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Meeting

Nov 26
2012

Hubble Legacy Archive

Lee Quick

November 26, 2012

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HLA news in the last year

- DR6 Release (2012 January 5)

- DR7 Release (2012 November 2)
  - New interface features and capabilities
  - New data and revamped pipelines

- Staff ~ 4 FTEs

| Rick White	Stefano Casertano
Niall Gaffney	Lee Quick
Michael Wolfe	Steve Lubow
Mark Kyprianou	Brian McLean
Rachel Anderson	Kevin Lindsay

New interface capabilities

- Interactive display enhancements including JPEG save option

- Inventory and images view include select all button

- HLA Simple Image Access Protocol server compliant with VO standards
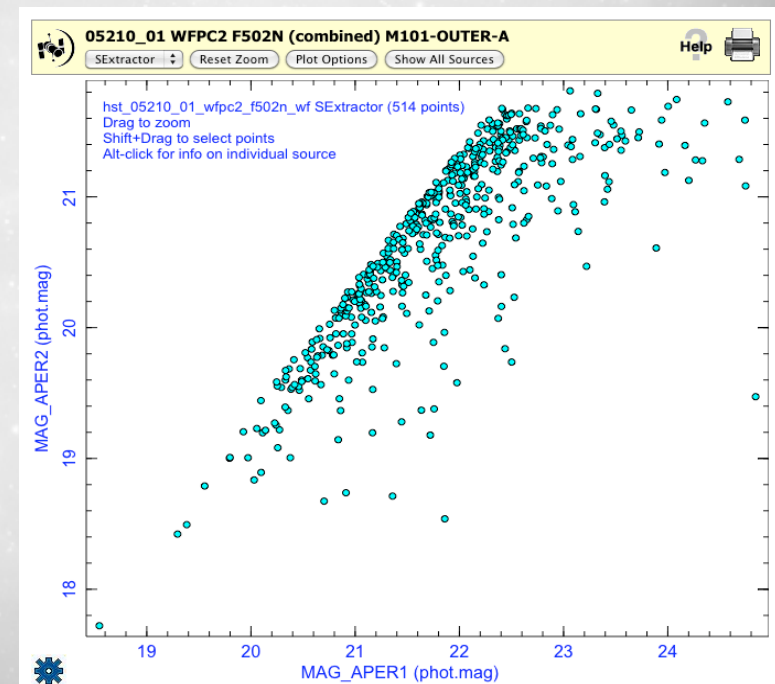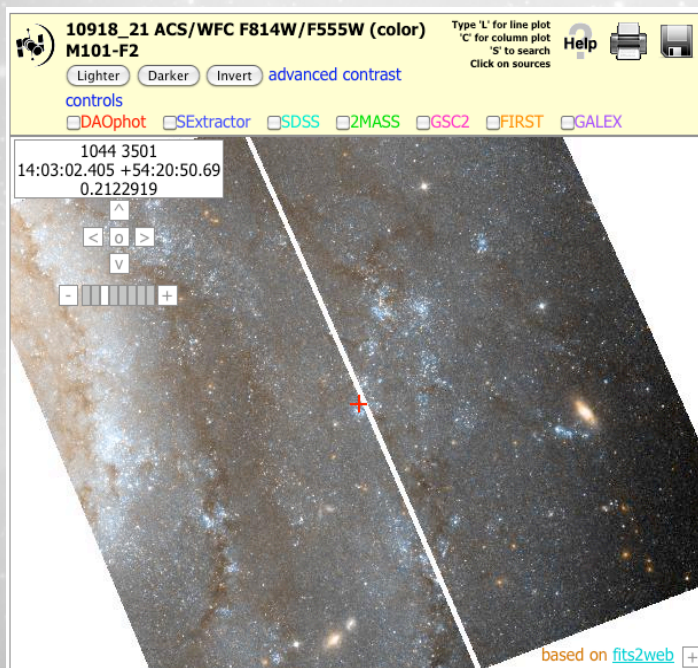
- Scatter plotting tool plots properties of HLA source lists

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New interface capabilities, cont.

- Ability to support Spectral HSLP
  - 586 spectra from the StarCAT project
  - New line plotting tool – HTML5/Canvas
 - Interactive display accepts spectra
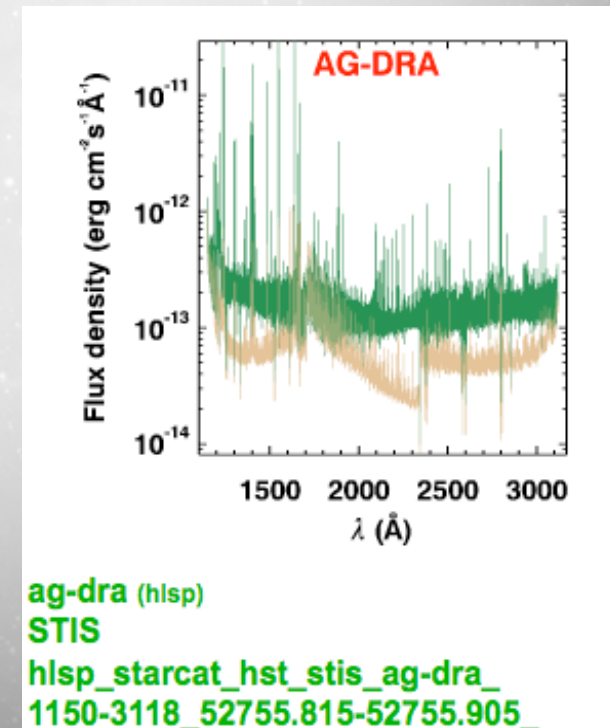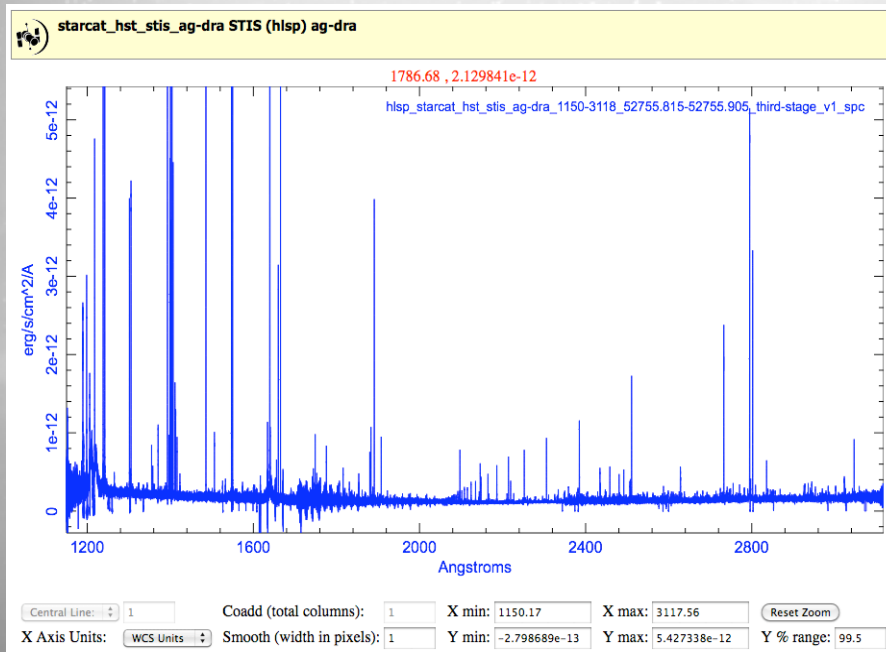
New Data

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- Additional ACS (updated to release date 2-16-2011), WPFC2 and NICMOS data
- New High Level Science Products
    - **CANDELS** (Cosmic Assembly Near-IR Deep Extragalactic Legacy Survey)
    - **CLASH** (Cluster Lensing And Supernova survey with Hubble)
    - **PHAT** (The Panchromatic Hubble Andromeda Treasury)
    - **HIPPIES** (Hubble Infrared Pure Parallel Imaging Extragalactic Survey)
    - **HUD09** (Hubble Ultra Deep field 2009)
    - **ORION** (The HST survey of the Orion Nebula Cluster
    - **BORG** (Brightness of Reionizing Galaxies Survey
    - **GHOSTS** (ACS Nearby Galaxy Survey)
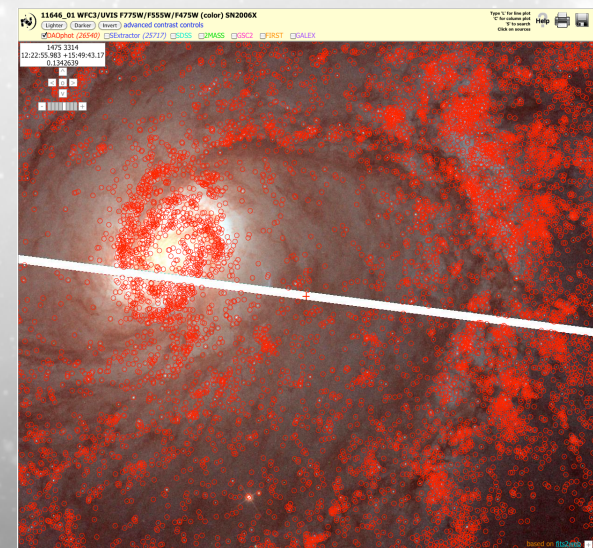   - **StarCAT** (HST STIS Echelle Spectral Catalog of Star)
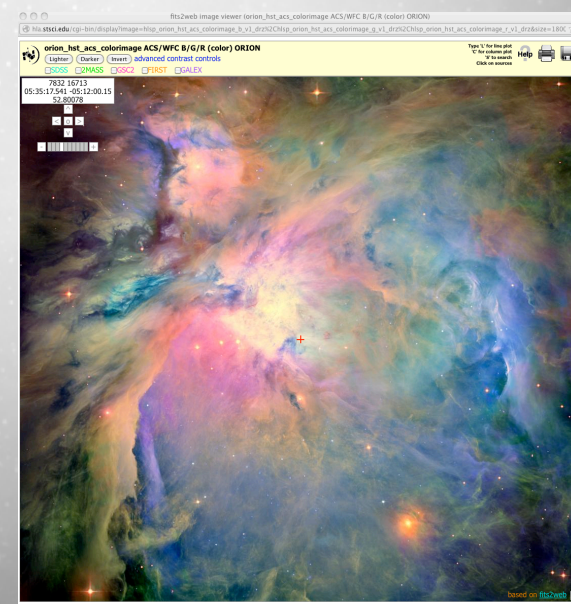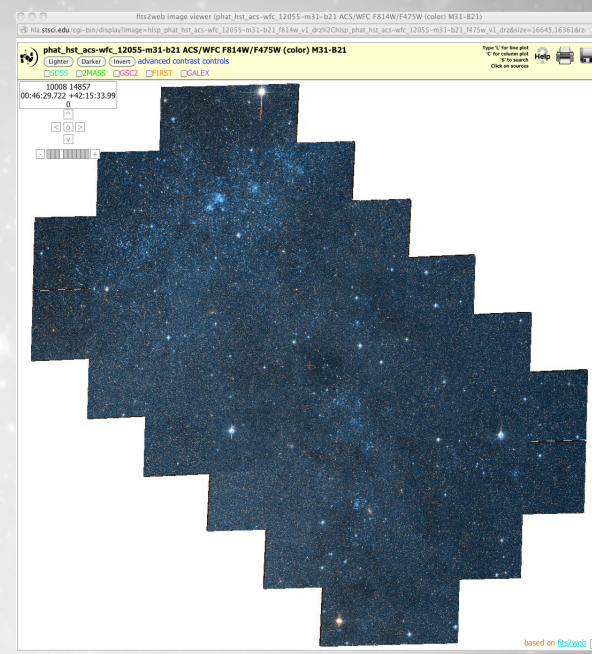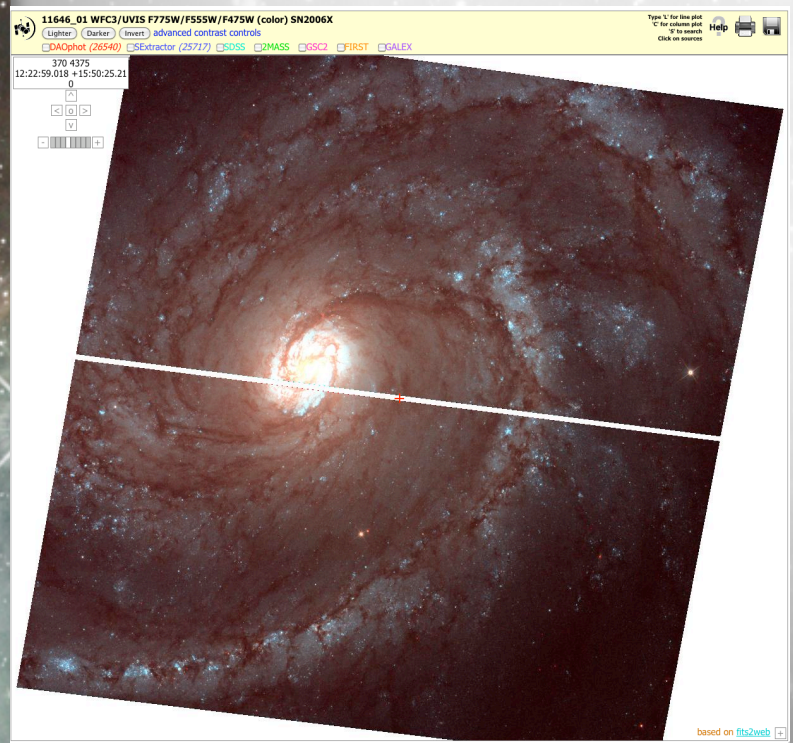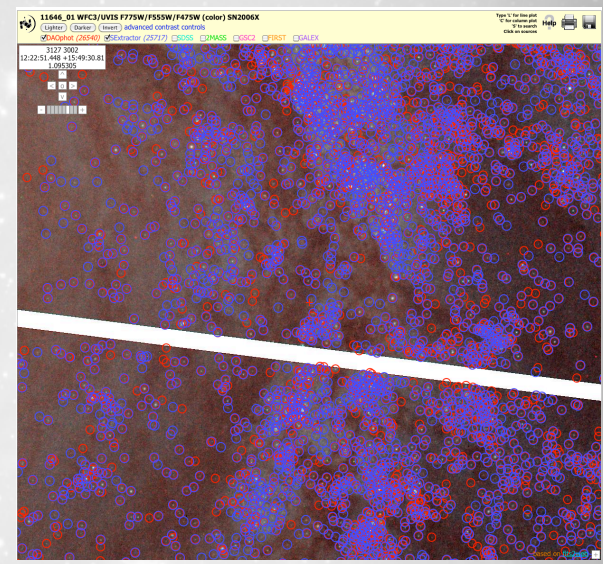
New Data

- WFC3 image data: includes ~62% of data from observations that have a release date up to 11-30-2011
- WFC3 source lists
    - DAOphot -5,201
    - Source Extractor -7,019
- New (internal) review interface for approving data

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WFC3 Processing Pipeline

- Based on existing HLA pipelines (ACS, NICMOS) with structural changes
  - Integrates data processing, source list generation
  - Modular design - steps are broken into separate programming units
  - Removes STSDAS dependencies as much as possible
  - Isolate instrument dependencies into small modules
  - Designed to be extensible to mosaic generation
- Some algorithmic changes
  - New alignment module performs very well on crowded fields
  - Sky equalization included
  - More rigorous handling of header information
- WFC3 images include two additional extensions (extensions 1-3 remain unchanged)
  - Extension 4 - Exposure Time layer records the effective exposure time for each pixel
  - Extension 5 – Table that includes information on all contributing images
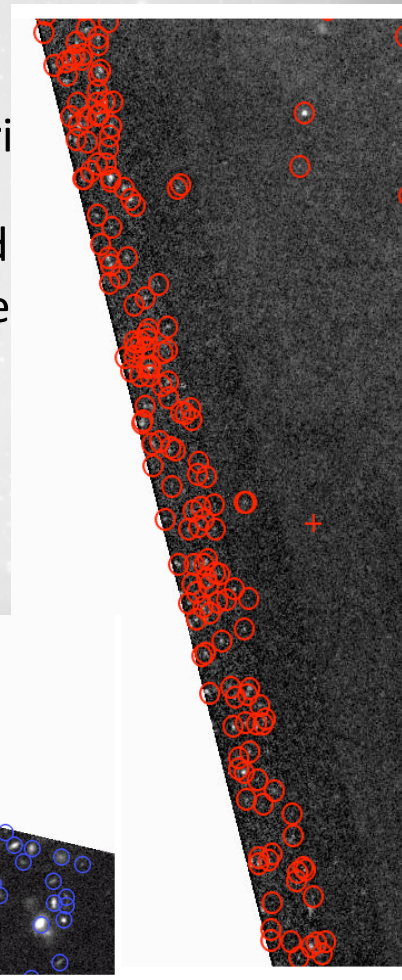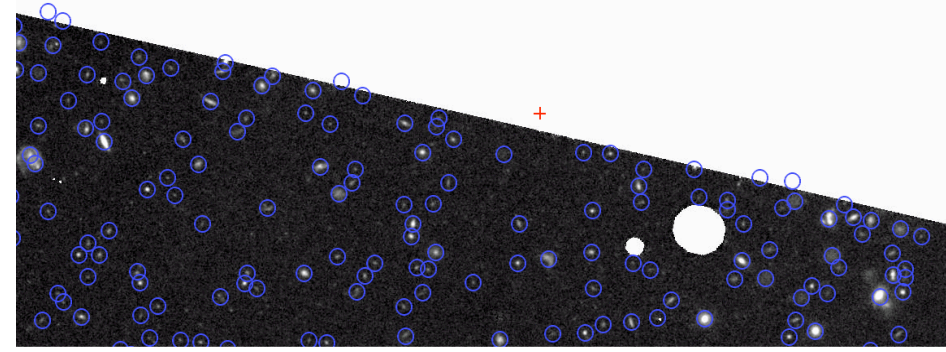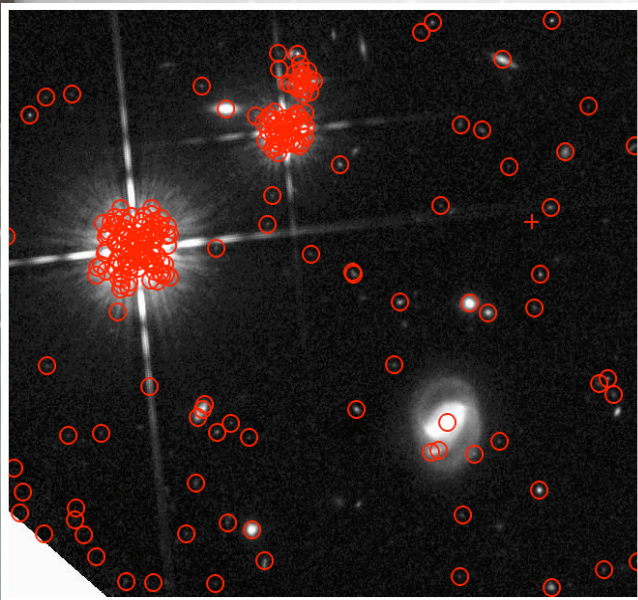
WFC3 Source list generation

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- Similar to ACS source lists
- Total light image
  - Algorithm modified because sky background was not subtracted from WFC3 images
- Spatial Filters
  - Gaussian kernel for sparse images
  - Mexican hat kernel for crowded images
- Problems
  - DAOphot - number of spurious detections associated with bri
    stars constitute nearly half of the total source counts
  - SExtractor - detections of spurious sources near edge of valid
  - DAOphot - UVIS the edge region is affected by cosmic ray eve

Work in progress

- WFC3 imaging pipeline
  - Inclusion of Astrodrizzle
  - Refactoring and adding Astrodrizzle functions
- WFC3 source lists flagging
  - Concentration index
  - Saturated sources
  - Detection swarms around bright stars
  - Diffraction spike detections
  - Nexp filtered detections, i.e. Lingering spurious edge detections

Work in progress

- IRS – Incremental Release System
  - Database development almost complete
  - Design data delivery infrastructure

HLA stats

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searches

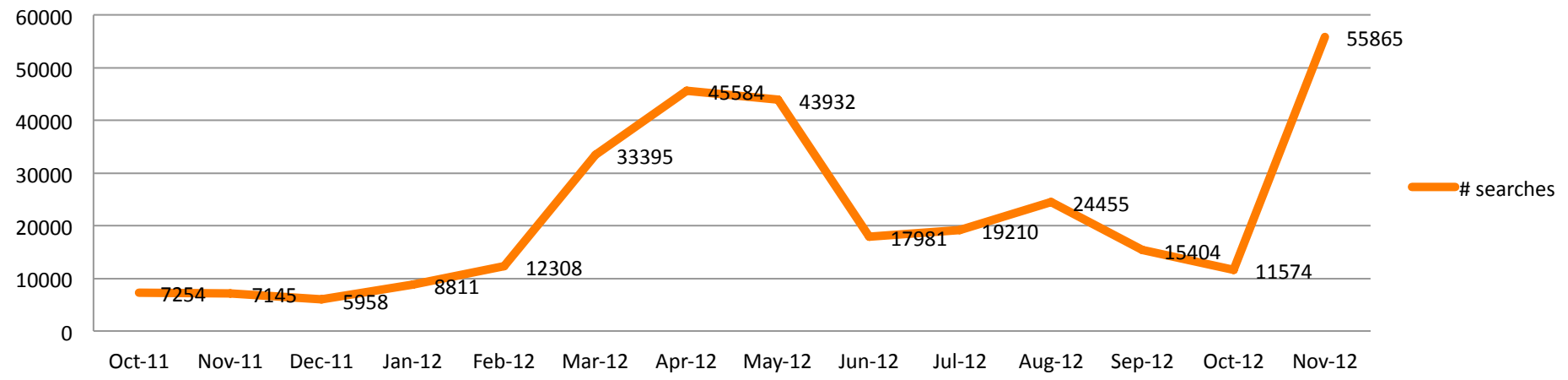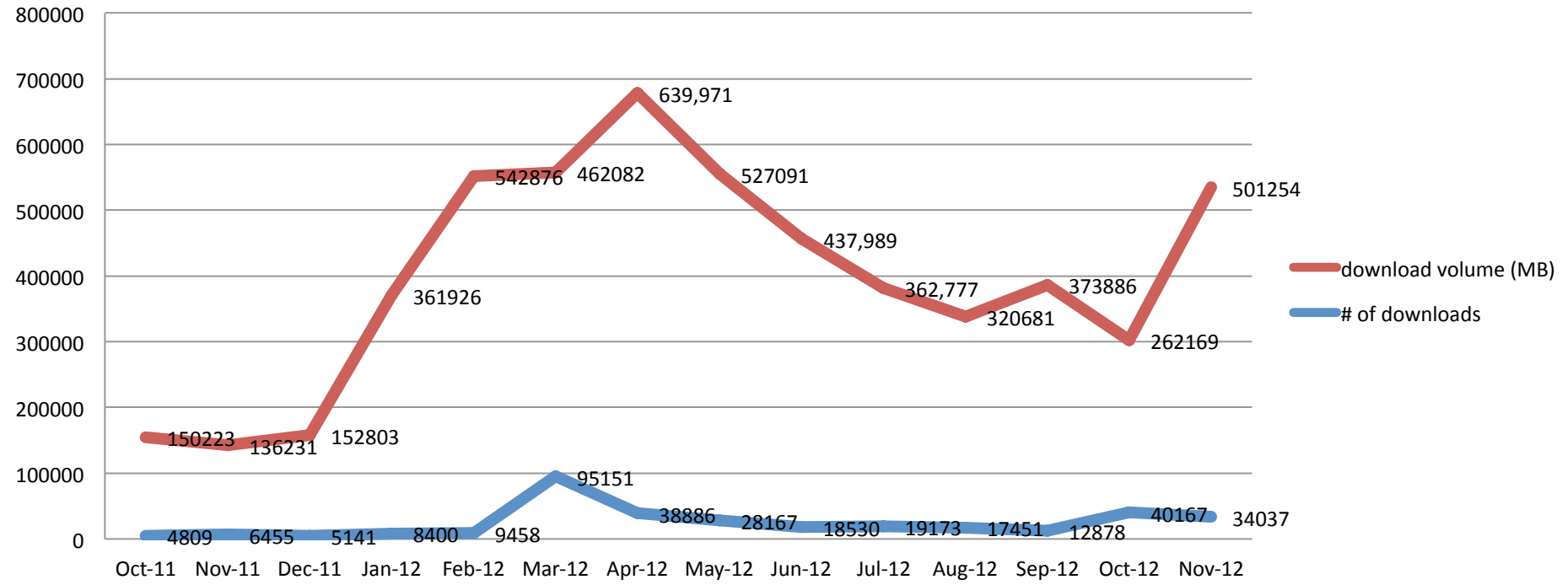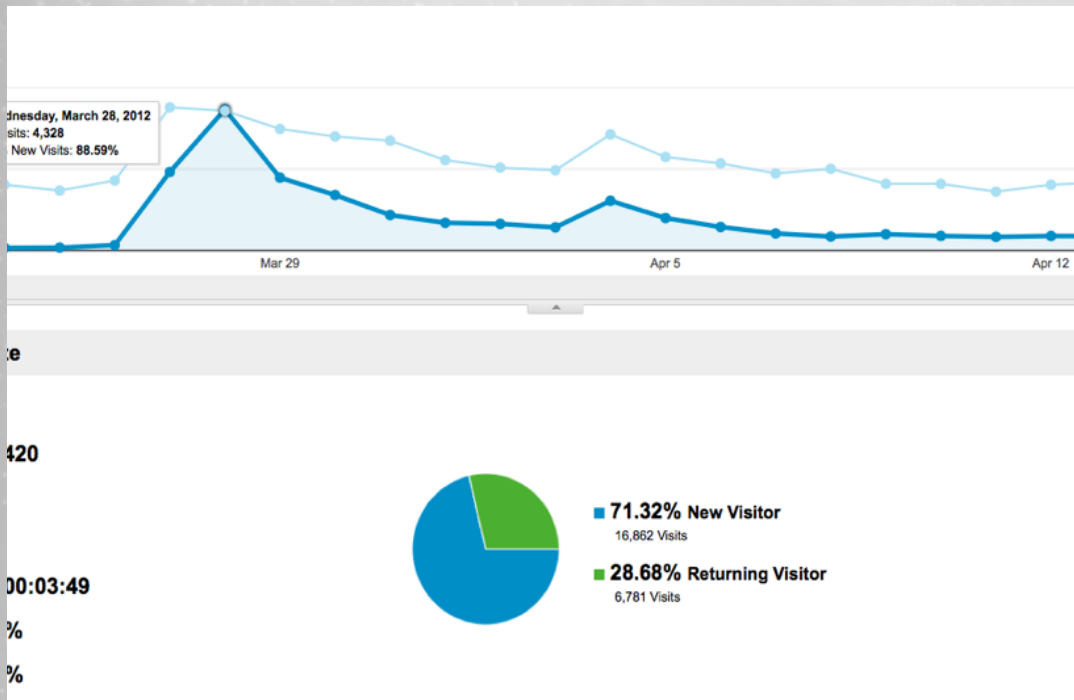Data points for # searches (orange line):
- Oct-11: 7254
- Nov-11: 7145
- Dec-11: 5958
- Jan-12: 8811
- Feb-12: 12308
- Mar-12: 33395
- Apr-12: 45584
- May-12: 43932
- Jun-12: 17981
- Jul-12: 19210
- Aug-12: 24455
- Sep-12: 15404
- Oct-12: 11574
- Nov-12: 55865

downloads

Data points for download volume (MB) (red line):
- Oct-11: 150223
- Nov-11: 136231
- Dec-11: 152803
- Jan-12: 361926
- Feb-12: 542876
- Mar-12: 462082
- Apr-12: 639,971
- May-12: 527091
- Jun-12: 437,989
- Jul-12: 362,777
- Aug-12: 320681
- Sep-12: 373886
- Oct-12: 262169
- Nov-12: 501254

Data points for # of downloads (blue line):
- Oct-11: 4809
- Nov-11: 6455
- Dec-11: 5141
- Jan-12: 8400
- Feb-12: 9458
- Mar-12: 95151
- Apr-12: 38886
- May-12: 28167
- Jun-12: 18530
- Jul-12: 19173
- Aug-12: 17451
- Sep-12: 12878
- Oct-12: 40167
- Nov-12: 34037

HLA stats cont.

Google Analytics
~150 hits > 4,328 hits
(factor of 28)

FITSCUT
~600/hour > 41,000/hour (a
factor of 68)
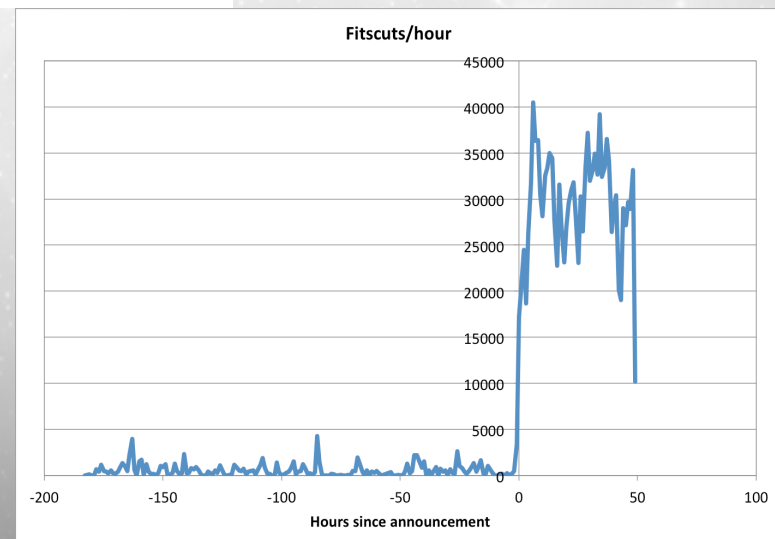
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Outreach and Education
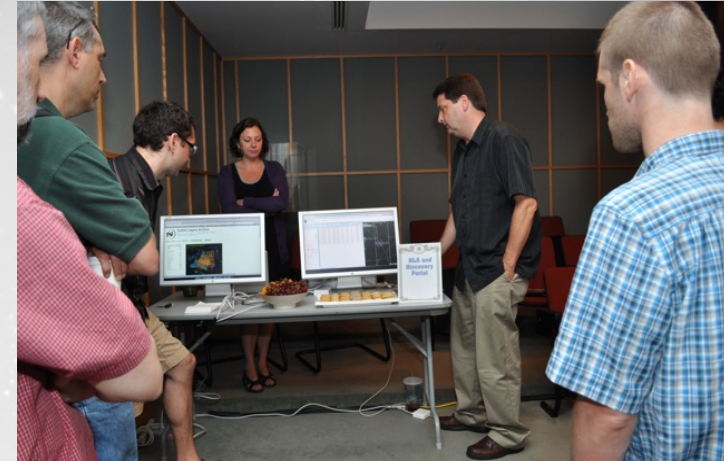
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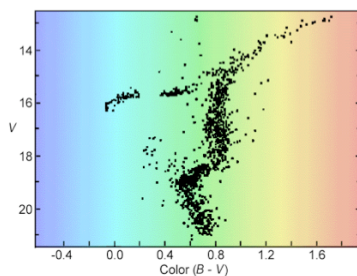Group
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- AAS Summer/Winter Sessions
- ADASS – November 2011
- STScI Citizen Engagement Jamboree
- STScI Spectroscopy Workshop

- Educational materials now available

Age Dating Clusters in the Antennae Galaxies

Color Magnitude Diagram of M80

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Future HLA

- Current and future baseline product generation
  - Process all public WFC3 data
  - Extend new WFC3 pipeline and data formats to other imaging instruments (WFPC2, ACS, NICMOS)
  - Develop robust mosaic pipeline
  - Produce mosaics for more pointings, instruments
  - Incorporate source lists and produce uniform metadata for HLSP
  - Enhance presence of spectral data in HLA
    - Include more existing products
    - Encourage teams to provide HLSP whenever possible
    - Foster development of spectral pipeline
  - Consider feasibility of WFC3 grism analysis tools
  - Develop tools to combine moving-target images

Future HLA cont.

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- Other products and features
  - Produce all-sky HST catalog (see Whitmore talk)
  - Develop tools to investigate time-domain data
  - Search for solar system targets
  - Expand capabilities of image display
  - Further enhance plotting tool capabilities
  - Continue educational and outreach endeavors
- Integrate HLA interface into MAST portal
  - Ultimately portal will incorporate all HLA interface capabilities
  - Common look-and-feel for seamless navigation
  - Identify HLA services and functions to incorporate