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HST Data Handbook

SPACE TELESCOPE SCIENCE INSTITUTE

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PREFACE
How to Use This Handbook

In This Preface...

This *HST Data Handbook* gives you the information you need to work with the data from a Hubble Space Telescope (HST) observation from any instrument. In this introduction, we explain how to make the best possible use of this handbook.

Purpose of this Handbook

The *HST Data Handbook* is a guide intended to help you maximize the scientific return of data obtained with HST. We describe how data are sent to observers, how to read the data and recognize the file structures, how to display data, and—most importantly—how to understand the data and to look for common (and not so common) anomalies in the data. This handbook assumes no prior knowledge of HST data, the IRAF and STSDAS software, or any specific knowledge of HST instruments, other than that required to have prepared a successful observing proposal. A typical HST user should find this document sufficient to answer most of the questions arising during data analysis.

If you have any questions that are not addressed in this handbook, the STScI Help Desk (`help@stsci.edu`) is available to serve you. The Help Desk staff will either answer your questions directly or will refer them to the appropriate STScI expert.

What's New?

This new version of the *HST Data Handbook* contains substantially more information than version 1.0. The previous version was written at about the time of the first servicing mission in December 1993. Therefore the Wide Field Planetary Camera-2, the new instrument, was only briefly covered. In the meantime WFPC2 has produced a wealth of new data, and WF/PC-1 data are used only by archival researchers. The properties of the Faint Object Camera, the Faint Object Spectrograph, and the Goddard High Resolution Spectrograph are significantly changed by COSTAR so that pre- and post-COSTAR data are quite different.

The revised version of the *HST Data Handbook* takes into account the new instrument properties. The WF/PC-1 and WFPC2 and their data products are discussed separately. FOC, FOS, and GHRS data obtained before and after the servicing mission are still discussed at the same time for each instrument but differences between pre- and post-COSTAR data are highlighted. It is assumed that data are post-COSTAR by default but a discussion of pre-COSTAR data is given for the benefit of archival researchers.

The Fine Guidance Sensors experienced only a minor change due to COSTAR. Therefore analysis of data obtained before and after December 1993 will not be very different.

Since the High Speed Photometer was replaced by COSTAR, only pre-COSTAR HSP data exist. The current section on HSP data analysis is only slightly revised.

In designing the structure of the *HST Data Handbook* we arranged the chapters to reflect the order in which most users would approach their data reduction. We start with a general overview and some basics of data structure and reduction which should be beneficial for most users.

Archival research is becoming increasingly important and the analysis of archival data is not substantially different from the analysis of new data. Therefore the chapter describing the HST Archive is no longer an appendix but has become an integral part of the handbook.

Version 2.0 contains a new chapter describing the Observatory Monitoring System (OMS), which provides easy access to pointing information for observations. This capability did not exist when Version 1.0 of the handbook was written.

Finding Information

This handbook is divided into a series of chapters, each covering one specific aspect of HST data. Much of the information provided in this handbook is independent of the STSDAS software and will be of use even to those not reducing and analyzing their data with STSDAS. However, we have described, at each step, how to you use tasks in IRAF and STSDAS to work with your HST data.

Chapters 1 through 5 are not instrument specific: they should be read by everyone before proceeding to subsequent chapters, which are instrument-specific. Most users will analyze only data obtained with one instrument at a time, and the structure of this handbook follows this approach.

Chapter 1 is an overview of the available resources for obtaining documentation and getting help. Everybody using HST data should read this chapter before analyzing the data. We describe how to access the electronic information system at the Space Telescope Science Institute, including the World Wide Web server.

Chapter 2 is a brief introduction to IRAF and STSDAS. It is far from exhaustive, and more complete discussions are provided in the IRAF and STSDAS manuals. However, this chapter should provide enough information for a novice IRAF user to start using the system for basic data manipulations.

Chapter 3 is for the observer who has received an HST data tape and needs to load the data to a local disk. File structures and naming conventions are explained. This chapter pertains to all instruments.

An introduction to the HST Data Archive is provided in Chapter 4. For most purposes, data from the Archive are not different from data sent to observers on tapes. Throughout this handbook, new and archival data are treated identically.

In Chapter 5, we describe the data produced by the Observatory Monitoring System (OMS), a software system reporting instrument and observatory status during an observation. This information is useful, for example, when determining the spacecraft jitter.

Following the generic chapters is a sequence of parts, each covering one science instrument. Each of these parts is divided into several chapters. The instrument chapters prepare you to work with, and understand the limitations of, the data for a particular HST instrument. The instrument parts include the following topics:

- An instrument overview describing the hardware configuration.
- A chapter describing how to compare planned observations with the data returned from the executed observation.
- Calibrating data.
- Potential error sources.
- Recalibrating data.
- Specific calibration concerns.

A short glossary defining HST-specific terms, as well as acronyms and abbreviations used in this manual, is provided as an appendix to this document.

Typographic Conventions

To help you understand the material in the *HST Data Handbook*, we will use a few consistent typographic conventions.

Visual Cues

The following typographic cues are used:

- **bold** words identify a STSDAS or IRAF task or package name.
- `typewriter-like` words identify a variable, file name, system command, or response that is typed or displayed as shown.
- *italic* type indicates a new term or an important point.
- ALL CAPS identifies a header keyword or a table column.

Keystrokes

Keystroke commands and sequences are identified by the following formats.

- [Shift]-[Q] - When two keys are linked by a *dash*, both keys should be pressed at the same time.
- [Esc] [D] - When a *space* separates two keys, a sequence is indicated. Press one key, release it, then press the other.
- [M] - Press *only* the key. If we meant that you should press shift with the key, we would say so, such as in the first example, above.

Comments

We include three types of information that are called out, each identified by an icon in the left margin.

Tip: No problems...just another way to do something or something that might make your life easier.

Heads Up: This is something that is often done incorrectly or that is not obvious.

Warning: You could corrupt data or produce incorrect results.