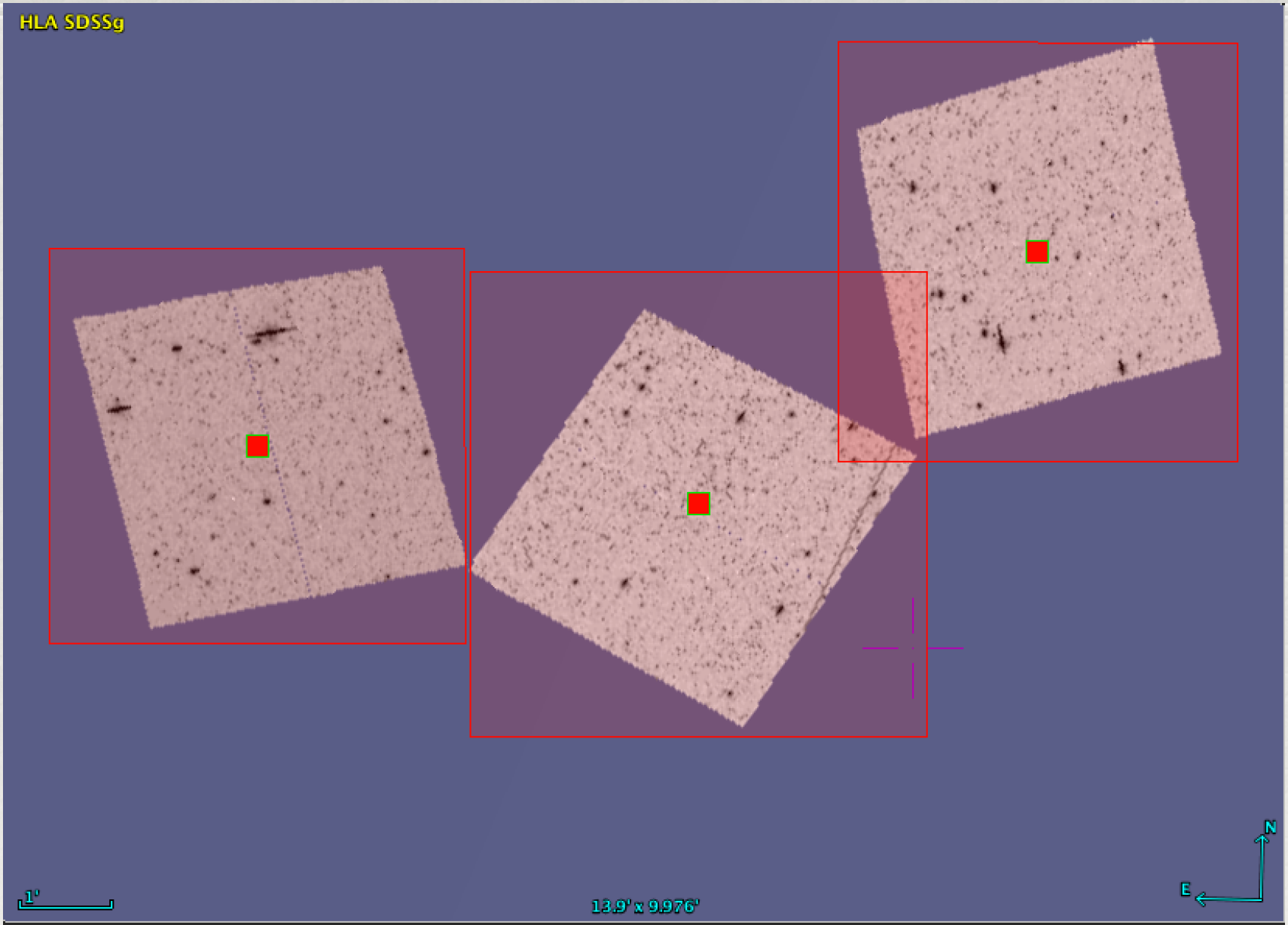
HiPS Progenitors

Small HiPS variation to trace provenance

Durand, Fernique, Boch, Micol



grid study wink north hdr multiview match Search

	RAJ2000	DEJ2000	id	access	Date	Target	FoV	Preview	Image	File
	284.77935	-36.68371	hst_13297	hst_132...	2014-07-05	NGC-6723	FoV	Preview	Original image	File
	284.85586	-36.72933	hst_13297	hst_132...	2014-06-15	NGC-6723	FoV	Preview	Original image	File
	284.95537	-36.71873	hst_13297	hst_132...	2014-04-03	NGC-6723	FoV	Preview	Original image	File

HiPS provenance: Rationale

- *Access to the metadata of input images*
- *Easily done when creating HiPS tiles from collection using HipsGen*
- *Based on FITS keywords extraction (or readable headers)*
- *Access to ORIGINAL data and metadata from original source*
- *Parallel tree structure (HpxFinder) to the HiPS tiles (as a HiPS catalog)*
- *In operation since ~2012 for the HST's HiPS*

HiPS Provenance: MetaData

- *HiPSGen extraction through -fitskeys*
- *-fitskeys="dsname instrume opt_elem detector time_exp prop_id targname obs_date t_min t_max wave_min wave_max"*
- *Standardisation of parameters through a presentation layer file (ex: dsname->observation)*

HiPS Provenance: Encoding

- *Via HpxFinder*
- *Tree structure ordered like the HiPS tiles*
- *Contents Keywords extraction from original images, image name, STC simple footprint (image)*

HpxFinder/Norder5/Dir0/Npix2712


```
{ "name": "u4491f01r_drz.fits",
  "path": "filter_V_extract/u4491f01r_drz.fits[1536,0-65x512]",
  "ra": "195.13724072889153",
  "dec": "40.15553719299793",
  "stc": "POLYGON ICRS 195.12251595472318 40.184859886405164
                       195.17566544427441 40.16673207303801
                       195.15197115529605 40.1261759475216
                       195.09884708487024 40.144292936236276",
  "INSTRUME": "WFPC2",
  "OPT_ELE": "F555W",
  "DETECTOR": "WFPC2",
  "TIME_EXP": "300.0",
  "PROP_ID": "6967",
  "PRODTYPE": "I",
  "TARGNAME": "3C280.1",
  "NMEMBERS": "1",
  "OBS_DATE": "1999-04-29",
  "T_MIN": "51297.5147385",
  "T_MAX": "51297.5182107",
  "WAVE_MIN": "4.7226E-07",
  "WAVE_MAX": "5.951E-07" }
```

Example of multiple input images for a given tile


```
{"name": "hst_06518_01_wfpc2_f487n_pc_drz"
 "path": "filter_Hbeta_extract/hst_06518_01_wfpc2_f487n_pc_drz.fits"
 "ra": "161.2495148813889" "dec": "-59.681067276111115"
 "stc": "POLYGON J2000 161.28667814689274 -59.699812025294605...
 "DSNAME": "HST_06518_01_WFPC2_F487N_PC_01"
 "INSTRUME": "WFPC2" "OPT_ELE": "F487N" "DETECTOR": "WFPC2"
 "TIME_EXP": "2.0" "PROP_ID": "6518" "PRODTYPE": "I"
 "TARGNAME": "ETA-CARINAE" "OBS_DATE": "1998-12-26"
 "T_MIN": "51173.577247" "T_MAX": "51173.5772702"
 "WAVE_MIN": "4.85220000000000E-07" "WAVE_MAX": "4.87810000000000E-07"}
```

```
{"name": "hst_06518_01_wfpc2_f487n_wf_drz"
 "path": "filter_Hbeta_extract/hst_06518_01_wfpc2_f487n_wf_drz.fits"
 "ra": "161.2651188813889" "dec": "-59.68415192611112"
 "stc": "POLYGON J2000 161.34087276309617 -59.722324559647845...
 "DSNAME": "HST_06518_01_WFPC2_F487N_WF_01"
 "INSTRUME": "WFPC2" "OPT_ELE": "F487N" "DETECTOR": "WFPC2"
 "TIME_EXP": "2.0" "PROP_ID": "6518" "PRODTYPE": "I"
 "TARGNAME": "ETA-CARINAE" "OBS_DATE": "1998-12-26"
 "T_MIN": "51173.577247" "T_MAX": "51173.5772702"
 "WAVE_MIN": "4.85220000000000E-07" "WAVE_MAX": "4.87810000000000E-07"}
```

```
{"name": "hst_07323_01_wfpc2_f487n_wf_drz"
 "path": "filter_Hbeta_extract/hst_07323_01_wfpc2_f487n_wf_drz.fits"
 "ra": "161.2561323122222" "dec": "-59.67509637111112"
 "stc": "POLYGON J2000 161.30706122234596 -59.70078095412093...
 "DSNAME": "HST_07323_01_WFPC2_F487N_WF_03"
 "INSTRUME": "WFPC2" "OPT_ELE": "F487N" "DETECTOR": "WFPC2"
 "TIME_EXP": "0.5" "PROP_ID": "7323" "PRODTYPE": "I"
 "TARGNAME": "ETA-CAR" "OBS_DATE": "1997-10-02"
 "T_MIN": "50723.867521" "T_MAX": "50723.8675268"
 "WAVE_MIN": "4.85220000000000E-07" "WAVE_MAX": "4.87810000000000E-07"}
```

```
{ "name": "hst_07323_02_wfpc2_f487n_wf_drz"
 "path": "filter_Hbeta_extract/hst_07323_02_wfpc2_f487n_wf_drz.fits"
 "ra": "161.2654109963889" "dec": "-59.67079978805555"
 "stc": "POLYGON J2000 161.32459841146857 -59.70064757980143...
 "DSNAME": "HST_07323_02_WFPC2_F487N_WF_01"
 "INSTRUME": "WFPC2" "OPT_ELE": "F487N" "DETECTOR": "WFPC2"
 "TIME_EXP": "0.5" "PROP_ID": "7323" "PRODTYPE": "I"
 "TARGNAME": "ETA-CAR-2" "OBS_DATE": "1998-09-06"
 "T_MIN": "51062.3494678" "T_MAX": "51062.3494736"
 "WAVE_MIN": "4.85220000000000E-07" "WAVE_MAX": "4.87810000000000E-07"}
```

```
{"name": "hst_09316_07_wfpc2_f487n_wf_drz"
 "path": "filter_Hbeta_extract/hst_09316_07_wfpc2_f487n_wf_drz.fits"
 "ra": "161.2409676602778" "dec": "-59.685188689444445"
 "stc": "POLYGON J2000 161.29880228306595 -59.7143426421335...
 "DSNAME": "HST_09316_07_WFPC2_F487N_WF_02"
 "INSTRUME": "WFPC2" "OPT_ELE": "F487N" "DETECTOR": "WFPC2" "TIME_EXP":
 "PROP_ID": "9316" "PRODTYPE": "I"
 "TARGNAME": "ETA-CAR" "OBS_DATE": "2002-05-10"
 "T_MIN": "52404.675888" "T_MAX": "52404.6758996"
 "WAVE_MIN": "4.85220000000000E-07" "WAVE_MAX": "4.87810000000000E-07"}
```


Maximum of 5000 entries per tile

HiPS Provenance: Display in Aladin Desktop

- *Using Presentation layer (metadata.xml)*
  - *via metadata.xml, a VOTable + some translation allowed via some flavour of regular expressions*
  - *translate JSON keys/values into a catalog (~VOTable) for Aladin*

<field name="RAJ2000" />	<td> $[ra]
<field name="DECJ2000" />	<td> $[dec]
<field name="id" <link cadc/AdvancedSearch? Observation.ObservationID=${id}/> />	<td> $[name:(.....).*]
<field name="Image_Name" datatype="char"/>	<td> $[name:(.*)\.fits]
<field name="fullid" />	<td> $[name:(.*)].fits
<field name="Date" />	<td> OBS_DATE
<field name="Target" />	<td> $[TARGNAME]
<field name="FoV" />	<td> $[stc]
<field name="Preview"> <link http:cadc/data/pub/ HSTCA/${id}_prev.jpg title=Preview>	<td> $[name:(.*)\.fits]
<field name="Display"><link http://cadc/data/pub/ HSTCA/${Image_Name}/ >	<td> Original Image
<field name="File"> <link http://cadc/data/puv/HSTCA/ $[Image_Name]>	<td> File
<field name="Instrument" />	<td> $[INSTRUME]
<field name="Filter" />	<td> $[OPT_ELE]
<field name="Time" />	<td> $[TIME_EXP]

	RAJ2000	DEJ2000	id	Image_Name	Obs Date	Target	FoV	Preview	Display	Files	Instrument	Filter	Exp Ti
☐	85.49297	-2.34367	u8w8ah01m	u8w8ah01m_drz.fits	2004-01-25	ANY	FoV	Preview	Original image	Download	WFPC2	F606W	700
☑	85.49297	-2.34367	u8w8ah02m	u8w8ah02m_drz.fits	2004-01-25	ANY	FoV	Preview	Original image	Download	WFPC2	F606W	700
☐	85.49297	-2.34367	u8w8ah03m	u8w8ah03m_drz.fits	2004-01-25	ANY	FoV	Preview	Original image	Download	WFPC2	F606W	700
☐	85.4922	-2.34398	u8w8ai01m	u8w8ai01m_drz.fits	2004-01-25	ANY	FoV	Preview	Original image	Download	WFPC2	F606W	700
☐	85.4922	-2.34398	u8w8ai02m	u8w8ai02m_drz.fits	2004-01-25	ANY	FoV	Preview	Original image	Download	WFPC2	F606W	700
☐	85.4922	-2.34398	u8w8ai03m	u8w8ai03m_drz.fits	2004-01-25	ANY	FoV	Preview	Original image	Download	WFPC2	F606W	400

HiPS Provenance: Aladin Display

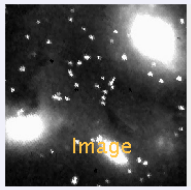
RA/Dec *Date* *FoV* *Image Display* *Instrument*

RAJ2000	DEJ2000	id	Image_Name	Obs Date	Target	FoV	Preview	Display	Files	Instrument	Filter	Exp Ti
85.49297	-2.34367	u8w8ah01m	u8w8ah01m_drz.fits	2004-01-25	ANY	FoV	Preview	Original image	Download	WFPC2	F606W	700
85.49297	-2.34367	u8w8ah02m	u8w8ah02m_drz.fits	2004-01-25	ANY	FoV	Preview	Original image	Download	WFPC2	F606W	700
85.49297	-2.34367	u8w8ah03m	u8w8ah03m_drz.fits	2004-01-25	ANY	FoV	Preview	Original image	Download	WFPC2	F606W	700
85.4922	-2.34398	u8w8ai01m	u8w8ai01m_drz.fits	2004-01-25	ANY	FoV	Preview	Original image	Download	WFPC2	F606W	700
85.4922	-2.34398	u8w8ai02m	u8w8ai02m_drz.fits	2004-01-25	ANY	FoV	Preview	Original image	Download	WFPC2	F606W	700
85.4922	-2.34398	u8w8ai03m	u8w8ai03m_drz.fits	2004-01-25	ANY	FoV	Preview	Original image	Download	WFPC2	F606W	400

ObservationId *Preview* *Download*

HiPS Provenance: Data

- *Link to original images and information*
- *Through direct links or through Datalink*



HST-V includes the following filters: F555W, F547W, F569W ... ...

Provenance: Canadian Astronomy Data Centre

Coverage: 9.051°² 4.4µm/67.9THz .. 6.6µm/45.5THz 1994-01-25 .. 2017-04-03 Res: 50.29mas

Access mode & derived prod. ☑ progressive + ☐ space cov. ☐ time cov. ☐ Links to orig.img.

CDS/P/HST/V

Load

Properties of the plane "CDS/P/HST/V"

PlaneID: CDS/P/HST/V

Description: *HST-V includes the following filters: F555W, F547W, F569W and F550W ...*

Acknowledgment: *All publications based on HST data ...*

Dataset ID: CDS/P/HST/V

HiPS creator CADC (Daniel Durand)

Release date 2017-05-30T21:49Z

Format: HiPS [See properties]

Url: *http://alasky.u-strasbg.fr/HST-hips/filter_V_hips*

HiPS properties

Best pixel resolution 50.32mas

HEALPix NSide: 4194304 (2^22)

Coord.sys.: equatorial

Number of levels 13

Tile format PNG 8 bits pixels

Tile width: 512 pix (2^9)

[Get full pixel dynamic (fits)]

Coverage

Time range 1994-01-25 .. 2017-04-03

Energy range 4.4µm/67.9THz .. 6.6µm/45.5THz

Space 0.02683 % of sky [Coverage]

Original data

Provenance *Canadian Astronomy Data Centre*

Access [Original images]

Specific drawing method

.projection Default

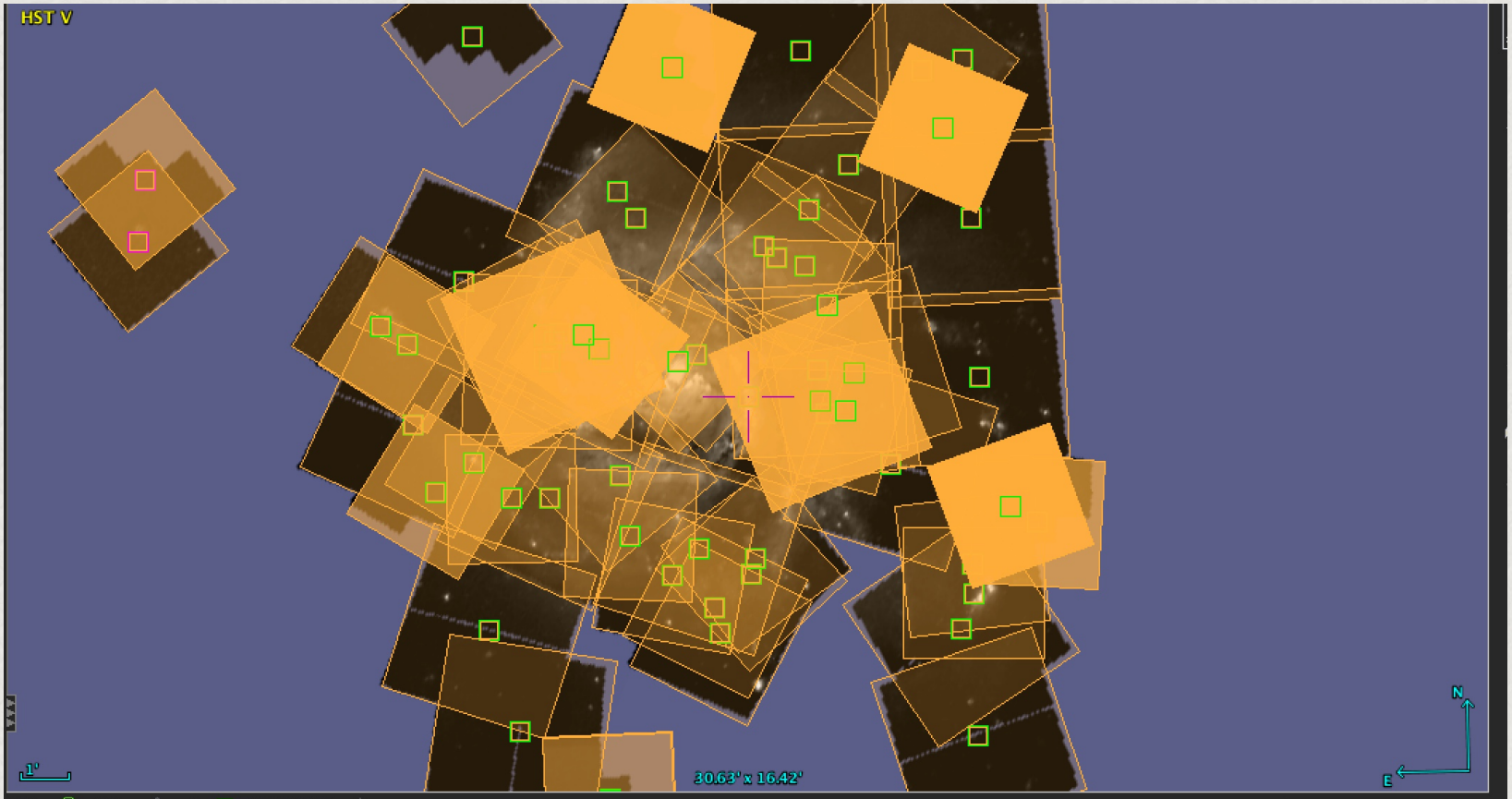
.frame Default

.longitude ○ ascending ◉ descending

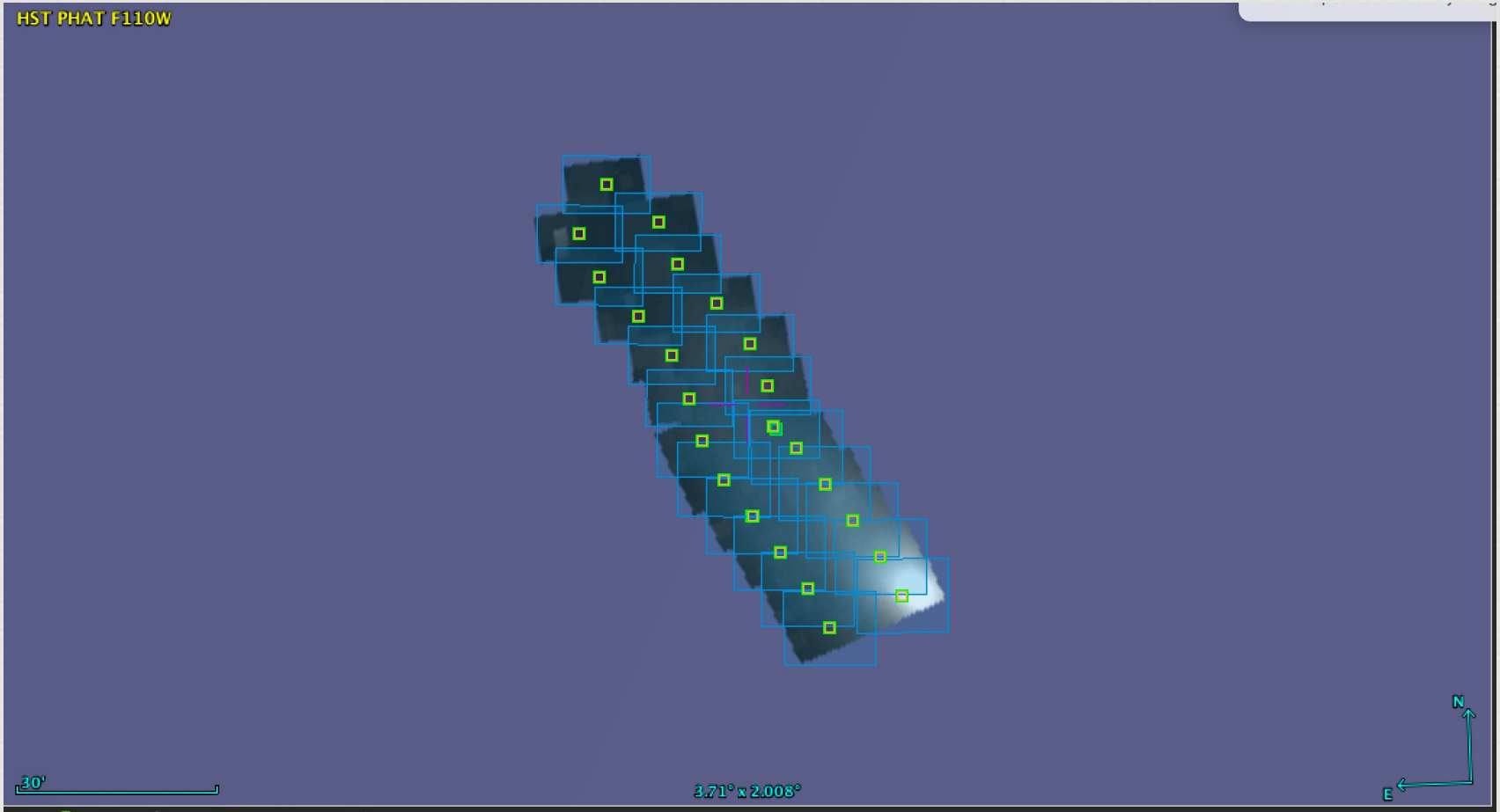
Apply Close

At load

As a property once loaded



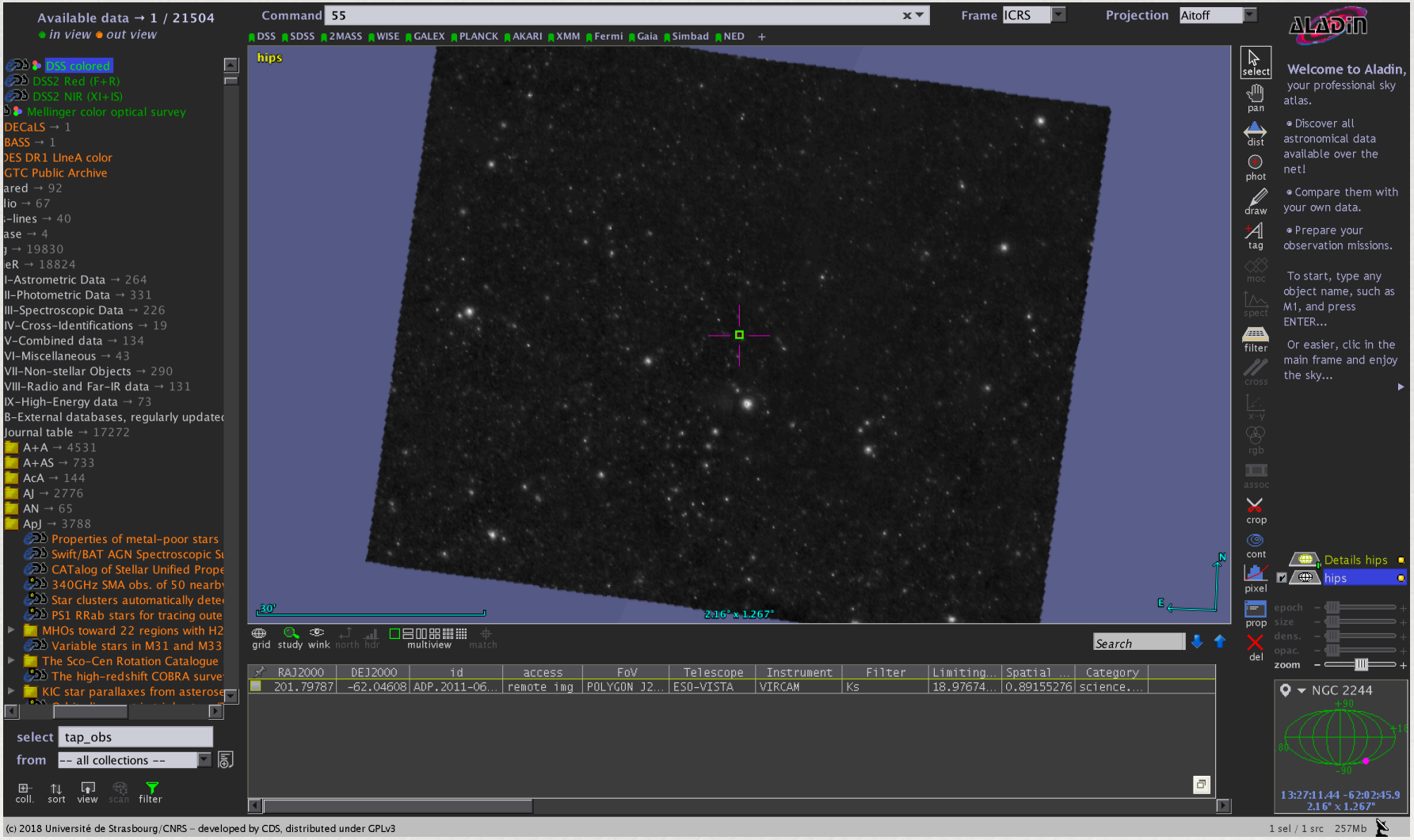
RAJ2000	DEJ2000	id	Image_Name	Obs Date	Target	FoV	Preview	Display	File
210.805	54.27849	iczj02030	iczj02030_drc.fits	2016-09-24	SN-2011FE-EP...	FoV	Preview	Original image	Downlo
210.84639	54.35468	j8d601020	j8d601020_drc.fits	2002-11-15	NGC5457-1	FoV	Preview	Original image	Downlo
210.76049	54.34033	j8d602020	j8d602020_drc.fits	2002-11-13	NGC5457-7	FoV	Preview	Original image	Downlo
210.83788	54.41118	j8d603020	j8d603020_drc.fits	2002-11-15	NGC5457-5	FoV	Preview	Original image	Downlo
210.87743	54.30554	j8d6a1020	j8d6a1020_drc.fits	2002-11-16	NGC5457-2	FoV	Preview	Original image	Downlo
210.78924	54.28796	j8d6a2020	j8d6a2020_drc.fits	2002-11-13	NGC5457-8	FoV	Preview	Original image	Downlo
210.75172	54.39229	j8d6a3020	j8d6a3020_drc.fits	2002-11-15	NGC5457-6	FoV	Preview	Original image	Downlo
210.95871	54.33043	j8d6b1020	j8d6b1020_drc.fits	2002-11-16	NGC5457-3	FoV	Preview	Original image	Downlo
210.91349	54.25951	j8d6b2020	j8d6b2020_drc.fits	2002-11-13	NGC5457-9	FoV	Preview	Original image	Dow
210.92851	54.38006	j8d6c1020	j8d6c1020_drc.fits	2002-11-16	NGC5457-4	FoV	Preview	Original image	



grid study wink north hdr multiview match Search

RAJ2000	DEJ2000	id	access	FoV
11.13376	41.36346	hlsp_phat_hst_wfc3-ir_12105-m31-b06_f110w_v1_drz	06/hlsp_phat_hst_wfc3-ir_12105-m31-b06_f110w_v1_drz	FoV
11.49442	41.85369	hlsp_phat_hst_wfc3-ir_12106-m31-b16_f110w_v1_drz	16/hlsp_phat_hst_wfc3-ir_12106-m31-b16_f110w_v1_drz	FoV
11.04142	41.27245	hlsp_phat_hst_wfc3-ir_12107-m31-b04_f110w_v1_drz	04/hlsp_phat_hst_wfc3-ir_12107-m31-b04_f110w_v1_drz	FoV
11.60683	41.95297	hlsp_phat_hst_wfc3-ir_12108-m31-b18_f110w_v1_drz	18/hlsp_phat_hst_wfc3-ir_12108-m31-b18_f110w_v1_drz	FoV
10.80004	41.35229	hlsp_phat_hst_wfc3-ir_12109-m31-b03_f110w_v1_drz	03/hlsp_phat_hst_wfc3-ir_12109-m31-b03_f110w_v1_drz	FoV
11.47479	42.0815	hlsp_phat_hst_wfc3-ir_12110-m31-b19_f110w_v1_drz	19/hlsp_phat_hst_wfc3-ir_12110-m31-b19_f110w_v1_drz	FoV
11.32023	41.54493	hlsp_phat_hst_wfc3-ir_12111-m31-b10_f110w_v1_drz	10/hlsp_phat_hst_wfc3-ir_12111-m31-b10_f110w_v1_drz	FoV
11.73833	42.05	hlsp_phat_hst_wfc3-ir_12112-m31-b20_f110w_v1_drz	20/hlsp_phat_hst_wfc3-ir_12112-m31-b20_f110w_v1_drz	FoV
10.98476	41.53452	hlsp_phat_hst_wfc3-ir_12113-m31-b07_f110w_v1_drz	07/hlsp_phat_hst_wfc3-ir_12113-m31-b07_f110w_v1_drz	FoV
11.17294	41.77945	hlsp_phat_hst_wfc3-ir_12114-m31-b13_f110w_v1_drz	13/hlsp_phat_hst_wfc3-ir_12114-m31-b13_f110w_v1_drz	FoV
11.14405	41.67042	hlsp_phat_hst_wfc3-ir_12115-m31-b11_f110w_v1_drz	11/hlsp_phat_hst_wfc3-ir_12115-m31-b11_f110w_v1_drz	FoV

From the ESO new science portal



Conclusion

- *An IVOA notes is now describing the why and how to link HiPS tiles to their progenitors*
- *We expect that the extension will be quite popular because of the HiPS wide acceptance*
- *We are open to modifications/suggestions/etc...*
- *Will be part of the HiPS standard eventually*