amateurs "to ask refreshingly new questions." Amateur proposals duplicating proposals already submitted by professional astronomers will not be considered unless the amateur has contributed a unique and creative aspect to the observation. It should be emphasized that duplication of observations will be the exception rather than the rule.

Information from your proposal will be entered in a database at STScI to estimate the resources required by the program (*e.g.*, spacecraft time, data volume, real-time requirements) and to test for duplication with both Guaranteed Time Observers (GTOs) and General Observers (GOs). In order to give more

### 5.1 Target Name:

1. The maximum allowable length of a target name is 30 characters and only upper-case characters should be used.

2. No blanks are permitted in target names. Blanks between letters and numerals should be suppressed (e.g., HD140283, NGC4378), but a hyphen should replace blanks between two letters or two numerals (e.g., ALPHA-CEN, NGC224-0040+4058), and should also be used where required for clarity (e.g., NGC4468-POS1).

3. Only letters and numerals are allowed in target names; punctuation (other than hyphens and + or -) is not permitted (e.g., BARNARDS-STAR, not BARNARD'S-STAR). Greek letters should be spelled out (e.g., ALPHA-ORI).

4. Degree signs should be represented by an upper-case "D" (e.g., CD-42°14461 becomes CD-42D14461).

Whenever possible, two types of designations should be provided for each target. The first will be a "catalog name" (for example HD124897), and the second (enclosed in parentheses) will be at most two "common names" (e.g., ALPHA-BOO, ARCTURUS, ANDROMEDA-GALAXY, ORION-NEB).

### 5.2 Target Position:

A position must be specified for each fixed target. If the target is not fixed, such as a solar system object or star with large proper motion, the name of the planet, asteroid, or star with proper motion will suffice. For fixed targets there are three options: (1) specify the celestial coordinates (right ascension, declination). **Be sure to specify the epoch (e.g., 1950, 2000, etc.) for the celestial coordinates you use;** (2) specify a positional offset from another target; or (3) specify an area of the sky. When using right ascension (RA) and declination (DEC) you must include their uncertainties, using the format RA=<value>+/-<uncertainty>, DEC=<value>+/-<uncertainty> or the source of the position. Include proper motion values if available. A suggested source for fixed targets is Volumes 1 & 2 of the Sky Catalogue 2000.0 by Alan Hirshfeld and Roger W. Sinnott. Both volumes are available from Sky Publishing Corp., P.O. Box 9111, Belmont, MA 02178-9111.

### 6. Primary Observations:

Since all of the SI's are permanently mounted at the telescope focal plane, it will routinely be possible to operate two (or more) SI's simultaneously, thereby increasing the scientific productivity of the HST. **Primary** observations are defined as those that determine the telescope pointing. They will always have operational priority over **parallel** observations made with a second SI.

Most primary observations will be scheduled at times that will provide maximum efficiency. However, special considerations regarding scheduling and execution of observations may come into play under the circumstances described in the next two sections.

proposers should be aware that such usage will become increasingly important in the future.

A separate Call for Archival Proposals will be issued by the STScI at some time in the future.

7. Completed Proposal: The complete proposal, including two 4"x9.5" (or larger) self-addressed stamped envelopes, must be postmarked and sent by November 1, 1990, to:

HST Proposal  
AAVSO  
25 Birch Street  
Cambridge, MA 02138

**Note: Questions about the proposal process, the HST observatory, or its scientific instruments should be directed to the AAWG via the AAVSO, not to the STScI.**

## SUGGESTED SOURCES AND LITERATURE REFERENCES

### JOURNALS

1. American Journal of Physics (Am. J. Phys.)
2. Astronomy and Astrophysics (A & A)
3. Astrophysical Journal (Ap. J.)
4. Astrophysical Journal Letters (Ap. J. Lett.)
5. Icarus
6. Nature
7. Journal of Geophysical Research (J. Geophys. Res.)
8. Physical Review (Phys. Rev.)
9. Physical Review Letters (Phys. Rev. Lett.)
10. Physics Today (Phys. Today)
11. Publications of the Astronomical Society of the Pacific (Pub. A.S.P.)
12. Proceeding of the National Academy of Science, U.S. (Proc. Nat. Acad. Sci. U.S.)
13. Science

### MAGAZINES

### SKY CHARTS AND ATLASES

- |                        |   |
|------------------------|---|
| 1. Astronomy           | Willman-Bell, Inc., P.O. Box 3125, Richmond, VA 23235 |
| 2. Discover            | Kalmbach Publishing Co., Milwaukee, WI 53233          |
| 3. Mercury             | Sky Publishing Corp., P.O. Box 9111, Belmont MA 02178 |
| 4. Observatory         | 1. W. Tirion Sky Atlas 2000.0 (to mag 8.0)            |
| 5. Science News        | 2. Uranometria 2000.0, Vol 1 (to mag 9.5)             |
| 6. Scientific American | 3. Sky Catalog 2000.0, Vol 1 (to mag 8.0)             |
| 7. Sky and Telescope   | 4. Sky Catalog 2000.0, Vol 2 (to mag 8.0)             |

### GENERAL ASTRONOMY TEXTBOOKS

1. George O. Abell, D. Morrison, S.C. Wolff, Exploration of the Universe, 5th ed., Saunders College Publishing, Philadelphia (1987); ISBN 0-03-005143-6; Tele. 800-227-TEXT
2. George O. Abell, Realm of the Universe, 3rd ed., Saunders College Publishing, Philadelphia (1984); ISBN 0-03-058504-X; Tele. 800-227-TEXT
3. William J. Kaufmann, Universe, W.H. Freeman and Company, N.Y. (1985); ISBN 0-7167-1673-9; 212-576-9400
4. Jay M. Paschoff, Contemporary Astronomy, 3rd ed., Saunders College Publishing, Philadelphia (1985); ISBN 0-03-071641-1; 800-227-TEXT
5. Jay M. Paschoff, Astronomy: From the Earth to the Universe, 3rd ed., Saunders College Publishing, Philadelphia (1986); ISBN 0-03-008114-9
6. A. E. Roy & D. Clark, Astronomy: Principles and Practice and Astronomy: Structure of the Universe, Adam Higler Ltd., Bristol England (1982)
7. Frank Shu, The Physical Universe, University Science Books, Millvalley, CA (1982); ISBN 0-935702-05-9
8. Theodore P. Snow, The Dynamic Universe, University Science Books, Millvalley, CA (1982); ISBN 0-935702-05-9

## KEYWORDS

The following is a recommended list of keywords which should be used for the scientific keywords on your proposal form (Item 9). These keywords are primarily used for archival catalogues and searches. Make the description as complete and concise as possible. Give any relationship to parent bodies if relevant. Other keywords than those listed below can be used if necessary.

### 1. \*\*\* SOLAR SYSTEM \*\*\*

Planet name (e.g. Mercury, Venus, Jupiter)  
Satellite of a planet (e.g. Callisto, Titan)  
Moon  
Comet  
Planetary Ring(s)  
Asteroid (e.g. Apollo, Trojan)  
Interplanetary Medium  
Plasma Torus  
Minor Planet  
Feature on planet (e.g. Mons Olympus)  
Zodiacal Light

### 2. \*\*\* STARS \*\*\*

Spectral Type and Luminosity Class  
Star  
Main Sequence Star (MS Star)  
Pre Main Sequence Star (PreMS Star)  
T Tauri Star  
Flare Star  
Nebular Variable  
Post Main Sequence Star (PostMS Star)  
Giant  
Supergiant  
Cepheid  
RR Lyr Star  
Long Period Variable  
RV Tauri Star  
R Coronae Borealis Star  
Horizontal Branch Star (HB Star)  
Extragalactic Star  
Chemically Peculiar Star  
Dwarf  
Subdwarf  
White Dwarf  
Brown Dwarf  
Variable  
Irregular Variable  
Regular Variable  
Binary  
Visual Binary  
Eclipsing Binary  
Spectroscopic Binary  
Interacting Binary  
X-ray Star  
Nova  
Recurrent Nova

## OBSERVING TECHNIQUE

- Spectroscopy
- Photometry
- Imaging
- Polarimetry
- Occultation
  - Lunar occultation
  - Planetary occultation

## POSITION AND MOTION

- Astrometry
- Parallaxes
- Proper Motion
- Radial Velocity
- Redshift

## SPECTRAL REGIONS

- Radio
- Millimeter
- Infrared
- Optical
- UV
- X-ray
- Gamma Ray

## RADIATION

- Emission
- Absorption
- Radiation
- Background
- Line
- Profile
- Continuum

## PHYSICAL PROPERTIES

- Luminosity
- Mass
- Rotation
- Temperature
- Density
- Pressure
- Diameter
- Magnetic Field

## LOCATION

- Circumplanetary
- Interplanetary
- Interstellar
- Circumstellar
- Galactic
- Intergalactic
- Extragalactic

## TYPES

- Early Type
- Late Type
- Type I
- Type II

## SPECIAL SOURCES

- IRAS Source
- Einstein Source
- Unidentified
- Blank Sky
- Calibration
- Offset Star
- Astrometric Reference Star
- Calibration Target

Instructions for Completing the Proposal Cover Page

Specific Line Items

- Item 1: Give a concise title for your proposal using key words (see attached list).
- Item 2: Name of the principal investigator (PI).
- Item 3: Address of the PI.
- Item 4: City, State, using two letter postal designation (e.g. California - CA, Oklahoma OK, etc.) and zip code.
- Item 5: Provide both day and night telephone numbers for the PI.
- Item 6: Name and telephone of the co-investigator, if any. Additional co-investigators and their telephone numbers may be listed on the reverse of the cover page.
- Item 7: Select the most appropriate scientific category for your proposal from those listed.
- Item 8: Provide a concise abstract for the proposed observations. Include WHAT, WHY, and HOW for the main scientific goals and justify the necessity of the HST time. This is only an abstract; your detailed proposal should be typewritten on the appropriate form included with this package and returned with this proposal form.
- Item 9: Provide the most appropriate scientific key words to describe your project in order of priority (see attached list of key words).
- Item 10: Give the total observing time (hours) requested for primary and/or parallel observations. For long-term projects, give the total time requested for the full duration of the project. It is understood the amateur may not have sufficient information to determine realistic exposure and observing times.
- Item 11: Give the total number of primary and/or parallel targets requested.
- Item 12: Circle the instrument(s) which will be used in your project.
- Item 13: List special constraints relevant to your observations. (Real-time observations require real-time contact with HST. Time-critical observations are those that must be made at a definite absolute time, or at a definite time interval before or after another exposure. Special orientations of the telescope are considered as time-critical observations.)
- Item 14: Sign and date your proposal form.

You should photocopy the completed proposal forms and keep a copy of them for your files.

PROPOSAL FOR  
HUBBLE SPACE TELESCOPE OBSERVATIONS

\*\*This complete proposal package including two 4" x 9½" (or larger) self-addressed stamped envelopes must be postmarked and sent to HST Proposal, AAVSO, 25 Birch St., Cambridge, MA 02138.

1. Proposal Title: \_\_\_\_\_

2. Principal Investigator (PI): \_\_\_\_\_

3. Address: \_\_\_\_\_

4. City: \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

5. Telephone: day (\_\_\_\_) \_\_\_\_\_ night (\_\_\_\_) \_\_\_\_\_

6. Co-investigator: \_\_\_\_\_ Telephone (\_\_\_\_) \_\_\_\_\_

7. Scientific Category: (Select One)

- Solar System
- Variable Stars (including novae & supernovae)
- Interstellar Medium
- Stellar Astrophysics
- Stellar Populations
- Galaxies and Clusters of Galaxies
- Quasars and Active Galactic Nuclei
- Other (describe nature and characteristics of object below)

8. Abstract: (please confine to this space) \_\_\_\_\_

9. Scientific Keywords: \_\_\_\_\_

10. Estimated observing time: \_\_\_\_\_ hours (primary)  
\_\_\_\_\_ hours (parallel)

11. Number of targets: \_\_\_\_\_ (primary)  
\_\_\_\_\_ (parallel)

12. Circle instrument(s) requested: WF/PC FOC FOS HRS HSP FGS

13. Special Scheduling requests:  Real-time observation  
 Uninterrupted long exposure  
 Time-critical observations  
 Special orientations

14. Signed \_\_\_\_\_ Date \_\_\_\_\_

Please answer the following questions. Continue on the reverse side of the question sheet if necessary. Try not to exceed the space available on both sides of the question sheets. We recommend you begin work first on the question you find most difficult.

Explain in detail what you are proposing to study and the significance of the investigation to the field of astronomy.

2. Give specific details of the targets to be studied and the HST instruments and their modes to be used. Explain how the data from the instrument/mode are required for your investigation. Provide a table with columns as follows: Target Name/ID, Target Position, Magnitude, Instrument/Mode, Filter or Spectral Range, Number of Exposures Needed, Comments. Provide a separate table listing only the targets you wish to study and the Exact Positions (either in Right Ascension and Declination [specify the epoch] or in offsets from a known target). In lieu of a table you can supply a chart or photograph indicating desired targets.

3. Given HST throughput and motion and pointing constraints, show not only that the HST can make the observations your investigation requires but that the data returned will be scientifically useful in answering the inquiry you propose.

4. Explain which of the HST-unique capabilities your investigation requires and show why your study cannot be made using a groundbased telescope.

5. Outline your plans for analyzing the data you obtain (help will be available from the ST Sci) and how/where you would like to publish your results.

6. Supply a bibliography listing relevant scientific publications that describe your topic. Give the title, author, journal or book, volume number, page, and year of publication. Supply photocopies of one to three recent articles.

BIOGRAPHICAL SKETCH OF HST PROJECT PROPOSER

Name:

Date of Birth:

Place of Birth

Education:

Occupation:

Current Position:

Brief Career Summary:

Membership(s):

Publications (if any):

Interests: