FAQ

High-Level Science Products ▶

Software ▶

FITS ▶

Related Sites

NASA Datacenters ▶

MAST Services

MAST and the VO ▶

Newsletters & Reports ▶

Data Use Policy

Dataset Identifiers

Acknowledgments

The Multimission Archive at STScI Newsletter

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The Multimission Archive at STScI (MAST) Newsletter disseminates information to users of the HST, FUSE, IUE, Copernicus, EUVE, HUT, UIT, WUPPE, IMAPS, BEFS, TUES and VLA-FIRST data archives supported by MAST. Inquiries should be sent to archive@stsci.edu.

Index of Contents

Data Distribution on CD and DVD

The Data Archive and Distribution Service (DADS) now has the ability to write the HST data users request to CD, DVD, 8mm or DAT tape. StarView and the World Wide Web (WWW) interfaces have been updated to offer users the new options of CD and DVD. We are writing CD-R and DVD-R format disks, all ISO9660 standard with RockRidge extensions. The DVDs are readable by any standard DVD-ROM drive or any DVD-R drive. The disks will be shipped through Federal Express shortly after they are made.

The Future of the HST Archive

We are currently working on a redesign project to upgrade the DADS software that should be completed by the end of the year. This upgrade will give users the ability to request specific file extensions for the retrieval of HST data. This new DADS version will restore users' ability to retrieve only calibrated or uncalibrated data, and will additionally allow one to request only data quality, pointing (astrometry), or a "final" product if that is all one wants. These particular options will make it easier to retrieve a subset of On-The-Fly-Reprocessing (OTFR) pipeline products without having to know the specific extensions and classes of data in the archive. There are also many DADS internal enhancements in this upgrade that will give us more flexibility to manage our system. This should result in faster retrieval times and fewer problem datasets, as well as more useful error messages when things do fail.

MAST to Archive Kepler data

Kepler is a Discovery Program mission designed to detect terrestrial planets around stars in the Sun's neighborhood. In December 2001, NASA selected Kepler for development, with

launch planned for 2007. The Kepler instrument will detect transits by planets across the disc of the host star. Planet transits cause a fractional reduction in stellar brightness of 5 to 40 x 10^{-5} and last for 2 to 16 hours. Investigators can calculate the sizes of the orbit and the planet sizes from the period and depth of the transit, respectively. Kepler will monitor the brightnesses of 100,000 stars simultaneously and continuously for 4 years, with a cadence of 15 minutes. The targets will be A-K dwarf (main-sequence) stars brighter than 14th magnitude. At their option, NASA may fund a participating-scientist program to allow observing an additional 3000 objects that are not of interest for planet searches but lie within Kepler's 110-square-degree field of view. NASA may also support an archival data analysis program. STScI will archive Kepler's approximately 5 terabytes of image-level data and provide basic data calibration. The primary data product-about 100 gigabytes in volume-will consist of extracted, very high precision differential time-series photometry for each of the target stars. More details on the Kepler mission can be found at http://www.kepler.arc.nasa.gov/.

StarView News

We have released StarView 7.1 on May 22, 2002. Users can automatically update their version. We have notified site managers to update versions of StarView accessed from a cluster.

StarView 7.1 has an updated look to make older features more obvious and easier to find and use. Query speed is significantly improved. Buttons on the results screen enable some of the most commonly used cross-qualification follow-up queries. Quick screen results include: show the proposal abstracts of the selected datasets; show more observational details of the selected datasets (opens the appropriate instrument screen(s)); and display search results based on dataset names.

Since the release of StarView 7, users have been able to search and request data from any MAST holdings, including IUE and FUSE. Now, StarView 7.1 enables spectral previews to be displayed with SpecView, from Ivo Busko. With this feature, the user can plot, overplot, change axes limits, and perform limited analysis. When displaying image previews or Digitized Sky Survey images, users can choose between using JIPA, a simple image viewer, and the APT's Visual Target Tuner (which must be bundled with the StarView distribution).

Please visit our StarView homepage at http://starview.stsci.edu for the new download and further information.

The Future of MAST

Last summer, STScI commissioned two internal studies for work on the future archive. Megan Donahue and Niall Gaffney co-chaired the Future of Archive Services at Space Telescope (FASST) study, which focused on archive interface issues and MAST services. Gerry Kriss chaired the Study of the Hubble Archive & Reprocessing Enhancements (SHARE), which focused on enhancing the scientific value of the data produced by the on-the-fly reprocessing pipeline. Both studies produced white papers, available at http://archive.stsci.edu/fasst/ and http://www.stsci.edu/science/share.

The FASST study made recommendations on instrument retirement, user-contributed science data, and interface improvements, like seamless searches of MAST and external archives. SHARE looked at data processing and reprocessing, recommending improvements in several key areas, like absolute astrometry, image combination, external catalog usage, and object catalog production. With lower priority, SHARE recommended STIS spectra combination and custom post-calibration analysis scripts.

The two committees made some common recommendations. Chris Blades is now leading a committee to scope, prioritize, and implement the FASST and SHARE recommendations that require resources from multiple divisions at STScI. The MAST team will implement some of the recommendations, such as (1) the drafting of a policy for accepting user-enhanced science data (high level science products) into the Hubble archive and (2) completing the negotiations for storing the final versions of the Goddard High Resolution Spectrograph (GHRS) data, produced by the Canadian Astrophysical Data Center (CADC), and the FOS data, produced by the Space Telescope European Coordinating Facility (ST-ECF). (The GHRS and FOS collections will soon be available from all three sites.)

STScI is now collaborating with the CADC and ST-ECF to provide WFPC2 data in the form of stacked and cosmic-ray-rejected images with improved absolute astrometry by correlation with the USNO2 and the GSC-II star catalogs. This project will also collect image statistics, like object density and detection limits, which users could query in archive searches. We expect that this project will extend in the future to include optimized ACS science products.

High-Level Science Products in MAST

We encourage our users to contribute high-level science products to MAST, including fully processed (reduced, co-added, cosmic-ray cleaned, etc.) images and spectra as well as ancillary products, like catalogs and object brightness profiles. Existing examples include the co-added images and associated object catalogs of the Hubble Deep Field and images from

the Hubble Medium Deep Survey. We expect the Hubble Treasury, Archival Legacy, and large programs from Cycle 11 to become main sources of high-level science products in the next few years. Nevertheless, we also welcome smaller contributions from previous Hubble programs and other MAST missions, such as IUE, Far Ultraviolet Explorer (FUSE), and the ASTRO instruments. We will add most such contributions to the searchable MAST database, for retrieval with the original data files. We have posted guidelines for high-level science products - including recommended file formats, naming conventions, and delivery protocols - at http://archive.stsci.edu/hlsp/hlsp_guidelines.html. Inquiries about contributing data to MAST should be directed to Michael Corbin, the archive scientist responsible for contributed data, at corbin@stsci.edu.

Co-Plotting News

Several improvements have been made to the coplotting capabilities available at the MAST WWW site. The co-plotting script extracts the fluxes and wavelengths from input files selected from various MAST WWW forms and plots them as a GIF-format image displayed as part of a WWW browser form. The form offers the user options to redraw the page with different plot dimensions, wavelength ranges, and/or flux scales. Currently, up to 15 spectra can be co-plotted, with each spectrum rendered with a different color and descriptive information shown below the plot. The current tools offering the spectral coplotting option are listed below.

MAST Scrapbook (http://archive.stsci.edu/scrapbook.php)

The MAST scrapbook tool offers users the option of coplotting spectra returned from a users query. A new feature is that a scale factor can be specified interactively for each plotted spectrum allowing users to more easily view overlapping spectra or determine rough flux ratios.

The coplotting tool is also accessible from both the IUE and EUVE search pages. As with the scrapbook, the scale factor option is also available for these spectra. Hopefully this tool will be added to the other MAST search pages in the near future.

MAST Coplot Utility (http://archive.stsci.edu/mast_coplot.html)

A new tool is now available from the main MAST page that allows up to 15 data sets (i.e., spectra from the STIS, IUE, EUVE, HUT, BEFS, TUES, FOS, GHRS, or WUPPE) to be coplotted simply by specifying the MAST data set names.

Proposal Information Available for IUE Observations

Researchers can now get easy access to proposal information associated to IUE observations. For each IUE program, a WWW page gives the title, the Principal Investigator, a link to the proposal abstract, a list of the publications referencing the data, and a summary of the data obtained under the program. To reach this information, one selects a dataset given in the IUE search page results, then selects the 5-character program ID. The abstracts are currently in the form of scanned images, since the originals were on paper, but they will be converted to text using Optical Character Recognition (OCR) software.

Researchers often find it useful to know why particular data were obtained and how they were used by the original observer. MAST is working to provide the associated proposal information for several other missions. Program pages are currently available for HST and IUE. EUVE and FUSE program pages are planned.

NAVIGATING THROUGH MAST: A MAST SEARCH PRIMER

MAST currently provides many different types of services and searches, some of which are recent. This primer provides a summary of what is available and how to find it.

Quick Target Search

The simplest, quickest way to search for data on a particular object or position is to use 'Quick Target Search.' This tool is available from our main page at http://archive.stsci.edu. To use it, the user either enters a target name, which is resolved by Simbad (the astronomical database of the Centre des Donnees astronomiques de Strasbourg) or by the NASA/IPAC Extragalactic Database (NED), or enters J2000 coordinates, where right ascension and declination are separated by a comma. The Quick Target Search returns a list of all relevant MAST datasets, including links to preview and dataset pages. By selecting 'Band/Data Type(s),' the user can restrict the search to specific wavelength bands. The output page summarizes the available datasets ordered by mission.

The Scrapbook

Using the spectral/imaging Scrapbook (http://archive.stsci.edu/scrapbook.php), the user can delve deeper to peruse selected (preview) spectra and images from most MAST missions

(outside the Solar System). Using parameters like exposure times and observing date, we have chosen these observations as 'representative' of a named target or position on the sky. For spectra, we have selected the maximum exposure time and lowest dispersion for a given grating/wavelength configuration, which provides the broadest wavelength coverage. For images, we have chosen on the basis of exposure time, eliminating multiple pointings. In the Scrapbook, the results page provides links to preview and dataset pages, where the user can both learn what data are available and gain a multi-wavelength view of the source. Using an option available for the spectral Scrapbook, the user can co-plot representative preview spectra. After selecting them, the user clicks 'plot marked spectra,' which displays them all on a single plot of calibrated flux versus wavelength. The result is a single, broad-band spectrum, possibly combining the results of multiple instruments and missions.

The Mission Interfaces

Dedicated search interfaces permit advanced searches for all MAST missions. The user can access these interfaces from the individual mission pages or from http://archive.stsci.edu/data.html. By this route, the user can search for a particular object or a given position, specifying a variety of observational parameters, including exposure time, observing date, filters, and gratings. The result is a list of datasets matching the criteria, including various parameters, like target name, coordinates, instrument, and the number of published papers associated with the proposal ID (HST) or dataset name (other MAST missions). We are currently developing new features for the search interfaces.

Searching on a List of Targets or by Class

We provide two options for archive users to determine which sources on a list or in a class of astronomical objects have MAST data. At http://archive.stsci.edu/search/upload.html, the user can upload a file containing a list of sky positions to cross-correlate with MAST holdings. The result is a table with links to the MAST search pages for individual missions. Or, at http://archive.stsci.edu/search/, the user can employ our catalog cross-correlation interfaces to correlate the MAST archive with the Hipparcos and Sky2000 star catalogs, an active galactic nuclei catalog, or the Abell catalog of clusters of galaxies. We plan to expand these class-search options.

The HST 'Pointings' Search

To learn how many times an instrument has imaged a given region of the sky - with how many filters and when - the user can search WFPC2, STIS, and FOC exposures through the 'pointings' interface at http://archive.stsci.edu/cgi-bin/point. This tool is useful for variability studies and serendipitous searches. It can provide answers to questions like, "How many and which WFPC2 pointings have more than two I-band exposures and two B-band exposures?" Or, "How many and which STIS pointings at low galactic latitude have observations separated in time by at least 100 days?" With the pointings interface, the user can search by position and by ranges in Galactic latitude, ecliptic latitude, right ascension, and declination. Future versions will include other HST imaging instruments, notably NICMOS and ACS. They will also allow multi-instrument searches, such as, "Which WFPC2 pointings have more than two U-band exposures and NICMOS data?"

The HST Parallel Search

Responding to the recommendations of the Cycle 7 Time Allocation Committee, we began the Archival Pure Parallel Program in June 1997, at the start of the Cycle 7 observations. This program continues. It seeks to maximize the scientific return from HST by taking parallel data with STIS, NICMOS, WFPC2 and now ACS whenever these instruments are not prime. The resulting data have no proprietary period and are promptly made available to the community. The Archival Pure Parallel Program strives to build large, consistent, and coherent datasets for the HST archive. Users can find more information at http://www.stsci.edu/instruments/parallels/ and access all pure parallel data at http://www.stsci.edu/instruments/parallels/pure_parallels.html.

The Abstract Search

Users interested in checking what science observations have been approved for HST can use the Abstracts Search at http://archive.stsci.edu/hst/abstract.html. The user specifies search words or phrases in a syntax similar to the AltaVista simple search. The search returns all matching proposal abstracts, information about the proposal, and - if the proposal has been executed - links to the archived data. A similar tool will soon be on-line for IUE and EUVE proposal abstracts.

The MAST Data/Paper Links and Search Tool

MAST provides links between archived data and papers based on those data. These links work two ways. First, archive users can find the refereed papers based on MAST observations that were found in a mission-interface search. Clicking on the number in the 'Ref' column (which is the number of published papers associated with the found observations), the user can display the list of found papers, including title, first author, and journal reference (bibcode). The latter follows the Astrophysics Data System (ADS) bibliography code and is also a link to the ADS Abstract Service, which provides electronic access to the paper.

Second, readers of on-line journals at the ADS can access the data when a paper is based on MAST holdings. At the end of 2001, MAST included links to almost 8,000 papers, of which more than 3,100 were based on HST data and almost 3,000 on IUE data.

A list of MAST-based papers can also be searched at ADS, which now provides dedicated forms for HST and IUE papers. These forms are accessible at http://adsabs.harvard.edu/Groups/search/HST and http://adsabs.harvard.edu/Groups/search/IUE. The user can search on all the usual ADS fields, which include authors, object names, and abstract. Alternatively, the user can scroll down the ADS main page (http://adsabs.harvard.edu/abstract_service.html), select "At least one of the following groups (OR)," and then select HST and/or IUE from the group list.

To Subscribe or Unsubscribe to the Newsletter

If you would like remove yourself from the mailing list send mail to archive_news-request@stsci.edu and put the single word unsubscribe in the BODY of the message. Information on the subject line will be ignored.

If someone would like to subscribe to the mailing list they should send mail to archive_news-request@stsci.edu and put the single word subscribe in the BODY of the message. Information on the subject line will be ignored. The subscriber will be asked to confirm the subscription.