Chapter 39
HSP Instrument Overview

In This Chapter...

The High Speed Photometer (HSP) was designed and built at the University of Wisconsin by the HSP Investigation Definition Team (IDT) consisting of Robert C. Bless (Principal Investigator), Joseph F. Dolan, James I. Elliott, Edward L. Robinson, and Wayne van Citters. A general overview of the instrument is given by Bless in "The High Speed Photometer for the Space Telescope," 1982, in *The Space Telescope Observatory*, ed. by D.N.B. Hall, page 106, NASA CP-2244. An instrument closeout summary is provided by Bless et al. in Wisconsin Astrophysics preprint no. 659, 1997.

The HSP was removed from the telescope during the First Servicing Mission in December, 1993 and was replaced by COSTAR.

39.1 HSP Documentation

In this section we list important STScI sources of documentation for the HSP and its various types of output data.

39.1.1 Instrument Handbook

The final version of the *HSP Instrument Handbook* (version 3.0) is a useful description of the technical capabilities of the instrument and practical information for its use.

Although many figures are not currently included, the text of the final version is available in electronic form from the STScI HSP WWW pages. Most earlier versions are now very hard to find and contain little useful information not included in the final version.

39.1.2 Instrument Science Reports

Instrument Science Reports (ISRs) are technical reports issued by STScI that describe calibrations, anomalies, and operational capabilities of the instrument. ISRs are generally written for a technical audience, so we have tried to incorporate their results into this handbook as necessary. When an ISR may be particularly helpful, as in treatment of a topic beyond the scope of this volume, we provide the appropriate reference. Several important ISRs are available electronically on the HSP WWW Documentation page; paper copies of all ISRs are available from the STScI Help Desk; send E-mail to `help@stsci.edu`.

39.1.3 Previous Data Handbooks

This version of the *HST Data Handbook* replaces all previous data handbooks as we have tried to improve upon and slightly expand the treatments in the previous handbooks. Any updates to this handbook will be posted on the STScI WWW site.

39.1.4 HSP WWW Resources

A modest collection of HSP-related documents, including the final *HSP Instrument Handbook*, the IDT SV report, and some of the references listed at the end of Chapter 42 may be found among the STScI World Wide Web resources. The STScI home page is at:

`http://www.stsci.edu/`

The HSP resources can currently be found by looking under “Observing with HST” then “Instruments and Calibration.” Additionally, notices concerning any updates to HSP documentation will be posted here, though none are presently planned.

39.2 Instrument Capabilities and Design

The HSP had five detectors: four image dissector tubes and one photomultiplier tube (PMT). There were two image dissectors with photocathodes sensitive to visual wavelengths (VIS and POL) and two sensitive to the near UV (UV1 and UV2). There were no moving parts in the HSP because the target star was positioned in the desired aperture filter combination (each detector had many filters and apertures) by moving the telescope. A particular aperture was sampled

by the detector *read beam* which was positioned by deflection coils in the detector assembly.

The HSP was designed to obtain high speed photometry with the VIS, UV1, and UV2 detectors in any one of the following modes:

- Single color photometry.
- Star-sky photometry.
- Prism.

The HSP could also be used in the SPLIT mode. In SPLIT mode, simultaneous observations were done using the PMT and the VIS detectors. A complete description of the HSP and its method of operation was given by Bless et al. (1992) as updated by Bless et al. (1997).

The HSP collected two types of data: *digital* and *analog*. Digital data consisted of the count of pulses from a pulse amplitude discriminator for a time equal to the integration time. Analog data was the output of the 12-bit analog-to-digital (A/D) converter. Analog data always produced two bytes of data. There were three science data collection modes:

- Single color photometry.
- Star-sky photometry using one or two detectors.
- Area scans.

Additional detailed information is in the final version of the *HSP Instrument Handbook*.