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HEASARC Data Analysis Software

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HEASOFT

- HEASOFT is the unified package of FTOOLS and Xanadu data analysis software
- FTOOLS contains 526 individual tasks in 21 packages (> 5M LOC)_
  - 70 new Swift and Suzaku tasks added in the last year
  - Dozens of enhancements were made to existing tasks
  - Major upgrades were made to the underlying build infrastructure to support newer operating systems
- Xanadu consists of 3 multi-mission analysis tools
  - Xspec – spectral analysis
  - Ximage – imaging analysis
  - Xronos – timing analysis
  - Xselect – multi-mission script runs ftools tasks to extract products for analysis by the Xanadu tools.

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Multi-mission Packages

- Attitude tasks (15 tasks)_
- Calibration Database (33)_
- Imaging tasks (28)_
- General utilities: futils (56) and heatools (25) (1 new)_
- High Energy tasks (35)_
- General time related tasks (11)_
- Xronos tasks (15)_
- Parameter file utilities (6)_

Total tasks = 224

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Mission Specific Software Packages

Delivered to the HEASARC by the mission project

- ASCA (40 tasks)_
- CGRO (21)_
- Einstein (2)_
- Exosat (7)_
- HEAO1 (3)_
- OSO8 (3)_
- ROSAT (35)_
- RXTE (67) (1 new)_
- Swift (84) (33 new)_
- Vela5B (5)_
- Suzaku (35) (all new)_

Total = 302 tasks

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HEASOFT Software Releases

- New Swift and/or Suzaku releases at 2-3 month intervals
- Modular download web page allows users to select individual packages
  - V6.1 July 20, 2006
  - V6.1.1 Sept 12, 2006
  - V6.1.2 Dec 6, 2006
  - V6.2 March 7, 2007
  - V6.3 July 5, 2007
  - V6.3.1 July 27, 2007

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Registered HEASOFT downloads

(unique IP addresses since the v6.1 release in July 2006)_

PC Linux 32bit	770	
PC Linux 64bit	208	
Solaris/SunOS	61	
Mac Linux	2	
TOTAL	1041	(944 in previous 12 months)_

- Email registration is not available for Mac OS-X and Cygwin
- Mac OS-X probably accounts for at least 30% of our users

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Other Individually Distributed Software Packages

- **Fv** - FITS file viewer and editor (ds9 compatible)_
  - Version 5.0 released this month with major WCS enhancements

- **CFITSIO** – C and Fortran programming interface for reading and writing FITS files
  - New release every 2-3 months in response to user-submitted enhancement and bug fix requests

- Both have >500 downloads per month.
- Used by researchers in astronomy and other sciences, as well as by amateur astronomers and the general public

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Hera Update

- Hera is an experimental data analysis service at the HEASARC
- Was demonstrated at the previous HUG meeting
- Hera enables full data analysis over the Internet, including
  - High speed access to all the HEASARC archival data
  - Latest versions of the HEASOFT, CIAO, and XMM-SAS software
  - Cluster of 6 Linux machines to run the software
  - Large user disk area for intermediate-term file storage
- Users only need to install the small Fv program on their machine
  - Fv acts as the client to the Hera servers at the HEASARC

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Hera Update (continued)_

- Initial Hera development was funded by AISRP
- The HEASARC continues to provide support for maintenance and small enhancements at the 0.5 FTE level
- Hera has the potential to tie into Virtual Observatory services
- Hera will likely play a role in the "2nd Heaven" AISR project described by Tom McGlynn

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Hera User Interfaces

Four distinctly different user interfaces to Hera are currently available:

- “Standard” Hera – the original GUI interface provides full interactive access to all features and user disk area for longer term data storage.
- “Anonymous” Hera – a temporary Hera session that uses the same GUI as Standard Hera but no long term data storage.
- “Runtask” Hera – the “batch” interface to Hera for executing single tasks from a command line on user's local machine.
- “Educational” Hera – developed with Jim Lochner to provide a simple analysis environment for student exercises.

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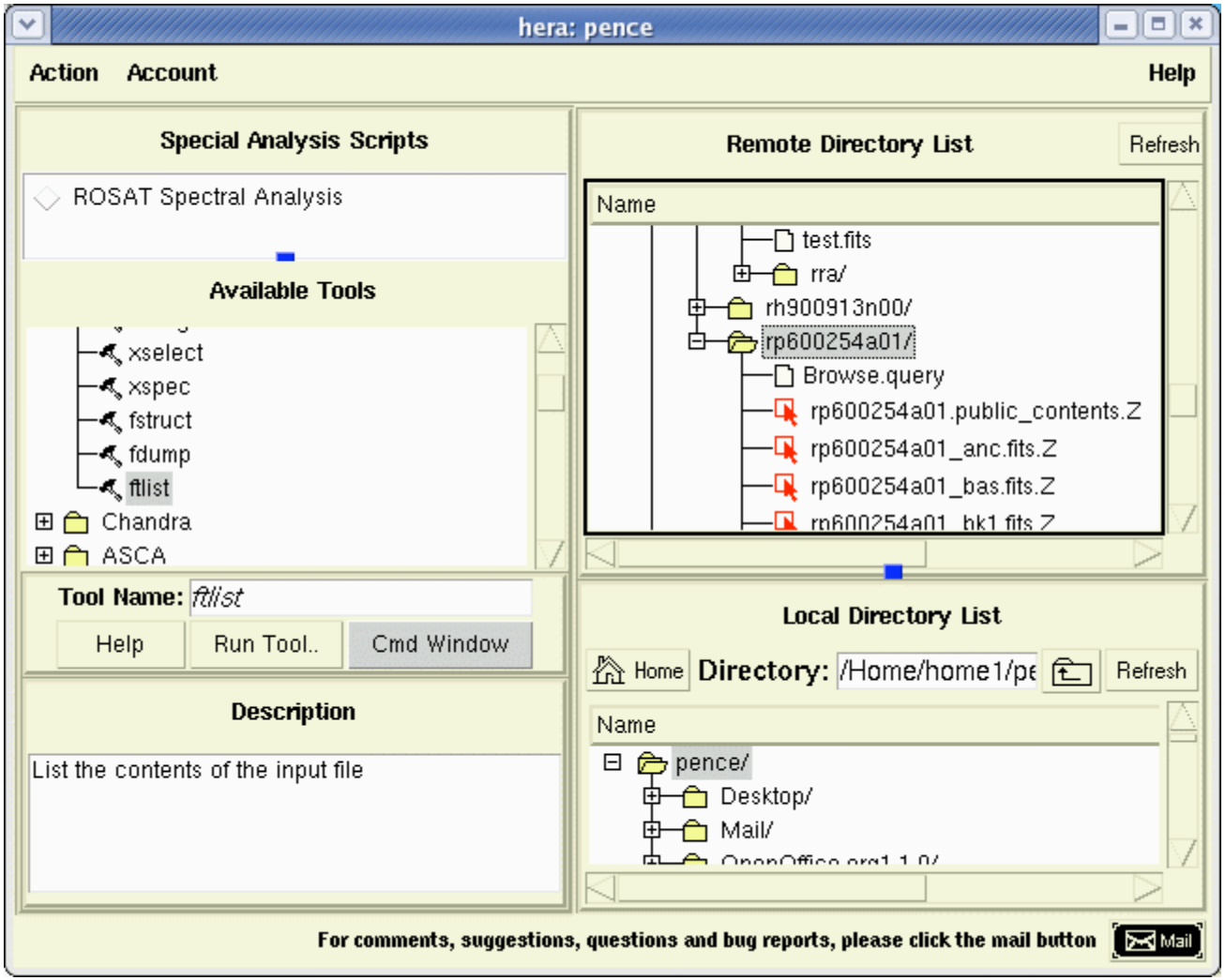
Standard Hera GUI



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Recent Hera Developments

- Infrastructure enhancements
  - Continually improving security and reliability
- User interface enhancements
  - Command line window with history recall and logging
  - More intuitive 'drag and drop' mouse functions
- New analysis capabilities
  - HeraSpec: like Webspec for simulating spectral data from any high energy mission.
  - Provides greater flexibility than Webspec in being able to immediately re-analyze the spectrum in Xspec

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Hera Usage

- ~200 individual Hera user accounts were created in the past year
- Typically have a few active “Standard Hera” user logins each day
  - Will see the same user return multiple days in a row
- “Student Hera” also gets a few users each week
- The “Runtask” command line interface to Hera is rarely used
  - Need to do more to educate potential users on it's benefits
- Overall Hera usage has gradually increased in the past year
  - Both the number of logins and help-desk questions are up
- We need to continue to promote Hera to reach out to new users
  - Current system could comfortably support 10x more users