



**MAST** Multimission Archive at Space Telescope

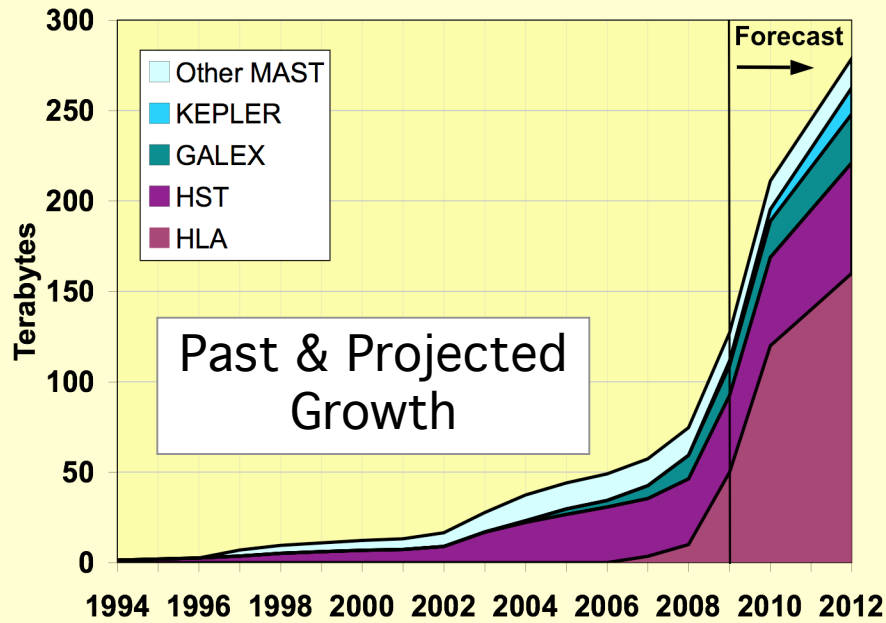
MAST Users Group – July 9, 2009

# Highlights of MAST Activities

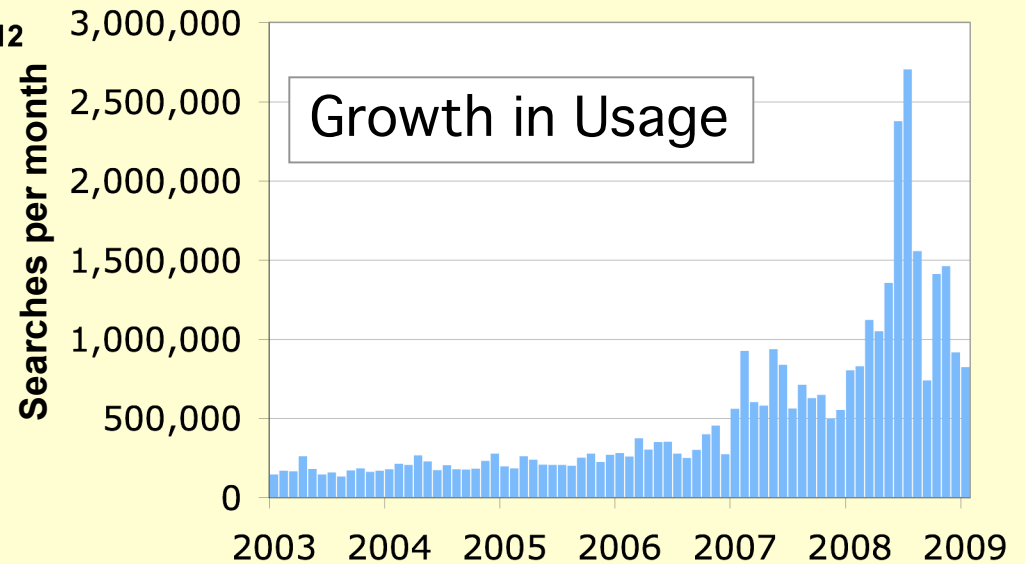
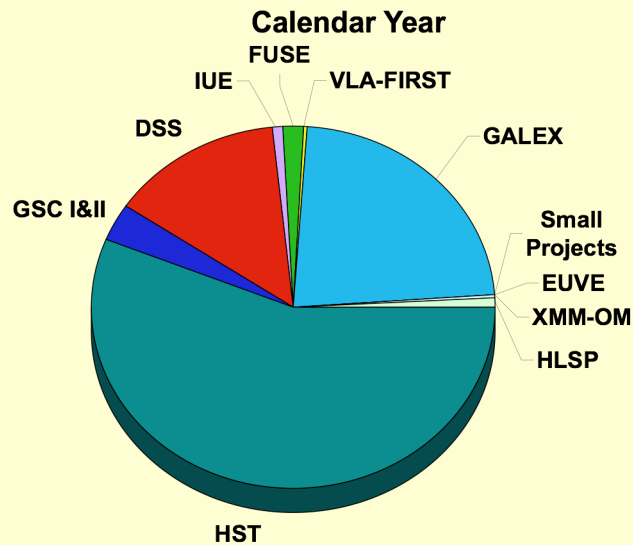
Rick White

MAST Users Group

2009 July 9

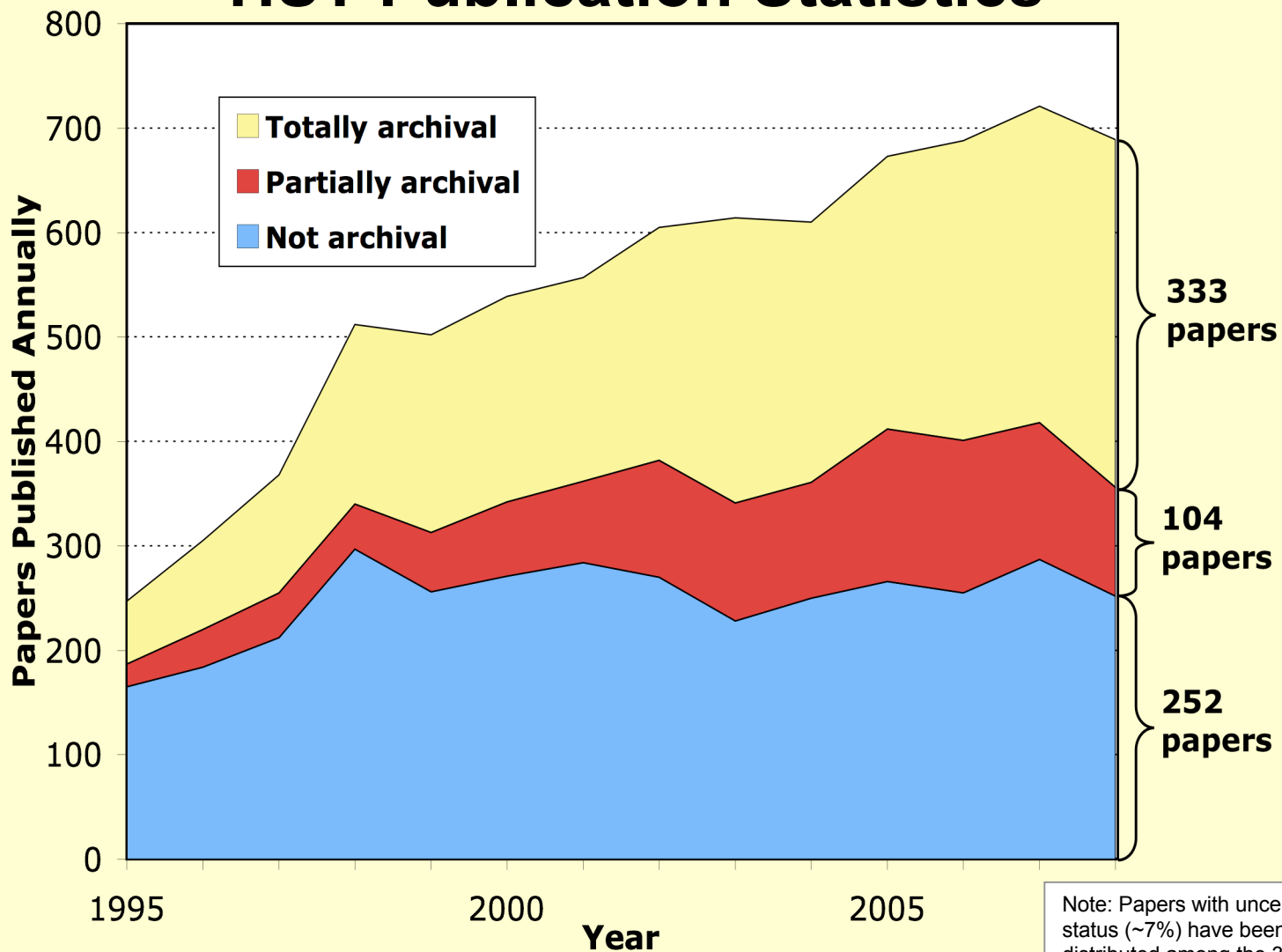


## MAST Data & Usage Growth





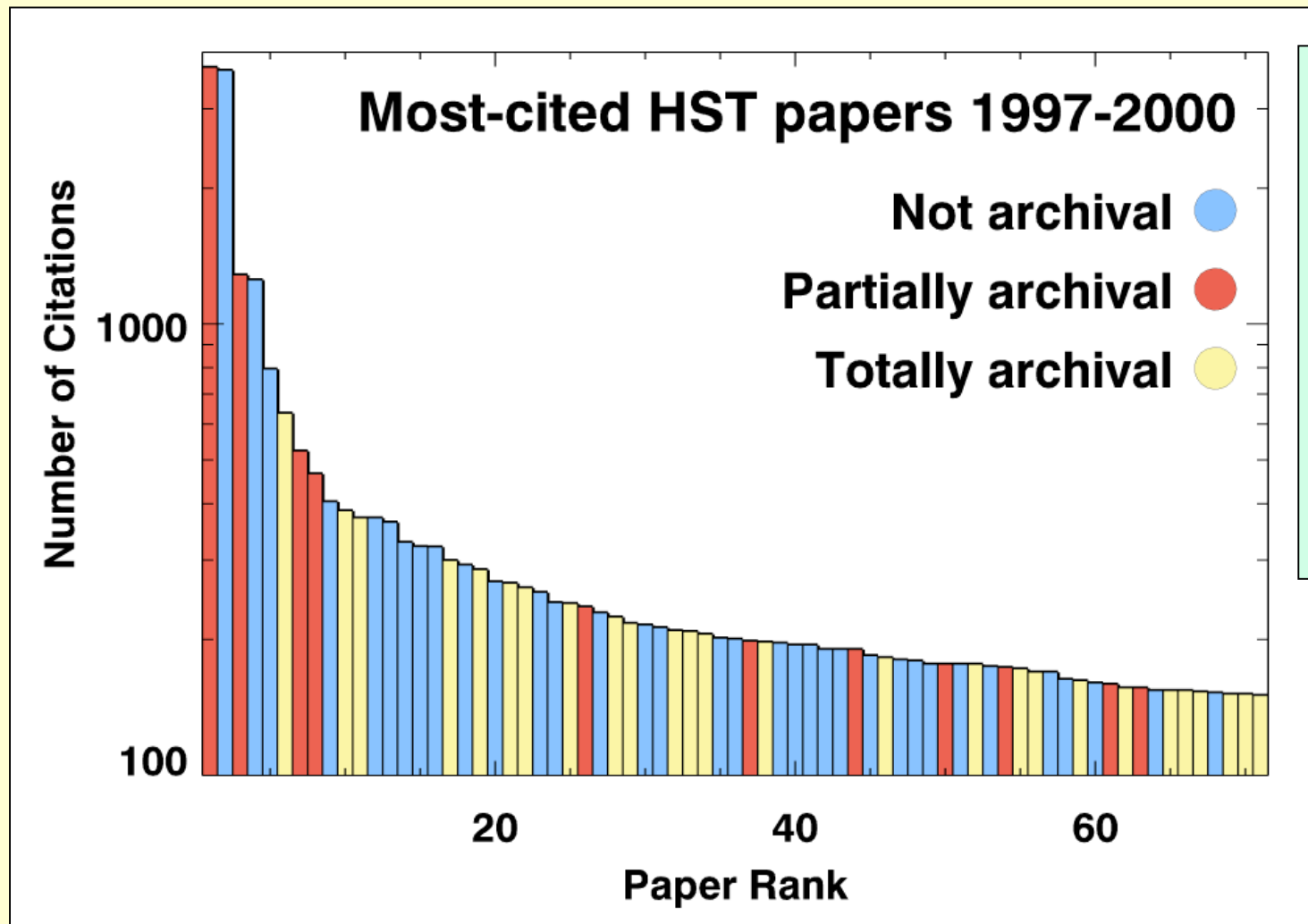
## HST Publication Statistics



Note: Papers with uncertain archival status (~7%) have been proportionally distributed among the 3 categories



## Archival Papers are Highly Cited



Totally archival papers make up 37% of the highly cited sample, slightly higher than expected based on the fraction of archival papers published from 1997–2000 (33%).

From “The High Impact of Astronomical Data Archives”, submitted to decadal survey (White et al. with coauthors from ADS, IPAC, Chandra, NED, HEASARC, SSC).



## MAST/Archive Science Branch Staffing Changes

- Changes:
  - **HLA/MAST merged** after 2008 NASA Senior Review
  - New “**Archive Center**” coordinates work from all STScI missions/divisions on archives
    - **Rick White** (science), **Gretchen Greene** (engineering), **Carl Johnson** (program management)
  - **Karen Levay** is acting ASB chief
  - Archive branch staff **moved** from Bloomberg (Physics Bldg) to **4th floor of main STScI building** (Feb 2009)
- Departures:
  - **Brad Whitmore** went on sabbatical
- Additions:
  - **Stefano Casertano, Mark Kyprianou** joined the HLA project
  - **Rachel Somerville** has a new baby!



## Current ASB & MAST/NVO Staff

Theresa Dower	Tony Rogers
Dorothy Fraquelli	Bernie Shiao
Kim Gillies	Myron Smith
Tim Kimball	Rachel Somerville
Karen Levay	Randy Thompson
Charlie Loomis	Shui-Ay Tseng
Brian McLean	Rick White

(All are not full-time on MAST/ASB; some are funded through NVO)



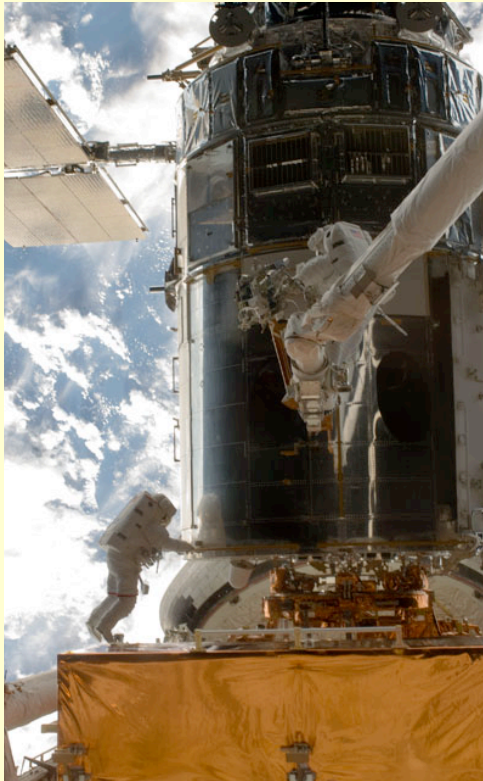
## Current HLA Staff

Stefano Casertano	Mark Kyprianou
Daniel Durand (CADC)	Steve Lubow
Niall Gaffney	Kevin Lindsay
Gretchen Greene	Brian McLean
Richard Hook (ST-ECF)	Lee Quick
Anton Koekemoer	Felix Stoehr (ST-ECF)
Rick White	

(Overlaps with MAST/ASB staff list; most are only part-time on HLA)



## 2008–2009 Highlights



### HST

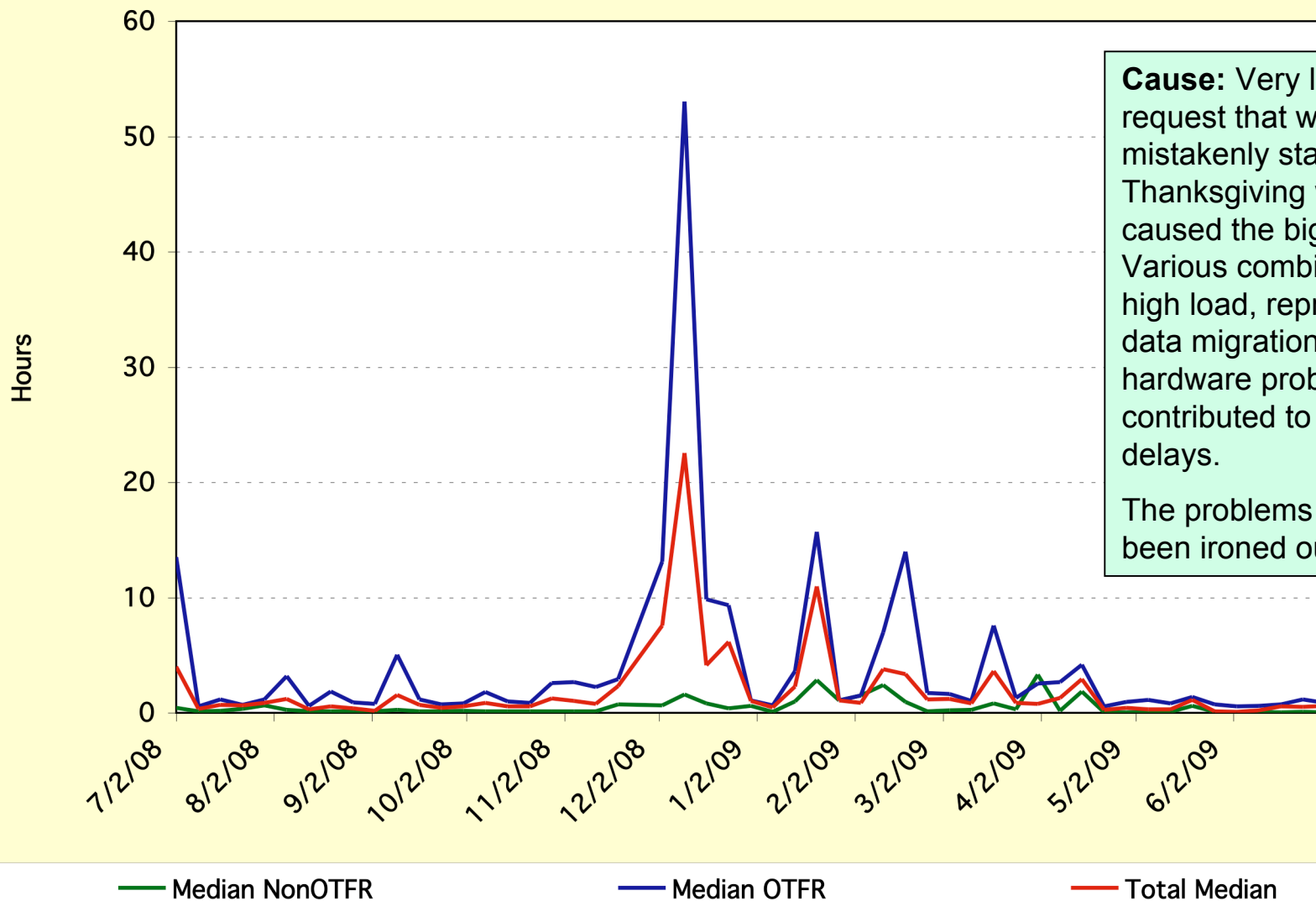
- Servicing Mission 4: May 2009!
  - WFC3, COS, ACS & STIS repairs, gyros, batteries, ...
  - Highly successful (essentially everything except ACS HRC recovered)
  - Early observations release expected early September (will be available through MAST HLSP)

- “Starview on the Web” development continuing [*T.Kimball, T.Rogers*]
- WFPC2, NICMOS reprocessing
- Safestore media migration to UDOs
- Problem: Major retrieval delays during December 2008



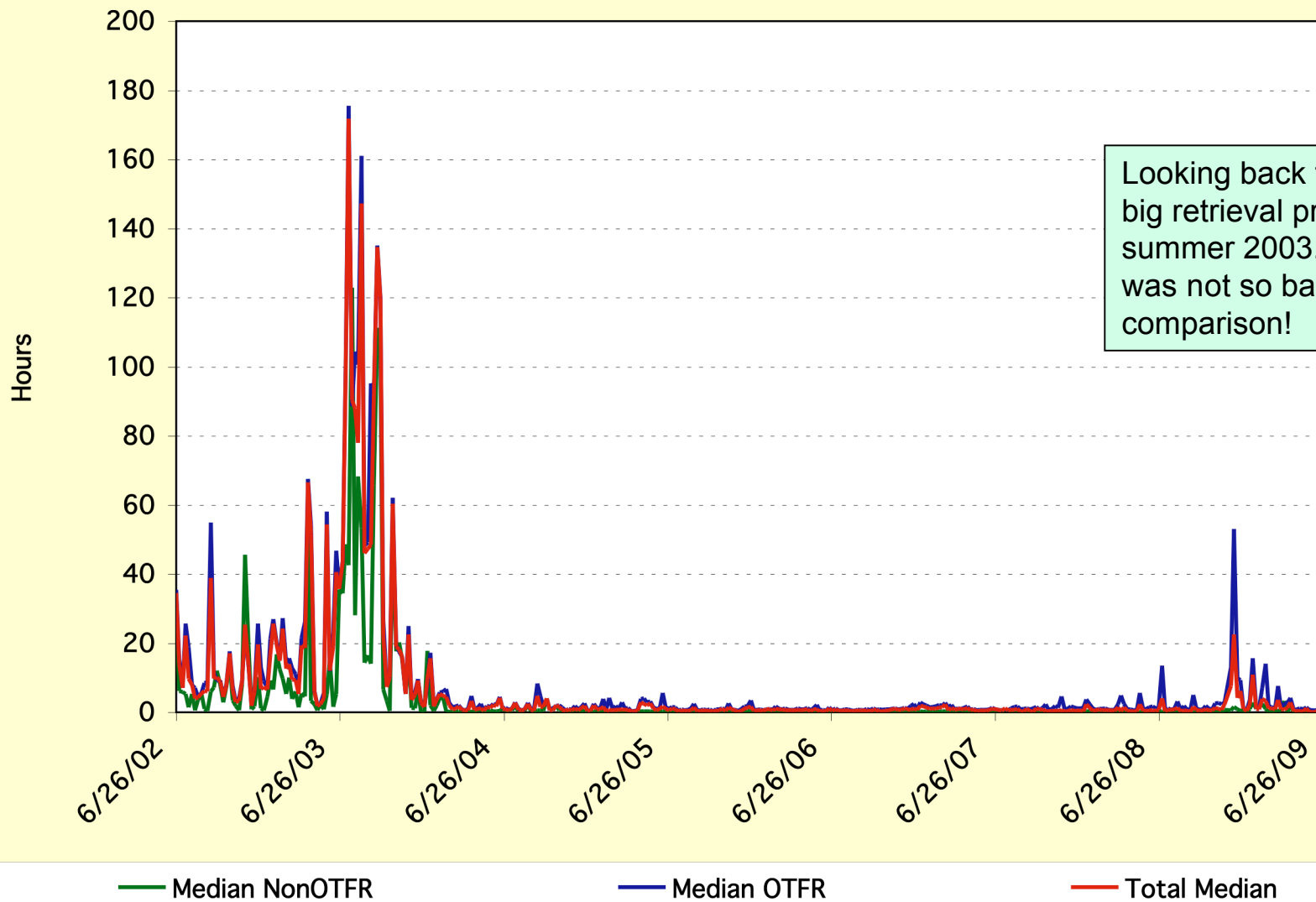


## HST Weekly Median Retrieval Times





## HST Weekly Retrieval Times (7 years)

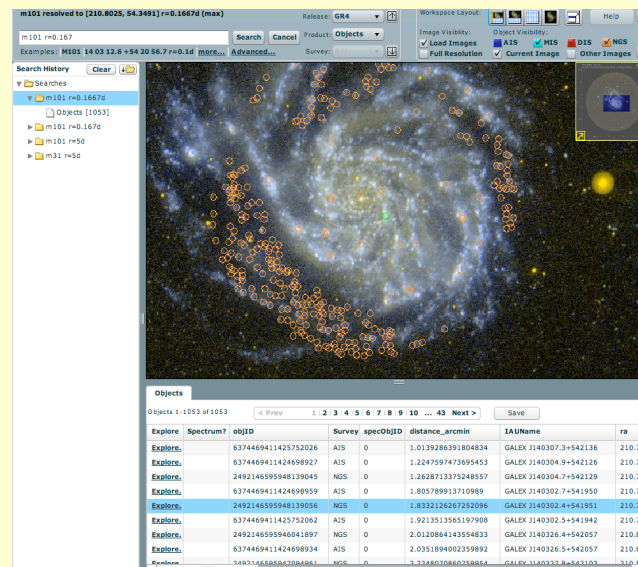




## 2008–2009 Highlights

- JWST: Some archive work beginning this year
  - GSC-2 enhancements to support JWST pointing
  - More work planned for next year
- GALEX [*M.Smith/T.Rogers/A.Conti*]
  - GR5 release (modest additional data)
  - GALEX/SDSS cross match
  - Continuing GalexView interface development

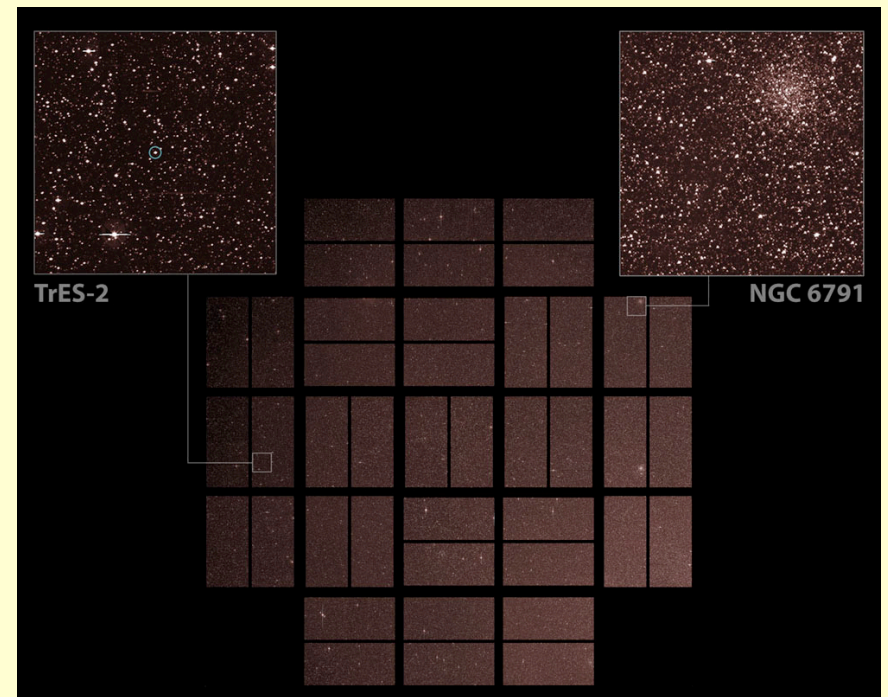
### GalexView





## 2008–2009 Highlights

- FUSE wrapup
  - Reprocessing complete, new documentation now online at MAST
- Kepler [*D.Fraquelli*]
  - Launched on March 6
  - Actual data coming soon!



Kepler image



## 2008–2009 Highlights

- Cross-mission activities
  - Database migration from Sybase to SQL Server leads to major speed improvements [*R.Thompson, S.-A.Tseng*]
    - Sample query: Find closest 1000 HST observations using 50 degree radius search around M81

Database	CPU time (s)	Memory (MB)
Sybase	70	842
SQL Server	9	169

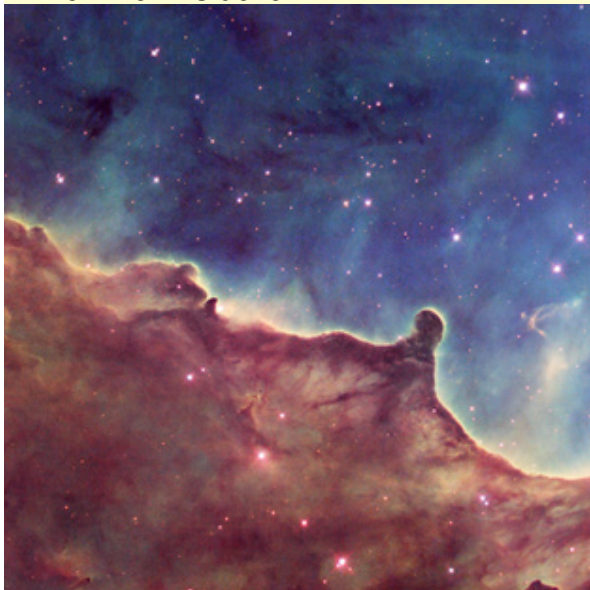
- MAST bibliography search tool [*K.Levay*]
- HLA footprint database now used by APT [*K.Gillies*]



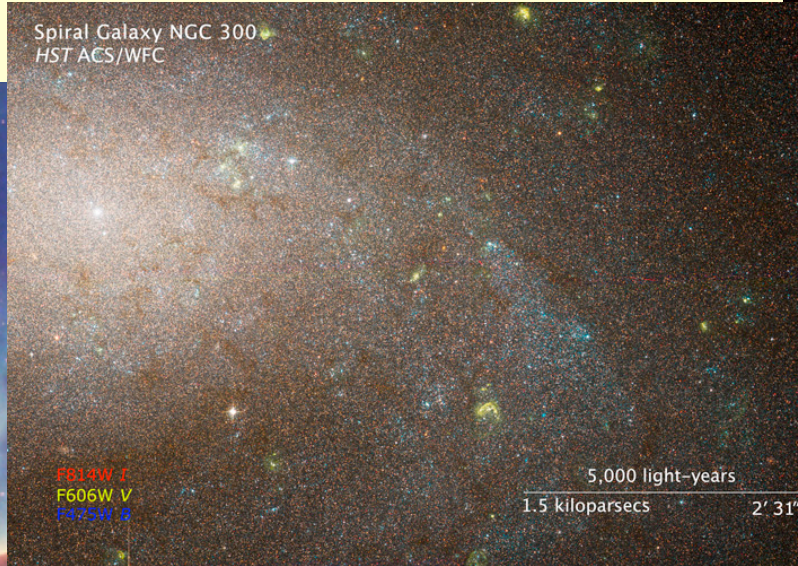
## HLSP Highlights

- Numerous new High Level Science Products  
*[B.McLean/K.Levay]*
  - Carina Nebula, STAGES, COSMOS, Merging Galaxies, Coma Cluster, ANGST, etc.

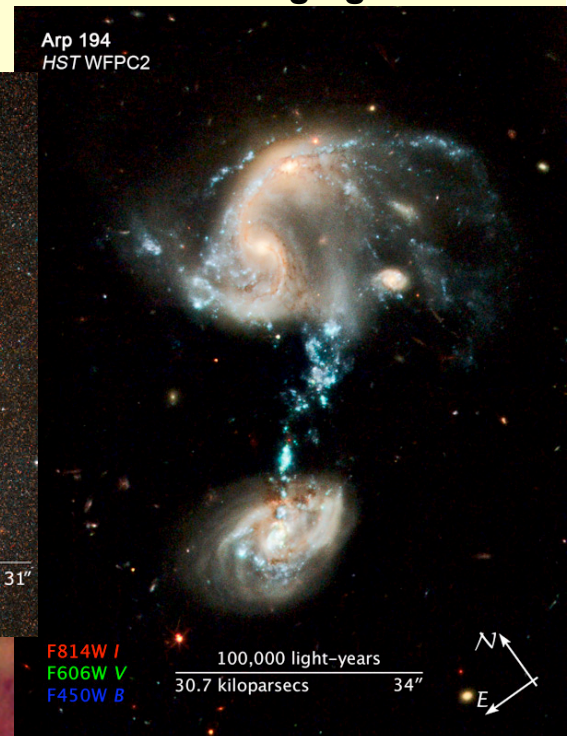
**Carina Nebula**

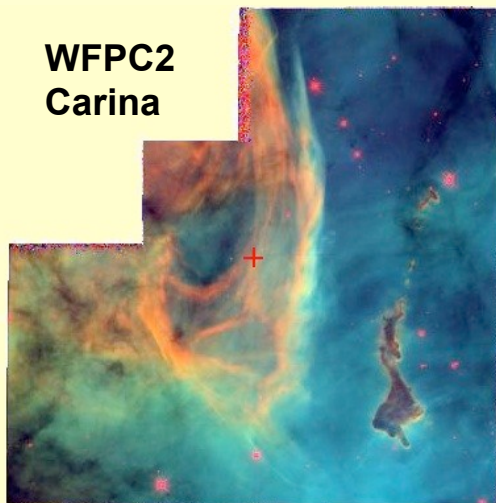


**ANGST**

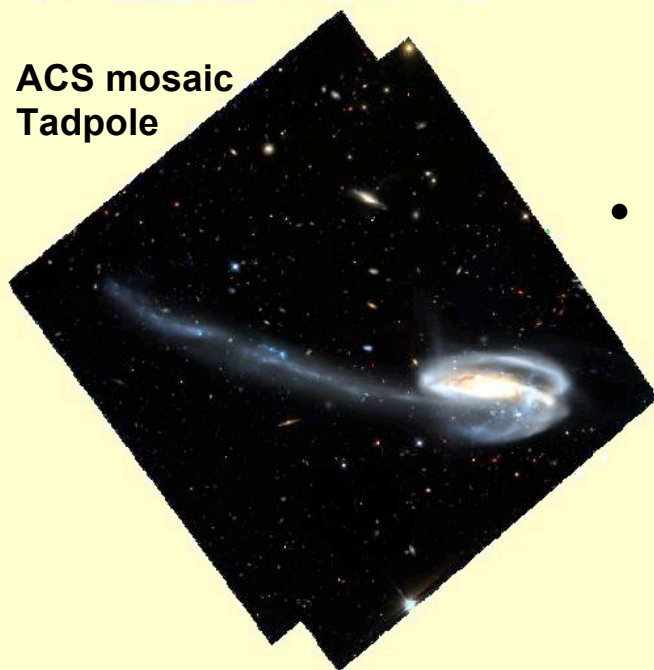


**Merging Galaxies**





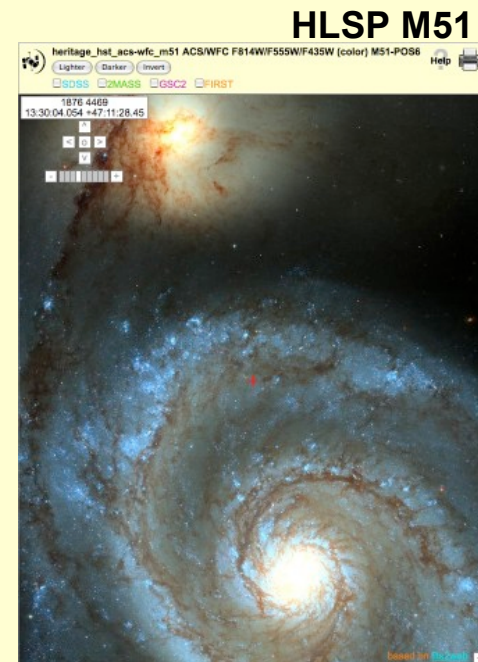
WFPC2  
Carina



ACS mosaic  
Tadpole

## Hubble Legacy Archive *[S. Casertano]*

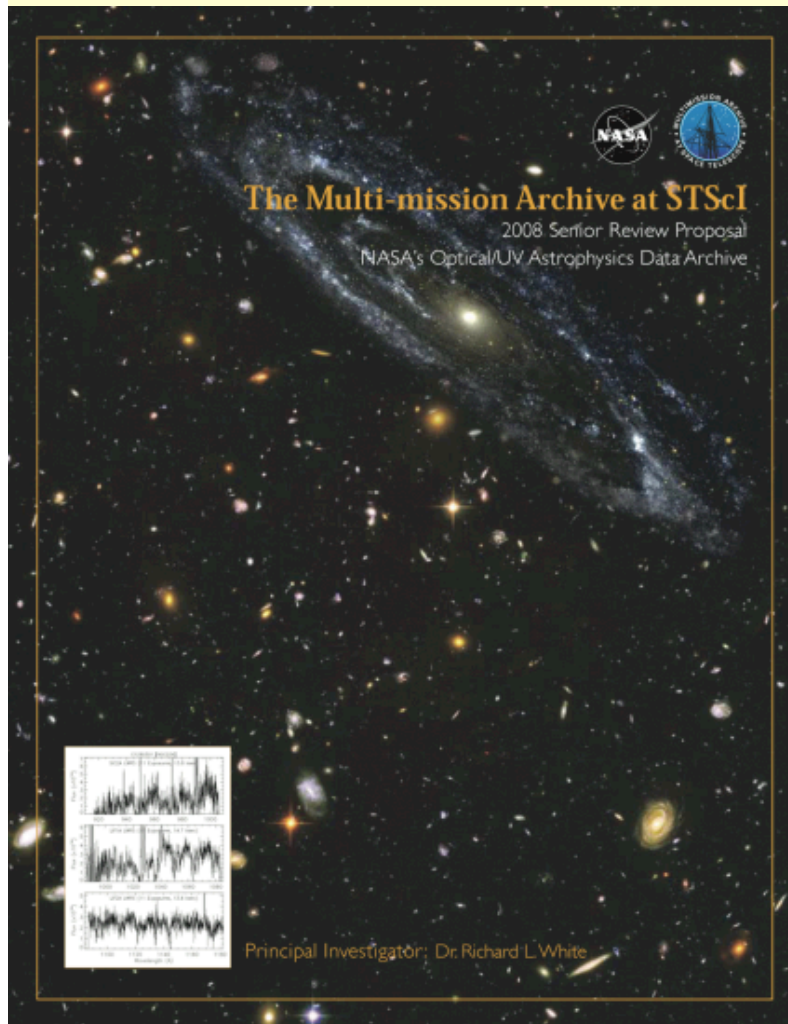
- DR2 in August 2008
  - WFPC2 combined images
- DR2.5 in December 2008
  - HLSP integrated (GOODS, COSMOS, etc.)
- DR3 in May 2009
  - NICMOS combined images
  - WFPC2 source lists
  - ACS deep mosaic (prototypes)





## MAST Senior Review

- NASA Senior Review
  - MAST and other NASA archive centers are reviewed by NASA HQ every 4 years to set funding
  - Proposal submitted May 2008, presentation at HQ June 2008
  - Major change: HLA included (at directive of NASA)

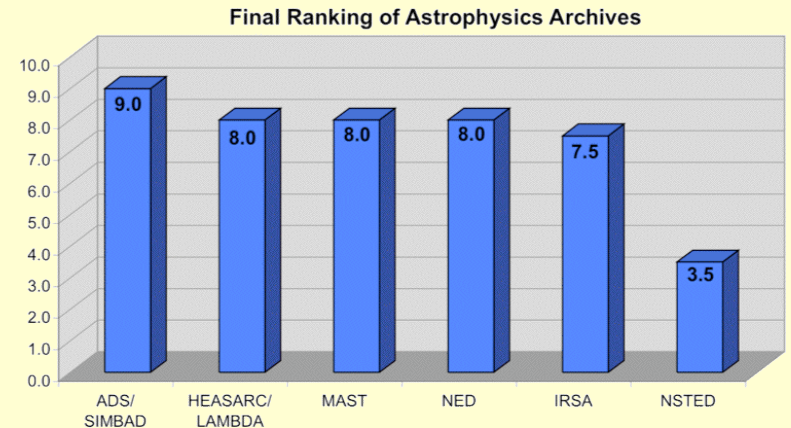






## Senior Review Report

- Summary:
  - Very favorable, MAST graded 8 out of 10 (tied for 2nd)
  - Many positives:



*“The scientific importance of the rapidly growing GALEX archive is clearly very large.”*

*“Both usage statistics and science output demonstrate the great utility of MAST. The panel was convinced that archival research with the MAST datasets will indeed have at least as wide a scientific impact as the initial work done by the guest observers.”*

*“The live demonstration of the power and speed of the HLA interface convinced panel members that it may be the best multi-mission data browser in existence, and could usefully include other mission footprints. The Flex-based GalexView appears to be an excellent platform for development.”*



## Senior Review Report

- Criticisms were relatively minor:
  - Concern that HLA would “freeze” Hubble datasets and lead to loss of institutional memory
  - Current MAST web pages can sometimes be confusing; difficult to find some resources
- Overall assessment and recommendations:

*“MAST provides vital services to the Astronomical community, and the Panel recommends continued support for this important facility through the in-guide budget. We also recommend Over-Guide funding to allow for a substantial part of the continuation of the Hubble Legacy, including GalexView. On the other hand, some augmentations, such as time-domain developments, were less compelling because superior time-domain data will be coming from ground-based observatories.”*



## Senior Review & Budget

- Budget sufficient to maintain robust MAST and HLA projects was allocated for next 4 years
- The only issue has been timing of the start of the funding
  - “FY09” funding finally arrived on 2009 June 1 ... but HLA work shifted to MAST budget on 2008 October 1
  - Result is a stressed budget for coming year
    - Spent most of this year’s hardware funding covering the extra labor
    - Delays in VAO/NVO funding also have caused some problems
  - Modest reductions in effort on MAST projects planned over next year to deal with shortfall
    - No staff reductions (mostly shifting to new work for JWST)
    - Hoping to save enough in labor costs to enable new hardware purchases this summer (mainly disk storage)