

The Hubble Legacy Archive - Project Update

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STUC Meeting, October 18, 2007

OUTLINE

- Potential for Enhanced Science
- Brief Demo
- Early Data Release (July, 2007)
- Plans for Data Release 1 (January, 2008)

Potential for Enhanced Science

Our goal is to **optimize the science return** from the Hubble Space Telescope by providing **online, enhanced Hubble products** and advanced **browsing capabilities**.

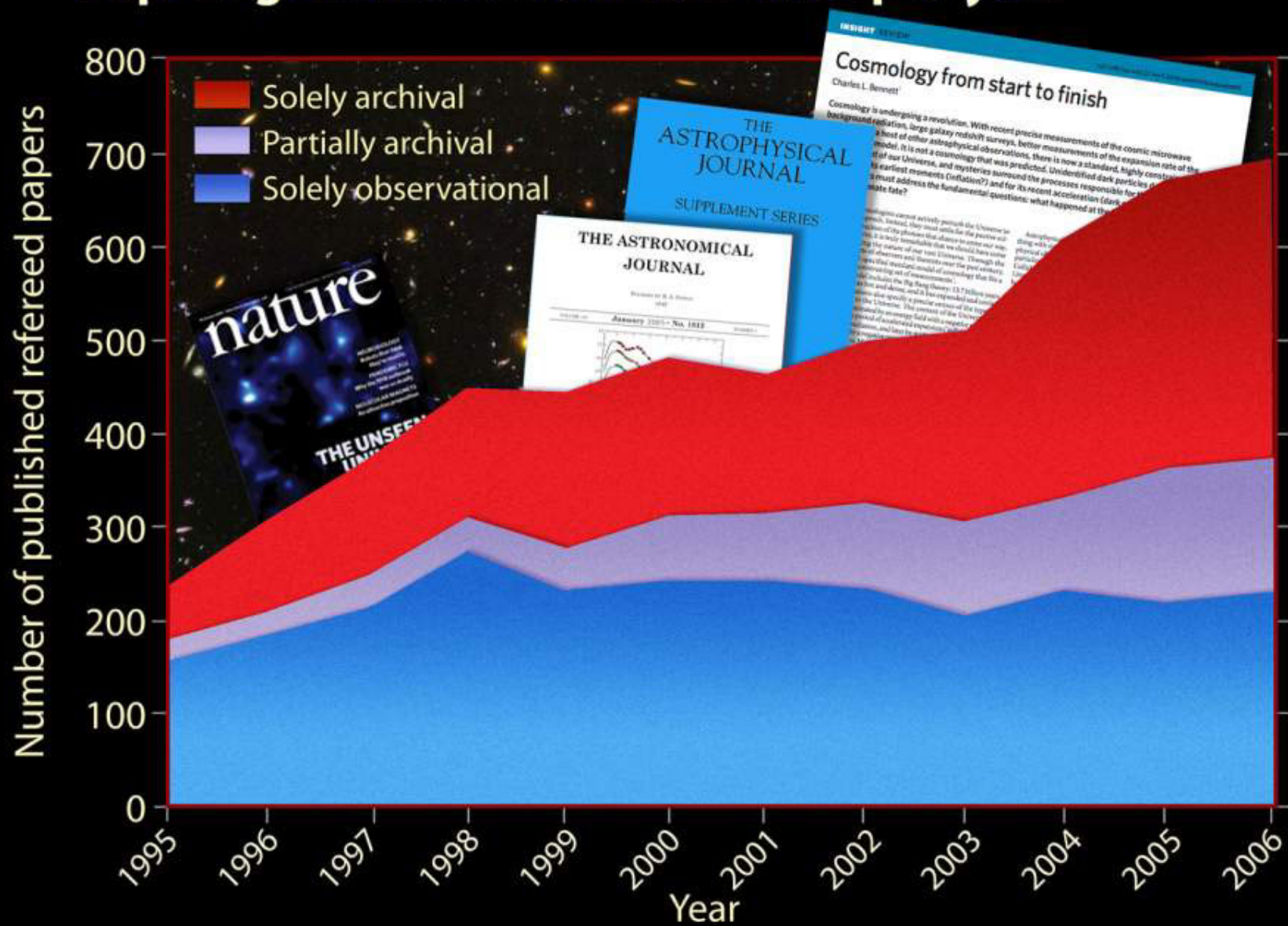
We take advantage of various **advances in the past decade**:

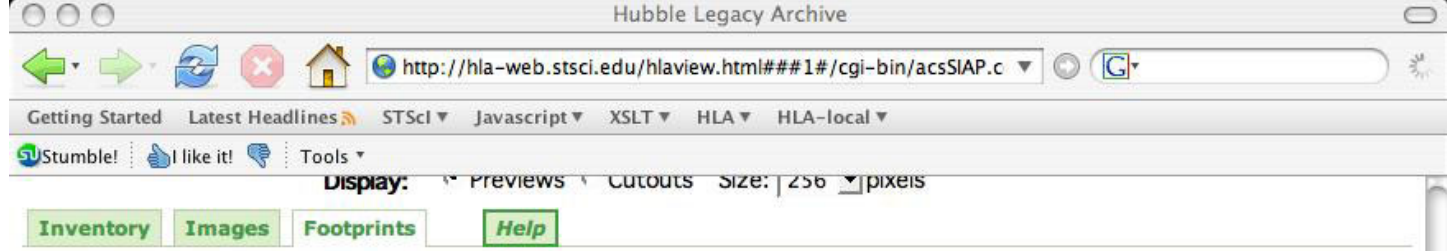
- growing archives (less need to propose oneself)
- cheap disk space
- improved Hubble products (e.g., “ACS-like” for WFPC2)

Increase overall science by:

- make it easier to browse and download HST data
- **reduce redundancy**
- **reach future generations** of astronomers (and public) by integration into the Virtual Observatory

Papers generated from HST data per year

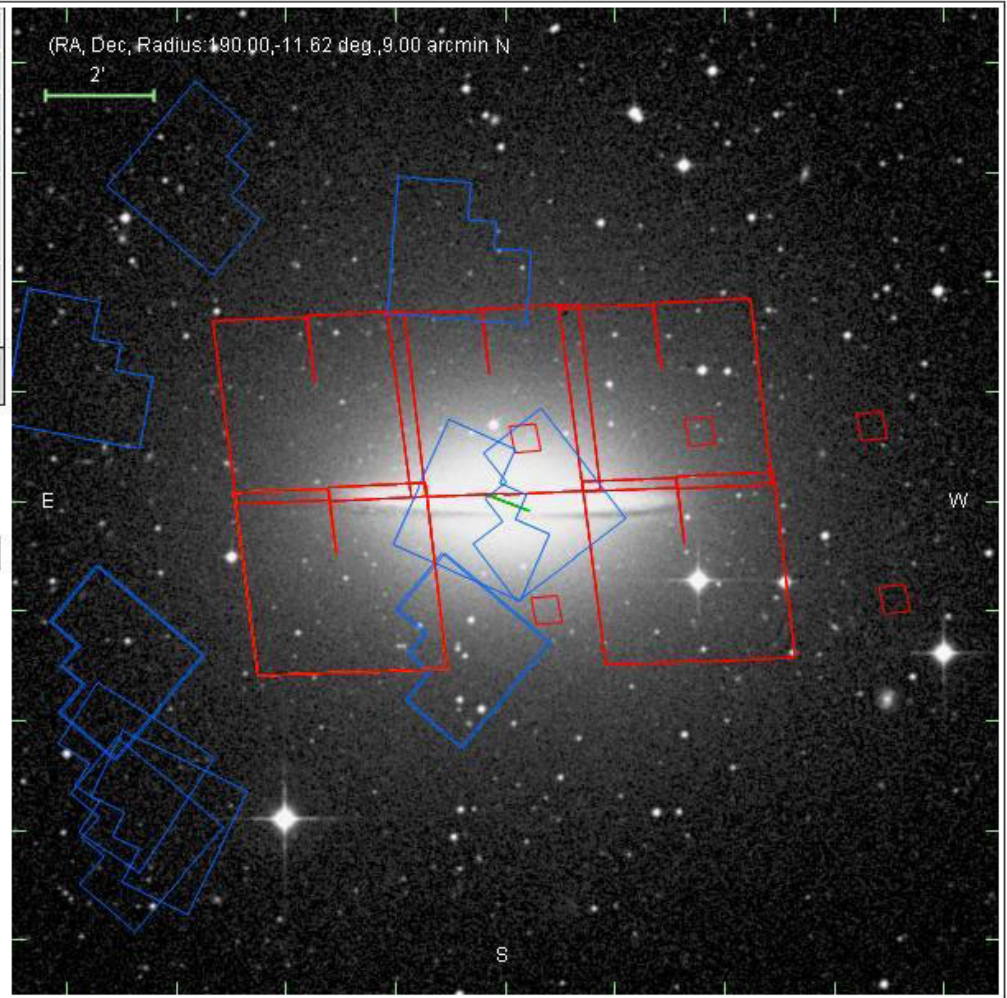




Instrument	#Footprints
<input checked="" type="checkbox"/> STIS*	6
<input checked="" type="checkbox"/> ACS	20
<input checked="" type="checkbox"/> WFPC2*	53
DSS Image	<input checked="" type="radio"/> On <input type="radio"/> Off
ACS Product	
<input type="radio"/> Exposure <input checked="" type="radio"/> Combined	
<input checked="" type="button" value="Submit"/>	

Click [here](#) for NVO Footprint Web Services

*Datasets available via [MAST](#)



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

Results: Viewing page 1 of 2 Selected 0 of 79

HLA ACS
footprints for
NGC 4594

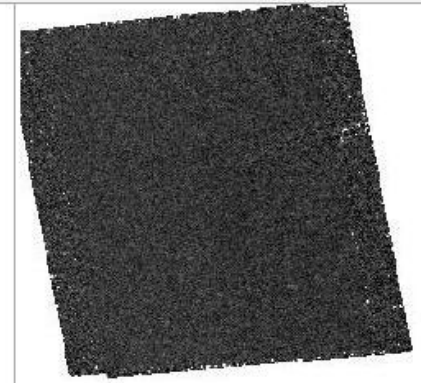
WFPC2 and STIS
footprints are also
available (though
the data cannot yet
be downloaded
through this
interface.)



NGC4594-POS1 (combined)
ACS WFC F625W
HST_9714_01_ACS_WFC_F625W
[Interactive display](#)
[Download FITS: Full-size \(252.9 MB\)](#)
[Download Source Lists: SExtractor](#)



NGC4594-POS1 (color)
ACS WFC F625W/F555W/F435W
9714_01
[Interactive display](#)
[Download FITS: None \(color image\)](#)
[Download Source Lists: None](#)



ANY (combined)
ACS HRC F220W
HST_9714_02_ACS_HRC_F220W
[Interactive display](#)
[Download FITS: Full-size \(22.5 MB\)](#)
[Download Source Lists: None](#)



NGC4594-POS2 (combined)
ACS WFC F435W
HST_9714_02_ACS_WFC_F435W



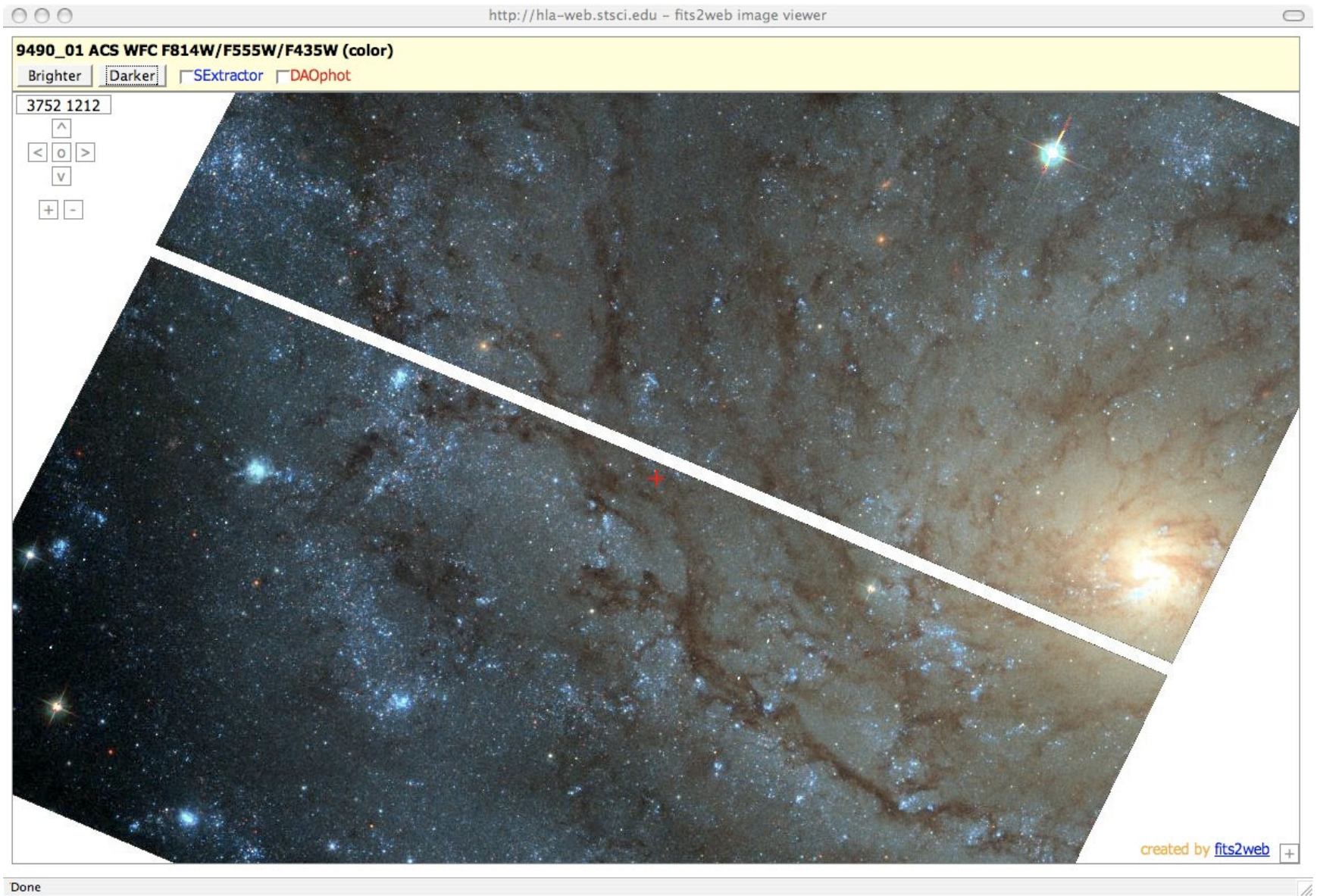
NGC4594-POS2 (combined)
ACS WFC F555W
HST_9714_02_ACS_WFC_F555W



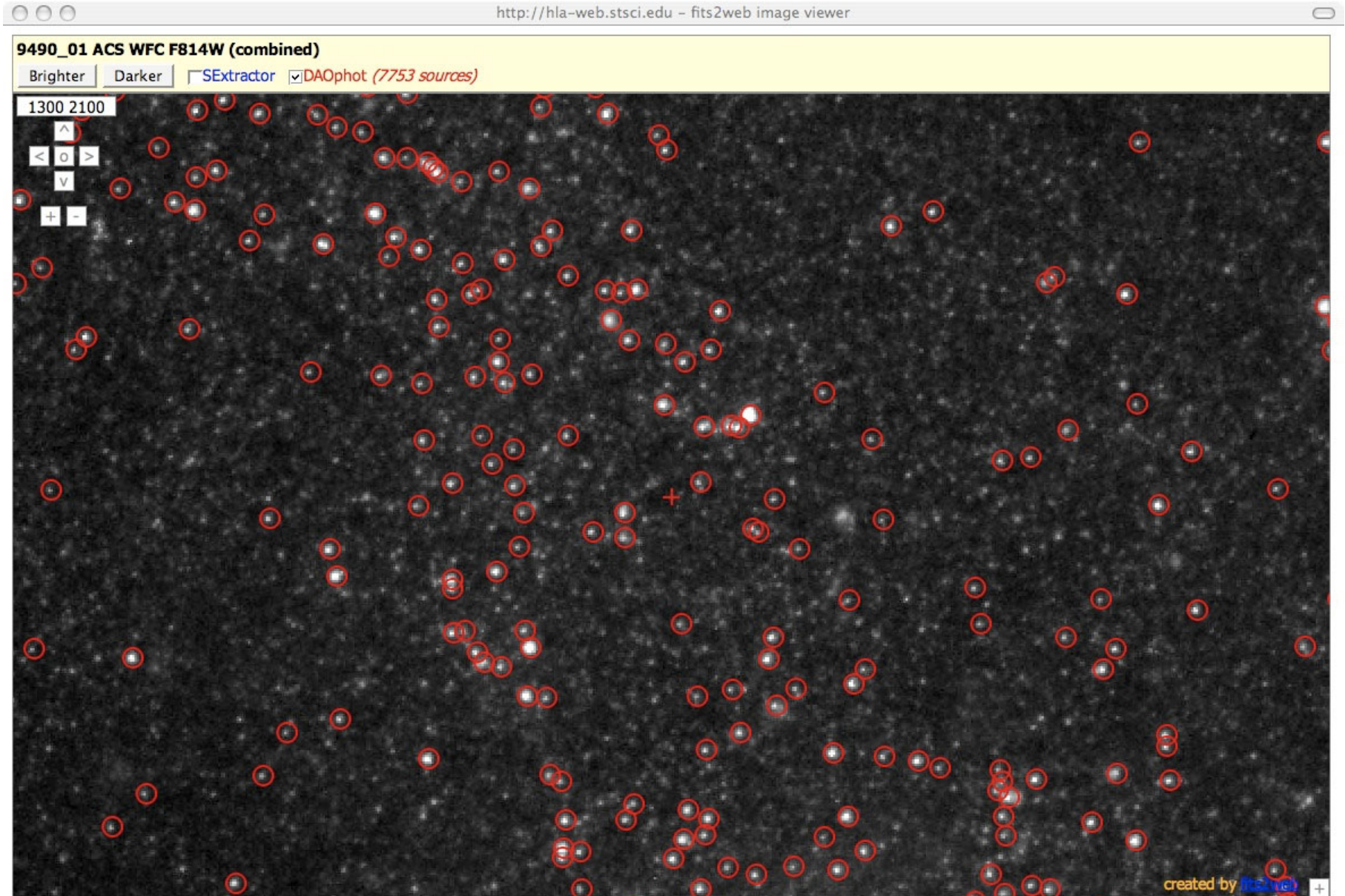
NGC4594-POS2 (combined)
ACS WFC F625W
HST_9714_02_ACS_WFC_F625W

HLA “Image
View” for
NGC4594
images.

HLA “Interactive Display” of M101 color image



HLA source list overlay for blowup of M101 image





Hubble Legacy Archive

Abell 1689

Examples: M101, 14 03 12.6 +54 20 56.7 r=0.2d, [more...](#)

[Requires Firefox or compatible browser](#)

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[Reset](#)

[advanced search](#)

[Inventory](#)

[Images](#)

[Footprints](#)

[Help](#)

Results **1-16**

Show results per page

Click column heading to sort list - Click row to select images [Reset selection](#)

Display	Download	RA	DEC	Level	Target	Camera	Filter	NExposures	ExpTime	<	>
Display	FITS	197.813169	-1.326523	2	ANY	ACS HRC	G800L	8	8652		
Display	FITS	197.874692	-1.338794	2	ABELL1689	ACS WFC	F850LP	8	9500		
Display	FITS	197.813438	-1.326950	2	ANY	ACS HRC	F625W	6	6464		
Display	FITS	197.813438	-1.326950	2	ANY	ACS HRC	F892N	2	2088		
Display	FITS	197.874966	-1.339224	2	ABELL1689	ACS WFC	F775W	2	2300		
Display	FITS	197.874966	-1.339224	2	ABELL1689	ACS WFC	G800L	6	7100		
Display	FITS	197.874966	-1.339224	4	ABELL1689	ACS WFC	F775W/G800L	8	9400		
Display	FITS	197.813438	-1.326950	4	ANY	ACS HRC	F892N/F625W	8	8552		
Display	FITS	197.813321	-1.326470	2	ANY	ACS HRC	F892N	8	8652		
Display	FITS	197.874846	-1.338741	2	ABELL1689	ACS WFC	F775W	8	9500		
Display	FITS	197.813210	-1.326528	2	ANY	ACS HRC	F606W	8	8652		
Display	FITS	197.874736	-1.338798	2	ABELL1689	ACS WFC	F625W	8	9500		
Display	FITS	197.813201	-1.326586	2	ANY	ACS HRC	F850LP	8	8652		
Display	FITS	197.874730	-1.338857	2	ABELL1689	ACS WFC	F475W	8	9500		
Display	FITS	197.813189	-1.326545	2	ANY	ACS HRC	G800L	6	6464		
Display	FITS	197.874712	-1.338815	2	ABELL1689	ACS WFC	F850LP	6	7100		
Display	Download	RA	DEC	Level	Target	Camera	Filter	NExposures	ExpTime	<	>

Results **1-16**

Show results per page

HLA
“Inventory
View” for
A1689
images.

Early Data Release - (July, 2007)

- After a ~10 months prototype phase, the HLA Early Data Release occurred on [31 July 2007](#).
 - Available to the community at <http://hla.stsci.edu/>
- HLA prototypes integrated into browser-based user interface:
 - Search by object name, coordinates, or radius
 - Results presented in [image, footprint, and inventory views](#)
 - Images (full and cutouts) and object lists available for download
 - Image browsing with object list overlays possible
 - Footprints include WFPC2 and STIS in addition to ACS images
 - Simple VO access to data
- Available Products:
 - ACS Level 1 (individual exposure) images - about 25%
 - [ACS Level 2 \(combined within visits\) images](#) - about 25%
 - NICMOS GRISM extraction (ST-ECF)
 - Point-source & extended-source, multi-wavelength [source lists](#)
 - [Improved astrometry](#)

HLA Slitless Spectroscopy

prepared by Wolfram Freudling

- goal: extract science-ready spectra from slitless spectrographs (STIS, NICMOS, ACS, WFC3)
- motivation:
 - data from slitless spectrographs cannot be judged from simple preview of images
 - extracting spectra requires substantial expertise
 - spectra in archive underused
 - ST-ECF has unique experience with slitless spectroscopy


Related Activities

- Meetings
 - HLA Coordination Meeting (STScI/ECF/CADC) held in March
 - STSCI/CADC/ECF reaffirmed their commitment to develop the HLA and contribute in specific areas; signed agreement in June
 - □HSTP-G Technical Meeting in June
 - Convened HLA Board meeting (with HSTP and STUC representation) in June
 - AAS (June), ESLAB 2007(August) and ADASS (September) presentations, posters, and demonstrations

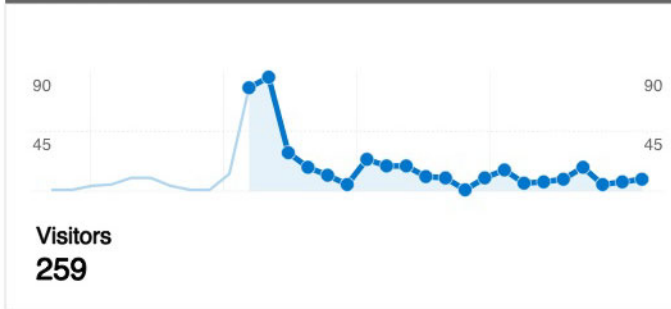
“Google Analytics” metrics are being used as the primary source of usage statistics.



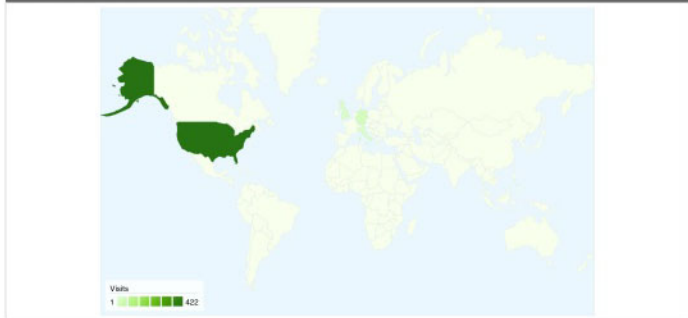
Site Usage

 **536 Visits** **1,925 Pageviews** **3.59 Pages/Visit** **36.01% Bounce Rate** **00:11:24 Avg. Time on Site** **42.72% % New Visits**

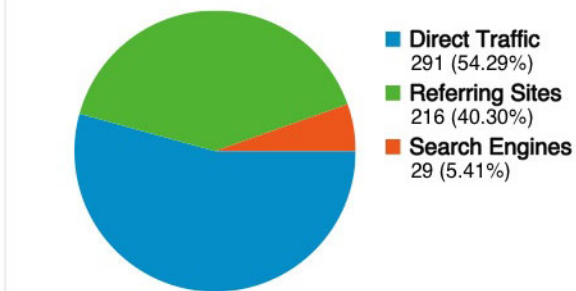
Visitors Overview



Map Overlay world



Traffic Sources Overview



Content Overview

Pages	Pageviews	% Pageviews
/hlaview.html	913	47.43%
/fits2web.html	241	12.52%
/cgi-bin/testdisplay?cdmatrix=-	172	8.94%
/testhlaview.html	88	4.57%
/hla_help.html	57	2.96%

The HLA “Board”

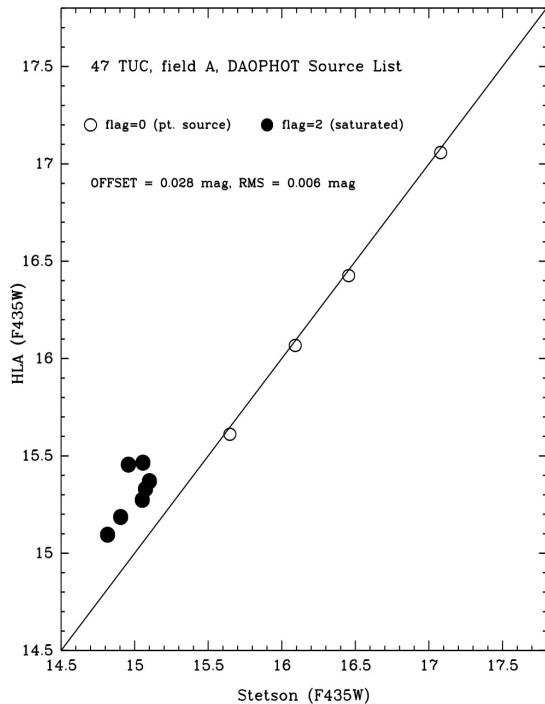
Charter (as defined in a Tripartite Agreement between CADC, ECF, and STScl)

“The board will be charged with being the guardian of the “HLA brand”. It will meet when products and services are ready for release and coordinate an assessment procedure to determine whether an adequate standard is reached. The board will have no direct control over activities at the three sites. “

Membership

- **Ken Carpenter** (GSFC)
- Richard Hook (ECF)
- **Mario Mateo** (STUC; Michigan)
- Warren Miller (STScl)
- David Schade (CADC)
- Brad Whitmore (STScl)

PASP paper in preparation: describes processing and assesses data quality

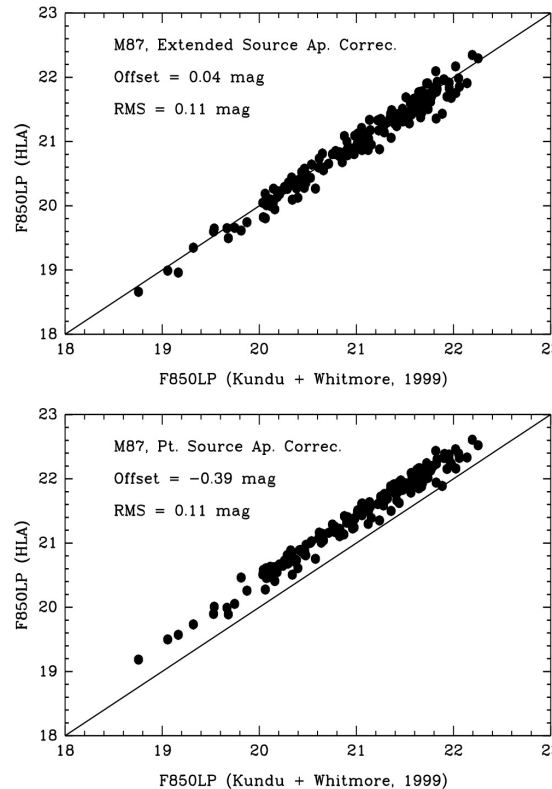


47 TUC - stellar field

- Comparison with Stetson ground-based B is excellent
- Shows multidrizzle maintains photometric integrity

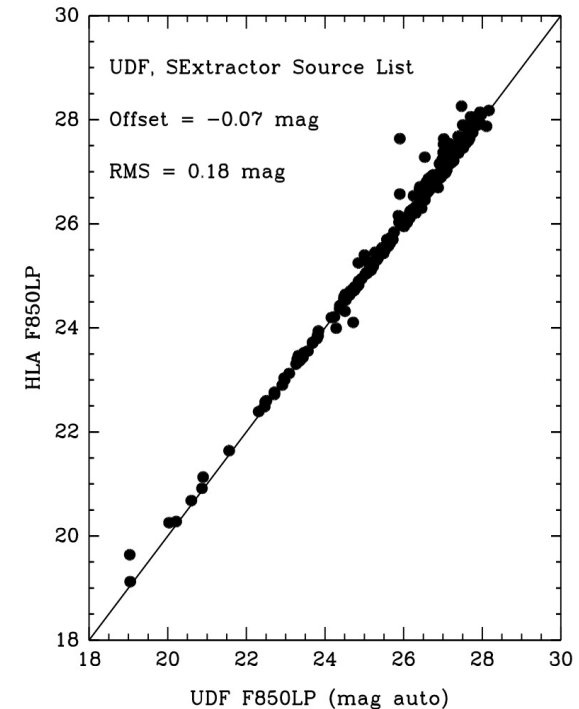
Examples of Source Photometry

Tests shown to HLA Board



M87 - slightly extended

- Extended objects will have offset since using stellar aperture corrections.
- Could make approx. correction. **Rec. for future.**



UDF

- SExtractor source lists look promising, but very limiting testing so far so **may consider holding for the future?**

Plans for Data Release 1 - (January 2008)

- Add new science products
 - Image data for ~90% of the ACS pool
 - Multi-wavelength and next generation source lists
- Initiate work on new science products
 - Spectroscopy prototypes (Ted Gull @ GSFC)
 - WFPC2 chip combination (CADC lead)
 - ACS mosaics
 - Contributed products (start with GOODS)
- Continue work on User Interface
 - Shopping cart / Data model
 - Advanced search capability (keywords, proposal ID,...)
 - Better integration of GRISM products/interface

Data Release 1 Schedule

The primary driver is to have in place for the **Cycle 17 Proposal Deadline** (i.e., March 4)

- **October**
 - Begin reprocessing new products (e.g., 2nd generation ACS images, source lists, WFPC2 chip-wide mosaics, ...)
 - System Design / Infrastructure Review (STScI/HSTP)
- **~ December 15**
 - HLA Board Discussion
 - Readiness review
- **January**
 - Data Release 1

Budget Programmatic

- FY07 funding was via a Technical Directive from HSTP.
- Effort for FY08 and beyond was removed from the Statement of Work during contract negotiations.
- A separate proposal for FY08 was submitted in August in response to a RFP from HSTP.
- The proposal was accepted with very minor changes.
- The HLA effort for FY09 and beyond will be the subject of separate negotiations.

Product Release Goals and Schedule

Item	Early Data Release (Jul 31,07)	Data Release # 1 (Jan, 08)	Data Release # 2 (Aug, 08)
ACS			
IMAGES (*1,*2)			
- Level 1 (exposures)	X (> 20 % of full pool)	X (> 9%)	X (> 90 %)
- Level 2 (combined)	X (> 20 %)	X (> 90 %)	X (> 90 %)
- Level 3 (mosaics)		X (> 20 %)	X (> 90 %)
- contributed		- prototype	X (50 % of MAST) ?
SOURCE LISTS			
- DAOPhot(*3)	X	X	X (HST-all-sky source list)
- SeXtractor	X	X	X (HST-all-sky source list)
Overlay, blink catalogs		X (e.g., 2MASS)	X
OTHER			
- Footprints	X (ACS, STIS, WFPC2)	X (add NICMOS, GRISM?)	X
- VO services	X (footprints, images, source lists) slightly later than EDR	X (spectral products prototype)	X (spectral products?)
- Spectra		X (NICMOS grism; 20 %, general spectra prototype)	X (NICMOS grism; 90 %, general spectra ?)
- Performance	X (<30 sec for typical request)	X (< 10 sec for typical req.)	X
- moving targets			>>>

NOTES:

1 - Images are online, multidrizzled, astrometrically corrected to < 0.3 arcsec.

2 - Image types include single filter, color images. Also include “white light” images at some point.

3 - Source lists have less than 10 % artifacts, photometric zeropoint accuracies < 10 % for stars. Both single filter and multi-wavelength are available.

Product Release Goals and Schedule (by Instrument)

Item	Early Data Release (Jul 31,07)	Data Release # 1 (Jan, 08)	Data Release # 2 (Aug, 08)	Data Release # 3 (Feb, 09)
ACS				
Images , Source Lists	X (> 20 % of full pool)	X (> 90 % of full pool)	X (> 90 % of full pool)	X (> 90 % of full pool)
GRISMS Extractions				X (ECF)
WFPC2				
Images, Source lists		X (> 20 %) (CADC lead)	X (> 90 %) (CADC lead)	X (> 90 %)(CADC lead)
NICMOS				
Images, Source Lists				X (> 80% of full pool)
GRISM Extraction	X (ECF , G140; > 20 %)	X (ECF , G140; > 90 %)	X (ECF , G140; > 90 %))	X (other grisms ?)
STIS				
Images, Source Lists			X (> TBD % of full pool)	X (> 80% of full pool)
GRISM Extractions				X(ECF)
General Spectra		Prototype (help from Ted Gull)	X (TBD %)	X (TBD %)
WFC3				
Images, Source Lists				X (> 80 % of non-prop. pool)
GRISM Extraction				>>>
COS				
Spectra				X (> 80 % of non-prop pool)

Conclusions

- The Hubble Legacy Archive successfully entered the **Early Data Release** phase (e.g., **25 % of the ACS data**) of the project on **July 31, 2007**.
- Our near term goal is **Data Release 1** (**~ 90 % of the ACS data, ~20 % of WFPC2, improved user interface, ...**) in **January 2008**, in time to support the Cycle 17 HST deadline on March 4.
- We are looking for your **input and continued support**.

The Team (partial list, small fractions for most)

STScI (integration, cutouts, footprints, associations, source lists, interfaces, ...)

- Warren Miller (Acting Project Manager, Lead Engineer)
- Brad Whitmore (Project Scientist, source lists)
- Anton Koekemoer (Integration Scientist, multidrizzle pipeline, astrometry)
- Niall Gaffney (Software Engineer)
- Rick White (cutouts)
- Steve Lubow, Gretchen Greene (footprints)
- Brian McLean (astrometry)
- Helmut Jenkner (consultant)
- Kevin Lindsay (source lists), Matt Stankiewicz (quality control)

ECF (spectra, e.g., NICMOS grism extractions)

CADC (associations, source lists, ...)

- Richard Hook (ECF Proj. Man.)
- Wolfram Freudling (NICMOS pilot lead)
- Alberto Micol (pipeline meta data)
- Martin Kuemmel (grism extraction)
- Harald Kuntschner (science validation)
- David Schade (CADC Proj. Man.)
- Daniel Durand (assoc., source lists)