



MAST User Group

July 16, 2010

08:30-09:00 *Breakfast*

09:00-10:30	<i>Welcome and Introductions</i>	<i>White & Levay</i>	<i>40 + 10 min</i>
	<i>User Survey Results</i>	<i>Conti</i>	<i>15 + 5 min</i>
	<i>GALEX Update</i>	<i>Smith</i>	<i>10 + 5 min</i>

10:30-10:50 *Coffee Break*

10:50-12:30	<i>HLA</i>	<i>White</i>	<i>30 + 10 min</i>
	<i>Kepler</i>	<i>Fraquelli & Smith</i>	<i>25 + 10 min</i>
	<i>VAO</i>	<i>Nieto-Santisteban</i>	<i>20 + 10 min</i>

12:30-14:00 *Lunch Break*

14:00-15:00	<i>HST Operations</i>	<i>Kyprianou & Scott</i>	<i>20 + 10 min</i>
	<i>Work in Progress</i>	<i>Conti</i>	<i>30 min</i>

15:00-15:30 *Coffee Break*

15:30-17:00 *MUG Executive Session*



"Welcome & Introductions"

Karen Levay & Rick White



Highlights of MAST Activities

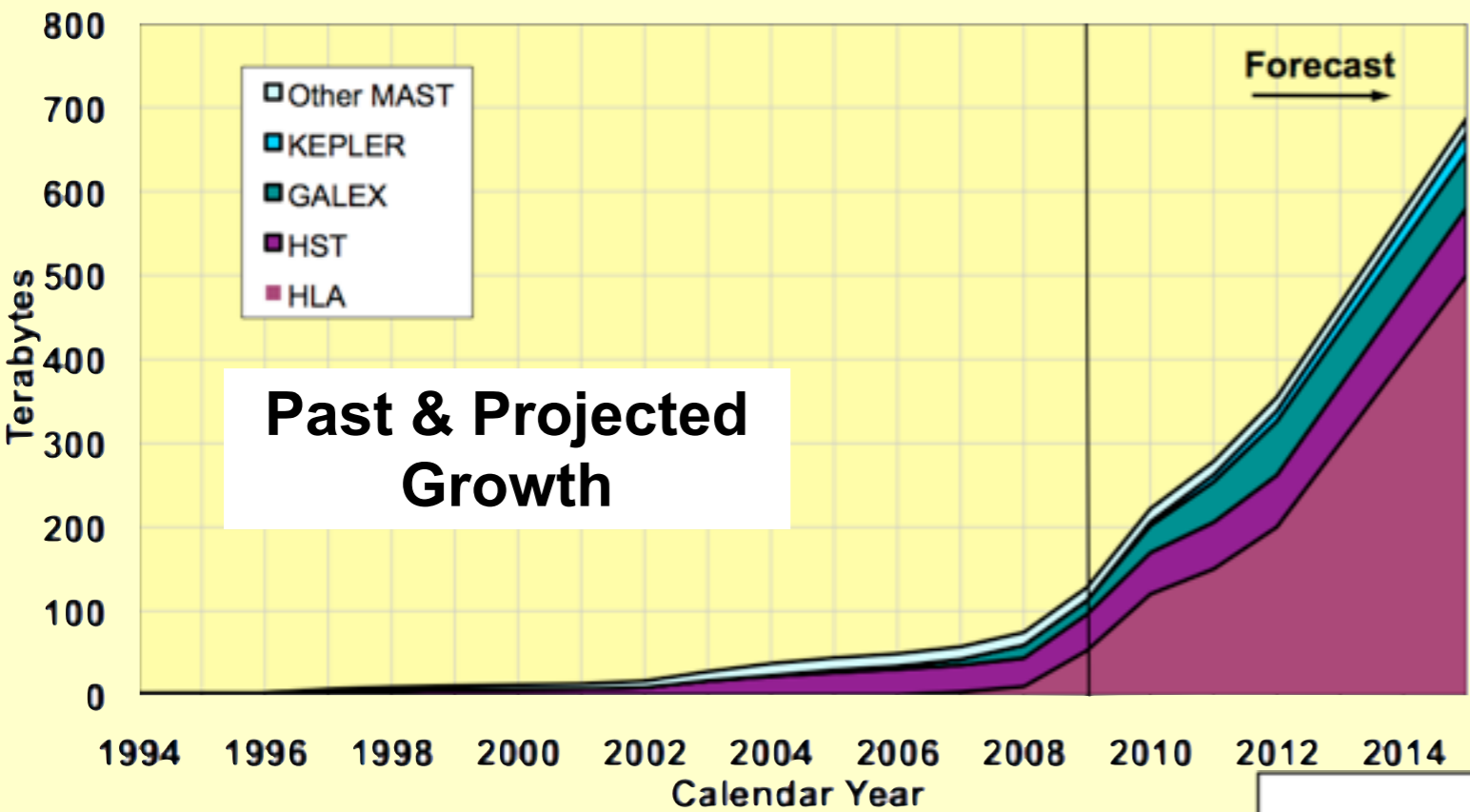
Karen Levay & Rick White

MAST Users Group

2010 July 16

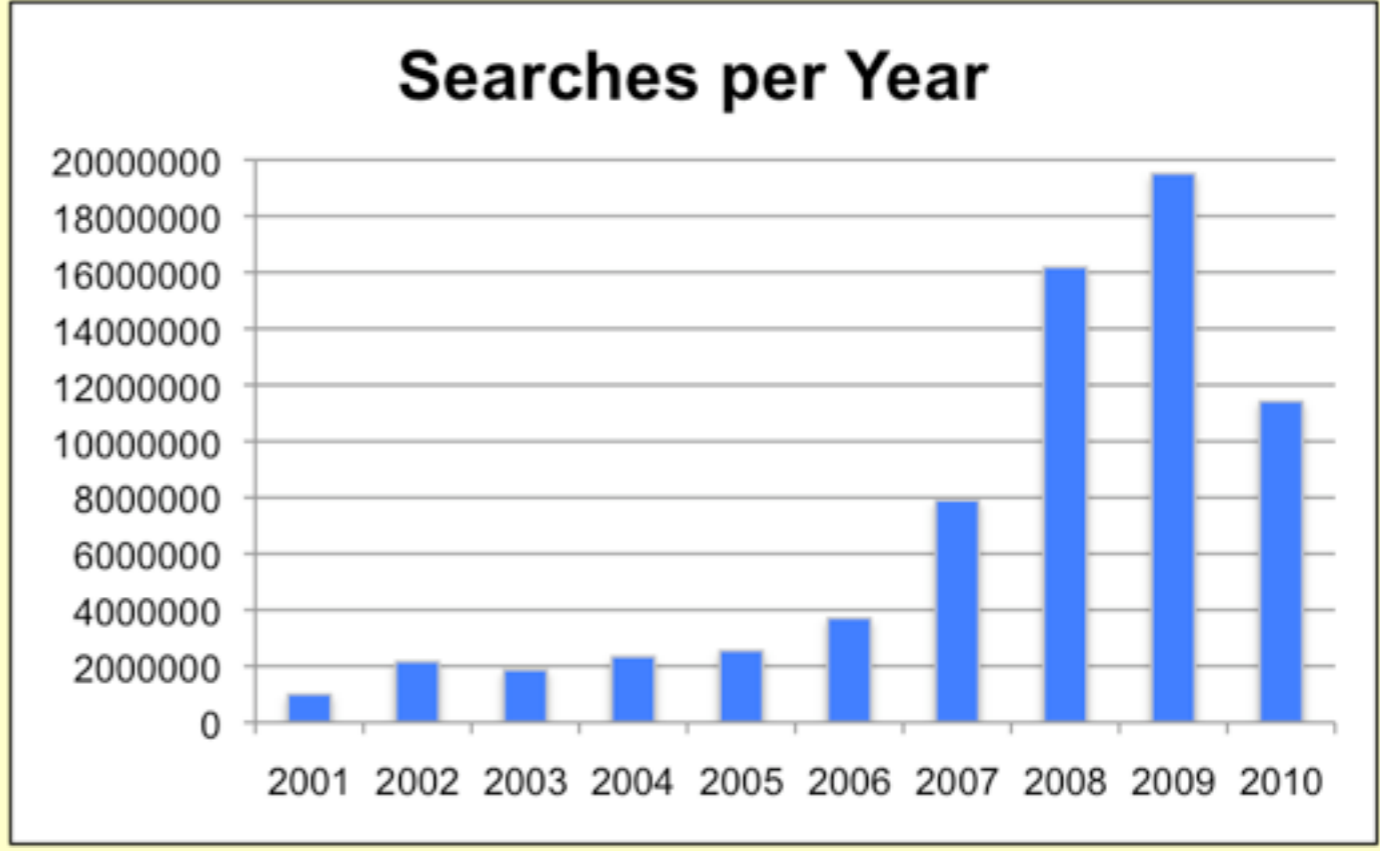
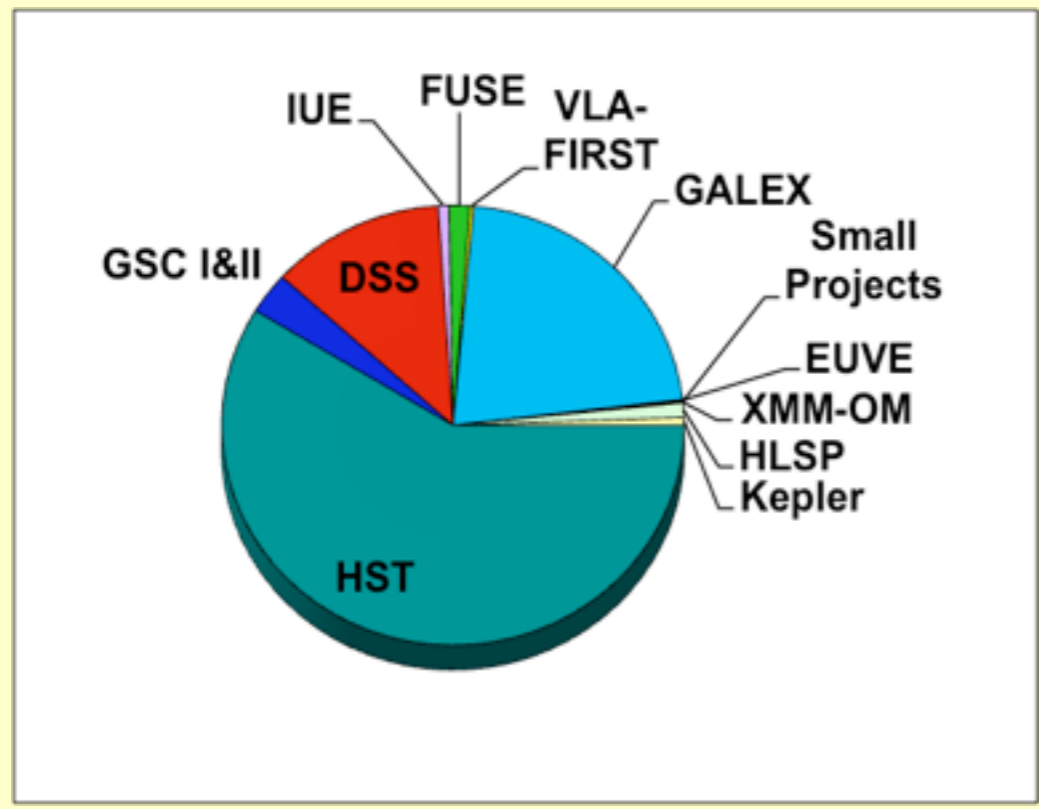


MAST Users Group – July 16, 2010



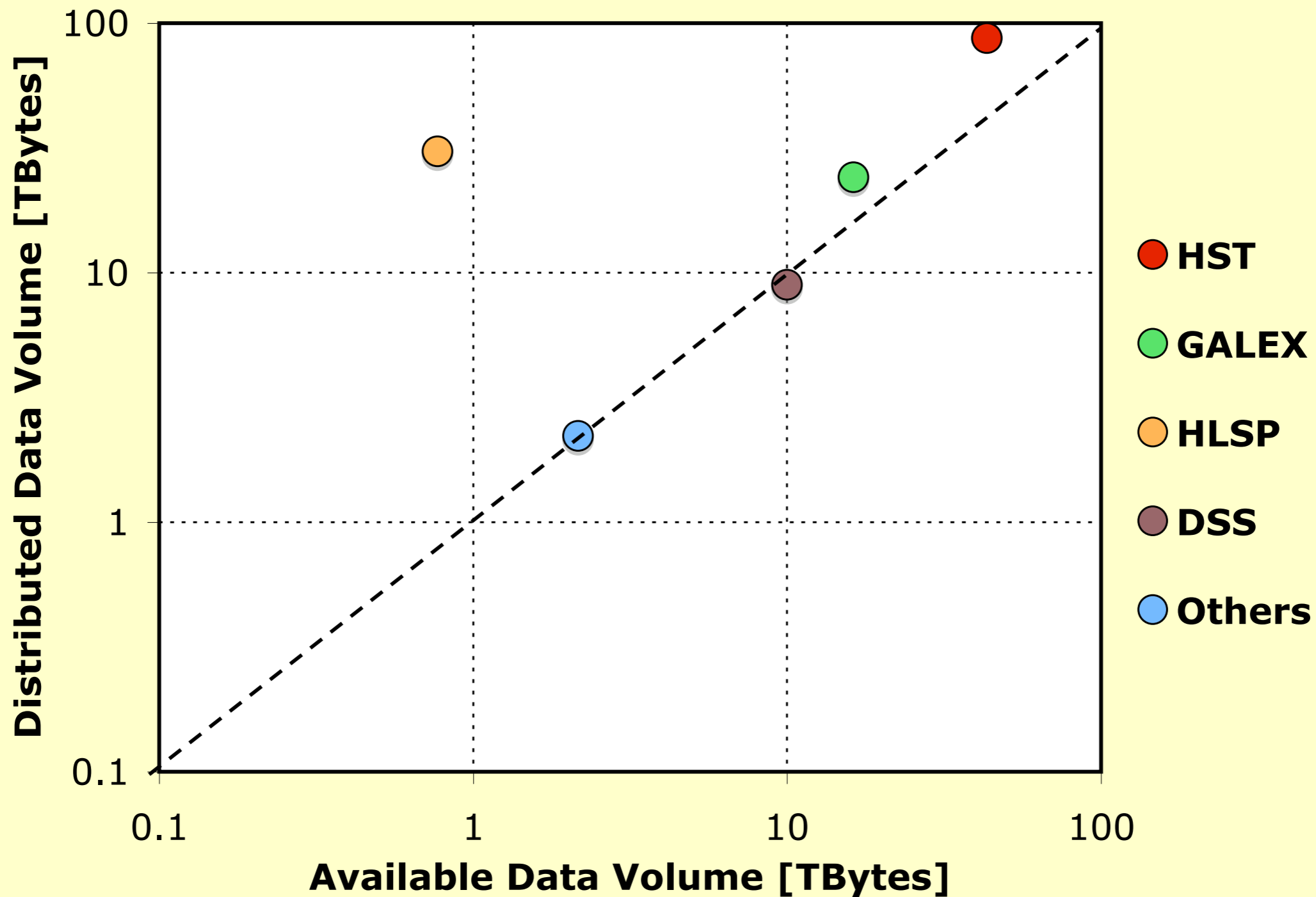
MAST Data & Usage Growth

80 TB of mission products
53 TB in HLA



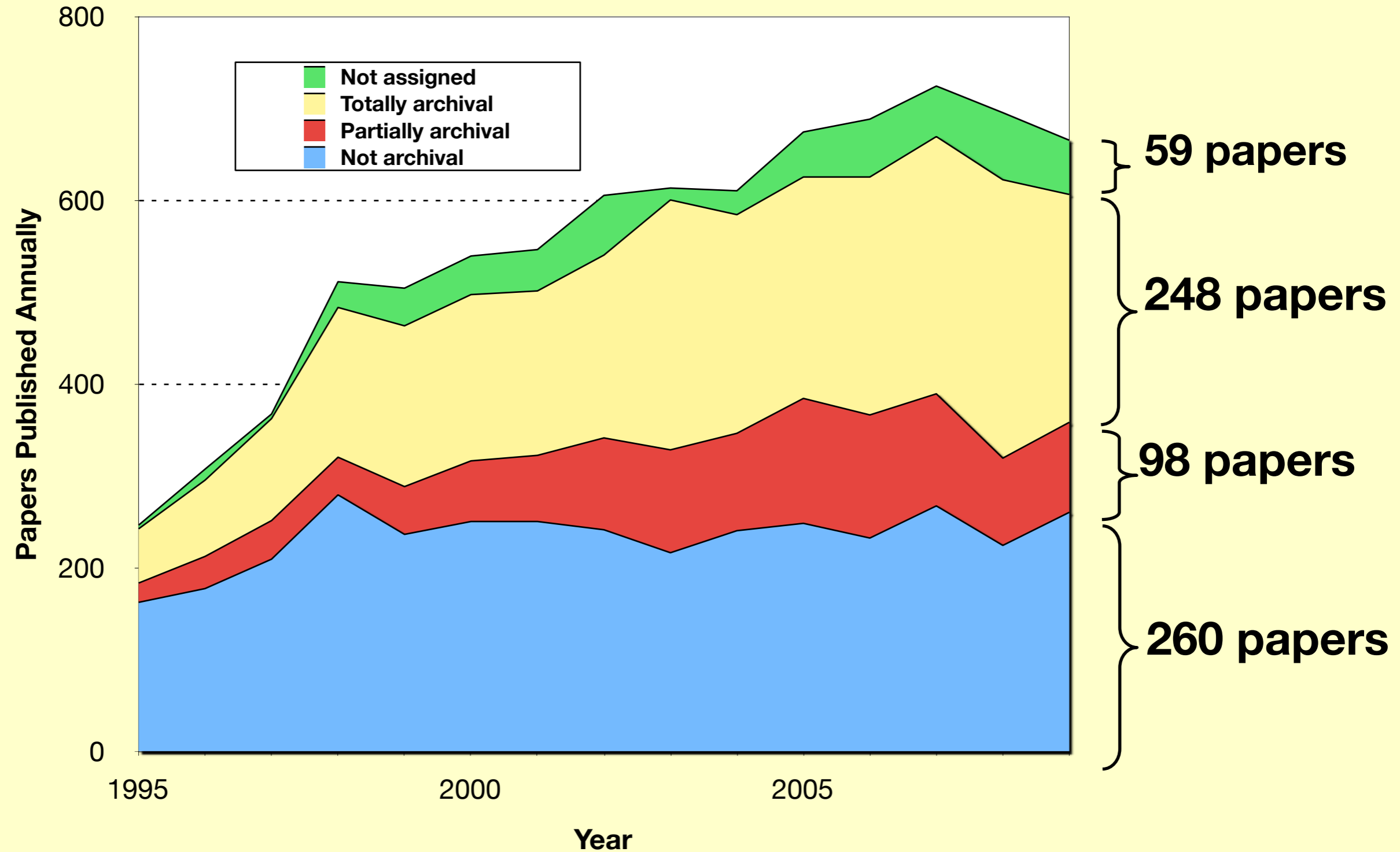


Distribution and Data Volume (2007-2009)





HST Publication Statistics





Archive Center

- “**Archive center**” organization was established to help unify various STScI archive projects (Dec 2008)
 - **Carl Johnson** (project manager), **Gretchen Greene** (chief engineer), **Rick White** (archive center scientist) are triumvirate coordinating group activities
 - Includes Archive Sciences Branch (K. Levay), Data Systems Branch (M. Kyprianou), Operations (F. Abney), Science Software Branch (P. Greenfield), and IT staff.
- Recent activities:
 - Roadmap defining high-level goals approved by all missions (HST, JWST, MAST).
 - Integrated plan being developed for near and medium term.
 - Defining several larger projects to help better integrate archives at some level.



MAST/Archive Science Branch Staffing Changes

- Numerous staffing changes!
 - Departures:
 - **Rachel Somerville** (to Science Mission Office)
 - **Kim Gillies** (to Thirty-Meter Telescope project)
 - Additions:
 - **Alberto Conti** (archive scientist)
 - **Maria Nieto-Santisteban** (database engineer, JWST)
 - **Tom Donaldson** (software engineer) [September 2010]
 - Role changes:
 - **Karen Levay** (ASB chief), **Mark Kyprianou** (DSB chief),
Faith Abney (DPAS chief), **Dorothy Fraquelli** (DPAS, CSC mgr),
Lee Quick (HLA coordination lead)

ASB=Archive Science Branch, DSB=Data Systems Branch
DPAS=Data Processing & Archiving Services, CSC=Computer Sciences Corporation



MAST/Archive Center Staff

ASB Branch	
Alberto Conti	Maria Nieto-Santisteban
Tom Donaldson*	Tony Rogers
Theresa Dower	Bernie Shiao
Tim Kimball	Myron Smith
Charlie Loomis	Randy Thompson
Brian McLean	Shui-Ay Tseng
Karen Levay (lead)	

Other MAST/HLA Staff	
Stefano Casertano	Mark Kyprianou
Dorothy Fraquelli	Steve Lubow
Niall Gaffney	Lee Quick
Gretchen Greene	Rick White
Anton Koekemoer	Michael Wolfe

Also collaborators outside STScI, principally at CADC and ST-European Coordinating Facility

*Starting September 2010



2009–2010 Hubble Highlights

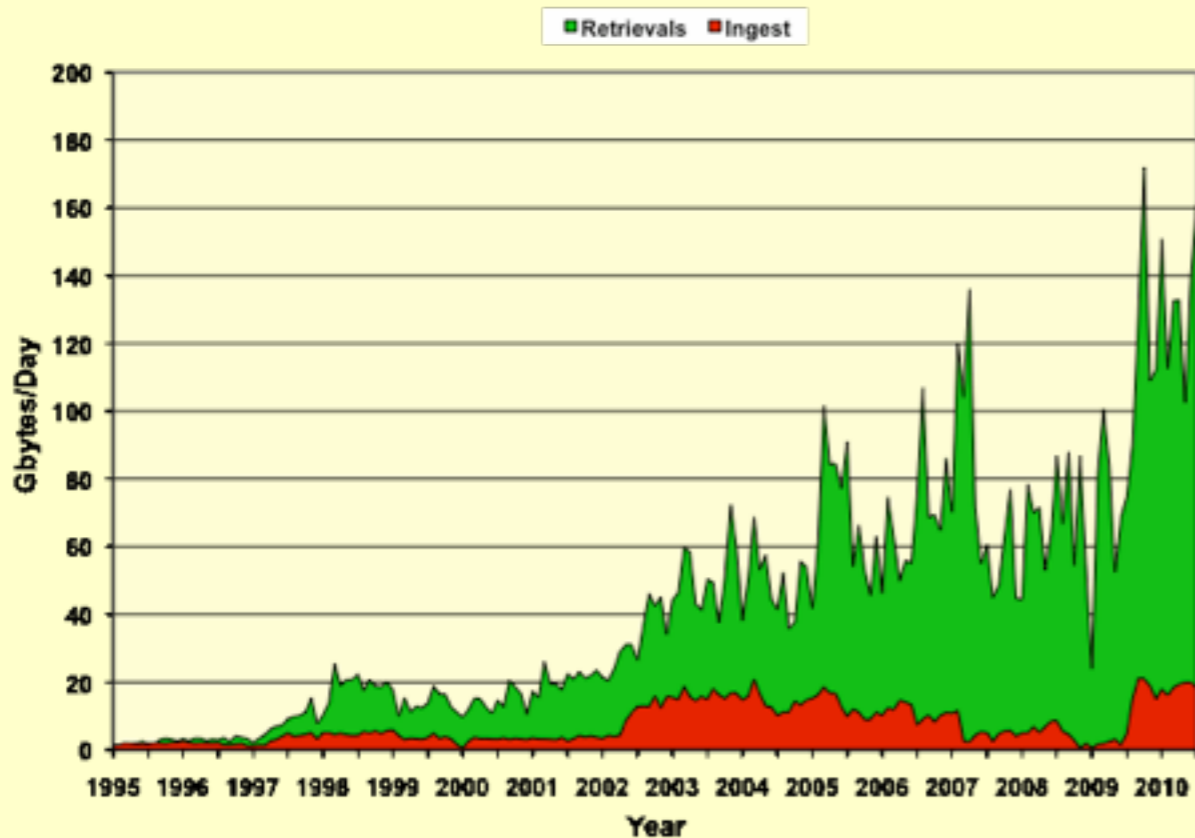
- HST [*M.Kyprianou, J.Scott*]
 - Successful Servicing Mission 4, 2009 May 12–24 COS, WFC3, ACS/STIS repair, gyros, batteries, ...
 - Large S/W effort to prepare for SMOV
 - Several “quick-fixes” during SMOV
 - “Starview on the Web” deployed November
 - Reprocessing of WFPC2 and pre-SM4 NICMOS data
 - During reprocessing, we bumped up against system limitations (e.g. DADS/OTFR struggled with multiple, simultaneous NICMOS reprocessing requests for associations with over 200 members).





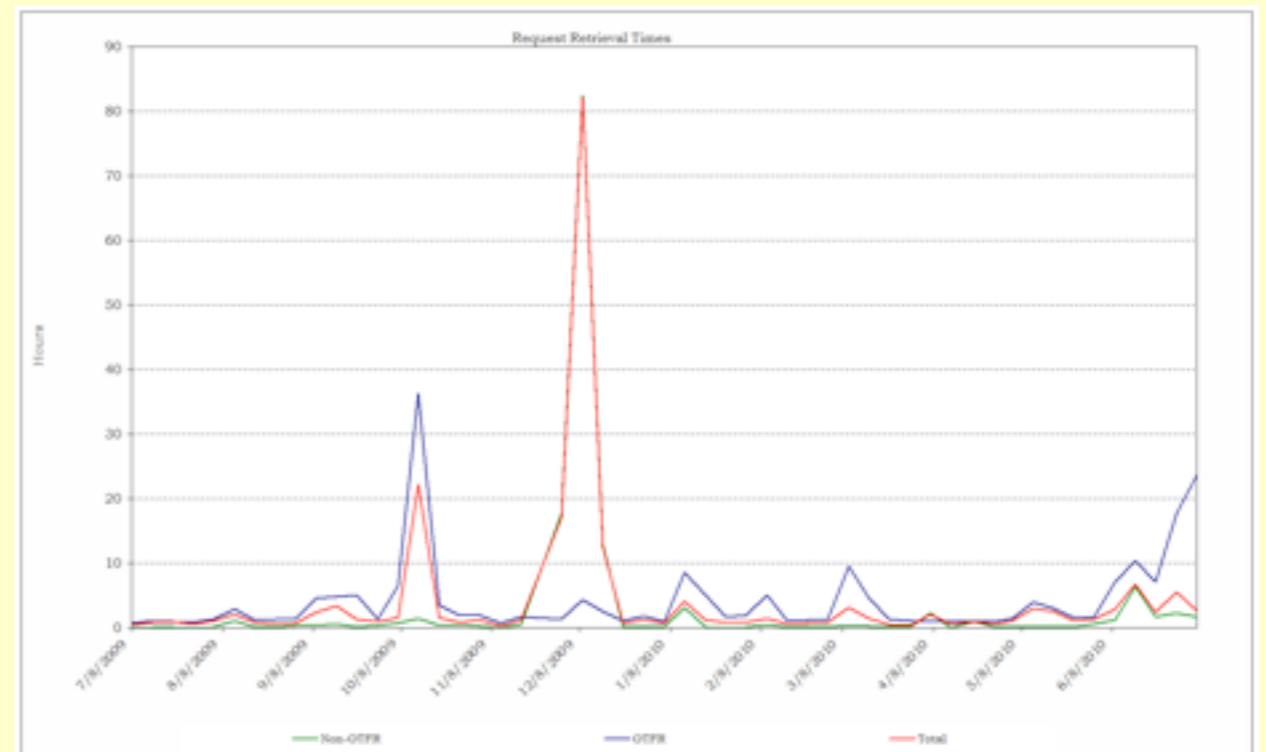
HST Data Ingest and Retrievals

HST & FUSE Data Archive



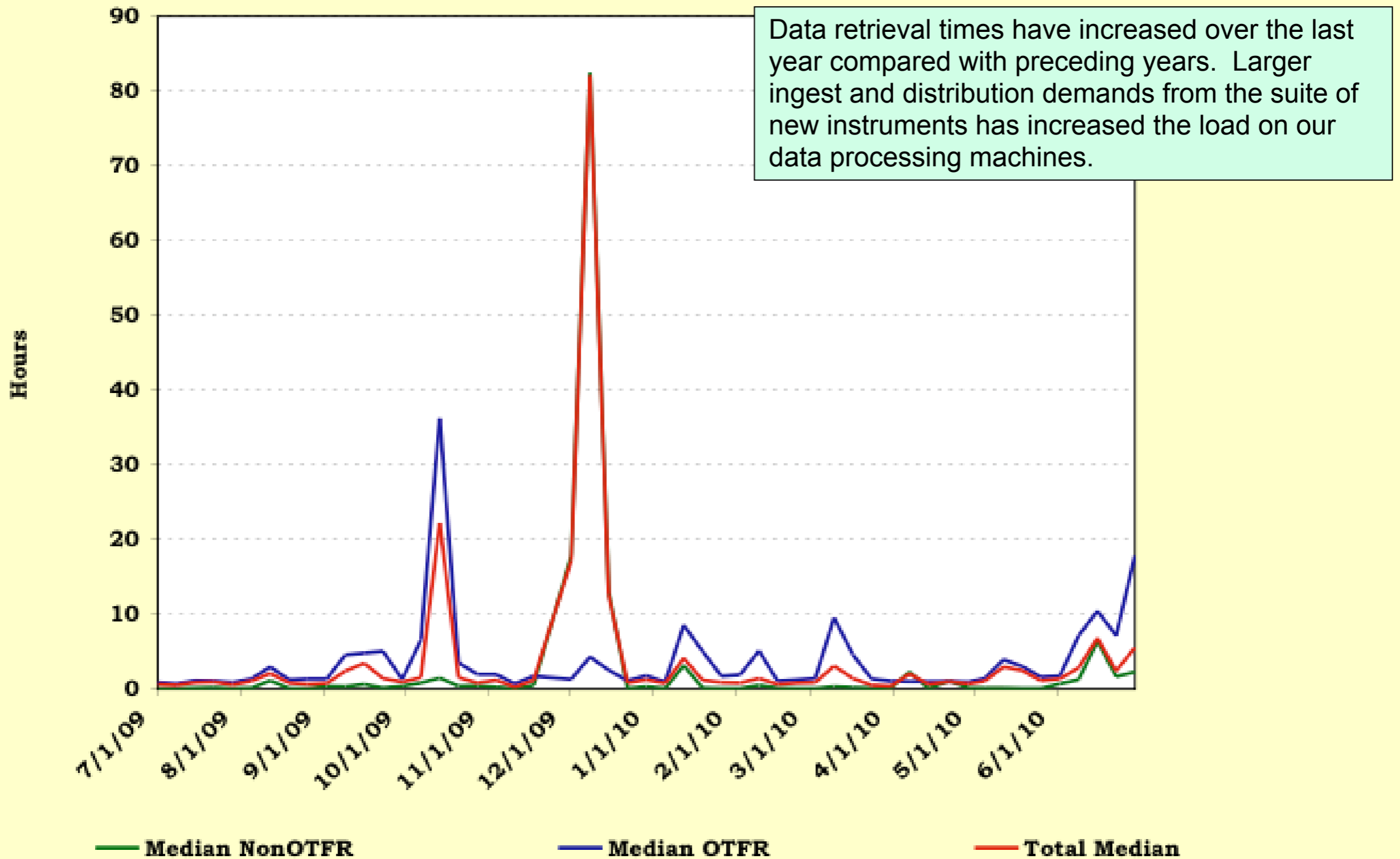
Both HST data volume into archive (red) and volume distributed (green) continue to grow.

Average time needed to fulfill requests for OTFR data rises.



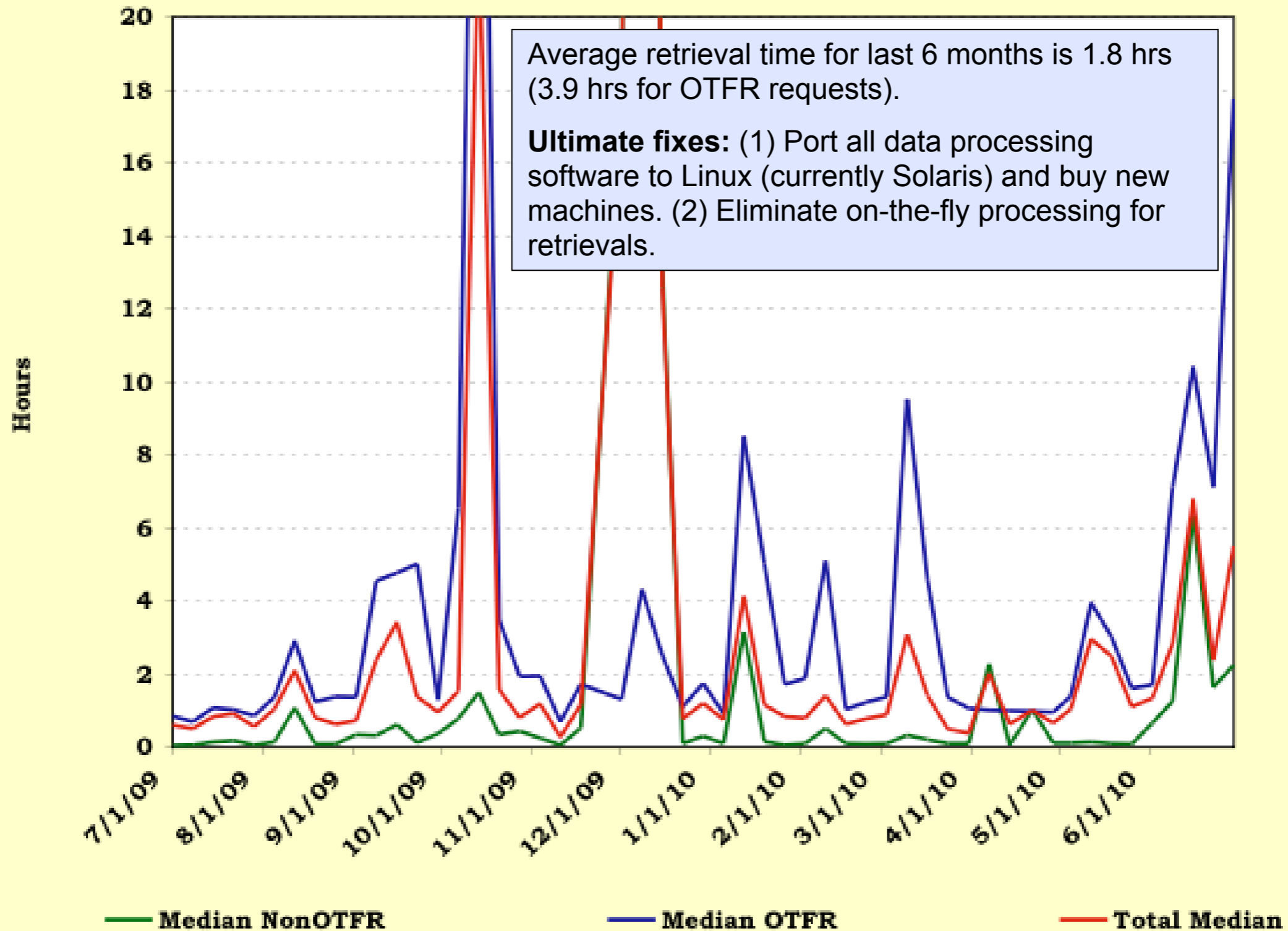


HST Weekly Median Retrieval Times (1 year)



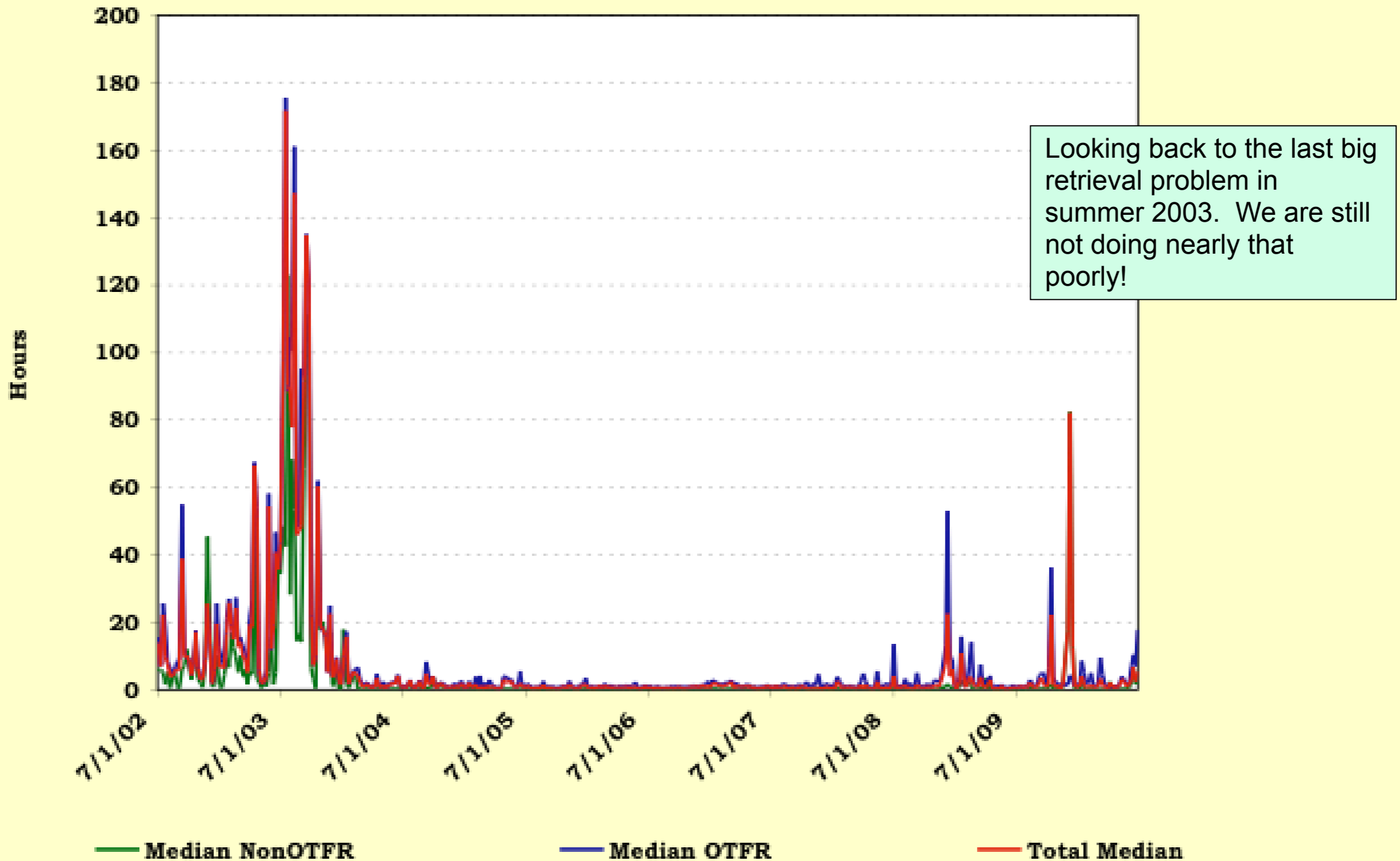


HST Weekly Median Retrieval Times (1 year)





HST Weekly Retrieval Times (8 years)

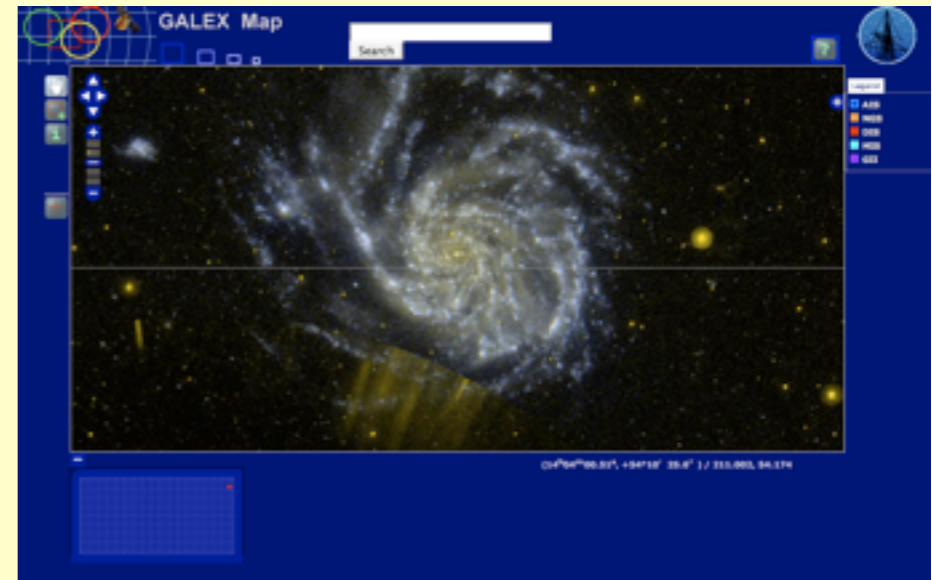




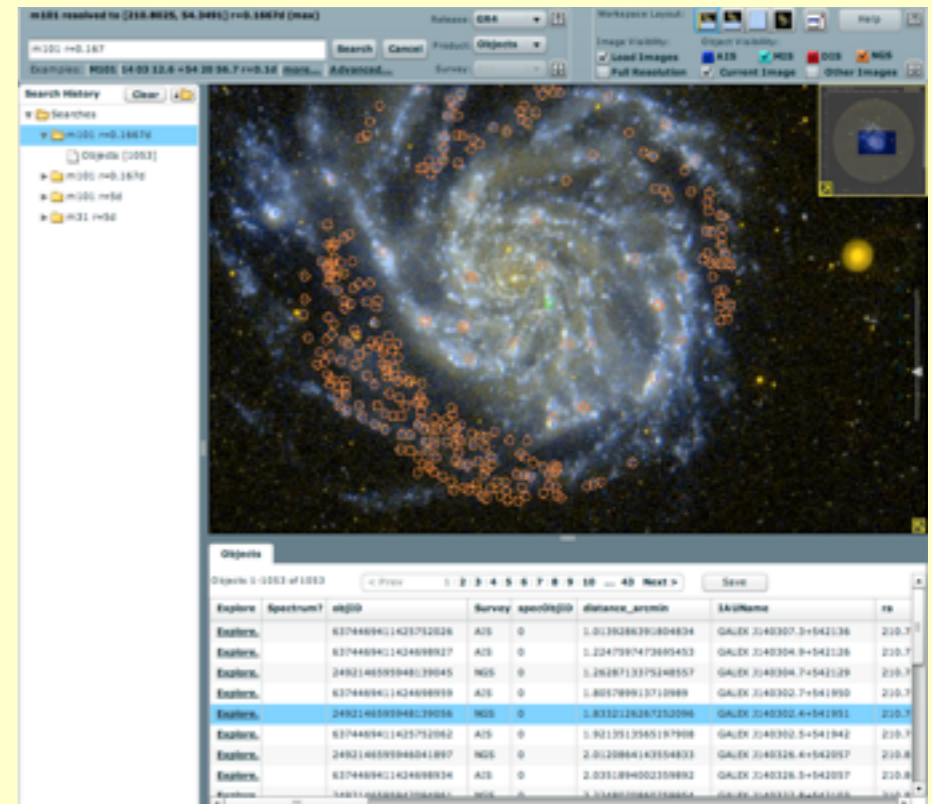
2009–2010 FUSE, GALEX Highlights

- FUSE wrap-up
 - Reprocessing completed, documentation rewritten by the FUSE project, web site revamped. Last data ingested Fall 2009.
- GALEX [M.Smith]
 - GR5/6 releases
 - GR6 all-sky survey completion expected by September 2010
 - SDSS DR7 to GALEX GR4/5 cross-match
 - GalexView (Flex/Flash) and GALEX Map interfaces continued to be improved.

GALEX Map



GalexView

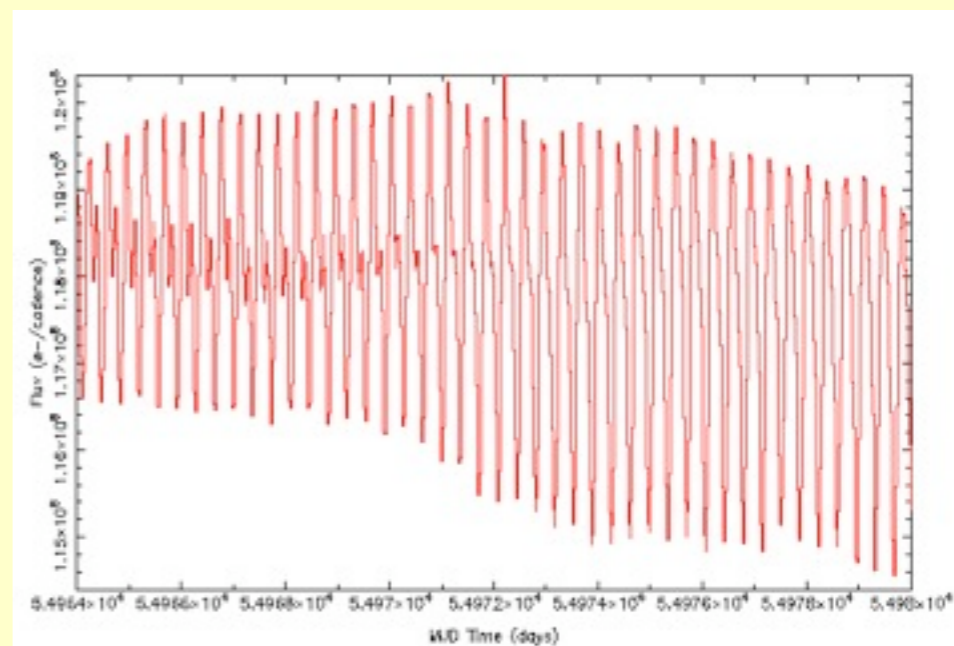
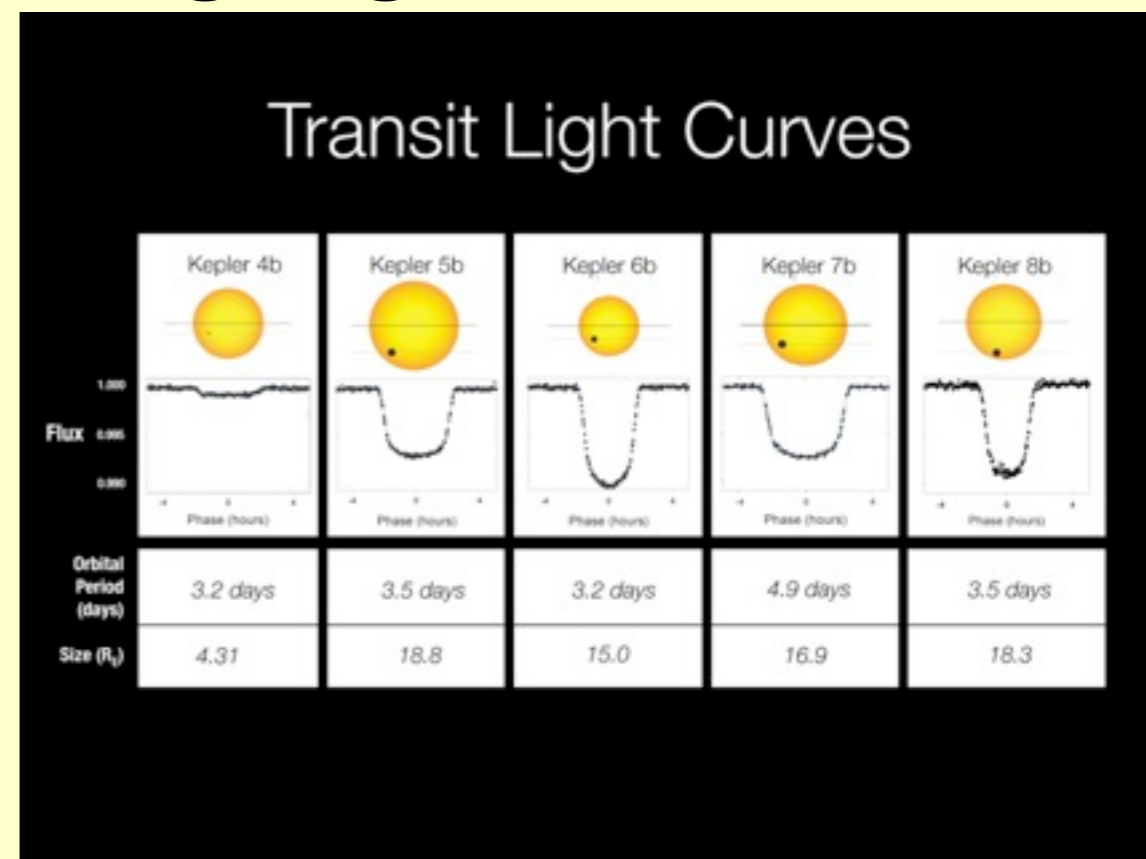


Explore	Spectrum?	objID	Survey	specObjID	distance_arcmin	GALEX ID	RA
Explore		637446940142372026	AIS	0	1.0130286391804834	GALEX J140307.3+042136	210.7
Explore		6374469401424088927	AIS	0	1.2247597473695453	GALEX J140304.9+042136	210.7
Explore		2492146339948139045	NGS	0	1.2638713375248557	GALEX J140304.7+042129	210.7
Explore		6374469401424088919	AIS	0	1.805799913710989	GALEX J140302.7+041950	210.7
Explore		2492146339948139056	NGS	0	1.8232126287252096	GALEX J140302.4+041951	210.7
Explore		637446940142372062	AIS	0	1.9212513545197908	GALEX J140302.5+041942	210.7
Explore		2492146339948041897	NGS	0	2.0120864143554833	GALEX J140326.4+042057	210.8
Explore		6374469401424088934	AIS	0	2.031894002359862	GALEX J140326.5+042057	210.8



2009–2010 Kepler Highlights

- Kepler launched March 6, 2009
[D.Fraquelli]
- Successfully archived Quarters 0, 1, 2 and 3 data. Although a lot of work to prepare for operations, we had a smooth start.
- First 5 planet detections announced at January 2009 AAS. MAST archiving the HLSP for these data.
- Q0/Q1 public data release 2010 June 15: 216,181 public light curves!
- 592,327 searches & 4.37 TB distributed through 2010 June!





More 2009–2010 Highlights

- New mission: EPOCH/EPOXI
 - Photometry of eight stars with transiting planets
 - Whole-Earth observations for comparison with exoplanets
- JWST archival work has begun, significant effort planned over coming year



Hubble Legacy Archive

- Hubble Legacy Archive (HLA)
 - DR4 in March 2010 [R. White]
 - Footprint database supported APT for Cycle 18

Inventory Images Footprints **NICMOS Grism (ST-ECF)** Help

pleiades r=1 RA = 56.869089 Dec = 24.105313 r = 1.000000 [03:47:28.581 +24:06:19.13]

Instrument	#Footprints
<input checked="" type="checkbox"/> ACS	34
<input checked="" type="checkbox"/> WFPC2	140
<input checked="" type="checkbox"/> STIS	84
<input type="checkbox"/> NICMOS	0
<input checked="" type="checkbox"/> NICMOS GRISM	11
<input checked="" type="checkbox"/> FOS	17
<input checked="" type="checkbox"/> GHRS	52

DSS Image On Off

Data Product
 Exposure(Level 1)
 Combined(Level 2)
 Best Available

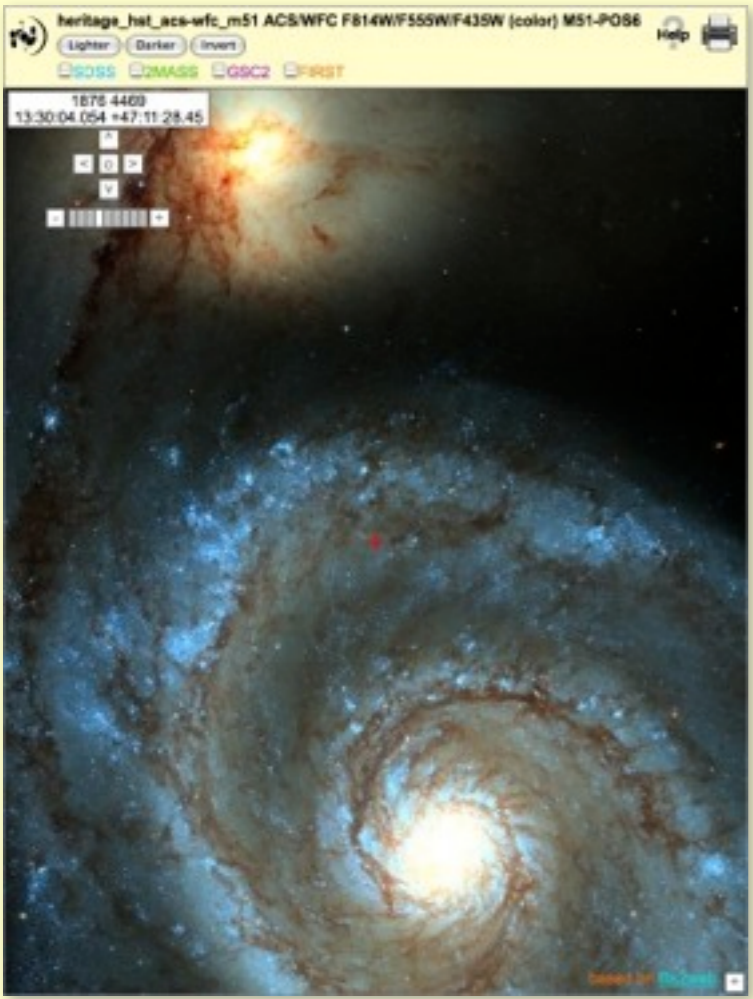
Submit

(RA, Dec. Radius: 56.872411 deg. 60.00 arcmin N
20'

Footprint Science Table (image and table selected fields are sorted to beginning of table)

Results: Viewing page 1 of 7 Selected 0 of 338

Target	Detector	Filter	NumExposures	ExposureTime	StartTime	Dataset
ANY	ACS/WFC	F775W	3	1235.000	2004-02-18 05:39:40	HST_9984_y7_ACS_V
ANY	ACS/WFC	F435W	3	1235.000	2004-02-18 05:39:40	HST_9984_y7_ACS_V



Inventory Images Footprints **NICMOS Grism (ST-ECF)** Help

M107 RA = 210.802458 Dec = 54.349094 r = 0.240000 [14:03:12.590 +54:20:56.74]

Results 1-20 of 32 (172 before filtering) Show 20 results per page

Click to select images [Reset selection](#)

NGC5457-1 (combined)
 ACS/WFC F435W WFC
 HST_9490_01_ACS_WFC_F435W

Interactive Display
 Download Data: FITS-Science (123.9 MB) FITS-MEF (371.9 MB)
 Download Source Lists: DAOPHOT(1.0) (pdf) [More...](#)

NGC5457-1 (color)
 ACS/WFC F814W/F555W/F435W WFC
 9490_01

Interactive Display
 Download Data: FITS-Color (371.9 MB)
 Download Source Lists: DAOPHOT(1.0) (pdf) [More...](#)

NGC5457-7 (combined)
 ACS/WFC F435W WFC
 HST_9490_02_ACS_WFC_F435W

Interactive Display
 Download Data: FITS-Science (111.2 MB) FITS-MEF (333.9 MB)
 Download Source Lists: DAOPHOT(1.0) (pdf) [More...](#)

NGC5457-7 (color)
 ACS/WFC F814W/F555W/F435W WFC

Interactive Display
 Download Data: FITS-Color (371.9 MB)
 Download Source Lists: DAOPHOT(1.0) (pdf) [More...](#)

NGC5457-5 (combined)
 ACS/WFC F435W WFC

Interactive Display
 Download Data: FITS-Science (111.2 MB) FITS-MEF (333.9 MB)
 Download Source Lists: DAOPHOT(1.0) (pdf) [More...](#)

NGC5457-5 (color)
 ACS/WFC F814W/F555W/F435W WFC

Interactive Display
 Download Data: FITS-Color (371.9 MB)
 Download Source Lists: DAOPHOT(1.0) (pdf) [More...](#)



2009–2010 HLSP Highlights

New High Level Science Products

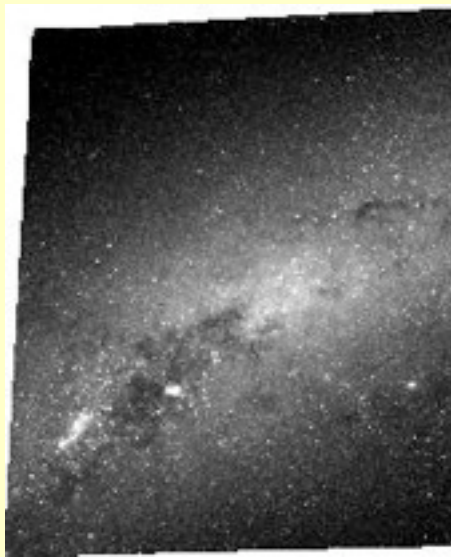
- Coma Cluster, **First theory HLSP DIGGSS**, B-star far-UV Atlas, STIS Next Gen Spectral Library, ANGRRR, CVARO-UVSCAT, FUSE CV, Andromeda, Carina Nebula, GOODS/NICMOS, SM4 Early Release, StarCat, Kepler Objects



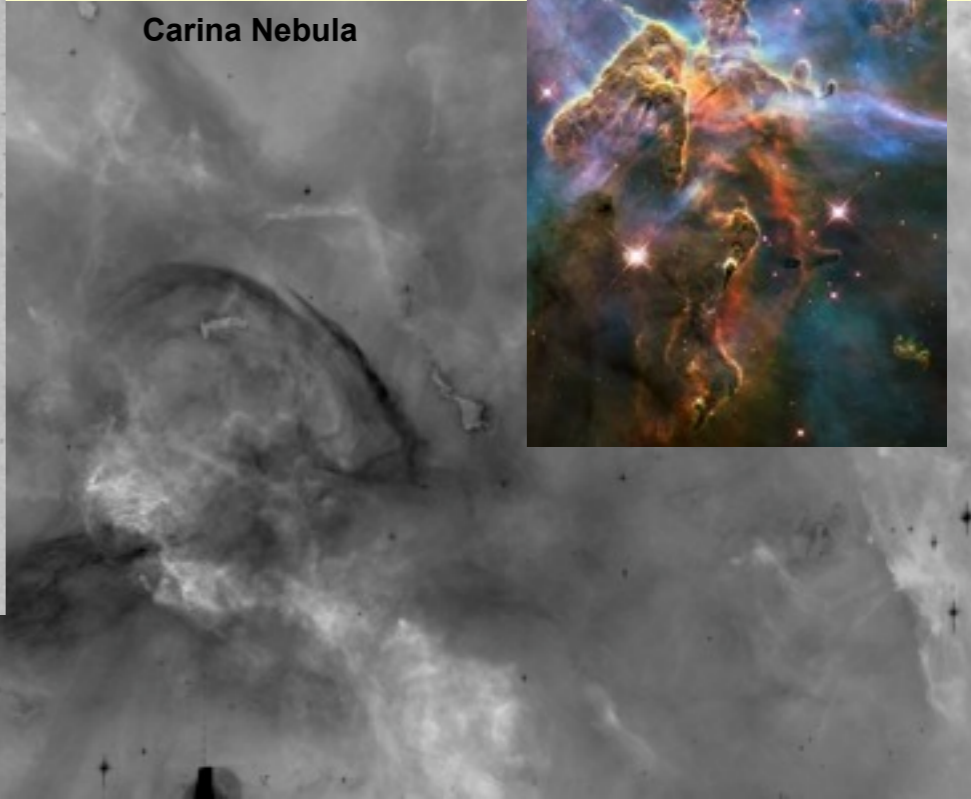
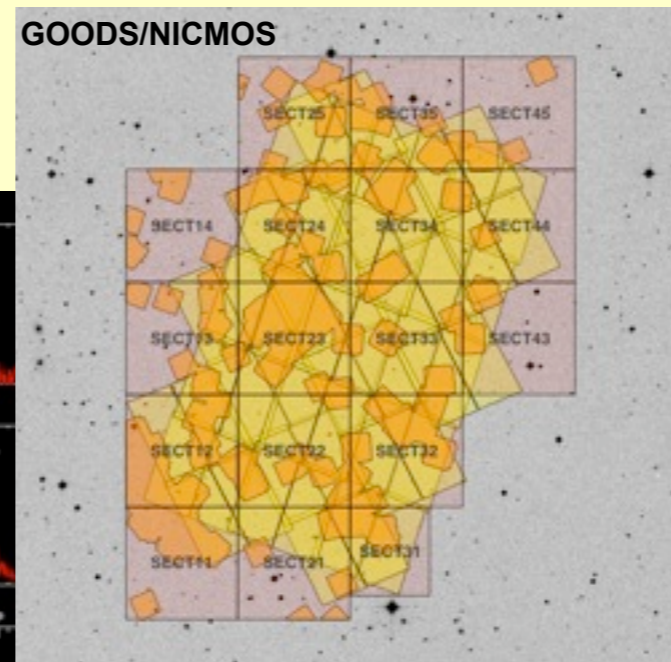
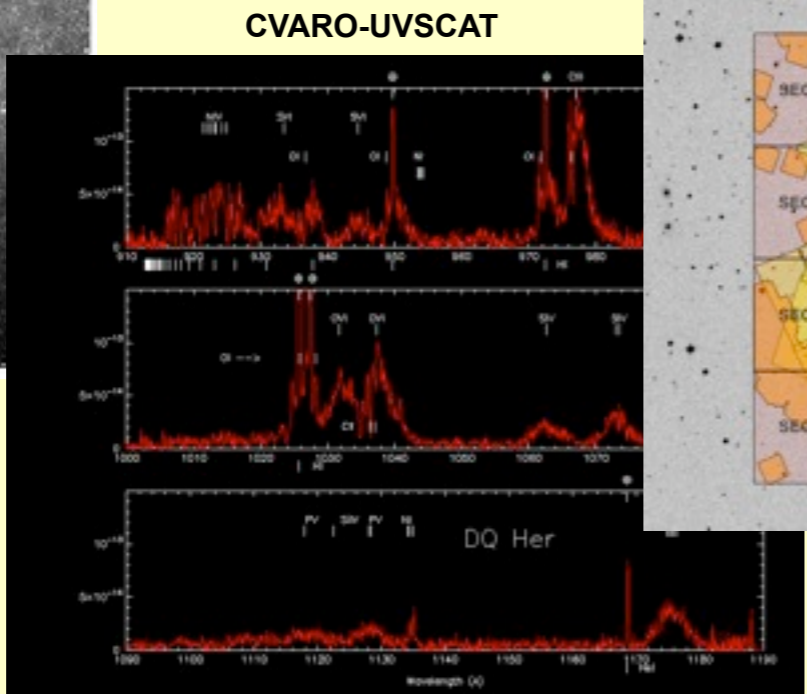
Coma Cluster



Andromeda



ANGRRR



Carina Nebula



Budget and Related Issues

- **MAST funding** from 2008 Senior Review finally started 6/1/2009
 - Delay in funding start impacted MAST work & hardware purchases over last year
 - Pretty much back on budget and schedule now
- **VAO funding** finally committed 5/11/2010 [*M. Nieto-Santisteban*]
 - Proposal submitted April 2008
 - Delay did have some impact on MAST work
- **Space Telescope-European Coordinating Facility closing** 12/31/10
 - ST-ECF support for advanced HST archival work will be missed
- **Next NASA Senior Review on accelerated** schedule
 - Spring 2011 instead of 2012
 - Less than two years of funding before we write next proposal
 - Probably moved up to avoid conflict with other Sr Revs in 2012



Some Current/Planned Activities

- Cross-mission [*A.Conti*]
 - Storage broker for integrated file storage
 - MAST Portal: new user interface
 - Data model [*B.McLean*]
 - Footprint database: integrate all MAST missions into the HLA footprint DB [*Conti/McLean*]
 - Extend CasJobs database access (previously GALEX-only) to other MAST missions
 - Moving Target Database/Interface
 - Starting to think about interface; may use the VO SkyBoT tool to identify observations



Some Current/Planned Activities

- HST/DADS [*M.Kyprianou, J.Scott*]
 - “Future of OPUS” project to replace pipeline software
 - Migrate to Linux and MS SQL
 - Move on-the-fly-reprocessing (OTFR) to the background so retrievals are much faster
- Kepler
 - New tools for light curve browsing and manipulation
- GALEX
 - Integrate GalexView and the MAP



2009 MUG Report Followup

- Some work deferred to deal with resource limits
 - Most GALEXview enhancements, moving target searches, AstroTag (science keyword indexing)
 - Still planned for future work
- Several items are planned to be addressed via portal
 - Enhanced user forum, personalized login & preferences, user data subscriptions & alerts, AstroTag
 - Note old user forum was shut down



2009 MUG Report Followup (HLA items)

- **Done:**
 - HLA image-of-the-month (<http://hla.stsci.edu/iotm/>): sample data products & tool usage
 - Help center improves documentation (incl. new HLA glossary)
 - Sextractor/DAOphot parameters are included in catalogs
 - Footprint polygons are in search result tables
- **In progress:**
 - Mosaic image production (much progress, still more to do)
 - Weight & rms maps available (will be improved with new format)
 - HLA “school” still in discussion (archive workshop Spring 2011?)
 - PASP paper still in preparation
- **Not yet:**
 - Multi-filter selection in spectral column; easy access to exposures from combined image; parallel-to-primary target links



2009 MUG Report Followup (Kepler items)

- *Establish common & proper time and “flux” units*
 - Time units still being worked by Kepler project
 - Light curves now in electrons/sec (better than previous electrons/cadence)
- *Make light curves easily accessible*
 - Direct FITS downloads for single curves and bulk data
 - Interactive preview tool for light curves
- *Enhance light curve search capabilities*
 - KIC fields available in data search (e.g., g-r color)
 - Not done: Searching by variability properties (e.g., varies by more than 0.5 mag)
 - Requires adding light-curve measurements to database (both quantities and method for keeping up-to-date are TBD)
- *Aside: Moving target experiments led to recognition that some asteroids cross Kepler fields; status flags added to Kepler data*



2009 MUG Report Followup (Misc. items)

- *Have survey ask for rankings of features*
 - Sorting is hard for users; current results seem clear on preferences
- *Put MAST missions in HLA footprint database*
 - Work is in progress; high priority for Senior Review
 - Observation data model work also relevant
- *Hide or tag outdated documents*
 - Mainly outside of MAST, but still needs attention
- *Enable larger inputs and outputs for searches*
 - CasJobs is being extended to other missions (allows very large queries, controls load on STScI resources through queue)
 - Kepler CasJobs in test, others will be added as resources allow
 - Note all databases are on one server, making extension fairly easy
 - ObsTAP VO interface will also allow large asynchronous queries



- end -

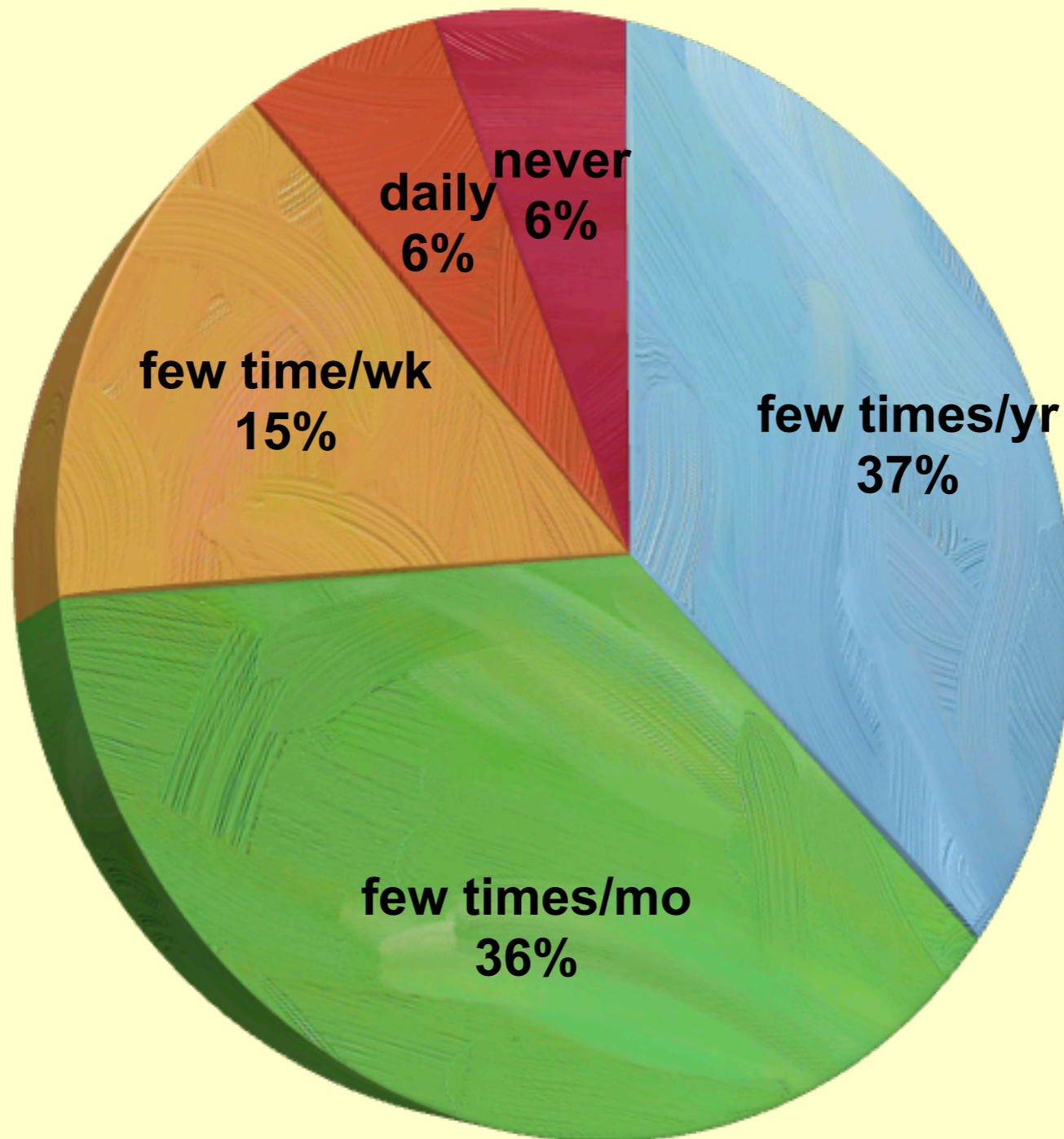


"User Survey Results"

Alberto Conti



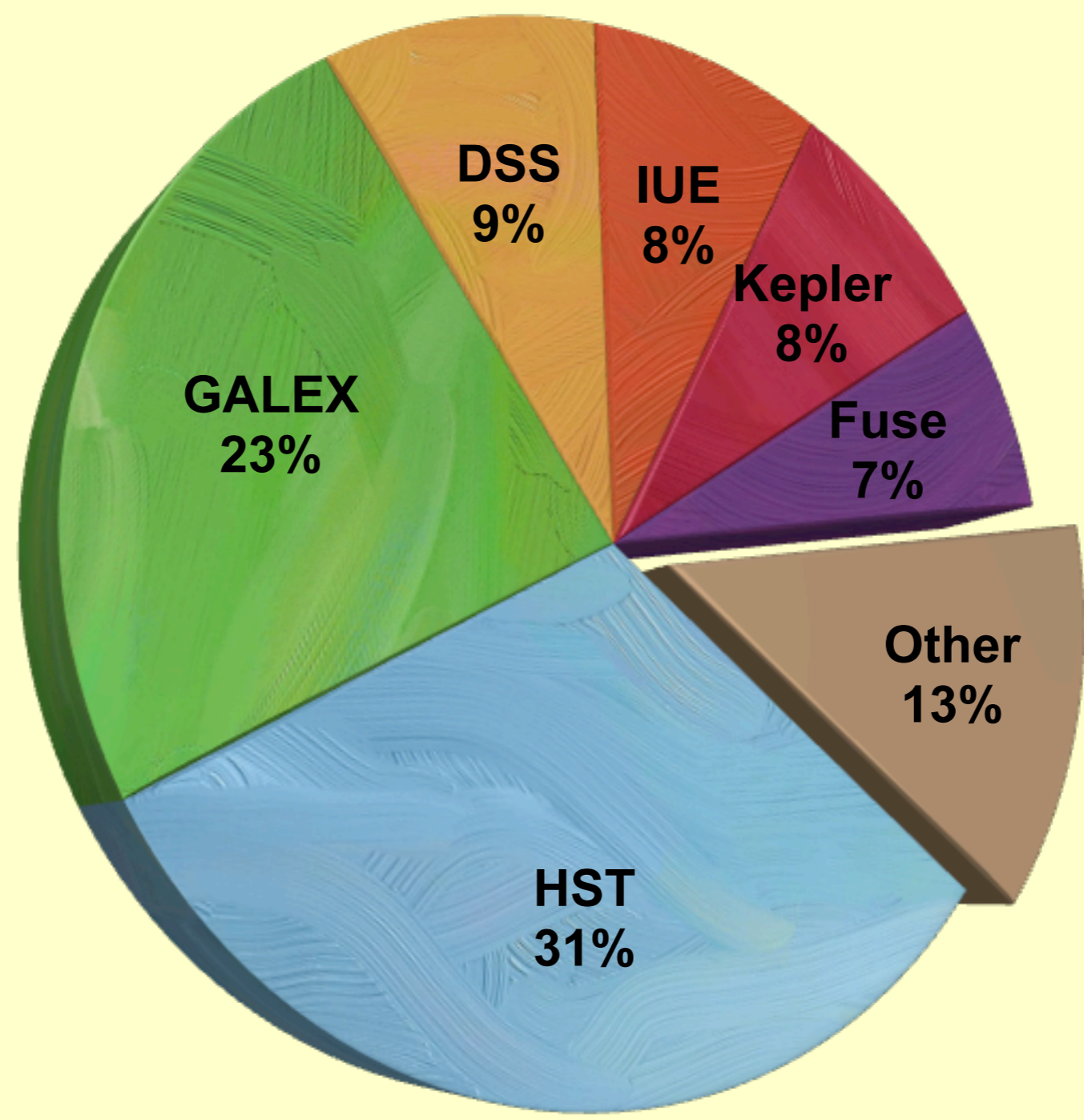
1. How often have you used MAST in the past 12 months?



126 Responses

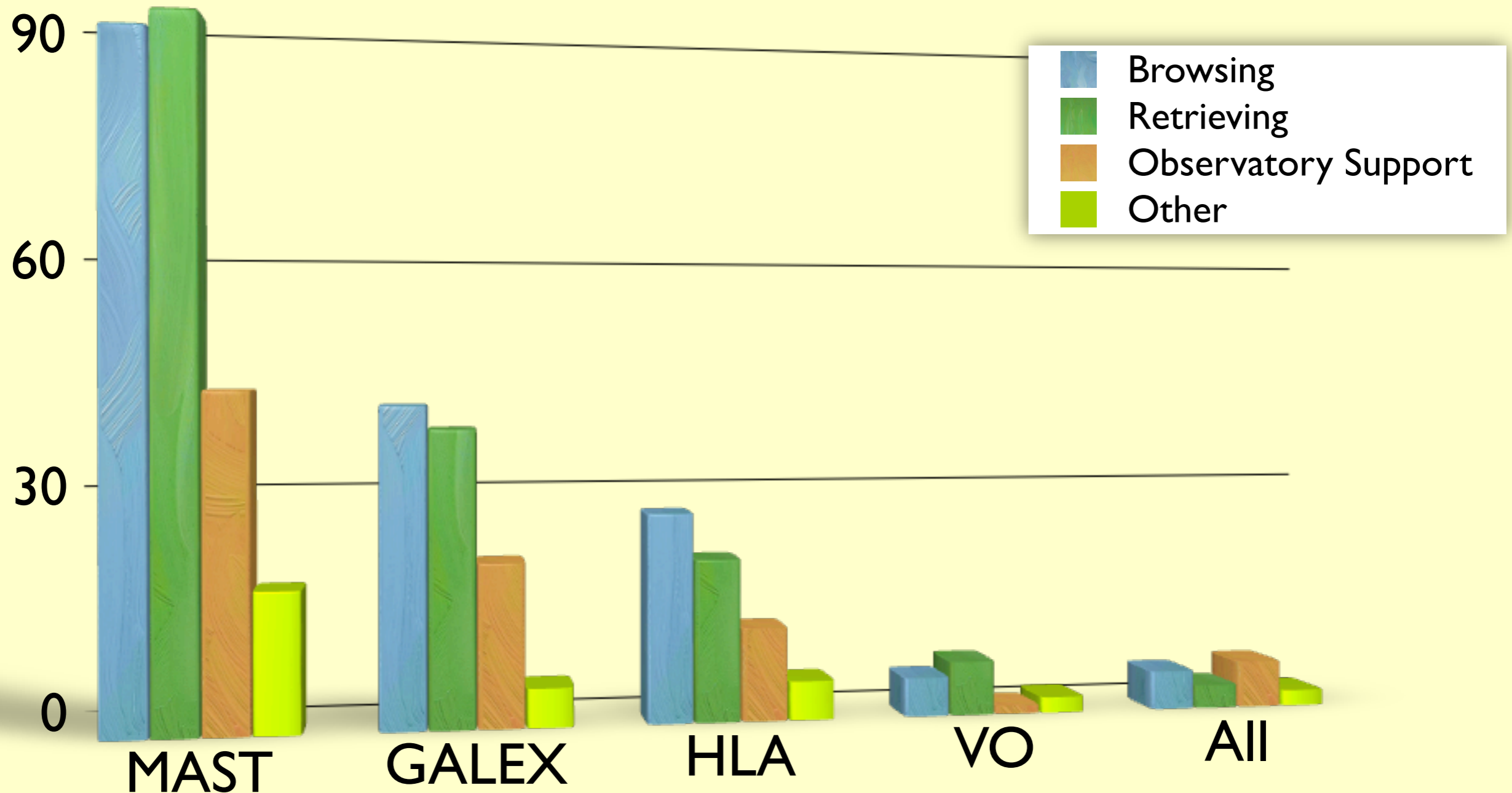


2. Which missions did you access?



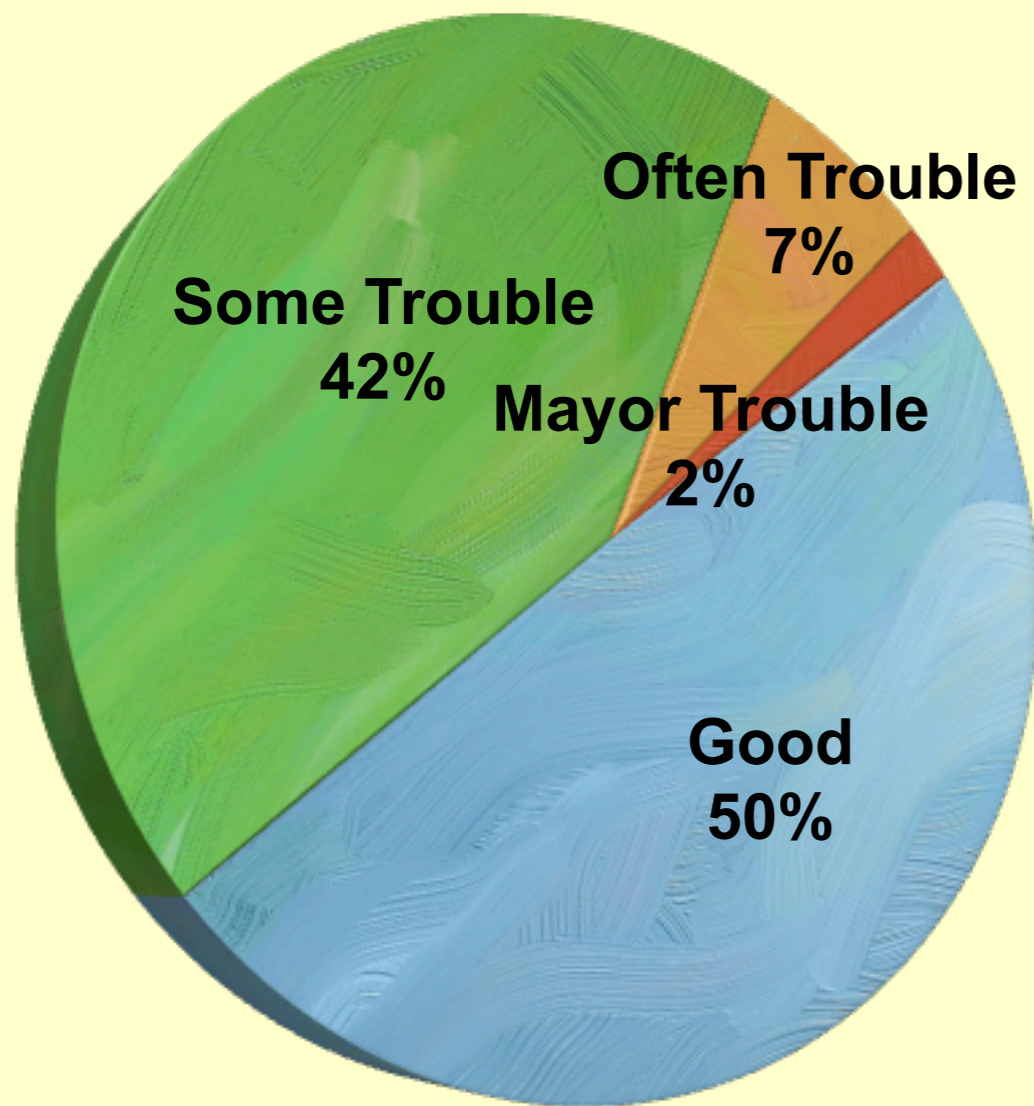


4. Which MAST interfaces do you commonly use?





5. Describe your experience with MAST documentation

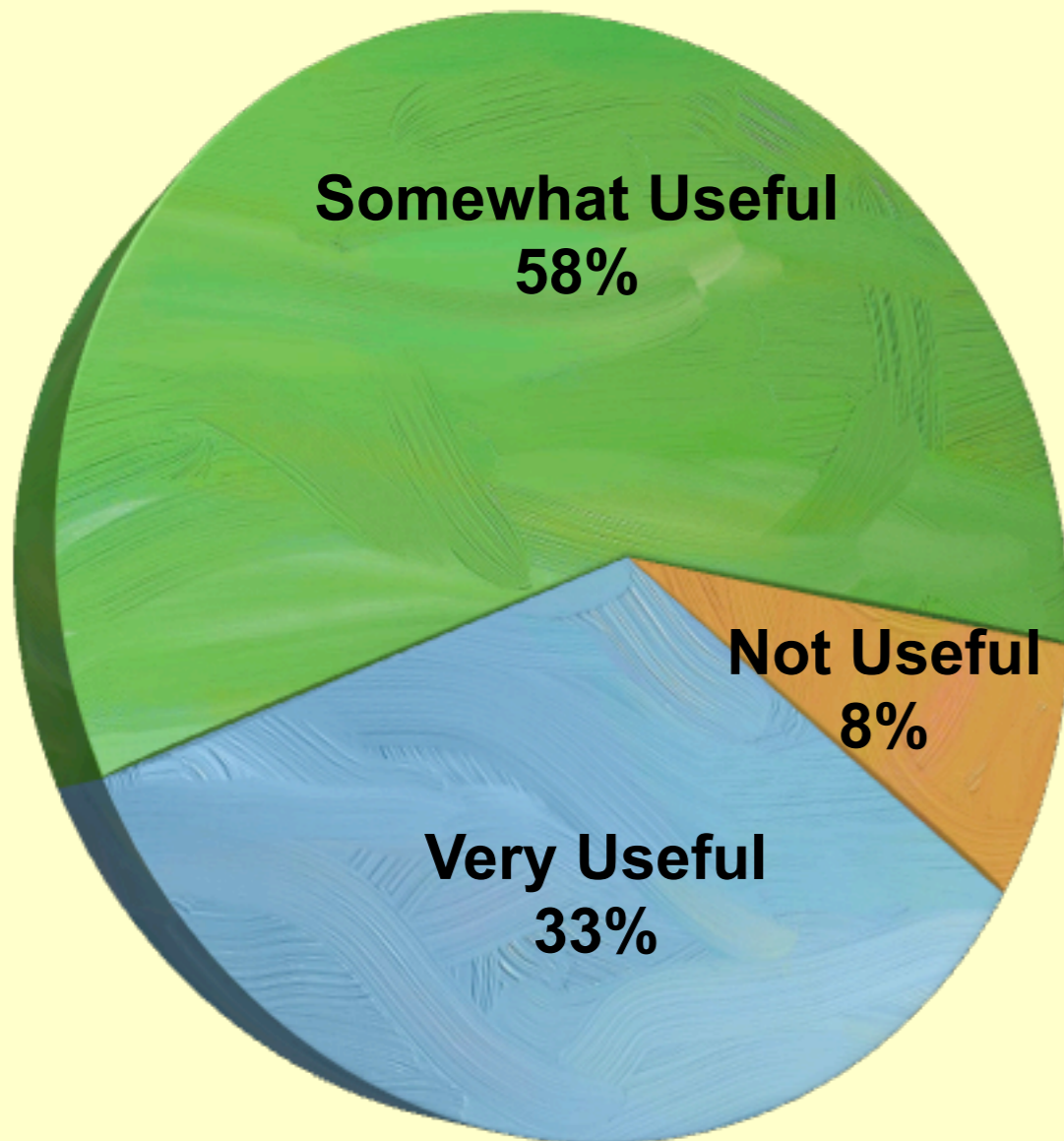


- “GALEX/Casjobs documentation [...] not sufficiently detailed”
- “Figuring out the difference in what units the counts were in for MAST and HLA data was confusing and difficult to find”
- “Add a link to a page that contains links to all available documentation related the mission + all available tools related this mission”

107 Responses



5. Describe your experience with the Kepler archive

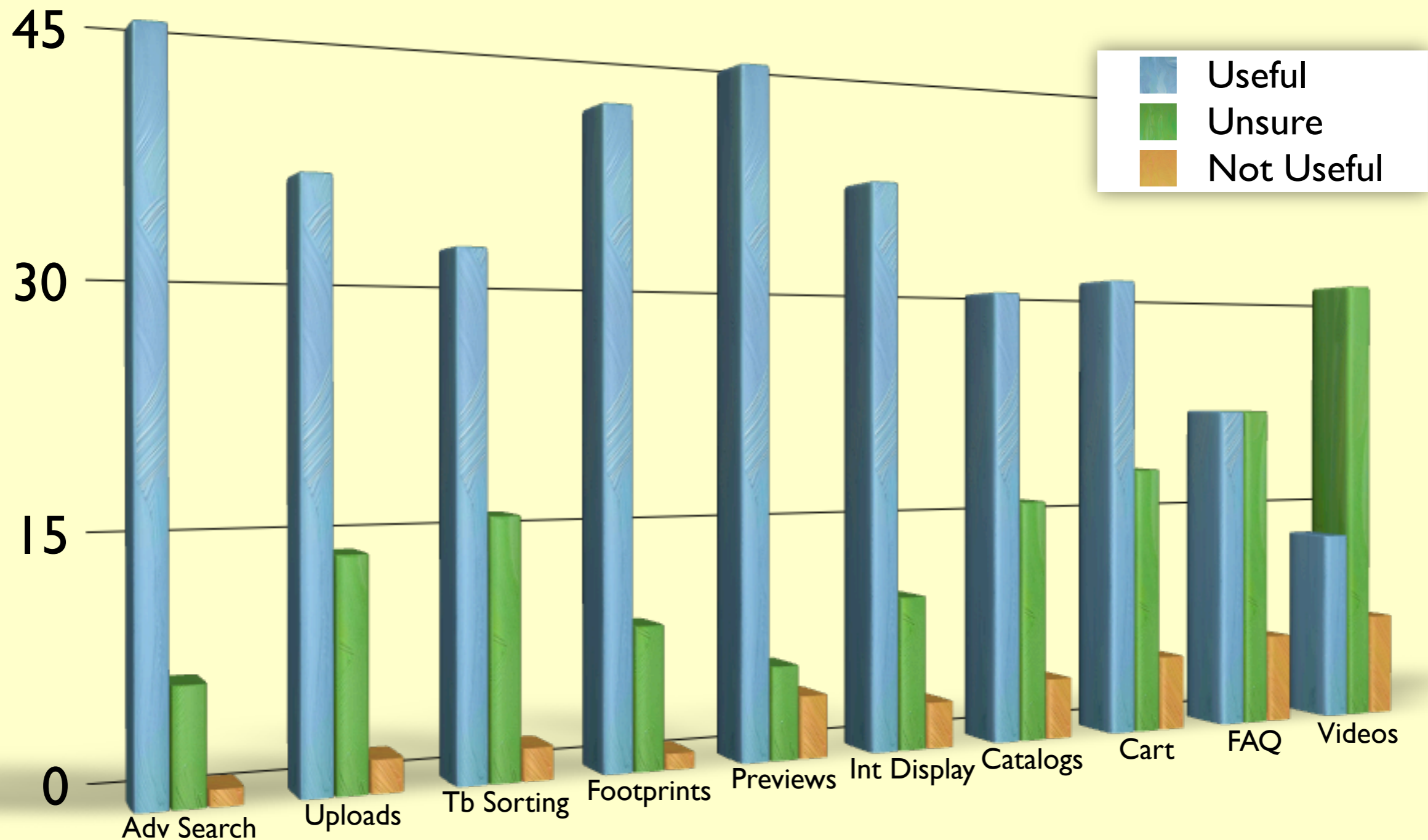


- “Would like to see some persistence added to the Web form”
- “Too little data available at this time to make a solid judgment”
- “I needed light curve for large amount of sources and it took me a while to find the 'ftp archive'”
- “The FITS files need to include flags indicating data quality”

24 Responses

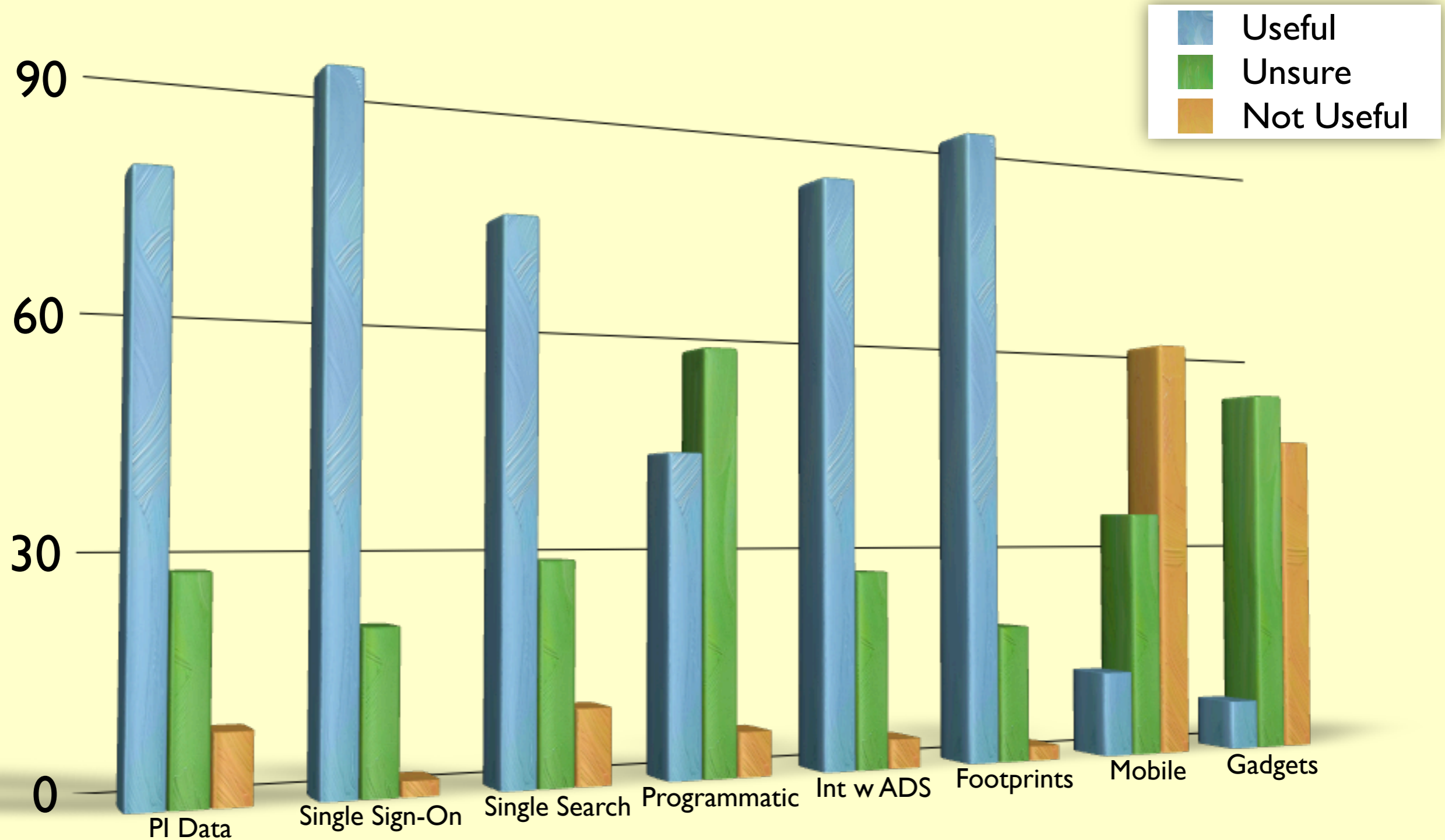


8. Please rate the usefulness of the following HLA tools



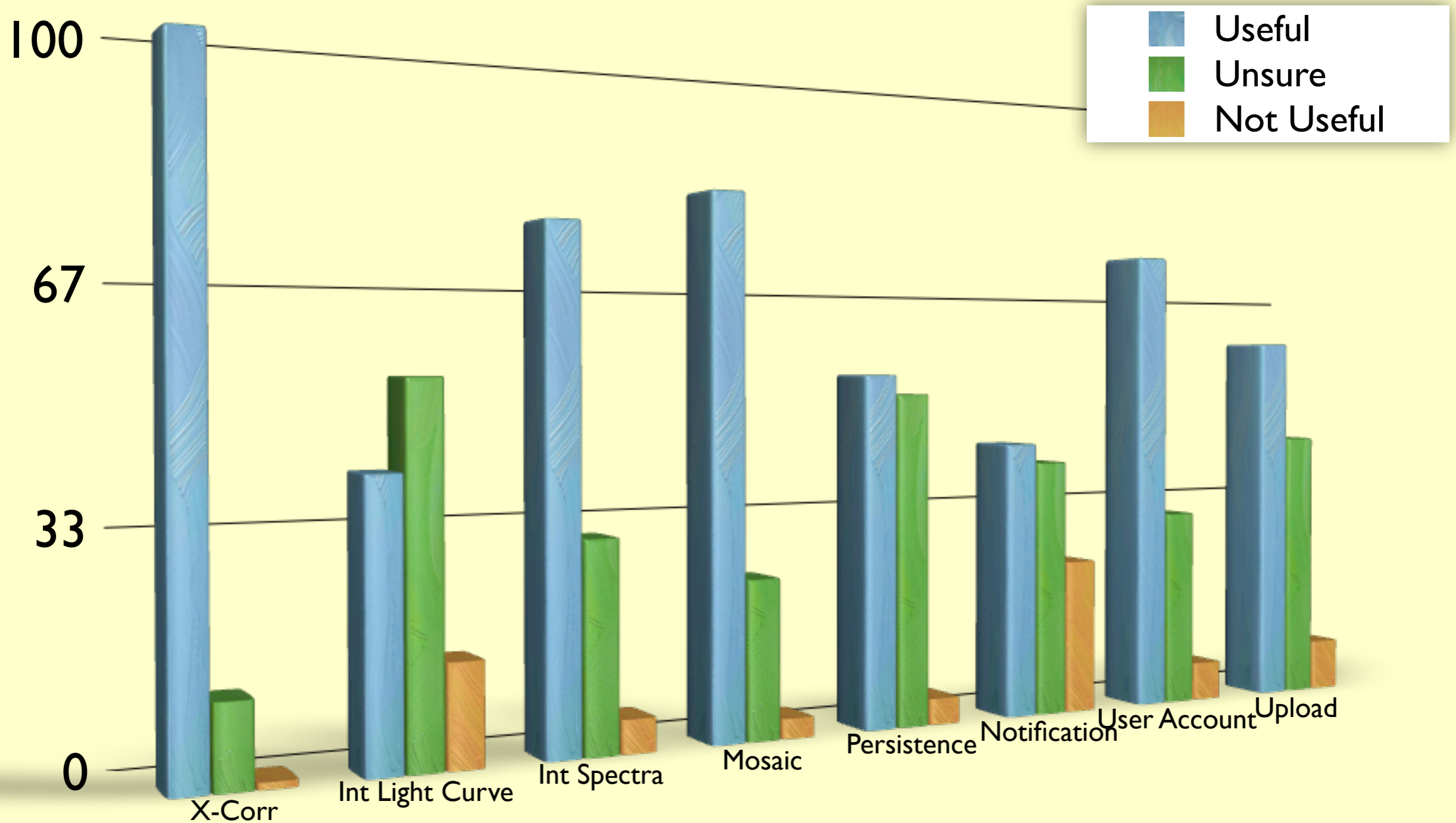


9. How important are the following for MAST overall success?





9. How important are the following for MAST overall success?





- “Add JWST instrument footprints, if possible.” [!!!]
- “An interactive plotting/image tool would be a big improvement.”
- “Integration with publications (ADS) is really very important for retrieving published data.
- “Support Starview which is much better than LAST”
- “It would be useful to cross correlate a user's provided catalogue (e.g. AKARI) with the whole content of external catalogues (e.g. 2MASS). I mean no limitations on the search radius.”

- “It's working really well for all my needs.”



- end -

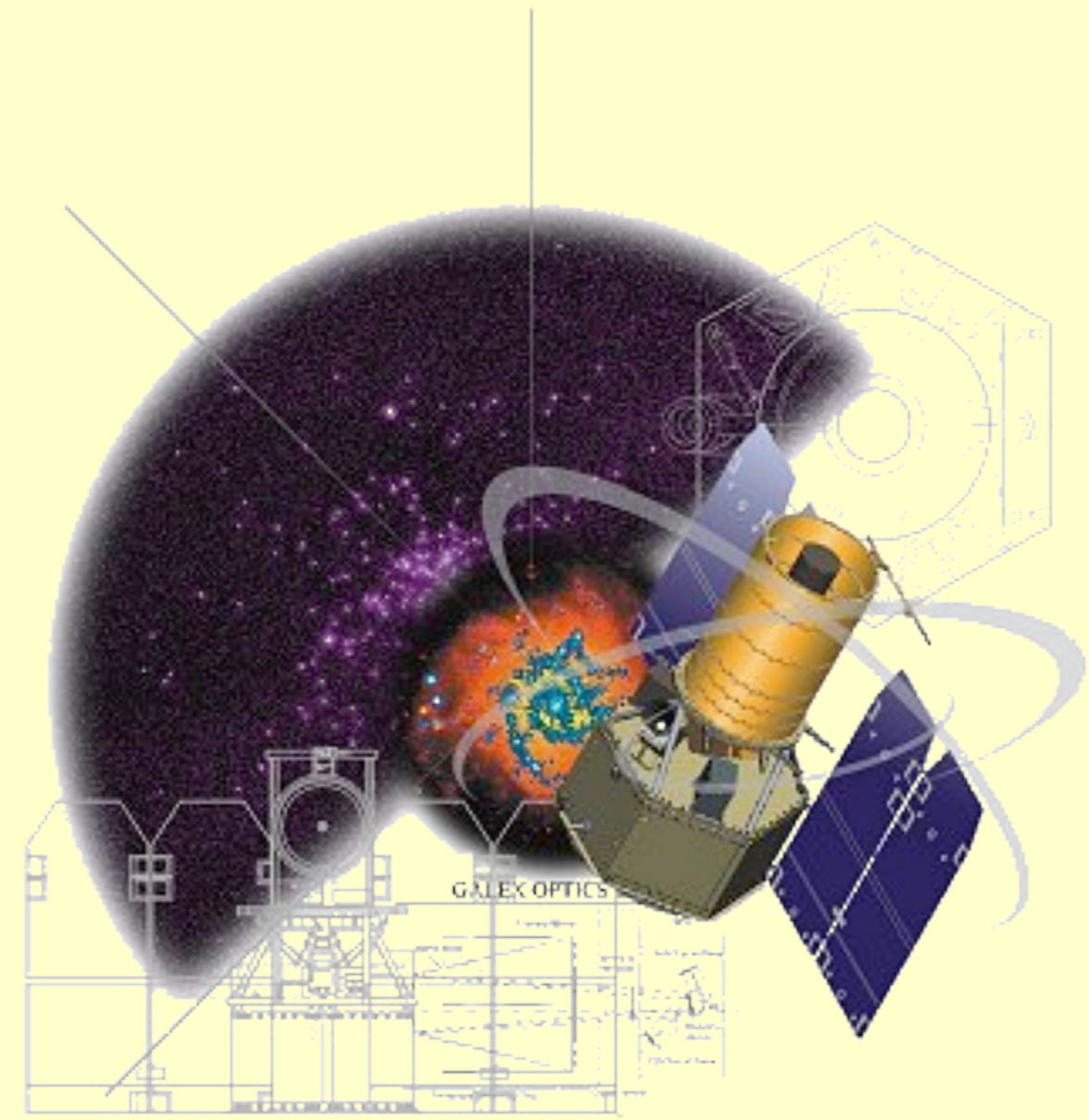


"GALEX Update"

Myron Smith



Galaxy Evolution Explorer



MAST Team:

- ^{cmo}Pat Brown
- Alberto Conti
- Tony Rogers
- Bernie Shiao
- Myron Smith
- Shui-Ay Tseng
- *A. Volpicelli



NGC 3242

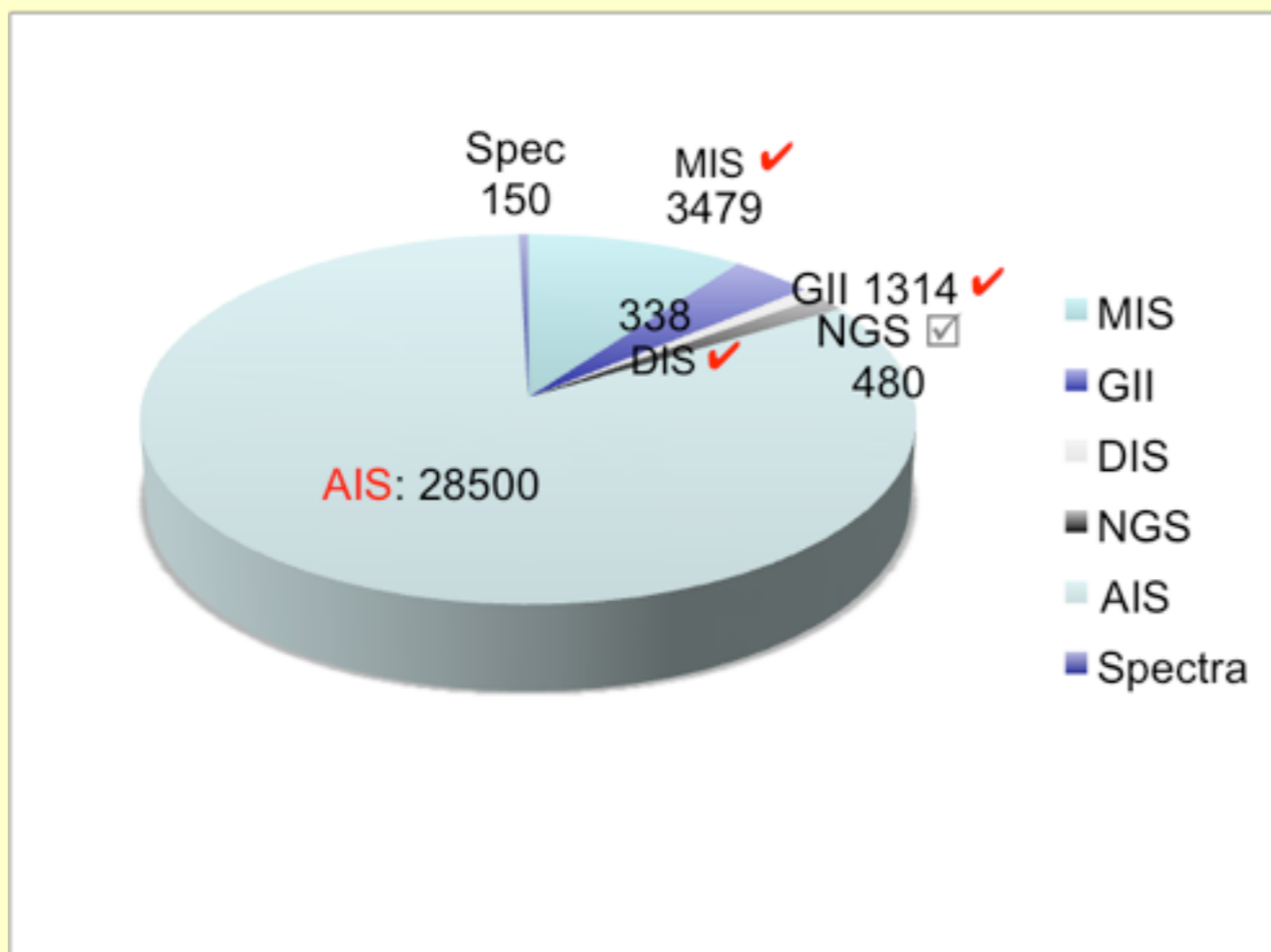


Recent/Upcoming Milestones:

- 12 monthly ingests of GI program datasets
- Spring/summer: delivery of GR6 imaging (except AIS), serving to public, to date **5231** tiles.
- Late 2010: GR6 will be supplemented by the first NUV/FUV cross-match catalogs, the “GCATT” (AIS, MIS surveys for objects up to 1’ in diameter).



GR6 Tile breakdown by Survey



- First 3 surveys now public
- NGS in progress (☑)
- AIS several deliveries
- Grism spectra this fall
- total volume: 20 TB



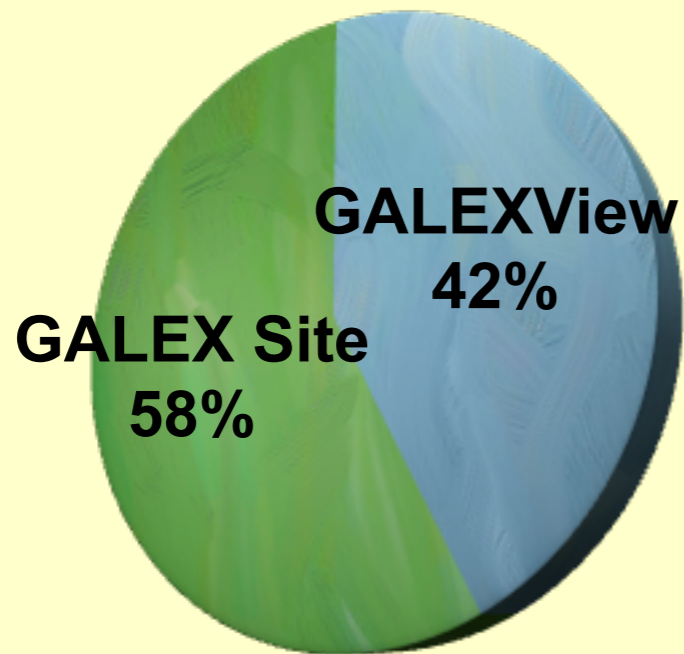
General Annual Usage Statistics (June 09 - May 10)

- Users
 - 28.6 (26.7) K visits (non-robotic, non-unique)
 - averages = 5.7 (5.5) min/visit, 5.4 (5.5) pages/visit
- Data download total
 - 7.6 (15.8) TB (> 1.2 X GR4+GR5 total data volume)

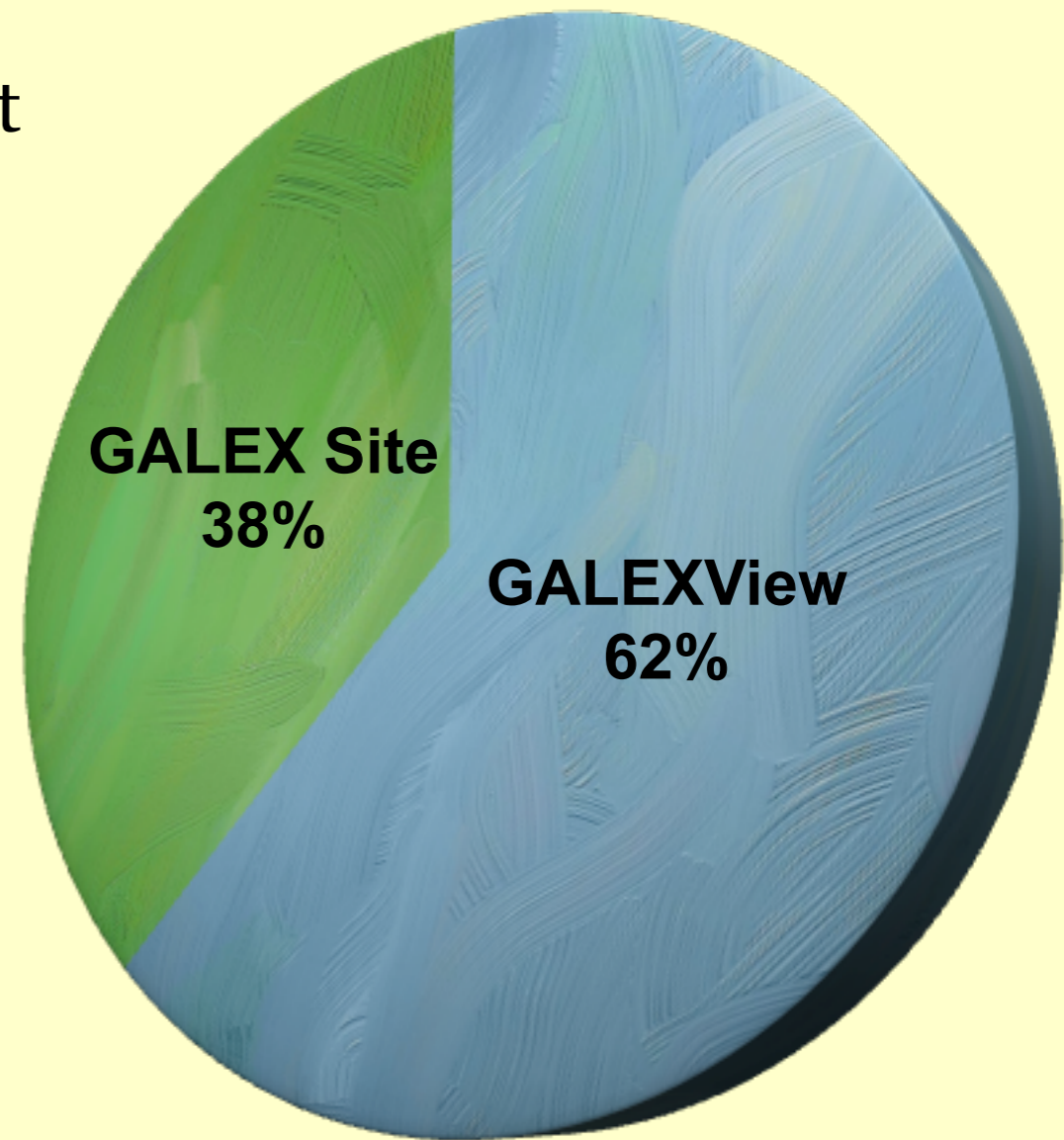
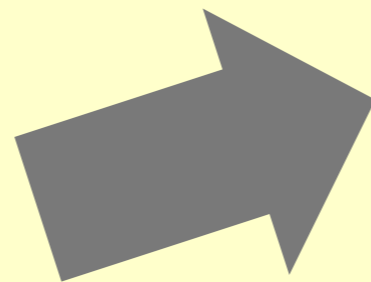


GALEXView

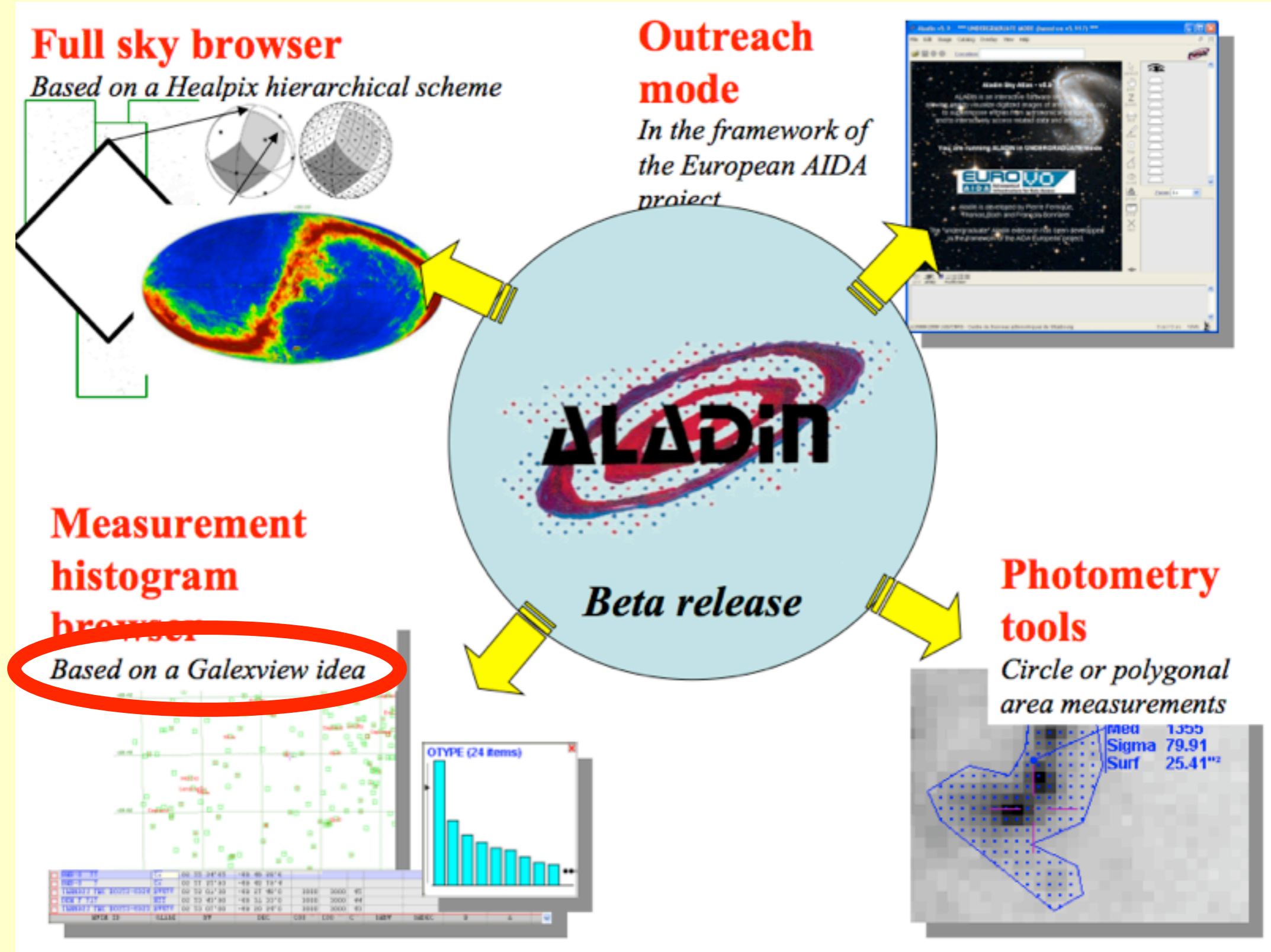
- galexView V1.4 declared a finished product
- new product will be a multimission search tool, integrating the Map and using a new viewer, “Astroview”



2009



2010





Tools and Services:

- Hosting of cross-match catalog: SDSS7 and GALEX GR4/5
 - available on CasJobs
 - includes tutorial
 - prototype of other cross matches, e.g. with Kepler

- CasJobs facility for Kepler also underway



GALEX Alerts this March and June:

- Failure of Far-UV detector in 05/09: FUV has been declared “non-operational”!
- GALEX GI Cycle 7 will proceed but NUV only
(proposal deadline: 10/29/10)



- end -



"HLA Update"

Rick White

for Stefano Casertano



Hubble Legacy Archive Status & Plans

Rick White
MAST Users Group
2010 July 16

<http://hla.stsci.edu/hlaview.html>

Hubble Legacy Archive
m51
Examples: M101, 14 03 12.6 +54 20 56.7 r=0.26, more...
Requires Firefox, Safari, IE7, or compatible browser

Inventory Images Footprints Cart, 0 kb Grism Spectra (ST-ECP) Help

m51 RA = 202.482194 Dec = 47.231509 r = 0.075000 [13:29:55.727 +47:13:53.43]

Results 1-20 of 224 Show 20 results per page

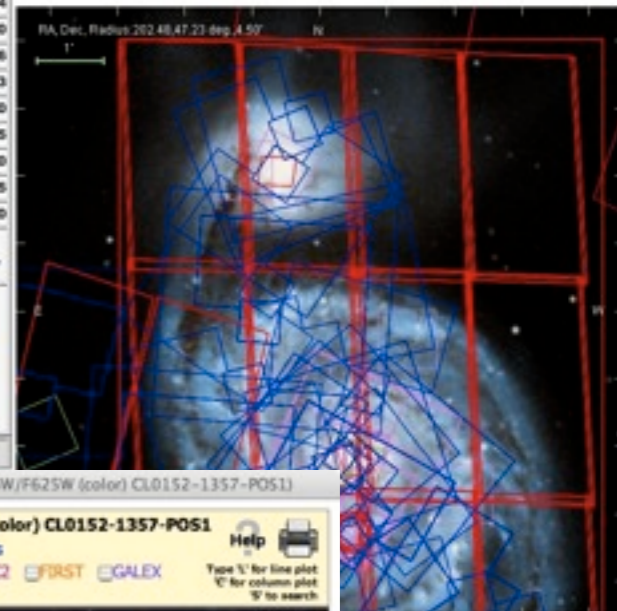
Display	Retrieve	RA	DEC	Level	Target	Detector	Aperture	Spectral_Elt
Display	<input checked="" type="checkbox"/> FITS	13:30:07.45	47:16:11.3	5	M51-POS6	ACS/WFC	WFCENTER	F435W
Display	<input checked="" type="checkbox"/> FITS	13:30:07.45	47:16:11.3	5	M51-POS6	ACS/WFC	WFCENTER	F555W
Display	<input checked="" type="checkbox"/> FITS	13:30:07.45	47:16:11.3	5	M51-POS6	ACS/WFC	WFCENTER	F658N
Display	<input checked="" type="checkbox"/> FITS	13:30:07.45	47:16:11.3	5	M51-POS6	ACS/WFC	WFCENTER	F814W

Instrument	#Footprints
<input checked="" type="checkbox"/> ACS	184
<input checked="" type="checkbox"/> ACSGrism	0
<input checked="" type="checkbox"/> WFPC2-PC	56
<input checked="" type="checkbox"/> WFPC2	83
<input checked="" type="checkbox"/> STIS	30
<input checked="" type="checkbox"/> NICMOS	55
<input checked="" type="checkbox"/> NICGrism	0
<input checked="" type="checkbox"/> FOS	15
<input checked="" type="checkbox"/> GHRS	0

DSS Image On Off

Data Product
 Exposure(Level 1)
 Combined(Level 2)
 Best Available
 Contributed HLSP
 Mosaic(Level 3)

Submit



Hubble Legacy Archive
M101
Examples: M101, 14 03 12.6 +54 20 56.7 r=0.26, more...
Requires Firefox, Safari, IE7, or compatible browser

Inventory Images Footprints Cart (empty) NICMOS Grism (ST-ECP) Help

M101 RA = 210.802458 Dec = 54.349094 r = 0.240000 [14:03:12.590 +54:20:56.74]

Results 1-16 of 16 (35 before filtering) Show 20 results per page

Click to select images

FITS2web image viewer (MOS_597 ACS/WFC...F775W/F625W (color) CL0152-1357-POS1)

MOS_597 ACS/WFC F850LP/F775W/F625W (color) CL0152-1357-POS1

Lighter Darker Invert advanced contrast controls Help

DAOPHOT EXTRACTOR SDSS ZMAGS GSC2 FIRST GALEX

5705 4898
01:52:42.200 -13:57:35.77
0.001329584

based on fits2web



Brief History of the Hubble Legacy Archive



- HLA project was established:
 - to create advanced HST data products (mosaic images, catalogs)
 - to prototype an archive interface using new web technologies
 - to build an interface on VO services (so there is only one set of services to maintain)
- Releases and principal data products:

EDR	2007 Aug	25% of ACS (“Level 2” advanced products), sample source lists
DR1	2008 Feb	90% ACS, NICMOS grism, 50% ACS catalogs
DR2	2008 Sep	95% ACS + WFPC2
DR2.5	2008 Dec	Contributed HLSP (e.g., GOODS, UDF, COSMOS)
DR3	2009 May	NICMOS, ACS grism, WFPC2 catalogs, sample ACS mosaics
DR4	2010 Mar	New NICMOS, WFPC2, ACS, HLSP; more ACS mosaics; early WFC3



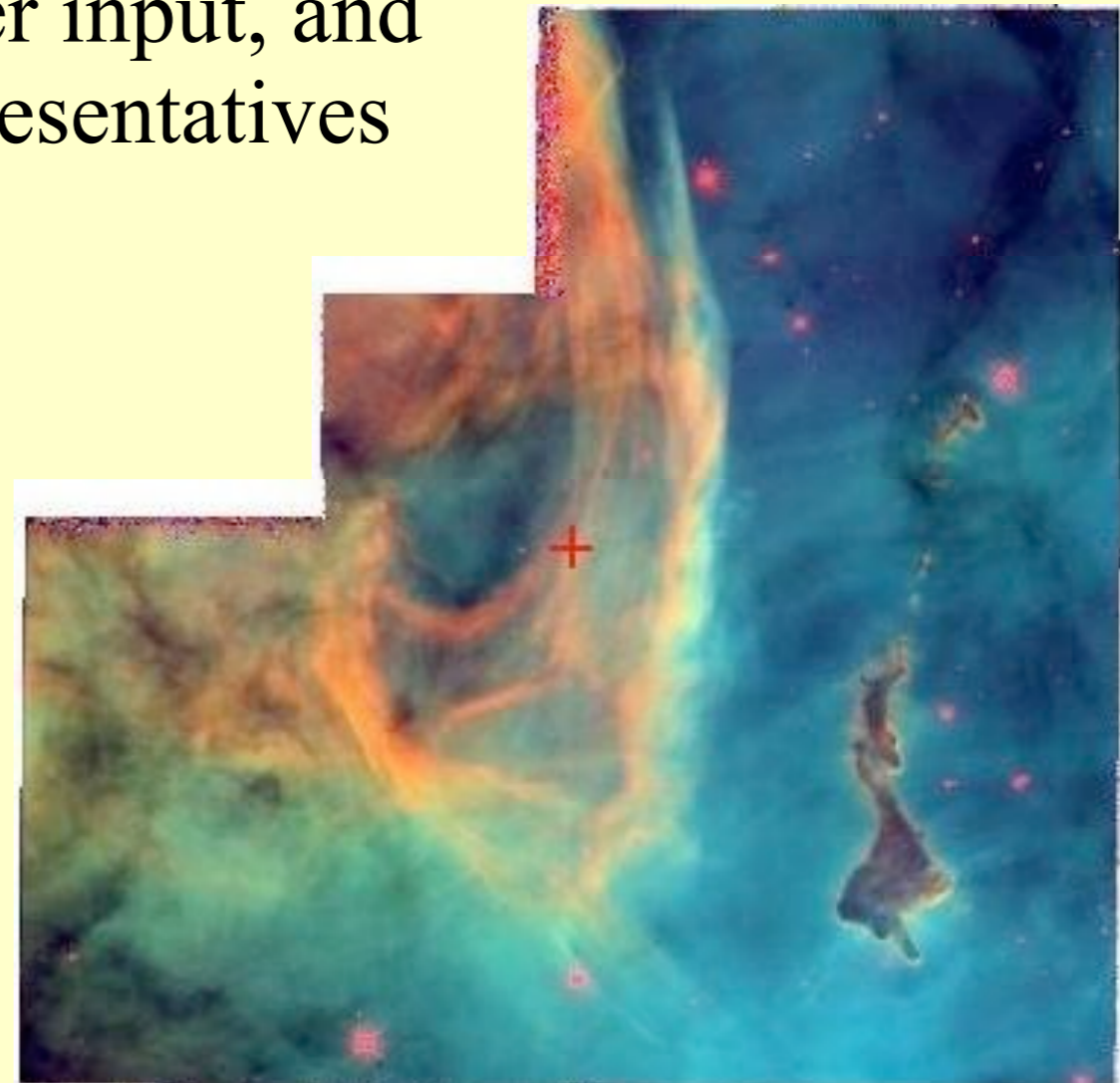
HLA and MAST

- HLA was initially funded through the HST contract
- HLA funded through MAST contract since October 2008
 - Additional funding allocated in 2008 Senior Review
- Ultimate goal: Merge HLA and MAST into one unified set of services and interfaces
 - Integrate functionality and lessons-learned from HLA with other MAST missions
 - Enable all search modes on MAST side for HLA too (e.g., complex searches, CasJobs access)
 - Active projects: Portal, footprint DB, storage broker



HLA Activities 2009–2010

- Integration with MAST team
- Strong presence at AAS meetings
 - Demo new features, collect user input, and interact with other archive representatives (e.g., Chandra, Spitzer)
- Data Release 4 (March 24, 2010)
- Planning for Data Release 5 (~ January 2011)





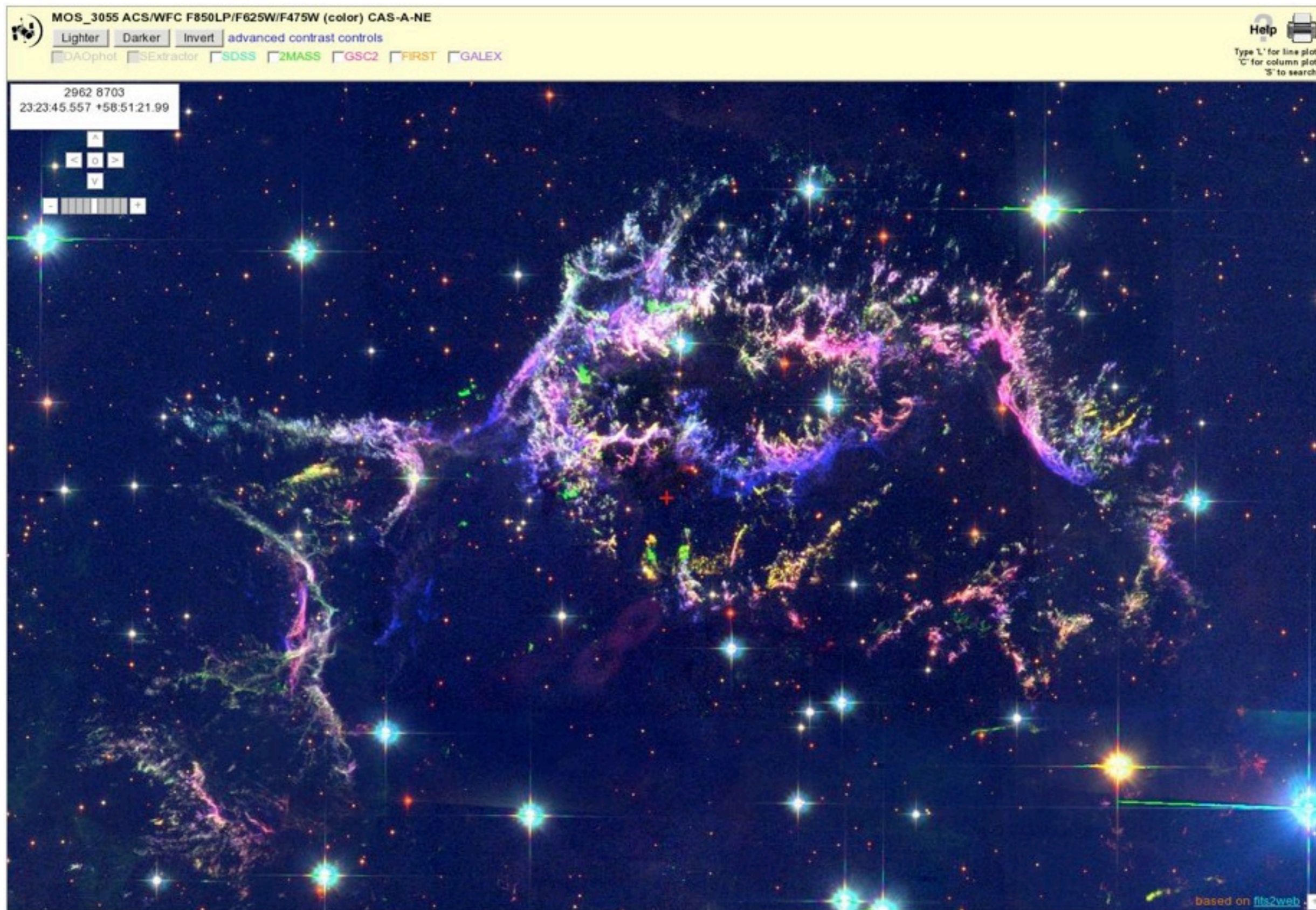
DR4 Data Products

- Reprocessed all **NICMOS** images
 - SAAClean issue affects a few percent of data
- Reprocessed **WFPC2** images & source lists (to Dec 2010)
- **ACS** data & source lists complete through Feb 2010
- **210 ACS multi-visit mosaics** (deep/wide fields)
- New **high-level science products**
 - Including WFC3 early release data
- Final ST-ECF **ACS grism spectra** release
 - ~ 48,000 spectra released 2010 July 6

<http://hla.stsci.edu/hlaview.html>

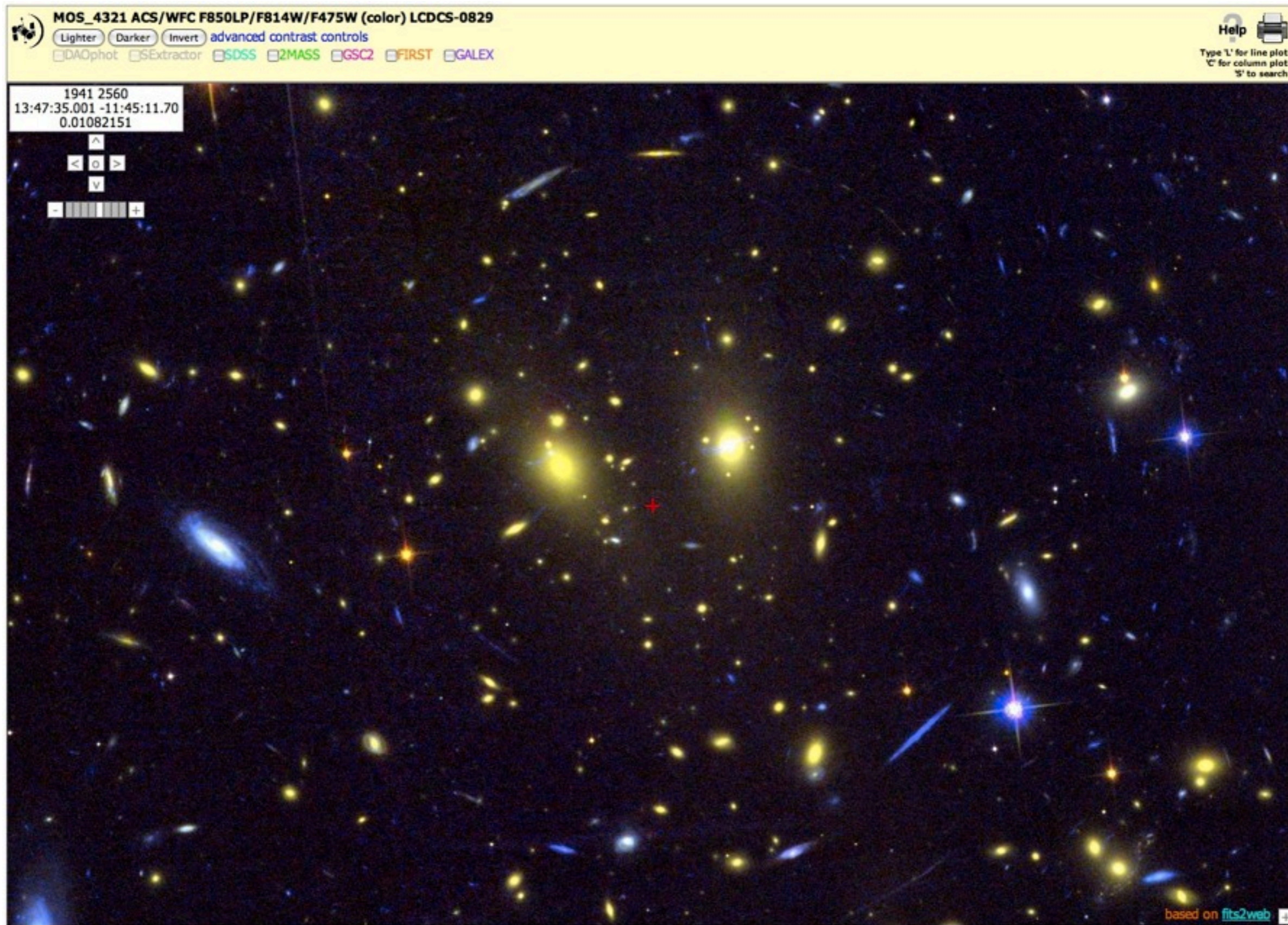


Mosaic: ACS image of the supernova remnant Cas A (F475W, F625W, F850LP)





Mosaic: ACS image of the galaxy cluster LCSDS 0829 (F475W, F814W, F850LP)





Mosaic: ACS image of the galaxy cluster CL0152-1357 (F625W, F775W, F850LP)

fits2web image viewer (MOS_597 ACS/WFC F850LP/F775W/F625W (color) CL0152-1357-POS1)

MOS_597 ACS/WFC F850LP/F775W/F625W (color) CL0152-1357-POS1

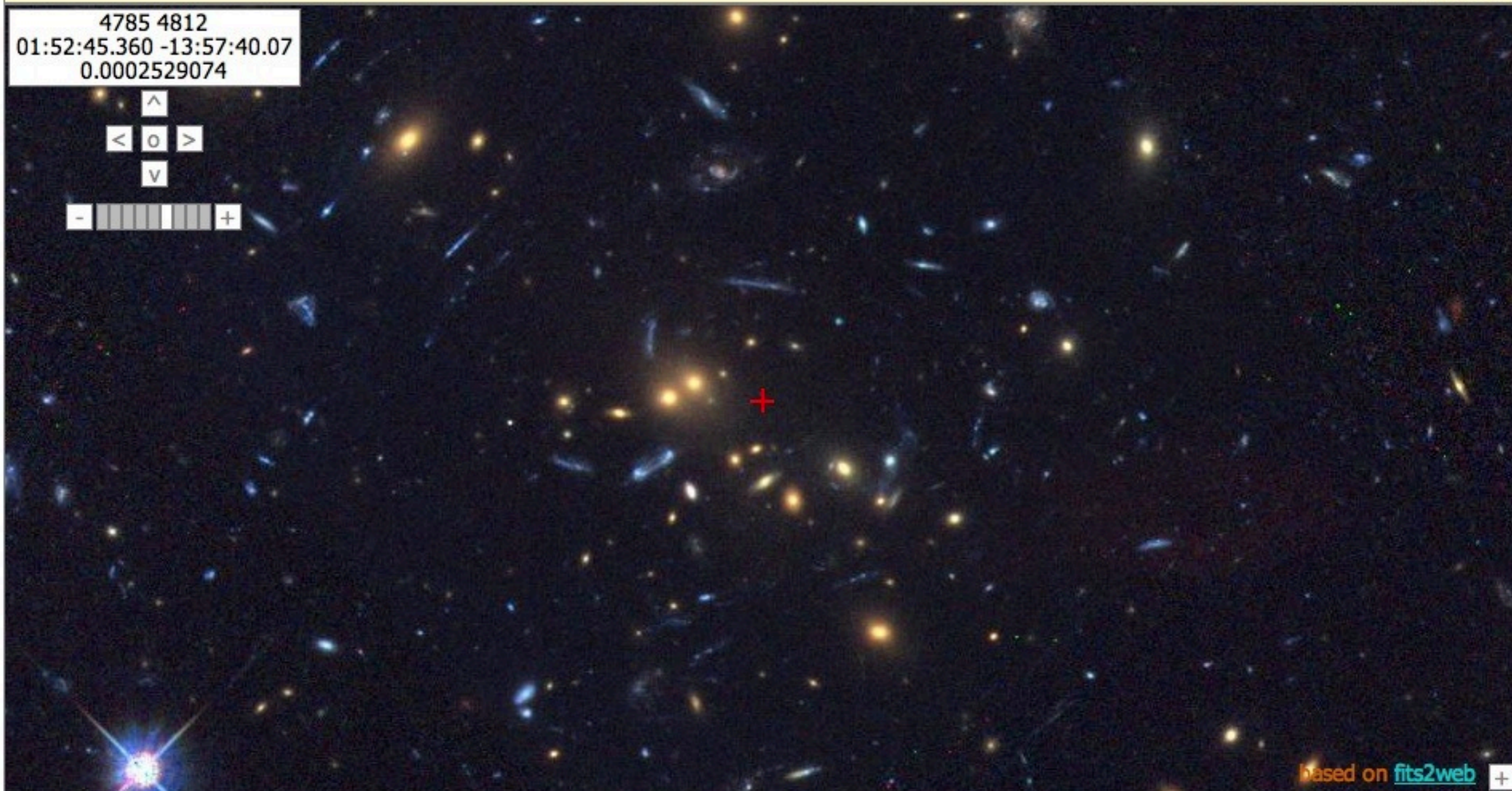
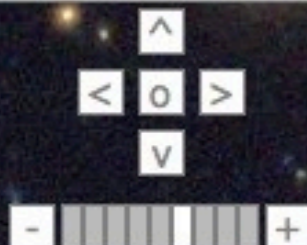
[advanced contrast controls](#)

DAOPhot SExtractor SDSS 2MASS GSC2 FIRST GALEX



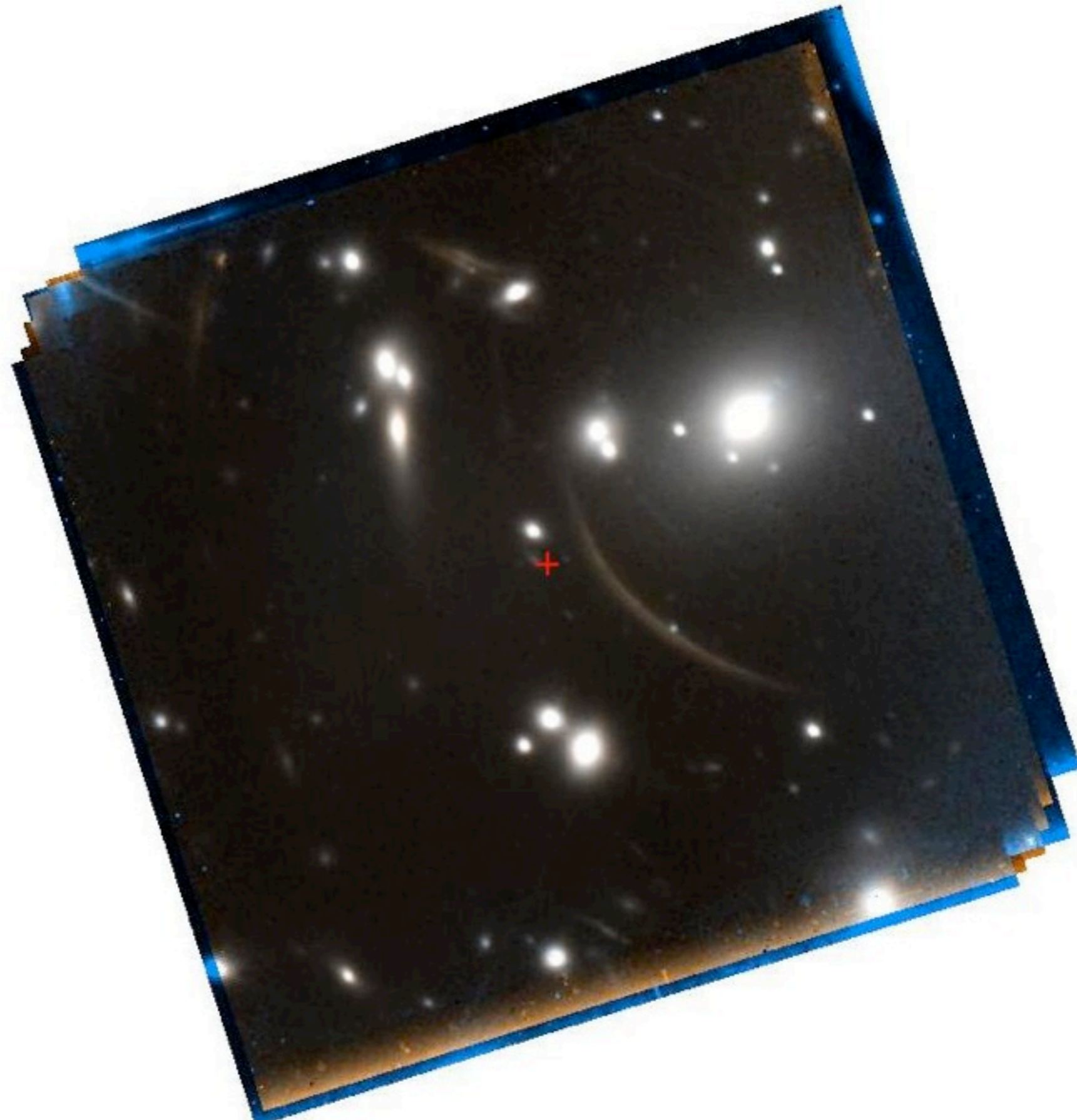
Type 'L' for line plot
'C' for column plot
'S' to search

4785 4812
01:52:45.360 -13:57:40.07
0.0002529074



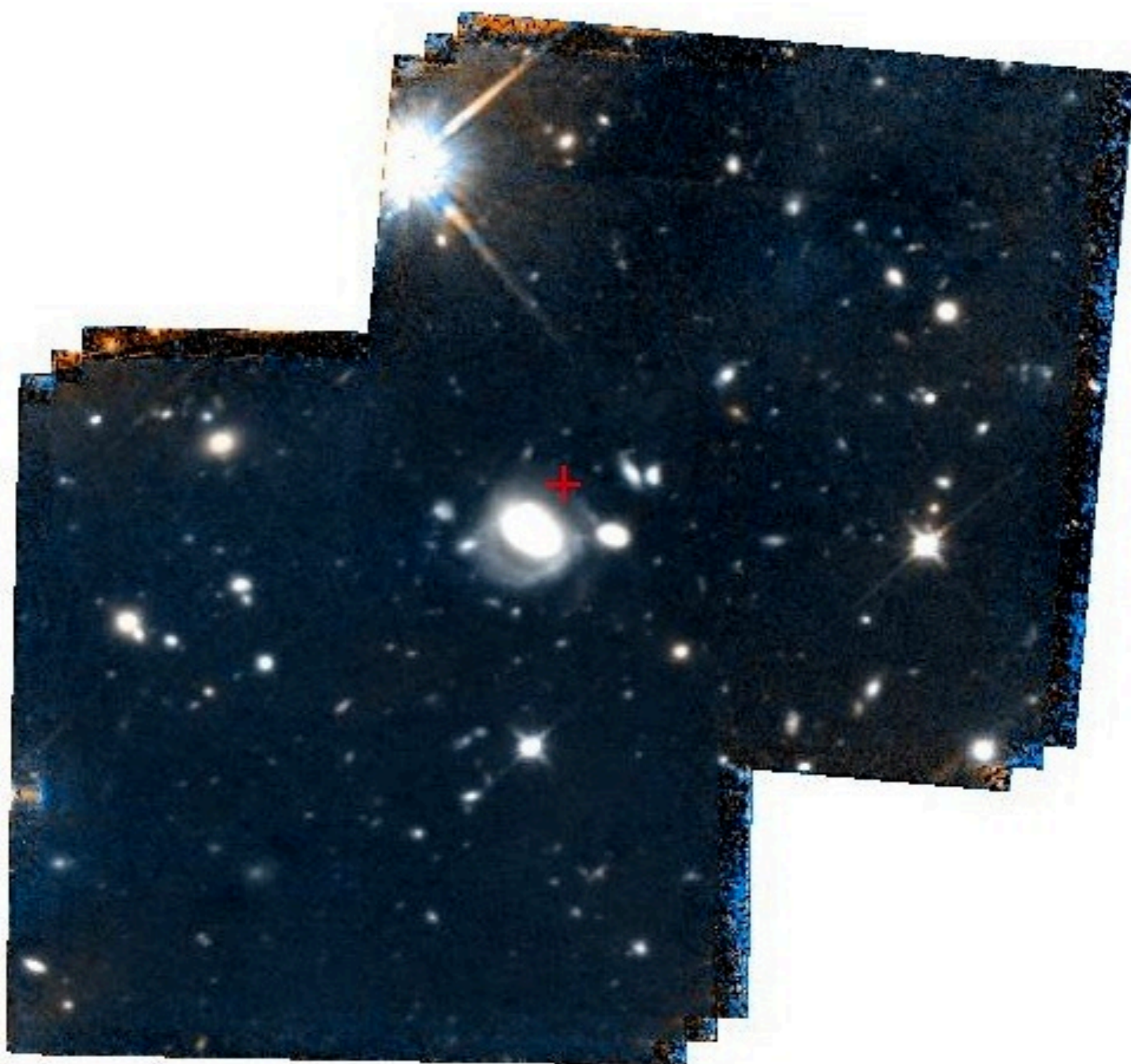
based on [fits2web](#)

NIC3 observation of a region in the lensing cluster Abell 2390 (F110W, F160W)





HLSP: Very deep NIC3 image near the UDF from GOODSNIC project (F110W, F160W)





ERO: WFC3/UVIS image of PN NGC6302 (F373N, F502N, F673N)





DR4 Interface Enhancement Highlights


- New **Help Center** with documentation search box
- **COS, WFC3** data included in search results and footprints (but no HLA-generated products yet)
 - **Proprietary** observations also included
- Search box accepts **dataset name** to search near a given observation
- Custom **column selection saved** in session status
- **Improved plotting** tool with zooming and panning
 - GHRS and FOS spectra are directly viewable in the plotting tool
- Interactive display shows **pixel value** in coordinate box
- **JPEG** images include **WCS** information (compatible with Aladin)



Help Center with documentation search

H) Welcome to the Hubble Legac... H) Hubble Legacy Archive Help ...

New [ACS grism spectra](#) released by ST-ECF (2010 July 6) Close x



Hubble Legacy Archive Help Center

The Hubble Legacy Archive Help Center is a portal of information, tips, exploration and support, encouraging the optimal HLA experience.

- [Release notes](#)
Details of the current release
- [Getting started](#)
A brief overview
- [FAQ](#)
Frequently asked questions
- [Movie tutorials](#)
Flash enabled tutorials
- [Forum](#)
View/post questions and comments
- [Glossary](#)
Alphabetical listing of terminology
- [News](#)
Learn about upcoming events
- [Contact us](#)
Via email

Search HLA Documentation:

 x

[presentation \[PPT\] - Star Clusters in Mergers](#)

Aug 25, 2008 ... The bottom three plots show significant offsets (-0.2 to 0.4 mag) between the WF and PC, due to greater CTE loss on the PC. ...
[hla.stsci.edu](#)

[Star Clusters in Mergers](#)

Aug 19, 2008 ... Charge Transfer Efficiency (CTE) has degraded with time. ... This image shows that the CTE trails are longer for objects at the top of the ...
[hla.stsci.edu](#)

[FAQ: Hubble Legacy Archive Frequently Asked Questions](#)

More specifically, if Charge Transfer Efficiency (CTE) is an important Unlike ACS, WFPC2 source lists explicitly include a correction for CTE based on ...
[hla.stsci.edu](#)

1



Using the improved Plotting Tool



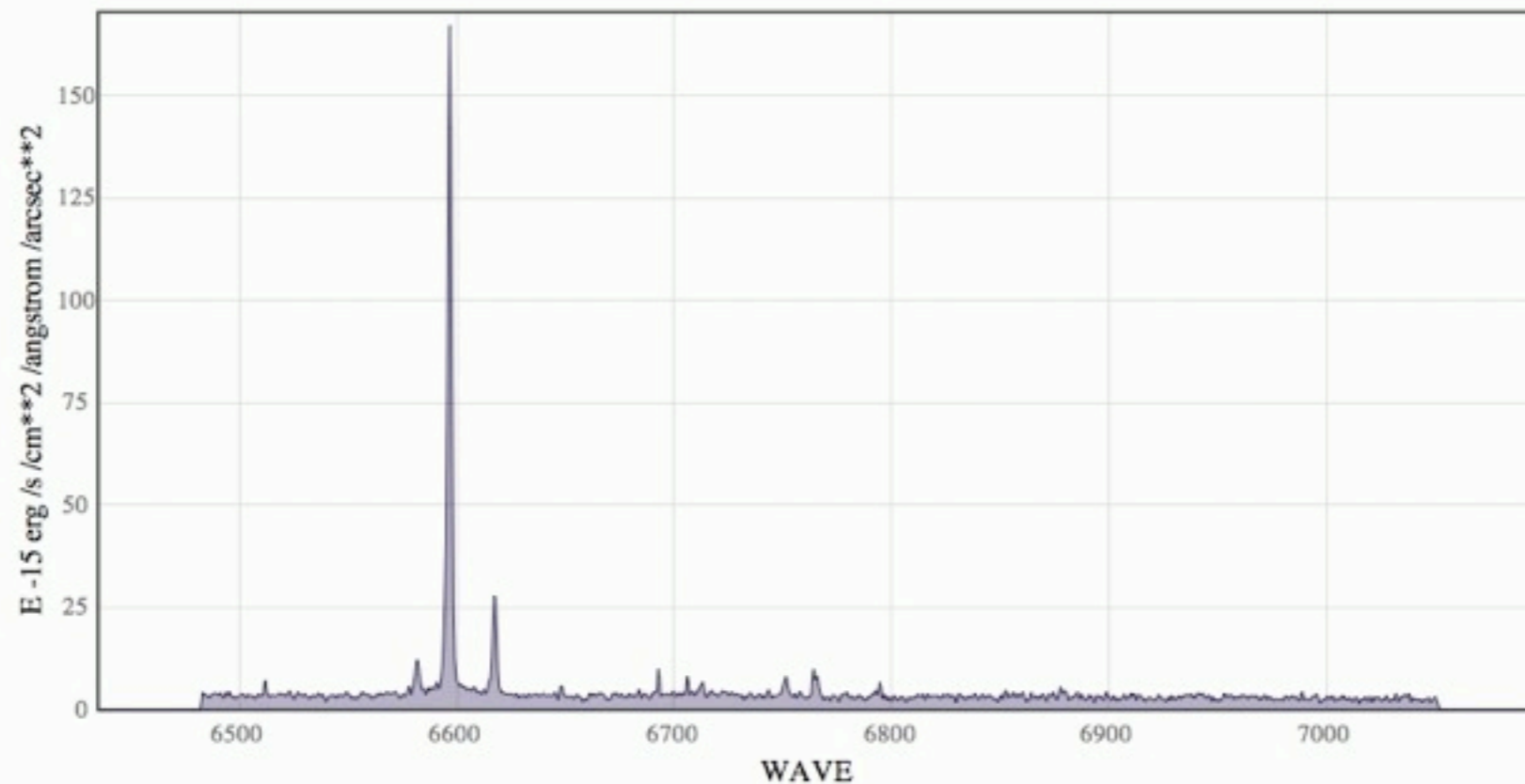
Hubble Legacy Archive

Image of the Month for June 2010

Antennae Galaxy: Emission Line Spectra from Young Star Clusters

O5HE06010 (Line 758)

Click point to get value



6611.2178, 3.8998

Enable Fitting

Flux	376.5623
Continuum	55.1387
Flux Wt. Cent.	6596.3648
Equiv. Width	-56.6792
Rest Wave	<input type="text" value="6564.614"/>
Redshift	0.0048
Velocity	1.45E3



Central Row: Coadd (total rows):

X Axis Units: Smooth (width in pixels):



DR4 Infrastructure Changes

- Automated data processing **pipelines**
 - Data processing under NHPPS control with advanced messaging
 - Used for ACS & NICMOS image processing, ACS & WFPC2 source lists
- **Source lists** now exist only as database entries
 - Downloaded catalog files are produced upon demand, and include parameters used to generate lists
 - Leads to better consistency and more flexibility in download formats
- **Database servers** upgraded
 - Hardware now includes full fail-over capabilities plus separate servers for test and operational databases
- **APT support**
 - HLA footprint DB supports Astronomer Proposal Tool for Hubble proposal preparation




Future Plans (DR5)

- Complete development of **new footprint interface** based on FLEX
 - Demoed at January and June AAS, preliminary version in test
- Improve **ACS mosaic** pipeline
 - Relax restrictions on timing, cosmic ray treatment
 - Implement **new data format**
 - Different multidrizzle extensions, table for info about exposures
 - Improve sky handling (**sky equalization**, not sky subtraction)
 - Enhance registration algorithm
 - Create mosaic source lists
- Implement **WFC3 product pipeline**
 - Use new data format and processing from ACS mosaic pipeline
- Move towards an **automated, incremental** product deployment model
 - Generate & release new products as data become public



New footprint display (in development)



Hubble Legacy Archive (Dev)

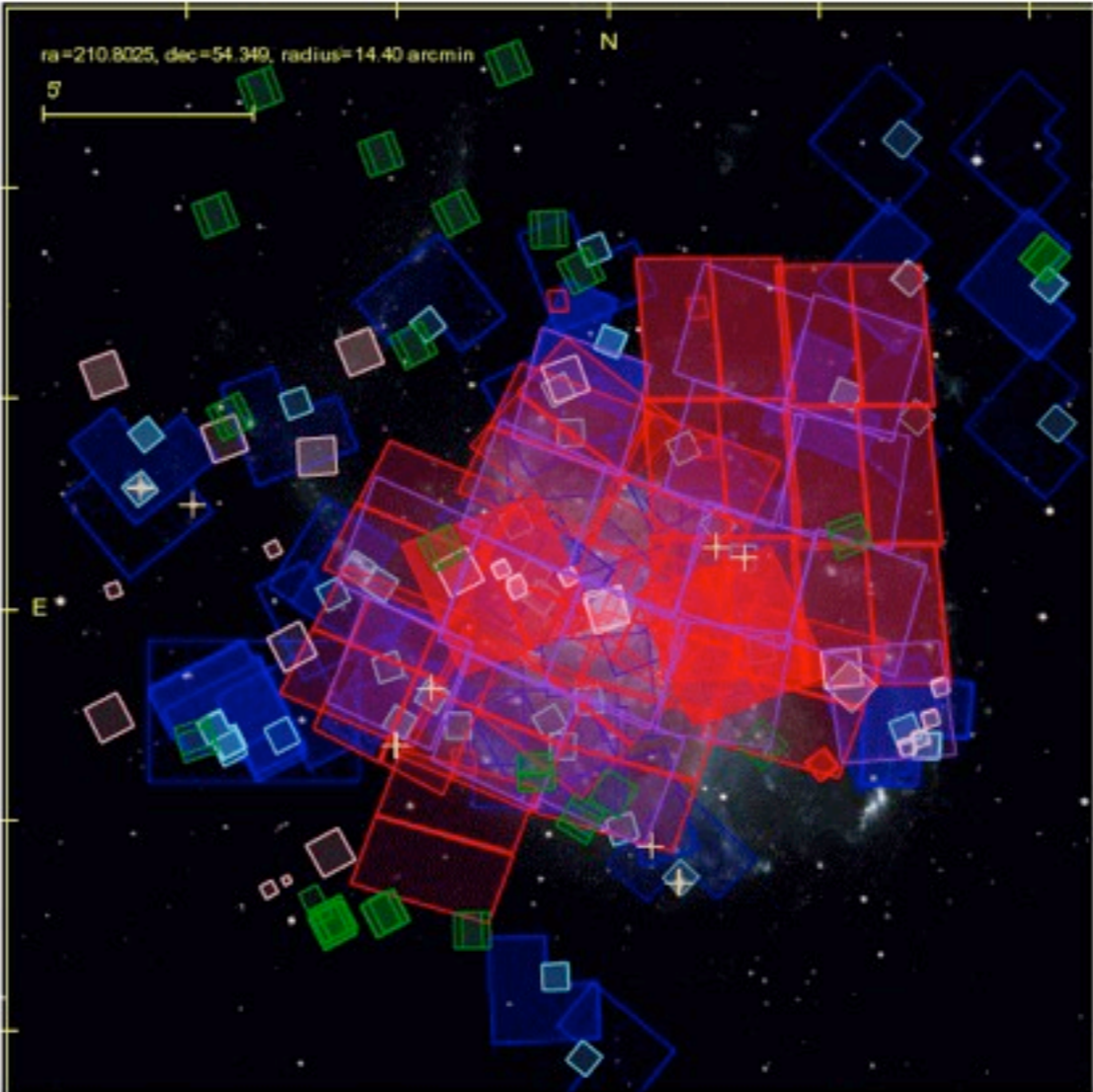
M101 [advanced search](#)

Examples: M101, 14 03 12.6 +54 20 56.7 r=0.2d, more...
Requires Firefox, Safari, IE, or compatible browser

[Inventory](#) [Images](#) [Dev Footprints](#) [Footprints](#) [Cart, 0 kB](#) [Grism Spectra \(ST-ECF\)](#) [Help Center](#)

Instruments	#Footprints
<input checked="" type="checkbox"/> ACS	205
<input checked="" type="checkbox"/> ACSGrism	0
<input checked="" type="checkbox"/> WFC3	17
<input checked="" type="checkbox"/> WFPC2	363
<input checked="" type="checkbox"/> NICMOS	122
<input checked="" type="checkbox"/> NICGrism	0
<input checked="" type="checkbox"/> COS	0
<input checked="" type="checkbox"/> WFPC2-PC	355
<input checked="" type="checkbox"/> STIS	170
<input checked="" type="checkbox"/> FOS	60
<input checked="" type="checkbox"/> GHRS	0

DSS Image
 On Off



You can use the keyboard to zoom in with = or +, or zoom out with -.

M101 RA = 210.802460 Dec = 54.349090 r = 0.240000 [14:03:12.590 +54:20:56.72]



Future Plans (Beyond DR5)

- Extend **absolute astrometry** improvement to all HST data
 - Typical accuracy 0.1–0.2” (worst-case 0.4”)
- Integrate user interface with **MAST portal**
 - Enable persistent user-specific preferences
 - Facilitate operations that require validation
 - Common look-and-feel for seamless integration across interfaces
- Possible areas for longer-term development:
 - Work with WFC3 team on grism analysis tools
 - Develop source lists and produce uniform metadata for HLSP
 - Continue work with Chandra, Spitzer to integrate footprint data
 - Evaluate new software tools for enhanced interface (Tony’s AstroView)
 - Incorporate new ST-ECF “one-box” approach for advanced searches: <http://archive.eso.org/archive/hst/search/>



- end -



"Kepler Update"

Dorothy Fraguelli &

Myron Smith



- MAST provides the archive user interface for Kepler data, primarily light curves, but also Full Frame Images (FFIs) and, eventually, target pixel data.
- ASB Staffing for Kepler
 - Shui-Ay Tseng
 - Randy Thompson
 - Myron Smith



MAST/Kepler as of 2009 MUG

- Standard MAST search interface for KIC and modified KIC
 - > For use in proposal preparation to locate targets
- Standard MAST search interface for data in prep
 - > password protected version existed
 - > of limited use as no data in the archive



MAST/Kepler as of 2010 MUG

Too many for one slide

**Alternative Retrieval Method
for Public Kepler Lightcurves**

Kepler Dropped Target List

The list below describes the latest set of targets made public by the Kepler project

Data Release Notes

and more

Quick Links

Pointers to items of main interest to archive users, prominently displayed on the Kepler home page

Links include interfaces, documentation and help



The screenshot shows the MAST Kepler website in a Mozilla Firefox browser window. The page features a navigation menu with links for MAST, STScI, Tools, Mission_Search, Tutorial, and Site Search. Below this, there are links for Kepler Home, About Kepler, Getting Started, Registration, Kepler Data Search, Kepler Target Search, and FFI Search. The main content area is divided into three columns. The left column contains a Data Search box and a list of links: FAQ, GO Program, Search & Retrieval, MAST Services, Data Release Notes, Data Reduction & Analysis, Documentation, Related Sites, Images, Publications/News, Data Use Policy, and Acknowledgments. The middle column is titled "Quick Links" and contains a list of links with descriptions: Kepler Data Search, Kepler Target Search, General Search Information, Kepler Public Light Curves, Kepler Data Release Notes, Pipeline Processing Papers, and List of "False Positives". The right column is titled "NEWS" and contains a list of news items with dates: June 15, 2010 (Kepler Public Data Release), May 14, 2010 (EPOCH Data Now Archived at MAST), April 22, 2010 (Kepler Q3 Public Dropped Target Data now available as a tarfile), April 19, 2010 (Kepler Data Release Notes 4 now Available), and April 09, 2010 (Dusty Interacting Galaxy GADGET-SUNRISE Simulations [DIGGSS]). Below the news section is a "Missions" section with a list of mission names: Hubble, Hubble Legacy Archive, HSTonline, DSS, EPOCH, GALEX, KEPLER, XMM-OM, BEFS (ORFEUS), Copernicus, EUVE, FUSE, and GSC.

Quick Links

- [Kepler Data Search](#) - search for and retrieve Kepler Data.
- [Kepler Target Search](#) - find targets on the Kepler CCDs.
- [General Search Information](#) - Information on search syntax.
- [Kepler Public Light Curves](#) - Information on quick access to the public lightcurves.
- [Kepler Data Release Notes](#) - these notes describe the data, the processing, and the known deficiencies associated with each release of Kepler data, including the most recent one. They are a critical read for anyone wishing to draw scientifically valid conclusions from the analysis or interpretation of Kepler data.
- [Pipeline Processing Papers](#) - Three [SPIE](#) papers presented at the [Software and Cyberinfrastructure for Astronomy Conference](#) (27-30 June 2010) describe the main components of the Kepler data processing system.
- [List of "False Positives"](#) - A list of light curves showing planetary transit-like features, but which further analysis led the science team to conclude that something else caused the feature.

Kepler Mission Description

Kepler, a NASA Strategic mission launched into an Earth-trailing heliocentric orbit on March 6, 2009, is designed to stare at a 105 square degree region of the sky in the constellations of Cygnus and Lyra. The mission's goal is to obtain long-term, unfiltered, and precise light curves of up to 100,000 cool stars and search for periodic transits of planets as small as the Earth. A secondary objective of the mission is to study rapid oscillations of the target stars in order to determine their ages, radii, and metallic chemical compositions. The [Kepler Science](#) page and [Science Goals](#) pages lay out the scientific objectives in some detail.

Data Search Interface

Standard MAST search form, with usual form elements.

Help is obtained by clicking on links, either for the fields, or general links in the upper right of the form (standard).

Users may add up to 4 additional search fields, and many output columns.

Output may be HTML, VOTable, cvs, excel spreadsheet (standard).

The screenshot shows the Kepler Data Search & Retrieval interface in Mozilla Firefox. The browser title is "KEPLER Search - Mozilla Firefox". The address bar shows "101797a7-...". The page has a navigation menu with links: "Kepler Home", "About Kepler", "Getting Started", "Registration", "Kepler Data Search", "Kepler Target Search", and "FFI Search". The main heading is "Archive Status Kepler Data Search & Retrieval" with a "(Help) Field Descriptions" link. Below the heading are two tabs: "Standard Form" (selected) and "File Upload Form". The form contains several input fields and buttons:

- Buttons: "Search", "Reset", "Clear Form".
- Fields: "Target Name", "Resolver" (value: NED), "Radius (arcmin)" (value: 0.02), "Right Ascension", "Declination", "Equinox" (value: J2000).
- Fields: "Kepler ID", "Investigation ID", "2Mass ID", "KEP Mag", "Target Type" (with checkboxes for "Long Cadence" and "Short Cadence"), "Release Date", "Teff", "Log G".
- Fields: "User-specified field 1" (value: Kepler ID), "Field Descriptions", "User-specified field 2" (value: Kepler ID), "Field Descriptions", "User-specified field 3" (value: Kepler ID), "Field Descriptions", "User-specified field 4" (value: Kepler ID), "Field Descriptions".
- Fields: "Output Columns" (list: Mark, Kepler ID, Investigation ID, Dataset Name, Quarter, RA (J2000), Dec (J2000), Target Type, Actual Start Time, Actual End Time), "Sort By:" (value: ang_sep ()), "Reverse" checkboxes, "Output Coords:" (radio buttons for "Sexagesimal", "Hours", "Degrees"), "Output Format" (value: HTML_Table), "Show Query", "Make Rows Distinct", "Maximum Records:" (value: 1001), "Records per Page:" (value: 50).
- Buttons: "add", "add all", "up", "down", "remove", "reset".

At the bottom of the form, there are buttons for "Search", "Reset", and "Clear Form".

Searchless Retrieval

For public data, ftp download is provided.

Light curves grouped by kepler_id and quarter.

Wget script is provided.

MAST Kepler Public Light Curves - Mozilla Firefox

Schema Expl... DPAS 101797a7-me... MAST Kepler ... MAST K... x

MAST STScI Tools Mission_Search Tutorial Site Search

Kepler Home About Kepler Getting Started Registration Kepler Data Search Kepler Target Search FFI Search

Alternative Retrieval Method for Public Kepler Lightcurves

Kepler's public data may be retrieved without submitting a batch request. These public data have been staged in a directory area that is available through anonymous ftp or through the browser.

We are creating tarfiles of the public lightcurves to make it easy to download of these data. Each tarfile contain a single quarter's worth of data of one of three groups of public targets:

- Dropped Target data
- Published Target data
- Other public data

As of June 15, 2010 the following data are available: Dropped targets for Quarters 0, 1, and 3. Public data from Quarters 0 and 1.

These data are found in the area <http://archive.stsci.edu/pub/kepler/lightcurves/tarfiles/> and are also available via anonymous ftp on archive.stsci.edu
cd /pub/kepler/lightcurves/tarfiles

WGET Script We have also provided a set of wget scripts that when executed will download the public light curves. These scripts are located in the same directory as the tarfiles. Please read the README file. <http://archive.stsci.edu/pub/kepler/lightcurves/tarfiles/>

All public data are also online as individual files. To see the directory through your browser go to <http://archive.stsci.edu/pub/kepler/lightcurves/>

You will note that the data have been group by the first four digits of the Kepler ID, e.g. 0007, 0008....0129. Under each of these directories, there is a directory for each public Kepler ID, where all public Kepler lightcurves will be stored.

For instance there are two datasets to be found in the directory: <http://archive.stsci.edu/pub/kepler/lightcurves/0104/010480861/>, each corresponding to a different quarter.

The path to these data via anonymous ftp is the same:

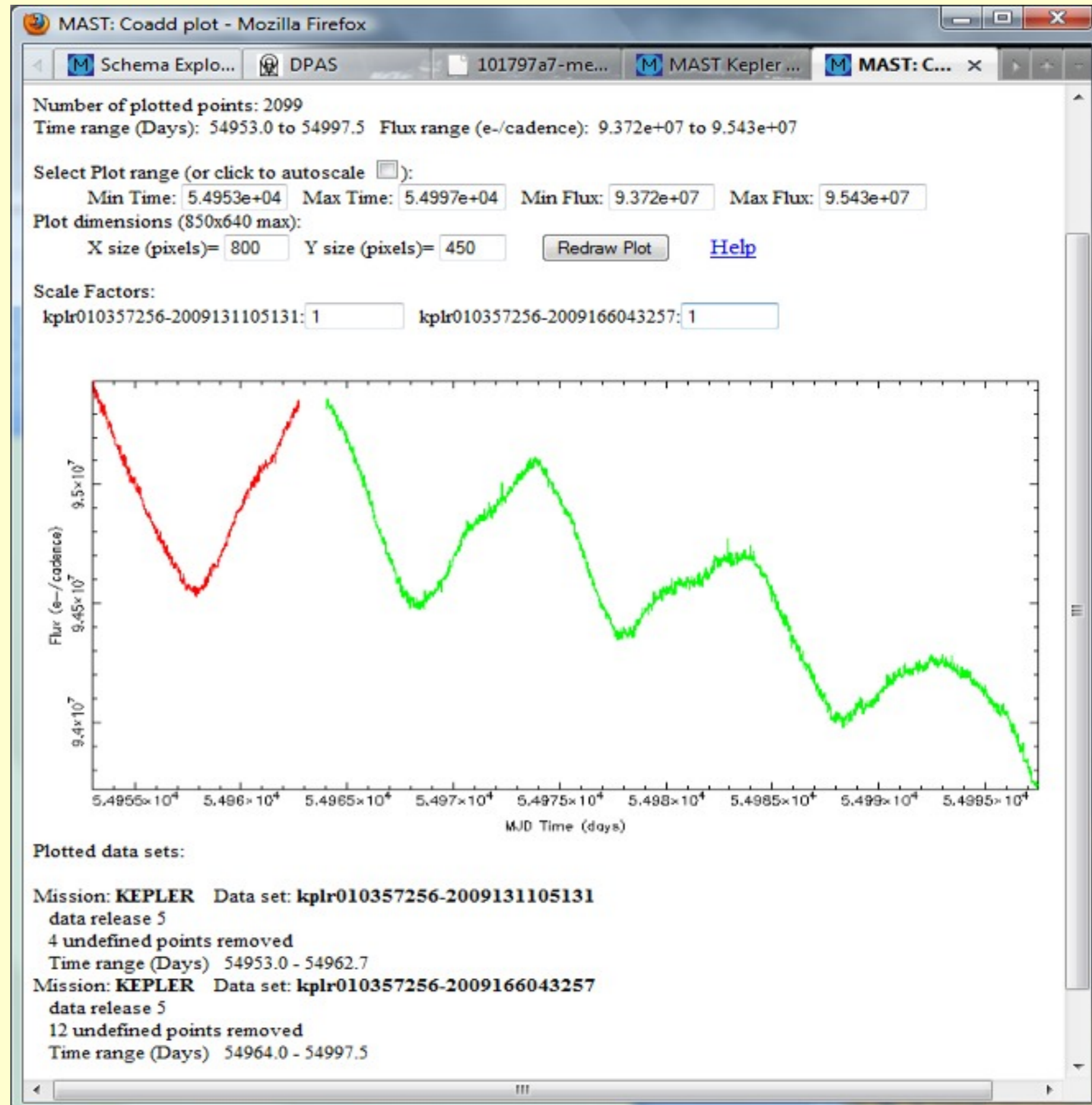
```
ftp archive.stsci.edu
login as anonymous
cd /pub/kepler/lightcurves
```

Light Curve Display

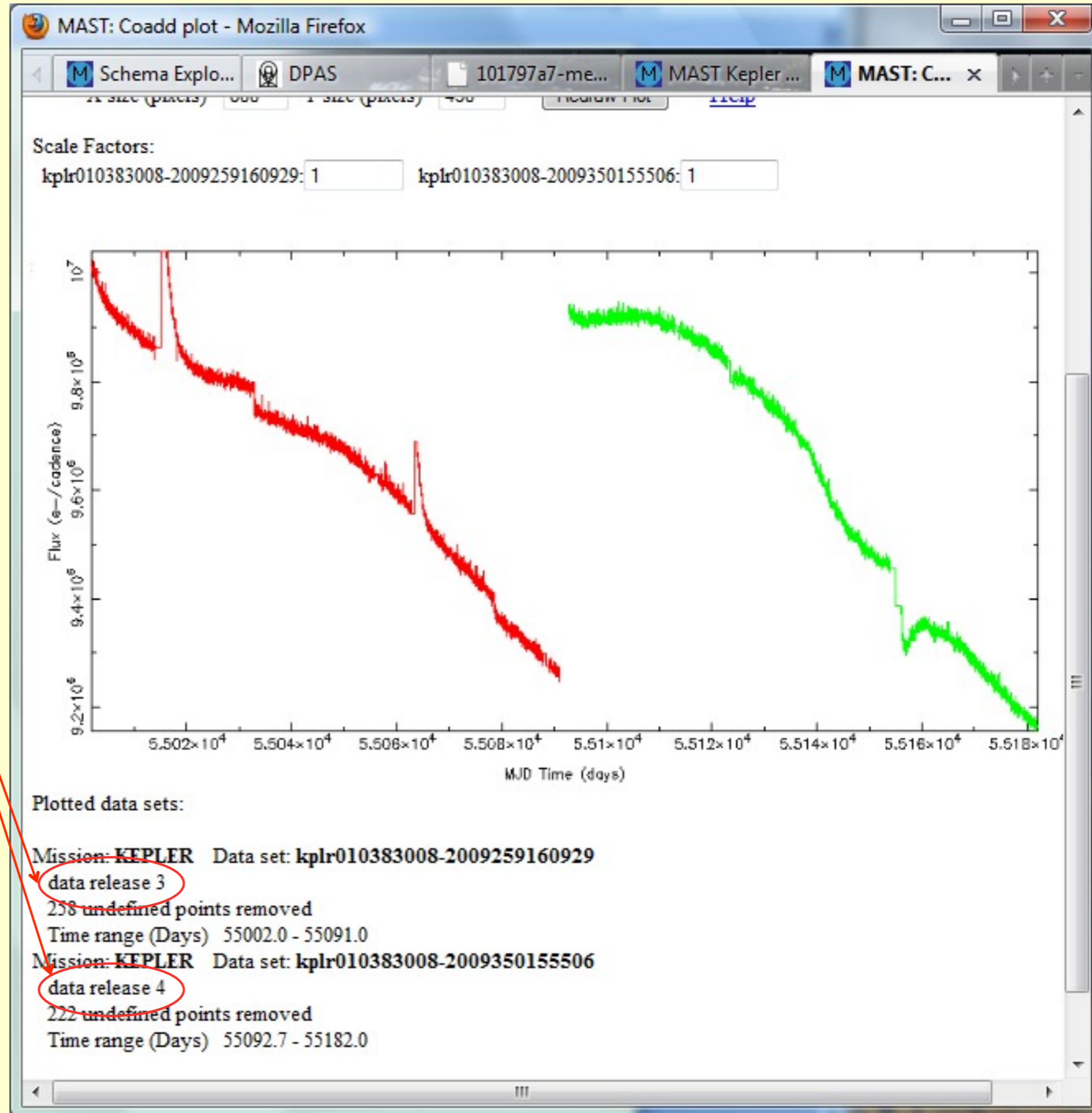
For public data only

Multiple quarters can be displayed on the same plot.

User may modify axes and scale to zoom.



Display of data from different releases (i.e. s/w processing versions) may not yield a good join between quarters.



No Search Download of Proprietary Data

MAST supports ftp area for download of all data by investigation id.

Access restricted to PI/GOs and their designated Co-Is.

A README file is provided.

```
ftp> cd /pub/kepler/tarfiles
250 CWD command successful.
ftp> dir
200 PORT: Command successful
150 Opening ASCII mode data connection for file list
drwxrwsr-x  2 3068  400    4096 Jun 22 13:39 EX
drwxrwsr-x  2 3068  400    4096 May 20 16:47 GO10000
drwxrwsr-x  2 3068  400    4096 Apr 15 17:01 GO10015
<SNIP>
-rw-rw----  1 3068  400    3610 May 21 14:12 README
drwxrwsr-x  2 3068  400    4096 May 20 16:46 STC
drwxrwsr-x  2 3068  400    4096 Jun  9 09:17 STKL
drwxrwsr-x  2 3068  400    4096 Jun  9 09:17 STKS
```

Within each directory, data are grouped by quarter.

When a target is shared between 2 investigations, the data appear in a separate tarfile.

Here is a partial listing for the planetary search investigation.

```
-rw-r----- 1 3068 400 765814 May 14 15:54 EX_GO10009_Q3.tgz
-rw-r----- 1 3068 400 6386514 May 13 11:43 EX_GO10011_Q3.tgz
-rw-r----- 1 3068 400 40517304 May 13 11:44 EX_GO10012_Q3.tgz
-rw-r----- 1 3068 400 31554986 May 13 11:47 EX_GO10014_Q3.tgz
-rw-r----- 1 3068 400 1354031785 Jun 8 10:12 EX_Q0.tgz
-rw-r----- 1 3068 400 12276814236 Jun 8 10:41 EX_Q1.tgz
-rw-r----- 1 3068 400 32547971095 May 13 13:55 EX_Q3.tgz
-rw-r----- 1 3068 400 5831825 May 13 12:37 EX_STC_Q3.tgz
```

Full Frame Image

Users may locate and download FFIs through standard MAST search page, via a file download page or through the FFI display.

Myron will talk about these interfaces later.

Lists of Kepler Targets

ASCII KIC available.

MAST posts dropped and published target lists on the Search and Retrieval menu.

The false positives list is on the same menu and in the Quick Links.

Coming soon: fold these lists into the search results.

MAST Kepler - Mozilla Firefox

MAST Kepler

Kepler

MAST STScI Tools Mission_Search Tutorial Site Search

Kepler Home About Kepler Getting Started Registration Kepler Data Search Kepler Target Search

Data Search

Quick Links

- [Kepler Data Search](#) - search for and retrieve Kepler Data.
- [Kepler Target Search](#) - find targets on the Kepler CCDs.

Search & Retrieval

- Data Retrieval Search Form
- Retrievals by Dataset
- Target Search Form
- Download Public Light Curves
- KIC Search Form
- KIC Release Notes
- ASCII KIC download
- Dropped Target List
- Published Target List
- False Positives List

Related Sites

- FFI Search Form
- FFI file download
- FFI Display
- High Level Science Products

Publications/News

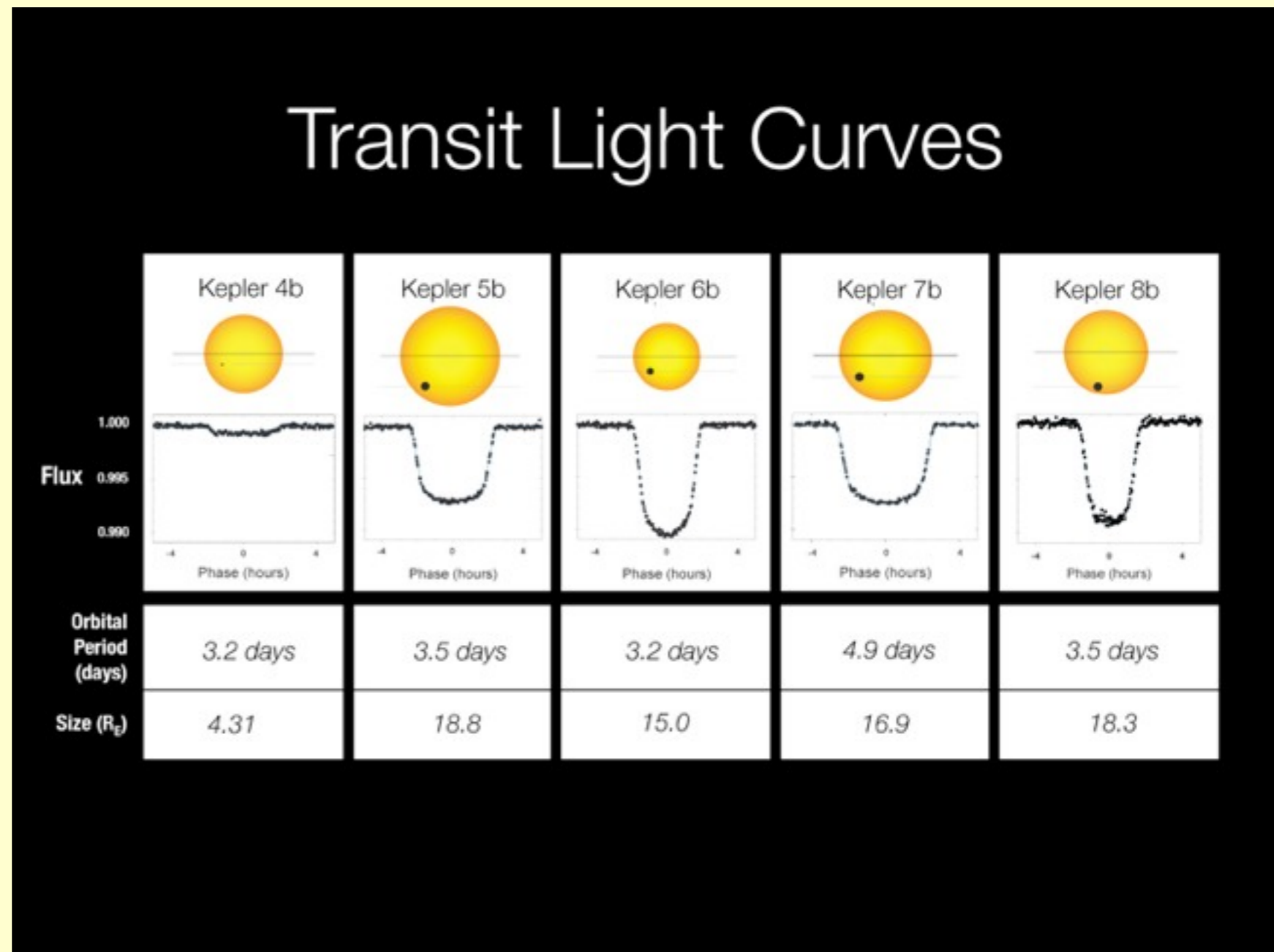
- Information - Information on search syntax.
- Curves - Information on quick access to the public
- Notes - these notes describe the data, the known deficiencies associated with each release including the most recent one. They are a critical read to draw scientifically valid conclusions from the creation of Kepler data.
- Papers - Three SPIE papers presented at the Infrastructure for Astronomy Conference (27-30) the main components of the Kepler data
- es" - A list of light curves showing planetary transit-like features, but which further analysis led the science team to conclude that something else caused the feature.

High Level Science Products

Papers from the Jan
2010 AAS meeting

Includes Kepler and
ground based data,
quick look plot of
Kepler data

Download by clicking
or via ftp.



VO Services

The following Virtual Observatory (VO) services have been registered. Each service returns all the default table columns, which includes the position.

- ❑ KIC - queries the MAST-version of the KIC
- ❑ KIC_CT - queries the KIC joined with the Characteristics table which comprises our Kepler Target Search interface (i.e., it queries only those targets known to be on (or very near) the Kepler field of view
- ❑ KTC - queries our KTC_KIC_ADS view which is the basis for our data search interface
- ❑ Exoplanets - queries our HLSP table for the 5 Kepler exoplanets

For the Future

CasJobs - Mozilla Firefox

CasJobs

MAST Query / CasJobs

Home Help Tools Query History MyDB Import Groups Output Profile Queues Logout fraquelli

Context: kepler Table (optional): MyTable_0 Task Name: My Query

Samples Recent Clear Line 1, Col 1 [5 s] Query complete! Syntax Plan Quick Submit

```
SELECT top 100 ktc_kepler_id, ktc_investigation_id, ads_data_set_name, kic_degree_ra, kic_dec,
ktc_target_type, ads_start_time, ads_end_time, ads_release_date, kic_rmag,
kic_imag, kic_kepmag, kic_2mass_id, kic_teff, kic_logg, kic_feh,
kic_ebminusv, kic_radius, kic_pmtotal, kic_grcolor
from kepler_ktc_kic_ads_v
where kic_teff between 5000 and 6000
and kic_logg between 2.5 and 4
```

100 row(s)

ktc_kepler_id	ktc_investigation_id	ads_data_set_name	kic_degree_ra	kic_dec	ktc_target_type	ads_start
10911000	EX	KPLR010911000-2009350155506	287.0644	48.37522	LC	9/18/2009
11014907	EX	KPLR011014907-2009350155506	283.1906	48.55574	LC	9/18/2009
11958976	EX	KPLR011958976-2009350155506	289.0423	50.34281	LC	9/18/2009
11340082	EX	KPLR011340082-2009350155506	286.0575	49.1943	LC	9/18/2009
11084834	EX	KPLR011084834-2009350155506	292.2247	48.62594	LC	9/18/2009
4853394	EX	KPLR004853394-2009350155506	296.285	39.94459	LC	9/18/2009
5066130	EX	KPLR005066130-2009350155506	288.4500	41.10010	LC	9/18/2009

Plot Save As HTML Query Results Both

Contact MAST
CASJobs is made possible by the Sloan Digital Sky Survey Collaboration
\$Name: v3_5_16 \$, \$Revision: 1.70 \$, Last modified: Wednesday, September 17, 2008 at 4:35:22 PM

General Background

- ❑ The Kepler Key Project is discovery and characterization of Earth-like planets around solar-type stars. The product is light curves.
- ❑ Kepler is in an Earth-trailing orbit, continuously monitors the same area of the sky,
- ❑ Access to *data in* the Kepler archive is through MAST.

- ❑ The Kepler Science Team has announced the discovery of 5 exo-planets.
- ❑ Much of the planetary search data from Quarters 0 and 1 became public on June 15, 2010.





- FFI -



Download from Full Frame Image form:

Typically a few are observed monthly:

- Once ingested, files are public
- Included are:
 - **no** meaningful WCS coordinates
 - (no rotation: **except the Golden 8 FFIs**)
- calibration methods may change with new deliveries

(Another option is to download by clicking entries in an index table.)



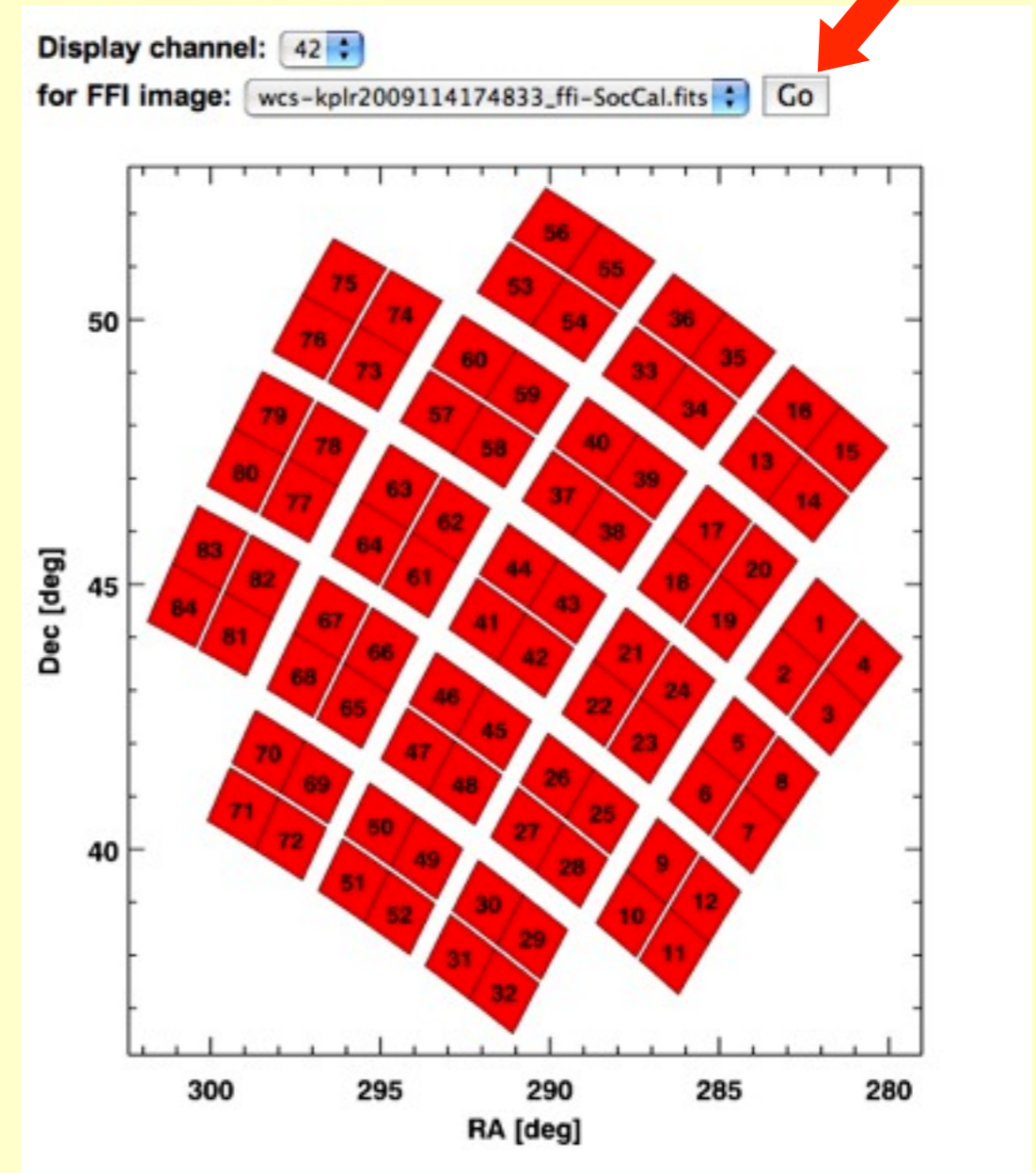
FFI Display Tool

(Golden 8; courtesy of Rick,
astrometry.net)

- The idea is to visualize all KIC objects in the Kepler field according to the detector channel.

And:

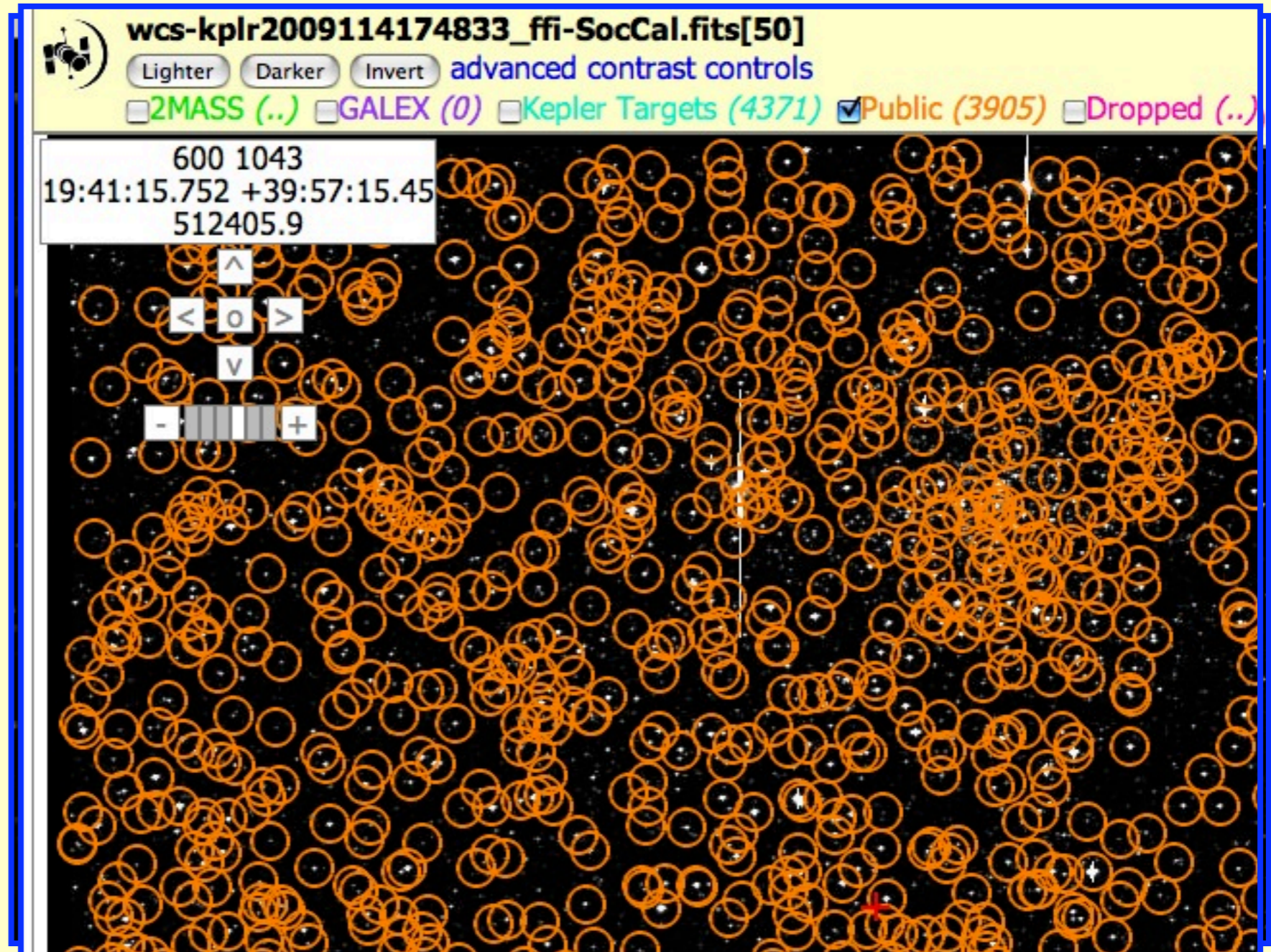
- To cross match with objects in other surveys and Kepler public categories ([more below](#))





A sample field
(NGC 6819
panned zoomed)

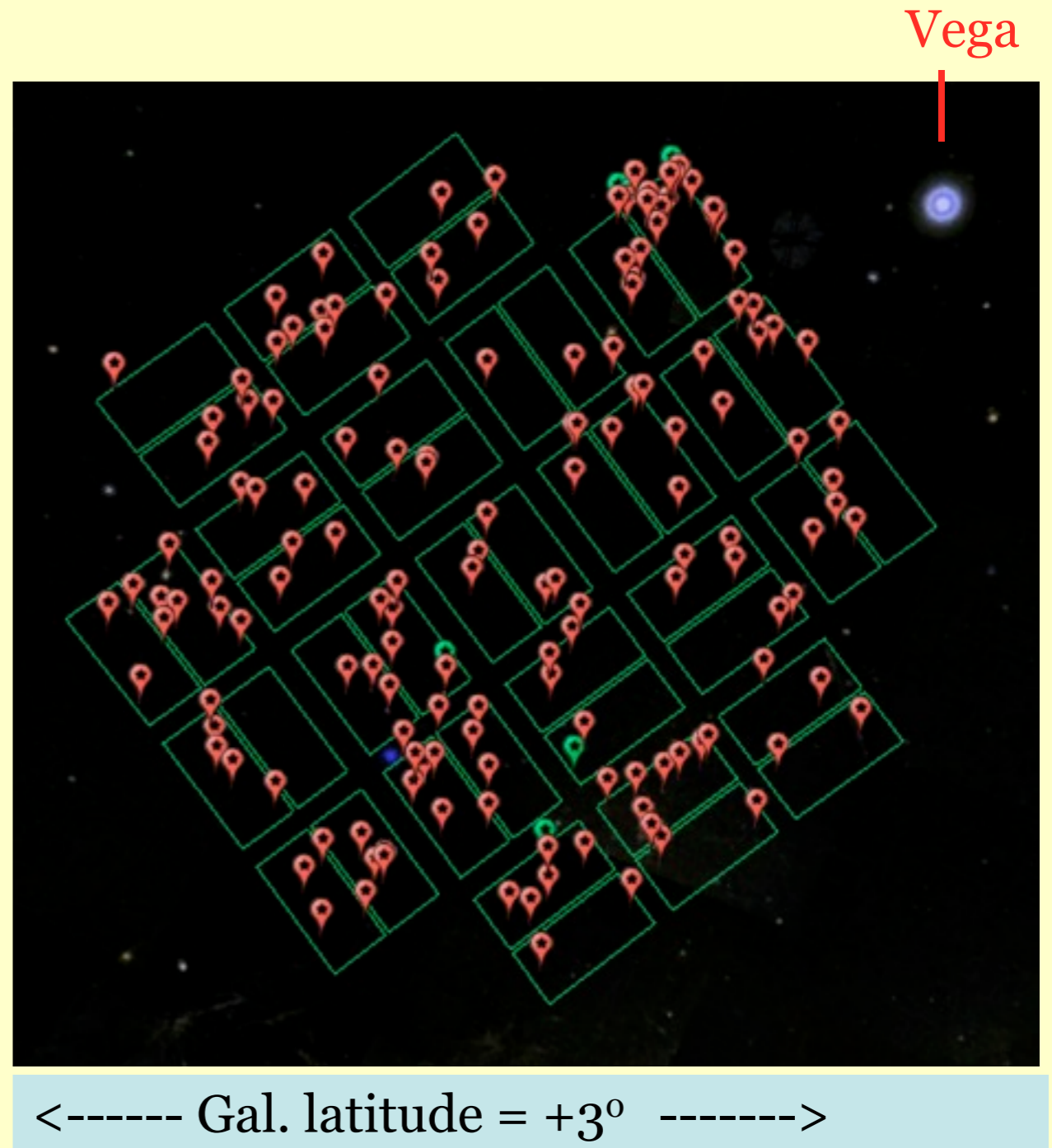
with cross-matches
to public objects





Our Summer project will be:

- Cross match GALEX/GR6, DSS 2MASS objects in Kepler FOV
- Some 68 tiles (70 sq. deg.); rare overlap near Galactic plane for recent satellite surveys
- UV colors will provide T_{eff} discrimination for hot stars and other stars near Galactic equator
- Do this in time for GO Cycle 3!



(Each flag is a GALEX tile, radius = 0.6°.)



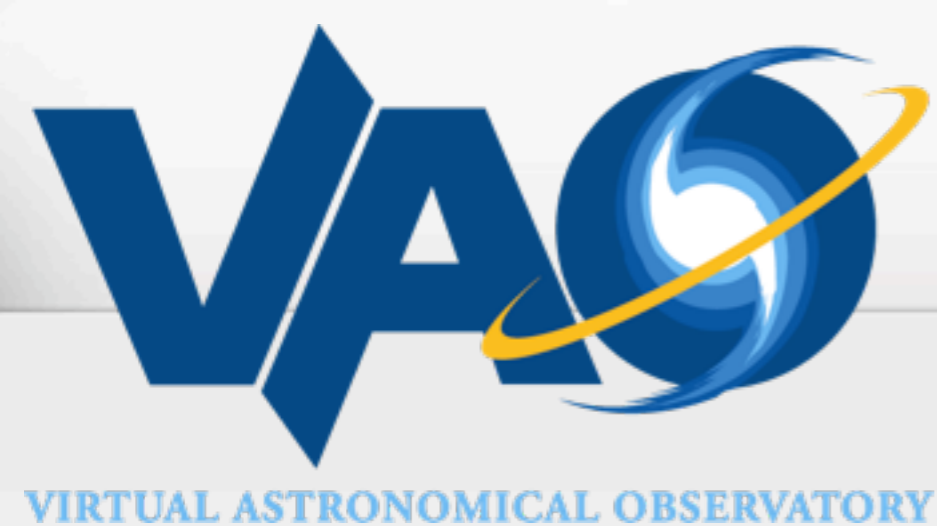
- end -



"VAO"

Maria Nieto-Santisteban

for Bob Hanisch



The Virtual Astronomical Observatory: Status and Plans

Maria Nieto-Santisteban, User Support Deputy
on behalf of

Robert Hanisch, Director

Space Telescope Science Institute





VAO Goals

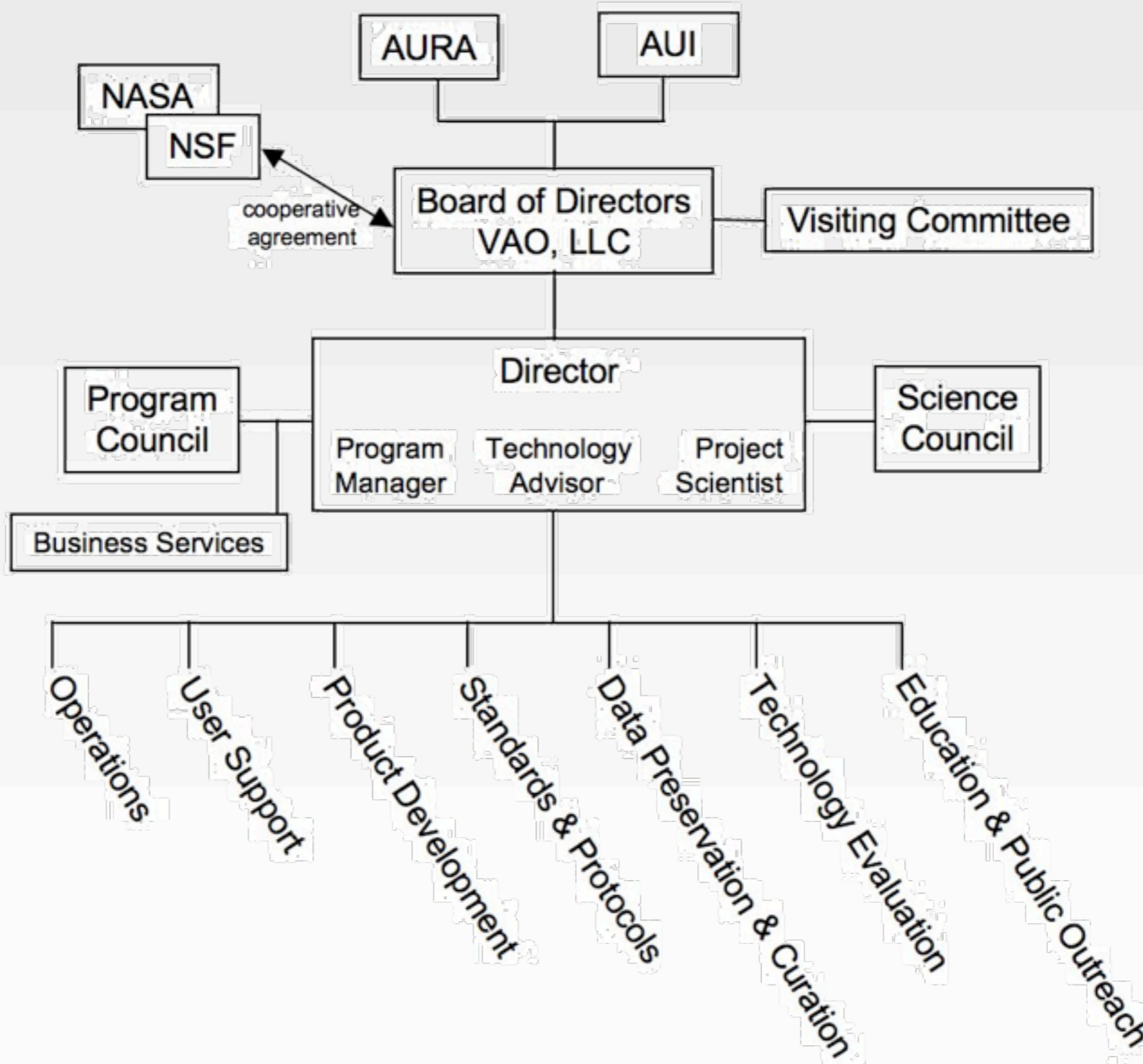
- The VAO is an operational facility whose services will enable astronomers to discover, access, integrate and analyze the vast quantities of astronomy data available electronically:
 - Develop robust services, built to meet community needs and developed according to industry standards, backed by responsive user support and training and professional outreach programs
 - Provide leadership in international cooperative efforts, coordinated by the IVOA to standardize data access and discovery protocols
 - Develop innovative EPO programs that convey to educators and students the science content of the range of data accessible through the VAO



NVO → VAO

- NVO development project funded by NSF 5+2 years (\$14M) [in-kind support from NASA data centers]
- NSF & NASA co-funding VAO—the operational NVO
 - RFP issued Jan 2008, proposal submitted Apr 2008
 - NSF/NASA informed AUI/AURA of intent to fund VAO in Feb 2009
 - \$27.5M over five years (75% NSF, 25% NASA), ~25 FTE/yr
 - NASA released funds in September 2009
 - NSF awarded funds on 11 May 2010, for 15 May 2010-30 April 2015
- VAO managed by VAO, LLC (AUI and AURA are partners)
 - Collaboration includes Caltech, IPAC, IRSA/NED, NOAO, NCSA, NRAO, STScI, JHU, GSFC/HEASARC, SAO
 - IPAC, HEASARC, and ~25% of STScI effort funded directly by NASA
 - VAO, LLC Board has governance oversight
 - Science Council provides guidance: science priorities, maximizing take-up, seeing science results directly enabled by VAO

VAO organization





VAO management

- VAO, LLC Board
 - Jay Gallagher, U. Wisconsin, Chair
 - Ethan Schreier, ex officio, AUI President
 - Bill Smith, ex officio, AURA President
 - Caty Pilachowski, Indiana University
 - Bruce Margon, UC Santa Cruz
 - Roscoe Giles, Boston University
 - Scott Kirkpatrick, Hebrew University Jerusalem
- VAO, LLC officers
 - Robert Hanisch, STScI, Director
 - Deborah Narcisso, AURA, Treasurer
 - Cynthia Allen, AUI, Secretary
- Management team
 - Bruce Berriman, IPAC, Program Manager
 - Alex Szalay, JHU, Technology Adviser
 - Dave De Young, NOAO, Project Scientist
 - Pepi Fabbiano, SAO, Chair of Science Council
 - TBD, AUI, Business Manager



The screenshot shows the VAO LLC website interface. The browser address bar displays <http://www.aui.edu/vao.php>. The website features a navigation menu with links for HOME, ABOUT AUI, AUI FACILITIES, VAO LLC, NEWS & SCIENCE, and INTERNAL. The main content area is titled "VAO LLC" and includes a large VAO logo. Below the logo is a "SECTIONS:" menu with links for VAO, KEY PERSONNEL, SCIENCE COUNCIL, PROGRAM COUNCIL, and DOWNLOAD AREA. The "VAO LLC BOARD OF DIRECTORS:" section lists:

- JOHN (JAY) S. GALLAGHER, III (CHAIRMAN), Professor of Astronomy, University of Wisconsin-Madison
- ROSCOE C. GILES, Professor of Electrical and Computer Engineering, Deputy Director of the Center for Computational Science, Boston University
- E. SCOTT KIRKPATRICK, Professor of Computer Science, School of Engineering and Computer Science, The Hebrew University of Jerusalem
- BRUCE H. MARGON, Professor of Astronomy and

 The "VAO LLC OFFICERS:" section lists:

- ROBERT J. HANISCH, DIRECTOR, VAO LLC Director, Space Telescope Science Institute, director at usvao dot org, DOWNLOAD CURRICULUM VITAE
- DEBORAH NARCISSO, VAO LLC Treasurer, Association of Universities for Research in Astronomy, Inc.
- CYNTHIA ALLEN, VAO LLC Secretary, Associated Universities, Inc.

 The right sidebar contains logos for Associated Universities, Inc., AURA, and a section titled "AUI, in collaboration with the Association of Universities for Research in Astronomy (AUIRA), created the VAO LLC to manage and operate the Virtual Astronomical Observatory for NSF and NASA."

<http://www.aui.edu/vao.php>



VAO Science Council

- Peppi Fabiano (Chair), Smithsonian Astrophysical Observatory
- Daniela Calzetti, University of Massachusetts at Amherst
- Christopher L. Carilli, National Radio Astronomy Observatory
- Paul Eskridge, Minnesota State University
- Eric D. Feigelson, Pennsylvania State University
- Željko Ivezić, University of Washington
- Sara Seager, Massachusetts Institute of Technology
- Alicia Soderberg, Harvard-Smithsonian Center for Astrophysics
- Travis Rector, University of Alaska Anchorage

VAO Team Consultants to the Science Council

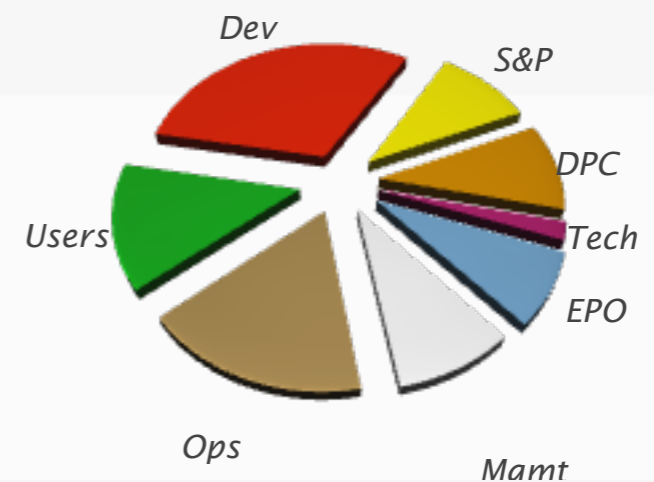
- George Djorgovski, California Institute of Technology
- Alyssa Goodman, Harvard University
- Barry Madore, The Carnegie Observatories, Pasadena
- Marc Postman, Space Telescope Science Institute



VAO Scope and Functions

- Proposed seven major areas of activity
 - Operations: Tom McGlynn, HEASARC, Ani Thakar, JHU
 - User Support: Betty Stobie, NOAO, Maria Nieto-Santisteban, STScI
 - Product Development: Ray Plante, NCSA, Gretchen Greene, STScI
 - Standards and Protocols: Roy Williams, Caltech, Doug Tody, NRAO
 - Data Preservation and Curation: Arnold Rots, SAO, Joe Mazzarella, NED
 - Technology Evaluation: Matthew Caltech
 - Education and Public Outreach: Stratis Kakadelis (acting), Bonnie Eisenhamer (acting), STScI
- Plus management

Graham,





Operations

- ~17% of overall effort
- Facility support
 - Problem report ticket system
 - Web browser compatibility, multiplatform support
 - Usage logging
 - Software configuration management
 - Hardware support (preservation facility)
- System Integration
- Monitoring
 - Adherence to standards
 - Metadata quality evaluation, correction
 - Work with service providers to repair and revise
 - Provide status to users and technical team

User Support

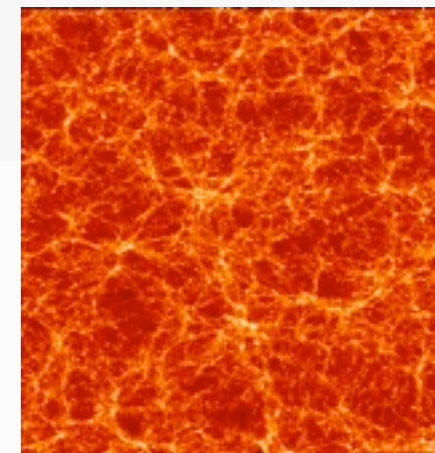
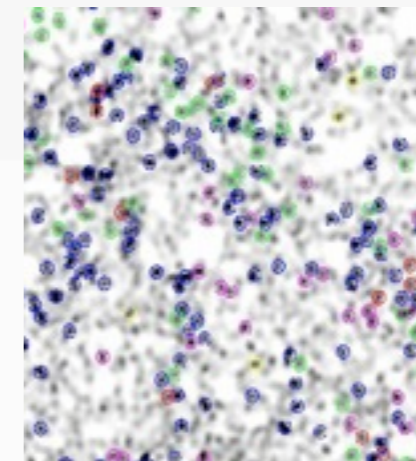
- ~14% of overall effort
- Testing & Readiness reviews
 - Acceptance Tests
 - Documentation
 - External feedback
 - Make release recommendations
- Training and advocacy
 - Summer schools
 - Professional outreach events (AAS, conferences, ..)
 - VAO newsletters
 - User forum
- Web site portal
 - Designs, implements, and maintains the VAO web site
- Help Desk
 - Responds and follow up to user's requests





Product Development

- ~31% of overall effort
- Science applications and products
 - Support and enhance existing applications
 - Integrate VO access into existing desktop applications
 - Cross-correlation
 - Spectral energy distributions
 - Data-mining
 - Visualization
 - Theoretical models and simulations
 - Master catalogs
- Service toolkits/templates
- Infrastructure
- Registry/Directory
- Robust software development process





Standards and Protocols

- ~10% of overall effort
- International standards process with IVOA
 - Protocols, service definitions
 - Data models
 - Registry
 - Semantics
 - Application frameworks, work flows, grid computing
 - Prototyping

*SCS, SIAP, SSAP, TAP, SLAP, SAMP,
STC, UCD, UType, Identifiers,
SSO, UWS, ADQL, SDM, SLDM,
VOTable, VOResource, VODataService
VOEvent, Vocabularies*



Data Preservation and Curation

- ~10% of overall effort
- Repository for community-produced high-level data products
 - Images, spectra, time series, etc., published in journals
 - Data collections that are currently privately hosted
 - Collaboration with NSF OCI DataNet program, JHU-led Data Conservancy team
- Cross-repository linking
 - Papers and bibliographic records, archives, repository
- Curation standards (in collaboration with Standards and Process activity)



Technology Evaluation

- ~2% of overall effort
- Monitor new technologies relevant to VO infrastructure
- Select promising technologies for evaluation; install and test
- Make recommendations to Product Development for adoption
- Assist User Support team and end-users in scaling-up applications



Education & Public Outreach

- ~8% of overall effort
- Train education and outreach specialists in use of, and capabilities of, VAO
 - EPO developer workshops
 - Establish partnerships with leaders in the EPO community
- Continue and strengthen relationship with Microsoft WWT and GoogleSky
- Build EPO-focused website
- Assist in creation of EPO-friendly data products



Management

- ~9% of overall effort
- Director, program manager, project scientist, business manager, chair of Science Council
- Costs for Board, Science Council, and Program Council meetings
- Costs associated with the VAO, LLC (banking, legal, audit, tax filing, insurance, office space, etc.)



Summary

- NVO was mainly about figuring out how to do data discovery and data delivery with distributed data centers.
- VAO is about how to use those capabilities to do forefront research in astronomy.



- end -



*"Changes in the
HST Archive Operations"*

Mark Kyprianou &

John Scott



The Future of OPUS: FOO



FOO: OPUS Migration and Enhancements

OPUS: Why do anything?

- OPUS is currently processing HST and Kepler data
 - Both missions are running on Solaris/ Sybase
 - The GUIs are on Windows
 - One GUI is also available on the Mac
 - Heavy processing done on Sun HW
- OPUS “gets the job done”
 - Sort of...
 - Is it good enough for the future?



FOO: OPUS Migration and Enhancements

OPUS: Scope Definition

- Pipeline infrastructure
 - Blackboard servers
 - GUI to manage pipeline
- It does not include
 - Mission specific data processing
 - OTFR
 - Archive ingest or catalog population
 - Engineering data processing
 - i.e. applications that run in the pipeline system



FOO: OPUS Migration and Enhancements

OPUS: Current Status

- No significant maintenance prior to SM4 cancelation
 - ~140 PRs, about 1/2 concerning the GUIs
 - Remainder are pipeline infrastructure issues
 - Lost expertise in key areas of the pipeline communications infrastructure
 - Technologies (Corba/C++) used in OPUS are not attractive to most developers



FOO: OPUS Migration and Enhancements

OPUS: The Future

- DMS is defining JWST requirements, SRR: Fall, 2010.
- HST data processing is moving to Linux/MS SQL Server: Winter 2011
- HST will begin to generate high-level products mid-2010



FOO: OPUS Migration and Enhancements

OPUS: What should be done?

- Use existing OPUS for HST end-of-life?
- How about JWST?
- Should alternatives be considered?
- Port OPUS to new pipeline infrastructure?



FOO: OPUS Migration and Enhancements

OPUS: What should be done?

- Do a study to evaluate available pipeline systems
 - OPUS
 - NHPPS – NOAO High Performance Pipeline System
 - GLAST Pipeline Front End
 - LSST PEX
 - others

- Study will evaluate pros/cons
- Make recommendation
- Implementation is targeted for 2011



Background Automated Reprocessing: BAR



BAR: Background Automated Reprocessing

Current Status

- DADS distribution uses On The Fly Recalibration (OTFR)
- Why OTFR?
 - At the time, reprocessing was expensive to keep data “up to date”,
 - disk storage was expensive.
 - It takes a long time to get the users their data, but they got the “best” data.



BAR: Background Automated Reprocessing

The Future:

- The core reasons for OTFR are no longer valid
- Users expect more immediate access to their data
- Makes data mining difficult
- VO synchronous interfaces are also problematic

- ECF/CADC HST Cache already provides this capability



BAR: Background Automated Reprocessing

The Future:

- Add a generalized service to DMS that handles the reprocessing of data
 - Will be based on ECF/CADC's experiences with their HST cache and mods to current DMS code
 - Need mechanism to identify datasets that require reprocessing
 - Reprocessing isolation from initial ingest pipeline
 - Need long term storage for the processed files
 - ▶ Common file storage broker to be utilized by the STScI Archive



BAR: Background Automated Reprocessing

The Future:

- Capabilities
 - Direct programmatic & VO protocol access
 - Faster access to data
- Resources Needed
 - Need additional HW bandwidth
 - Will be deployed on the new Linux HW
 - Additional storage



BAR: Background Automated Reprocessing

References:

ST-ECF HST Cache:

- <http://archive.eso.org/cms/hubble-space-telescope-data/the-hst-cache>



Linux Migration in DADS and OPUS



Current Processing Platform

Sun Fire Enterprise 15K running Solaris 10

- High availability practically no unexpected downtime
- Downtime dominated by large, scheduled software and OS patches.
- Up to 72 1 GHz UltraSparc III cores divided between development, testing and operations
- Processors can be reallocated dynamically (typically ops has 32)



Future of Current Platform

Sun Fire 15 K end of service life.

- Operational at STScl since Sept 2003
- Sun Microsystems acquired by Oracle
- Sparc chip architecture development on hold
- Solaris 11 past due



Future of Processing Demands

Processing demands increasing

- OTFR is starting to ramp up for public WF3 and COS distribution
- Bulk reprocessing for ACS (pre SM4) underway, WF3 and COS reprocessing expected to follow.
- Projects like Foo and Bar require much higher throughput



Future Processing Platform

Dell r910 using four Nehalem-EX Intel processors

- Eight hyper-threaded cores per CPU yields 64 logical cores at 3 GHz
- Operations will run on two Dell r910 machines provide backup and allow distribution to be decoupled from ingest.
- RHEL 5 on X86 already supported by ITSD
- RHEL 6 beta is available



Porting Processing Software to Linux

Both DADS and OPUS are Linux compatible

- OPUS supported on RHEL 3. Upgrade code and support libraries to RHEL 5 versions.
- DADS is Java-based and ported to Linux for JWST testing archive support.
- As a result, Linux software port is running ahead of hardware procurement.
- Regression test results available soon on older Dell equipment (24 x single-threaded core Dunnington CPUs)



Database Migration to MS SQL

Following MAST lead in converting Sybase databases to MS SQL.

- Replace 4x1GHz Sunfire E15K processors with dual hexacore Nehalem-EX (24 logical cores)
- Transact-SQL for both, with a few syntax differences (string allows only single quotes)
- Database organization differences (mixed case handling).
- No support for text data type fields



Unique Processing Database Issues

Database use by data processing differs from MAST in some respects

- Processing data is more dynamic for OPUS and DADS
- Used to temporarily cache the processing state
- Used for tracking progress on retrieval requests
- Use of MS SQL Server active-passive failover may be limited - still needs testing.
- Will follow Kepler mission model and replicate science catalogs directly to MAST database



- end -

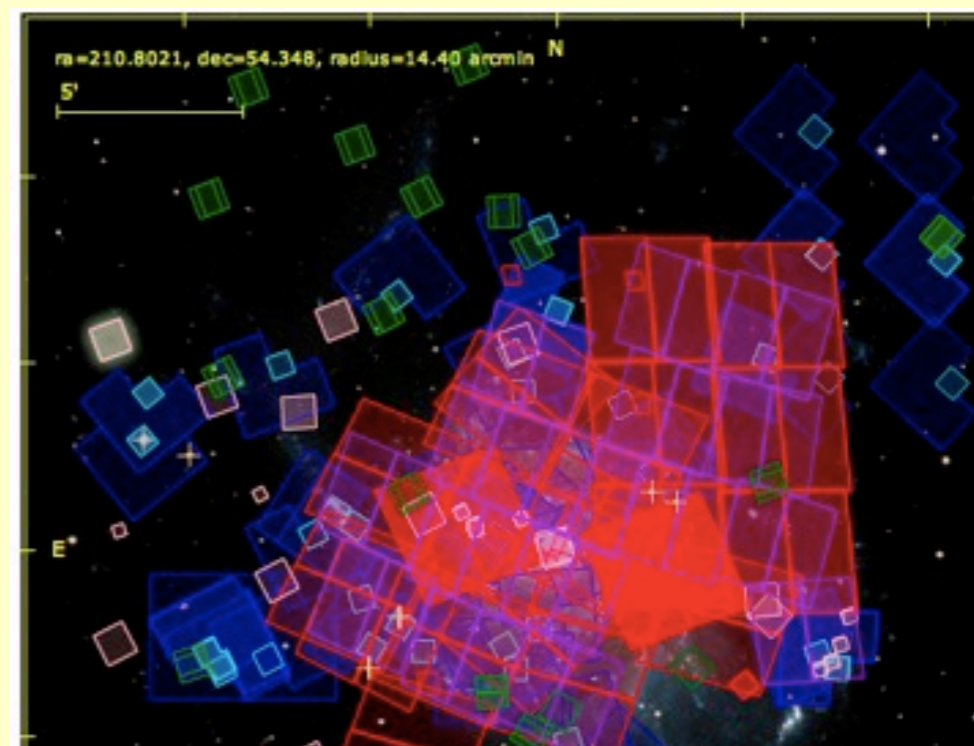


"Work in Progress"
Alberto Conti
for the MAST Team



Data Model Design

- Traditionally every mission has been treated independently
 - Unique schema and database design
 - Requires custom coding for all software that accesses metadata/data
- Modern approach is to use a data model as an interface layer
 - Map the metadata from each mission into model
 - Re-use same access methods for all missions
- Required for development of Archive portal where web-layer has short-lifetime
 - Back-end data access services are independent of front-end user-interface changes
 - Up-front work is in mapping all mission metadata into model
- Common Archive Observation Model (CAOM)
 - Developed by CADC
 - Implemented on a subset of CADC's most heavily used archives
 - Active collaboration on moving HLA into CAOM, eventually MAST
- Key features will be the availability of observation footprints for all of MAST missions
 - Footprints will be an important component of the data model
 - Will need to compute footprints for all observations





Data Broker

- Will simplify managing and distributing files. This provides users with
 - A unified access layer to all MAST holdings
 - Online access to all public MAST products
 - Common services and tools for browsing similar MAST products
 - Better cross-mission integration with new Portal
- Currently evaluating existing products ability to satisfy our needs
 - Using the iRODS data broker from San Diego Super Computer
 - Modifying and extending Data Broker used in DADS system
 - Using the commercial version of the Storage Resource Broker (iRODS predecessor but with SQLServer support)
 - Using other commercial products (e.g. EMC VPLEX)



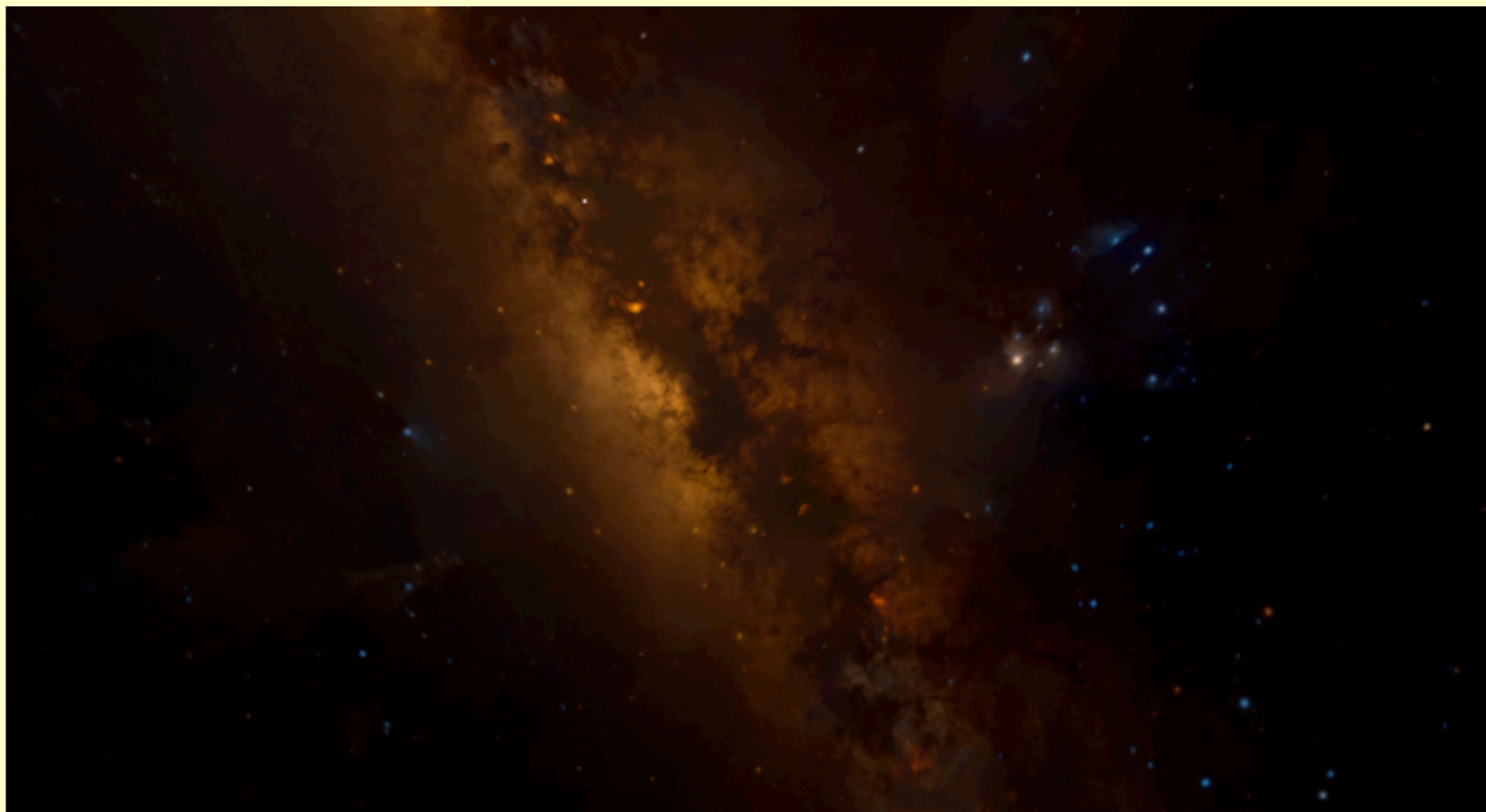
Ongoing GSC2/DSS Activity

- JWST Requirements for Enhanced GSC2
 - FGS Area smaller than originally planned. Need to use objects closer to plate limits to obtain sufficient density for guiding
 - Improved photometric calibration near limits
 - Better magnitude error estimate
 - Improved classification performance near limits
 - CrossMatch with deeper or IR catalogs
 - 2MASS done
 - WISE planned
 - SDSS & SkyMapper desirable
 - Transformations to FGS magnitude system
 - Can use 2MASS photometry in galactic plane
 - Used 2MASS and UKIDSS to derive optical to FGS transformation – improve with WISE
 - Global statistics
 - Improve GS selection algorithms
 - New Recalibration Pipelines planned
 - Astrometric (UCAC3/4)
 - Photometric (GSPC 2.5, SDSS, SkyMapper...)



Ongoing GSC2/DSS Activity

- DSS Improvements
 - Header metadata updates as needed
 - Footprints will be added to database to better determine plate selection
 - Deploy jpg webservice





AstroTag

- Searches title, abstracts of HST Programs and papers
- Flash visualization for search refinement
- Uses IVOA hierarchical vocabulary
- Direct link to datasets

Astro Tag Data Search

Search HST Programs and papers by keyword.

- narrower word association
- broader word association
- related word association

Current search terms are highlighted in yellow; previously navigated terms in white.

Top of Page Copyright Suggestions Email Us Printer Friendly page Contacts Last Modified: Jul 24, 2009 14:23



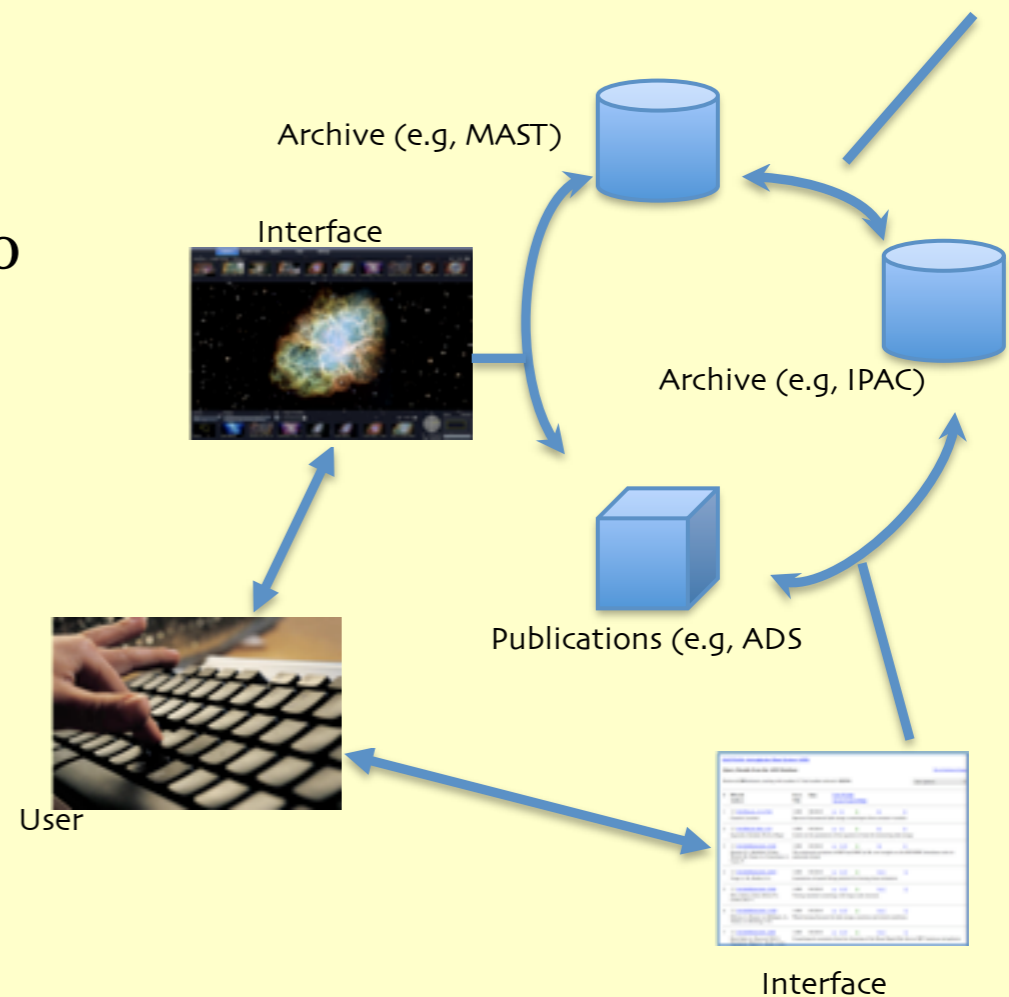
JWST – DMS Efforts

- JWST DMS Systems Engineering Working Group formed Oct '09
 - Group's task was to produce DMS requirements for JWST
- Completed Requirements and held Project level walk thru for:
 - Science Data Processing (SDP)
 - Engineering Data Processing (EDP)
 - Science Instrument Integration & Test Data Archive (SID)
 - Archive
 - Calibration Pipeline Software
- Working on Requirements/Walk Thru for reprocessing, cal. ref files, pipeline executive, and associations.
- Working toward System Requirements Review (SRR) in Sep '10
- Start work on design after SRR



MAST E/PO

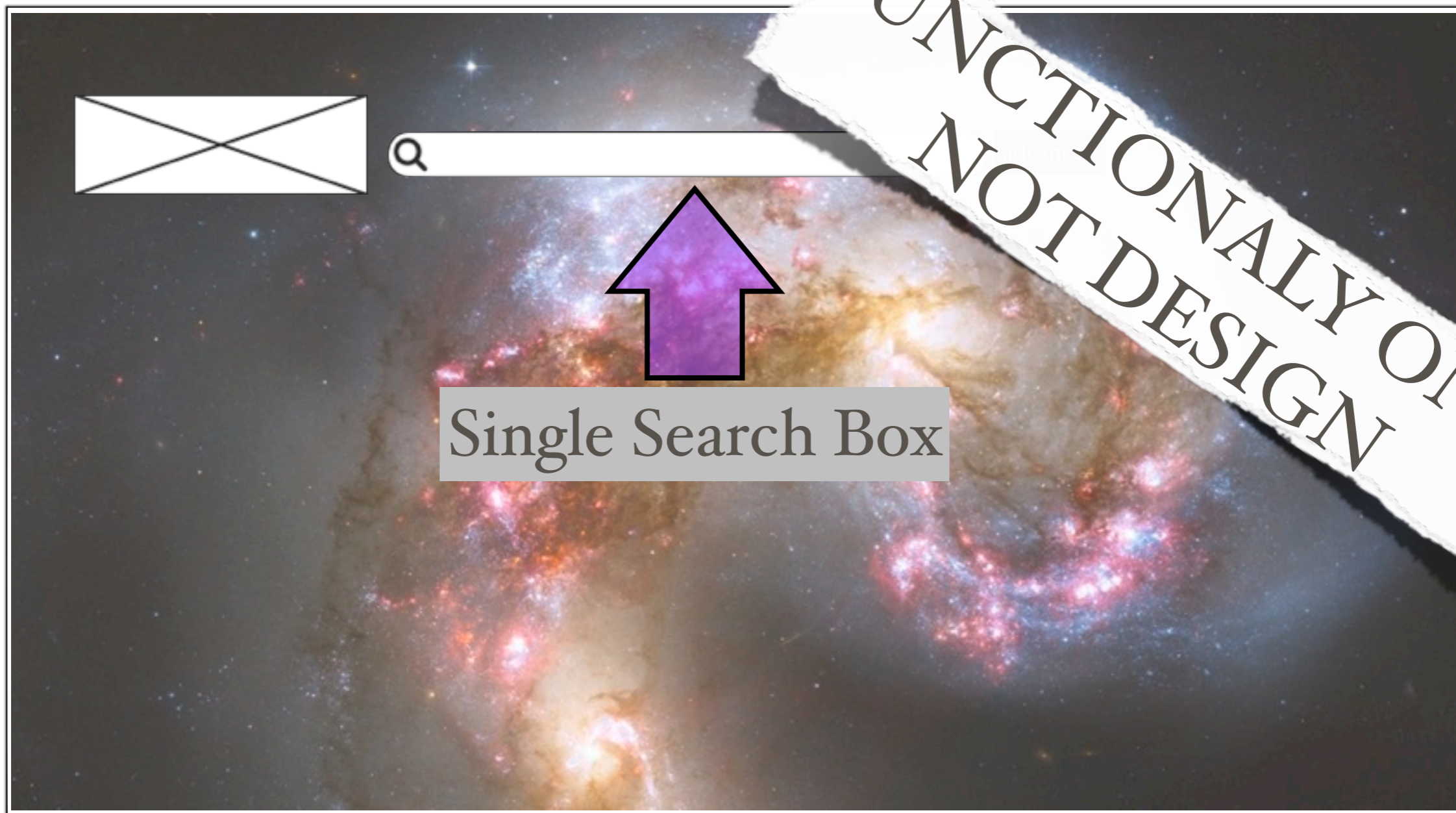
- **Audience:** Scientists, engineers, educators, students, interested individuals
- **Purpose:** Enhance the accessibility and usability of astronomical data for public use
- **Product:** Insure that diverse visualization interfaces (including but not limited to applications like Sky and WWT) can be used to find, locate, describe, retrieve, and display data.
- **Method:** Provide robust meta-tags including a controlled keyword vocabulary and accurate WCS for PR images
 - Integrate and exchange information with other archives and the ADS
- **Outcome:** Users will be able to locate and retrieve data, publications and ancillary information (e.g., press releases) through NASA archives and the ADS, regardless of the entry point





MAST Portal Group

- **Motivating Factors**
 - Consolidate access to existing application functionality and look-and-feel
 - Single Sign-on to existing and new applications
 - Provide a vehicle to integrate new functionality
 - Leverage existing programming expertise: python, php, .net, actionscript, javascript,....



Single Search Box

FUNCTIONALLY ONLY
NOT DESIGN

Navigation and utility icons: a left arrow, an RSS feed icon, a 'Quick Stats' bar chart with three bars of increasing height, and a right arrow.

Search suggestions:

- nebula hubble saturn space astronomy
- nasa mars uranus galaxy sun venus moon
- jupiter stars mercury neptune solar system
- planets pluto universe space exploration
- cosmology space shuttle black holes comets
- milky way telescope physics star



Q M83

Content Type

- Images,
- Spectra,
- Footprint,
- Map,
- ...

Wavelength

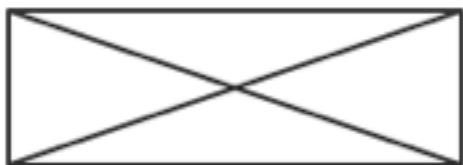
- UV,
- Optical,
- ...

Result Summary

Hubble Space Telescope	123 records	explor
ACS	34 records	
WFPC2	21	view
WF3	39 records	view
...		
Galaxy Evolution Explorer	94 records	view
FUV	47	view
NUV	47	view
Digital Sky Survey	15 records	view
Kepler	34 records	view
IUE	45 records	view

FUNCTIONALLY ONLY
NOT DESIGN ONLY

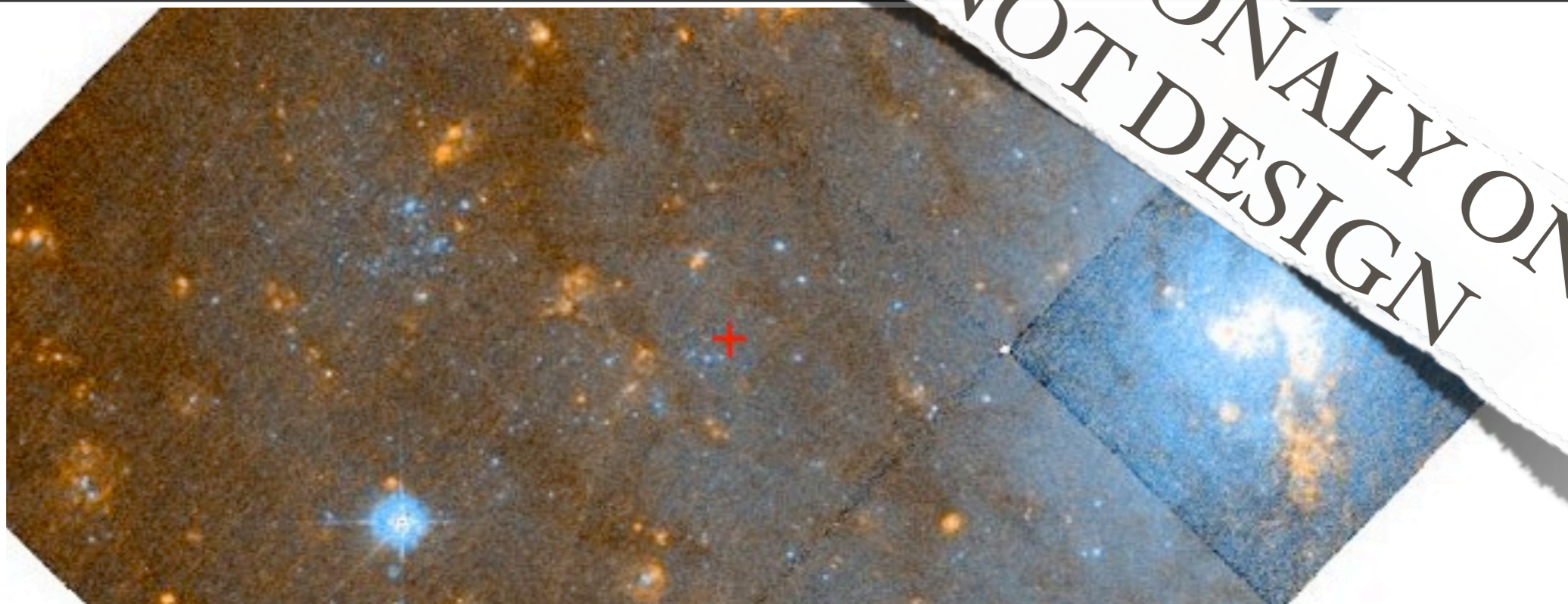




Q M83



- Hubble, 123
- DSS, 15
- GALEX, 94
- Kepler, 34
- IUE, 45
- ...



FUNCTIONALLY ONLY
NOT DESIGN

RA	DEC	Level	Target	Detector	Aperture	Spectral_Elt	NExposures
14:04:10.33	54:19:07.0	5	APPP	WFPC2	F606W	0	1900-01-01 00:00:00
14:04:10.33	54:19:07.0	5	APPP	WFPC2	F606W	0	1900-01-01 00:00:00
14:04:10.33	54:19:07.0	5	APPP	WFPC2	F606W	0	1900-01-01 00:00:00
14:04:10.33	54:19:07.0	5	APPP	WFPC2	F606W	0	1900-01-01 00:00:00
14:04:10.33	54:19:07.0	5	APPP	WFPC2	F606W	0	1900-01-01 00:00:00
14:04:10.33	54:19:07.0	5	APPP	WFPC2	F606W	0	1900-01-01 00:00:00
14:04:10.33	54:19:07.0	5	APPP	WFPC2	F606W	0	1900-01-01 00:00:00
14:04:10.33	54:19:07.0	5	APPP	WFPC2	F606W	0	1900-01-01 00:00:00
14:04:10.33	54:19:07.0	5	APPP	WFPC2	F606W	0	1900-01-01 00:00:00
14:04:10.33	54:19:07.0	5	APPP	WFPC2	F606W	0	1900-01-01 00:00:00



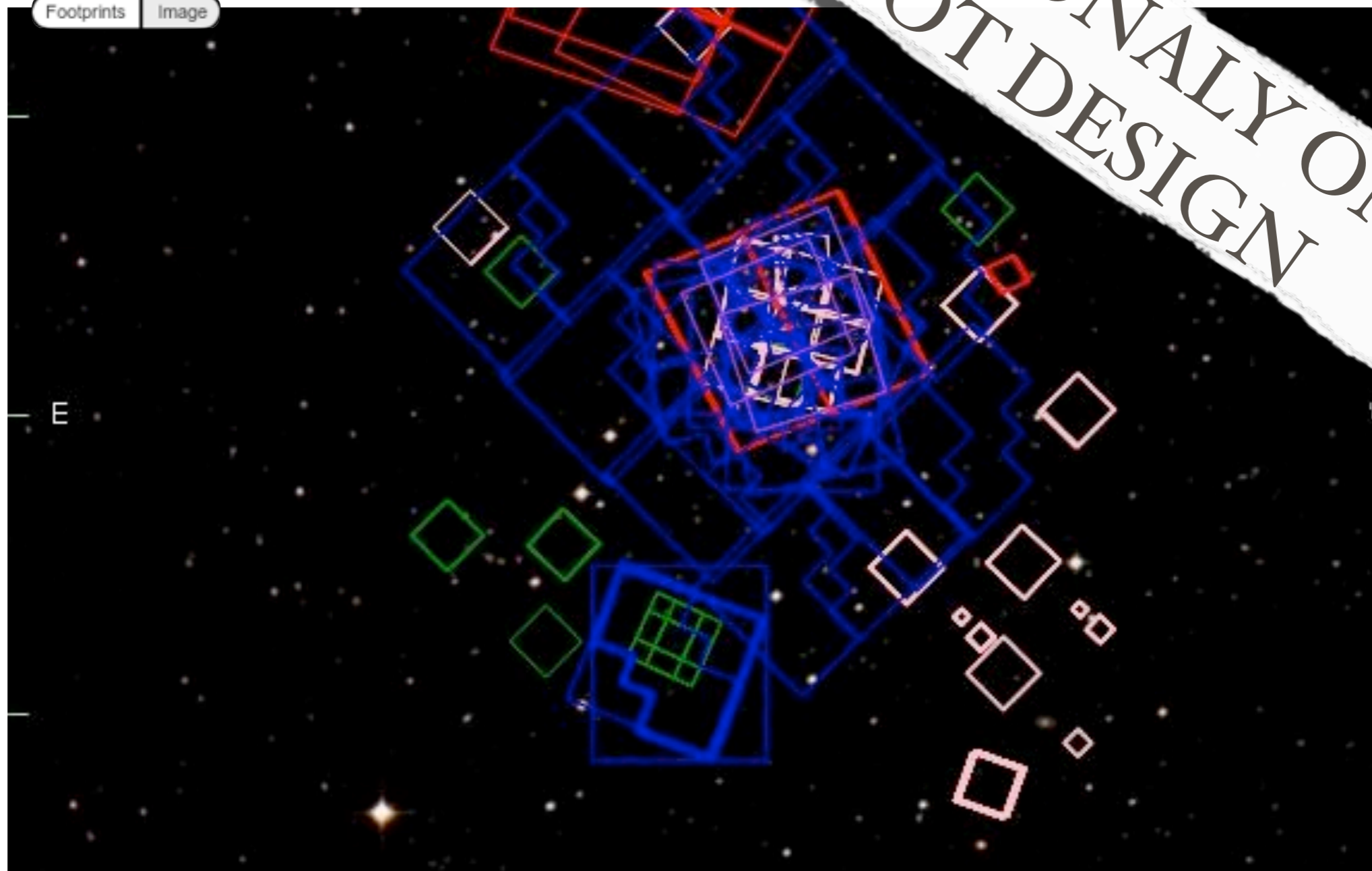


🔍 M83



Hubble, 1204
DSS, 45
GALEX, 13235
Kepler, 35
...

Footprints Image



E

W



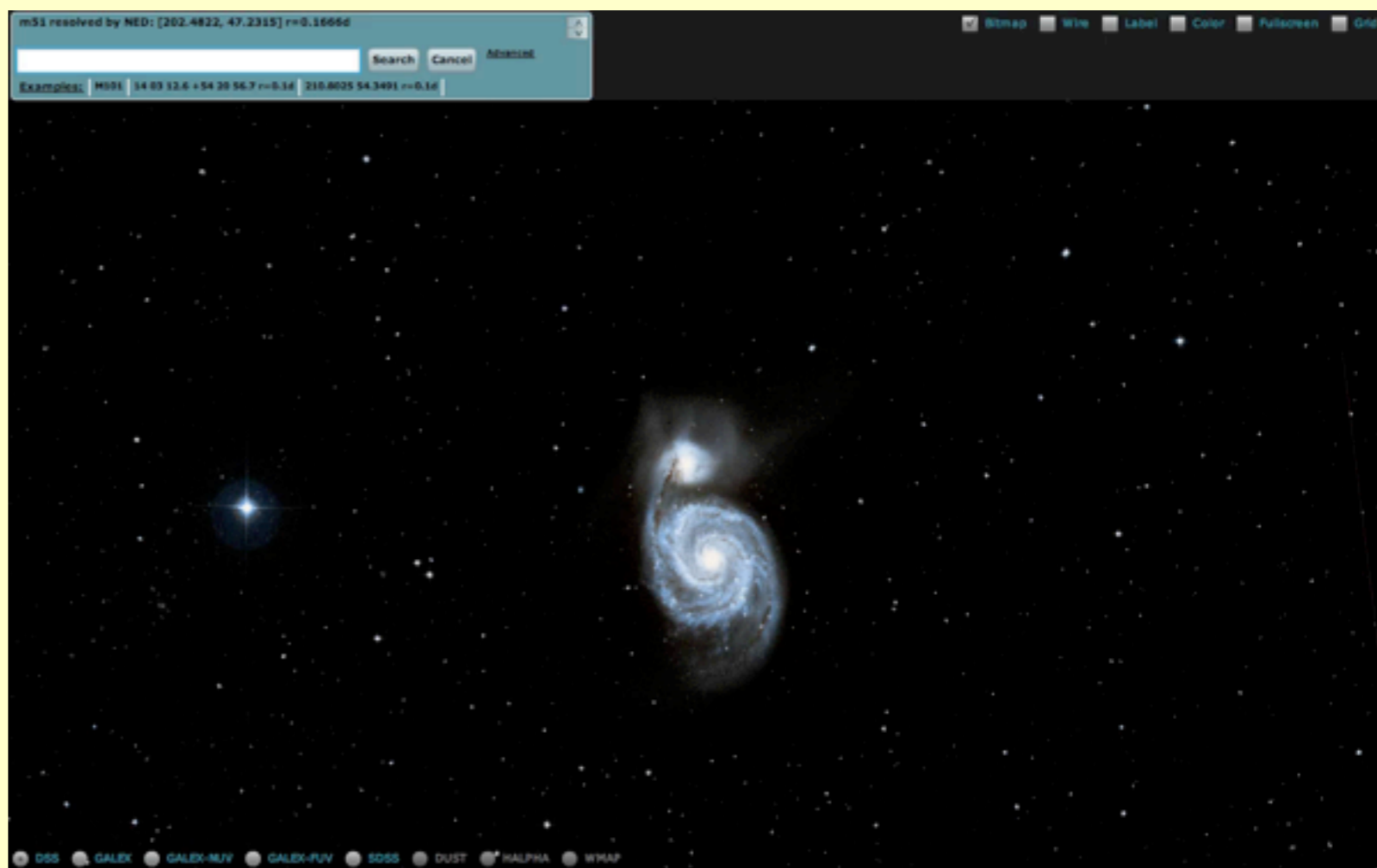


AstroView

- Web mashup of TOAST images retrieved from Microsoft's World-Wide Telescope
- Written in Adobe Flex using the PaperVision3D Library
- Runs inside 99% of Web browsers using Adobe Flash Player
- In-house 'Varnish' Image Accelerator set up by Don Mueller

Future Work:

- Integrate with other MAST Web Tools
- Overlay Footprints, Footprint Summary 'bubbles'
- Incorporate more image surveys created In-House and externally





SpaceRocks!

- iPhone App coming Soon to the Apple Store
- SpaceRocks! Team: Matt Brown, Tony Rogers
- SpaceRocks! is a Public Outreach(+) tool funded by JWST
- SpaceRocks! dynamically loads mission albums from the Server
- New albums can be easily added

Future:

- Each image will contain an 'info' link and 'high-res' link
- (+) Search capability to mine/preview datasets in MAST





- end -