

# VST ATLAS

Mike Irwin, Bob Mann, Nigel  
Metcalfe, Tom Shanks et al

# VST ATLAS Core Team

- \* CASU (Mike Irwin et al, Cambridge) does the basic reduction using the VST Data Flow pipeline
- \* Steve Maddox (Nottingham) leads the overall global calibration process
- \* Nigel Metcalfe + Peter Draper (Durham) – OB submission + QC on the ATLAS products
- \* WFAU (Bob Mann et al, Edinburgh) to provide archiving facilities, additional to the ESO archive

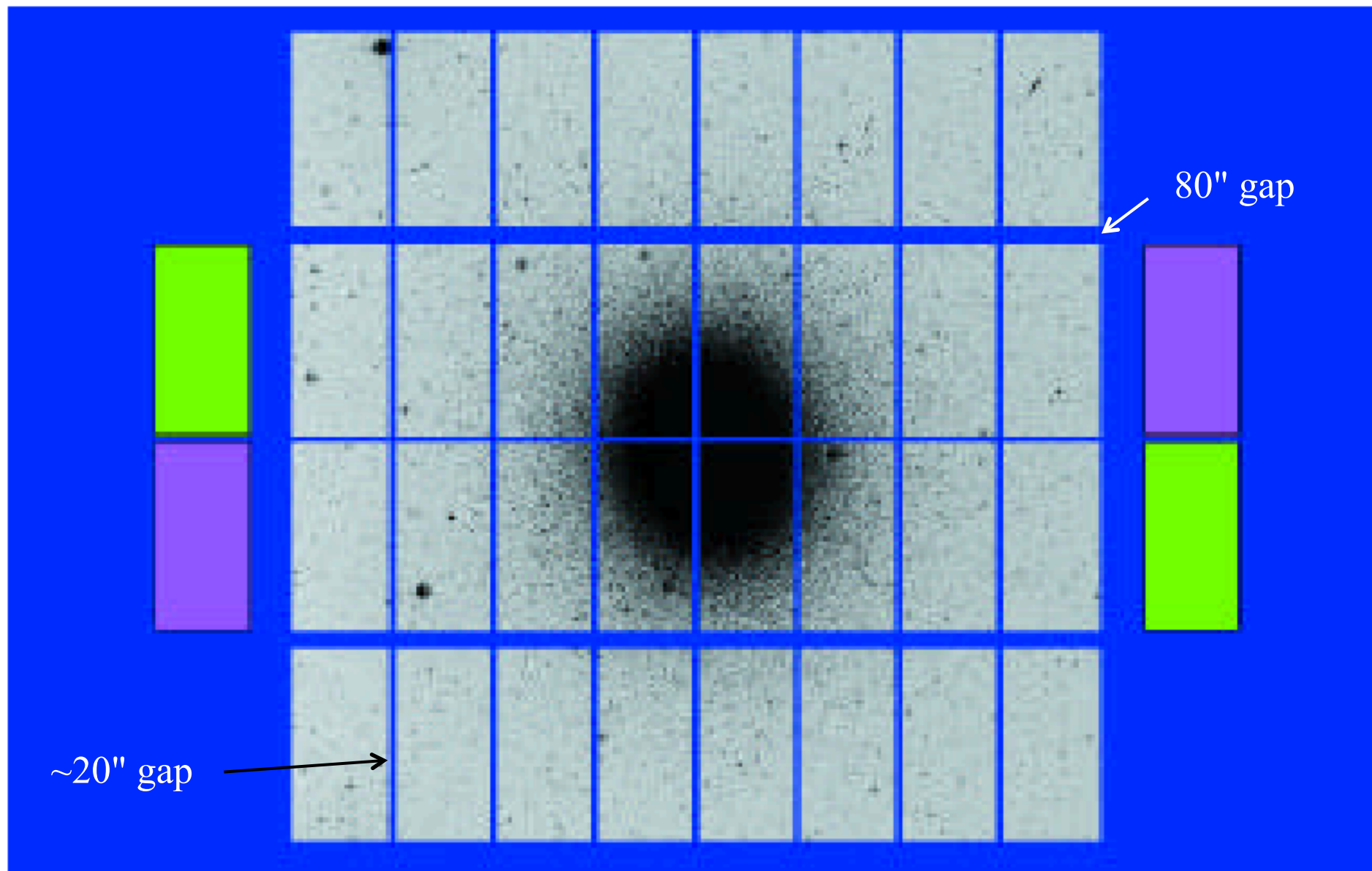
# ATLAS Science Summary

- \* VST ATLAS – "Southern Sloan" – SDSS depth +  $\sim 1.''2$  resolution in ugriz over  $\sim 4500 \text{deg}^2$
- \* Cosmology Package to rival WFIRST!
  - \* BAO at  $z \sim 1.5$  via ATLAS+2dF UVX QSO clustering
  - \* BAO at  $z \sim 3$  via ATLAS+2dF QSO Lyman  $\alpha$  forest
  - \* Gravitational Growth rate at  $z = 1-3$  via QSOs
  - \* ISW via LRGs
  - \* QSO Lensing vs galaxy ugrizYJHK photo- $z$
- \* Other Science
  - \* Stellar Streams + Galactic Archaeology
  - \*  $Z \sim 7$  QSOs via ATLAS+VHS  $z$  dropouts
  - \* Beyond the Great Attractor + Fornax etc

# VST ATLAS Survey

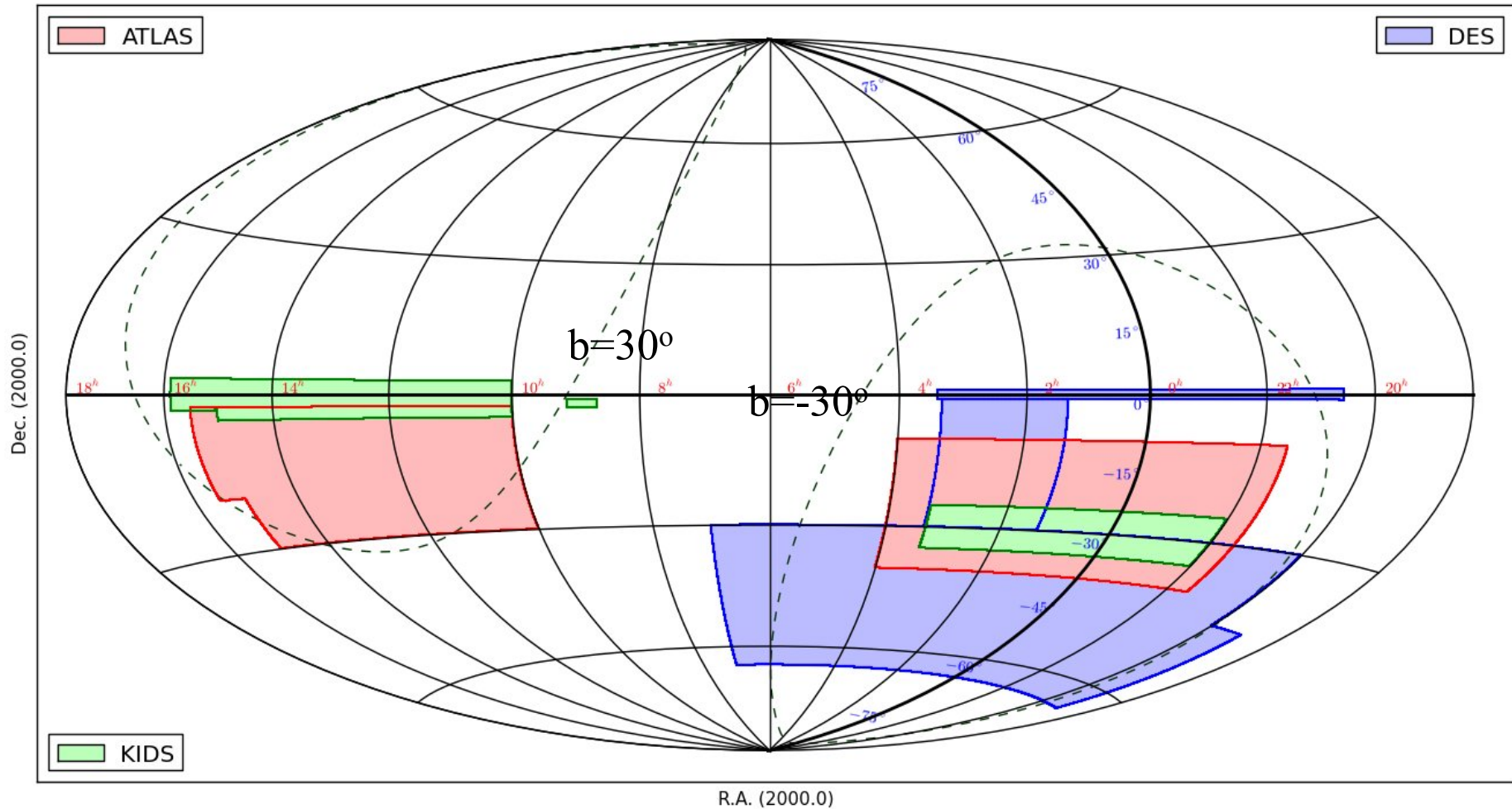
- \* VST ATLAS (+VHS) → Southern SDSS in ugriz(+YJHK)!
- \* Exposures u: 2x60s, g: 2x50s, riz: 2x45s – one filter per hourly concatenations – ugr (dark), iz (gray.bright)
- \* 2-tile dither – 84" in Dec, 24" in RA
- \* Offsets 58' in RA and Dec – 2' overlap
- \* 1"-1."4 seeing – better than SDSS median 1."4 –complements KIDS
- \* No guide star needed so no overhead
- \* ~45 nights per year for 2 years – accelerated!
- \* Footprint ~2500deg<sup>2</sup> in SGC and ~2000deg<sup>2</sup> in NGC

# OmegaCAM



# VST ATLAS Survey Area

VST ATLAS Survey

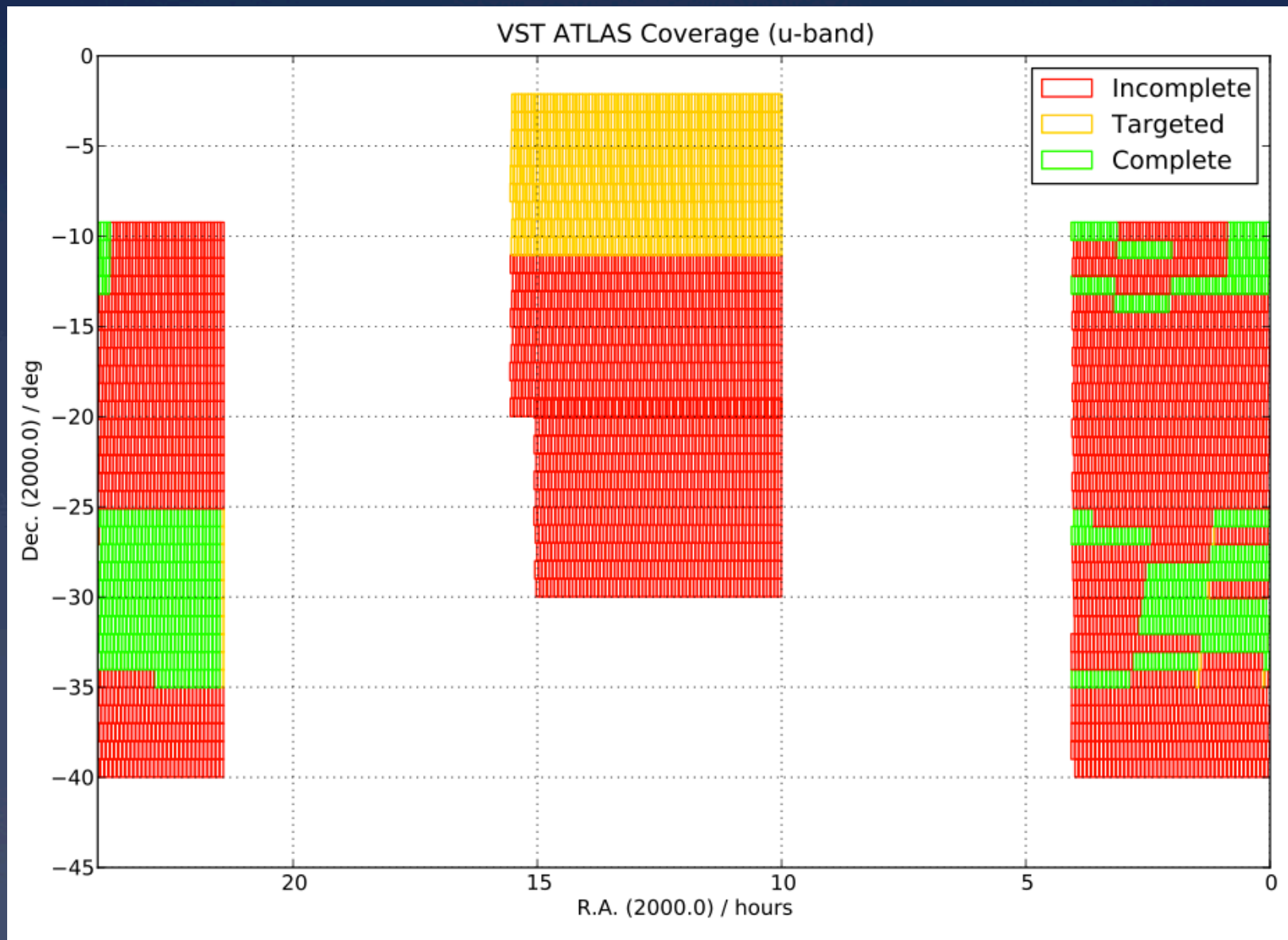


# VST ATLAS Status

	<b>21h30</b>			<b>02h30</b>	
<b>15</b>	<b>u,g,r</b>	<b>g,i</b>			<b>-25</b>
<b>14</b>	<b>i,z</b>	<b>u,g,r</b>			
<b>13</b>	<b>u,i,z</b>	<b>u,g,r</b>	<b>u,r,i</b>		
<b>12</b>	<b>u,i,z</b>	<b>u,g</b>	<b>u,r,i,z</b>	<b>u,g,r,i,z</b>	
<b>11</b>	<b>u,g,r</b>	<b>u,g,r</b>	<b>i,z</b>	<b>u,g,r,i,z</b>	<b>-30</b>
<b>10</b>	<b>u,i,z</b>	<b>u,g,i,z</b>	<b>u,g,r,i,,z</b>	<b>u,g,r,i,z</b>	
<b>9</b>	<b>u,g,r,i,z</b>	<b>u,g,i,z</b>	<b>u,g,r,i,z</b>		
<b>8</b>	<b>u,g,r</b>	<b>u,g,i,z</b>	<b>u</b>		
<b>7</b>	<b>u,g,r,i,z</b>	<b>g,i</b>			
<b>6</b>	<b>u,g,r</b>	<b>i</b>	<b>i</b>		<b>-35</b>
	<b>1</b>	<b>18</b>	<b>35</b>	<b>52</b>	

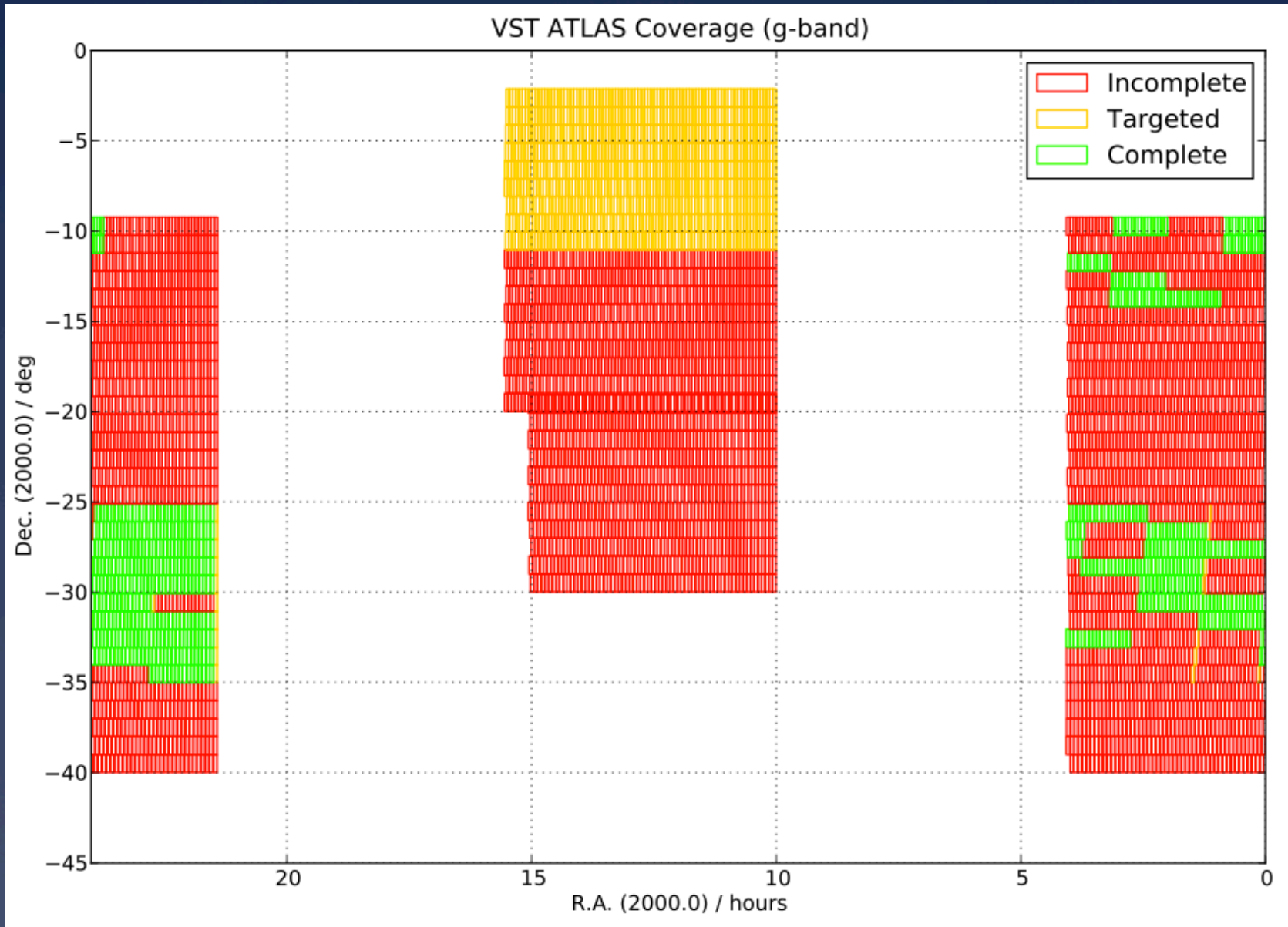
Equivalent of  $\sim 400\text{deg}^2$  ugriz observed in KIDS-S area since mid-August

# VST ATLAS Status

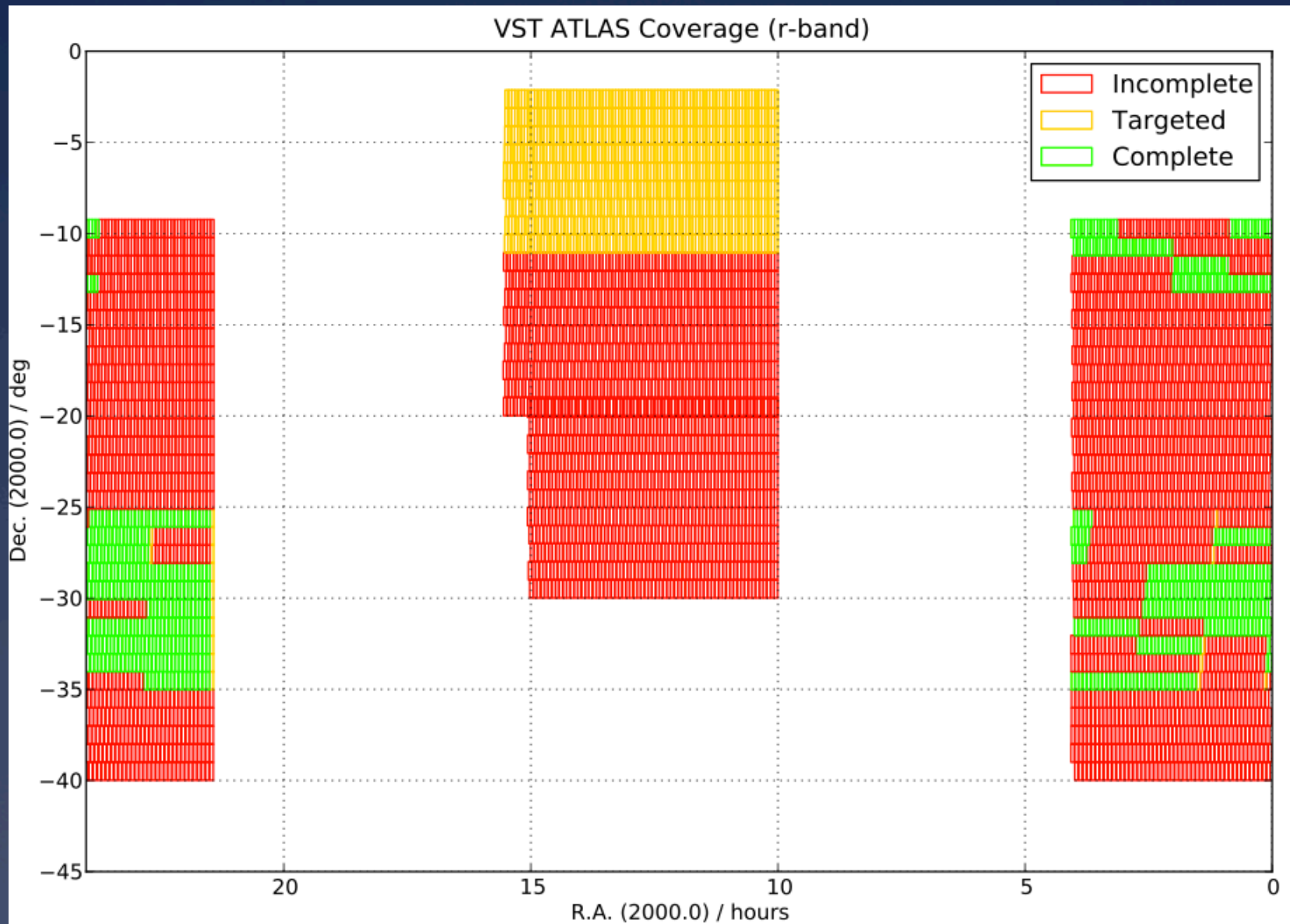




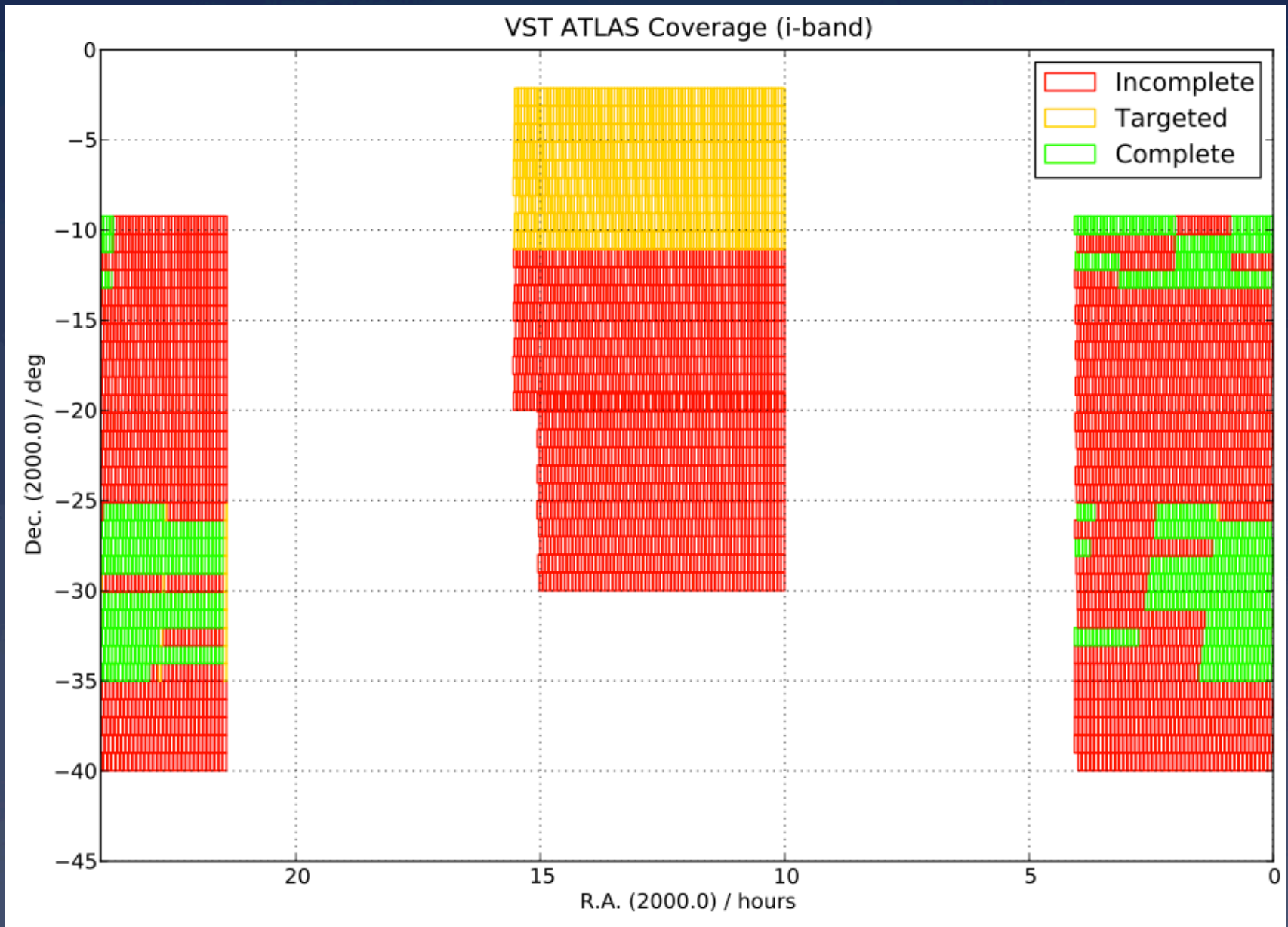
# VST ATLAS Status



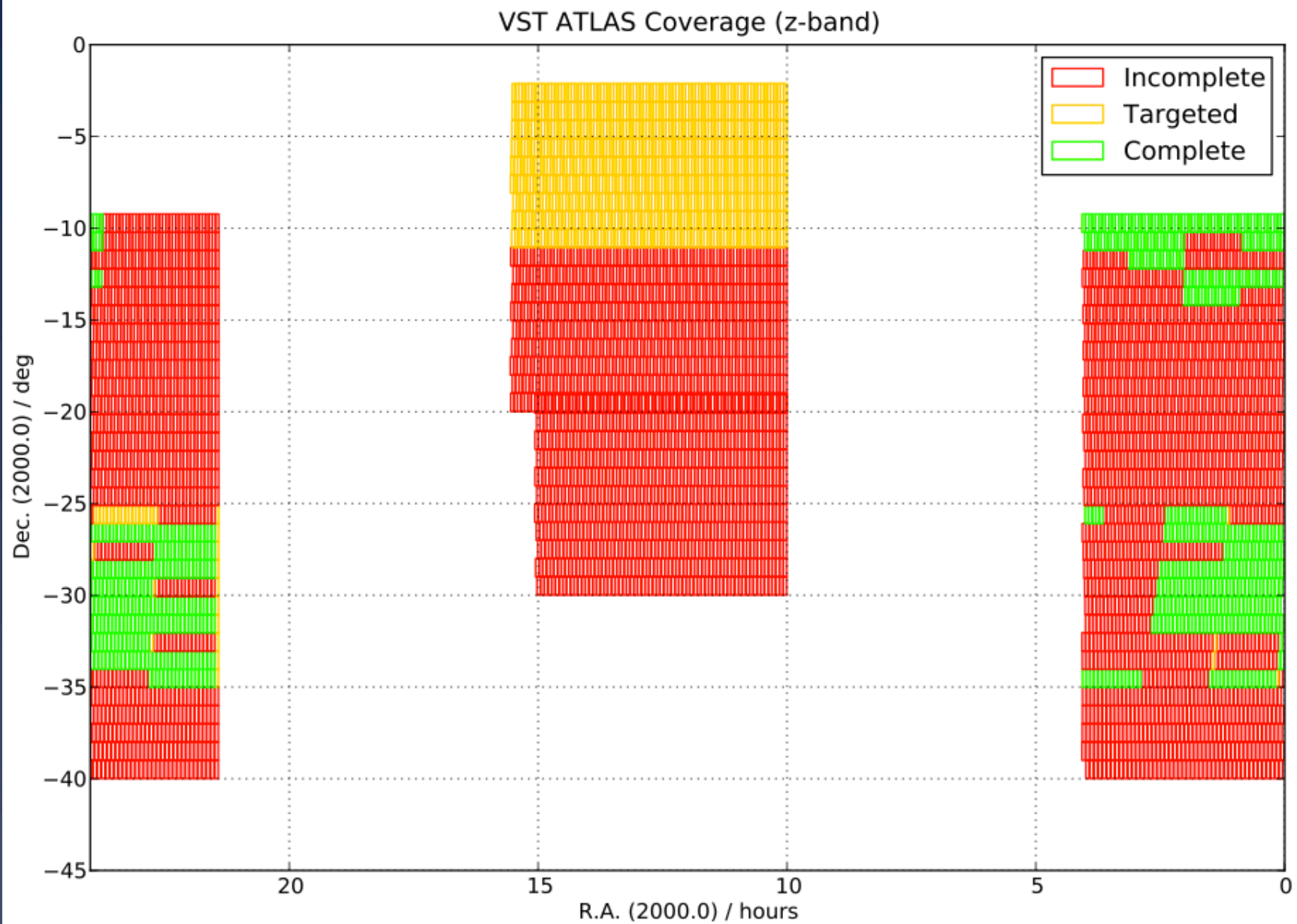
# VST ATLAS Status



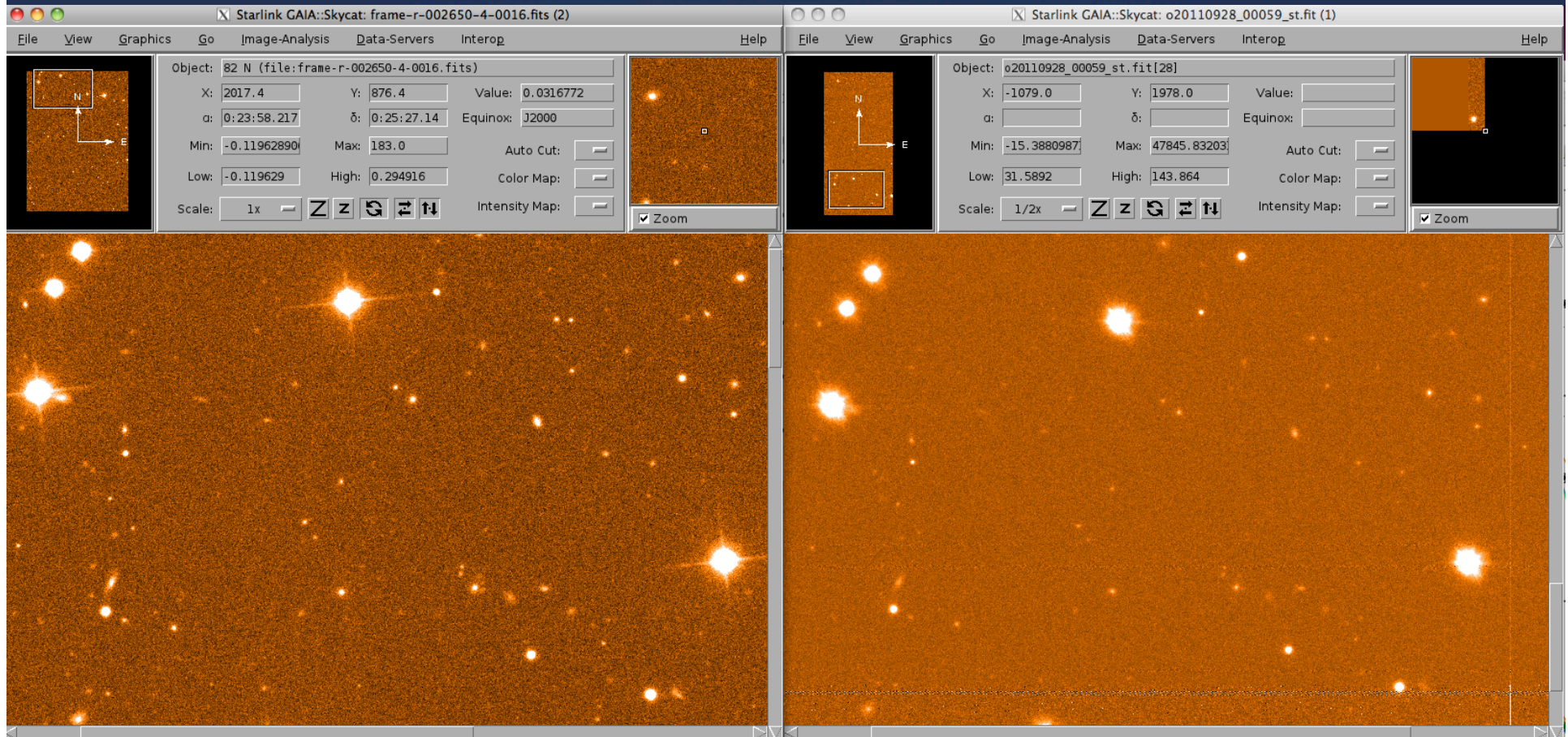
# VST ATLAS Status



# VST ATLAS Status



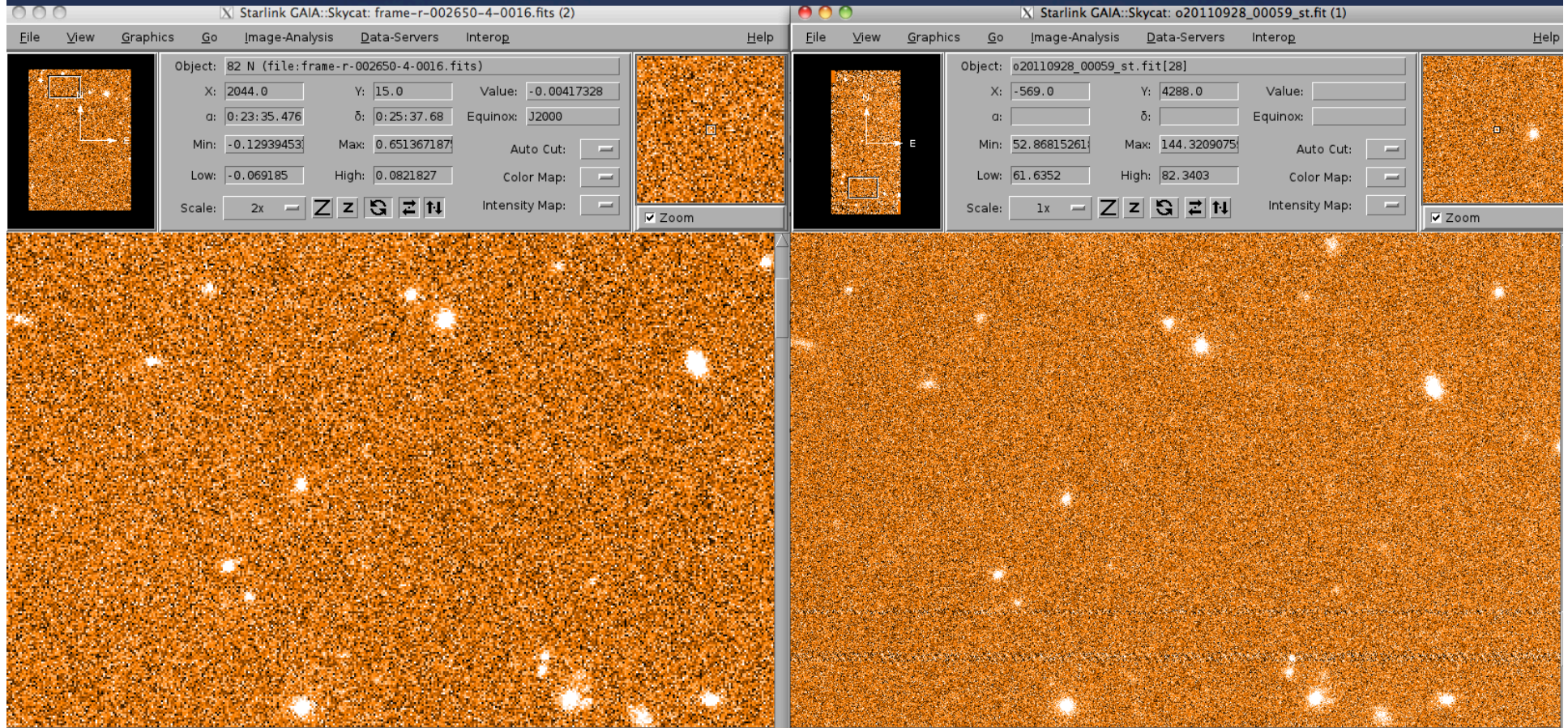
# SDSS-ATLAS no-zoom - r



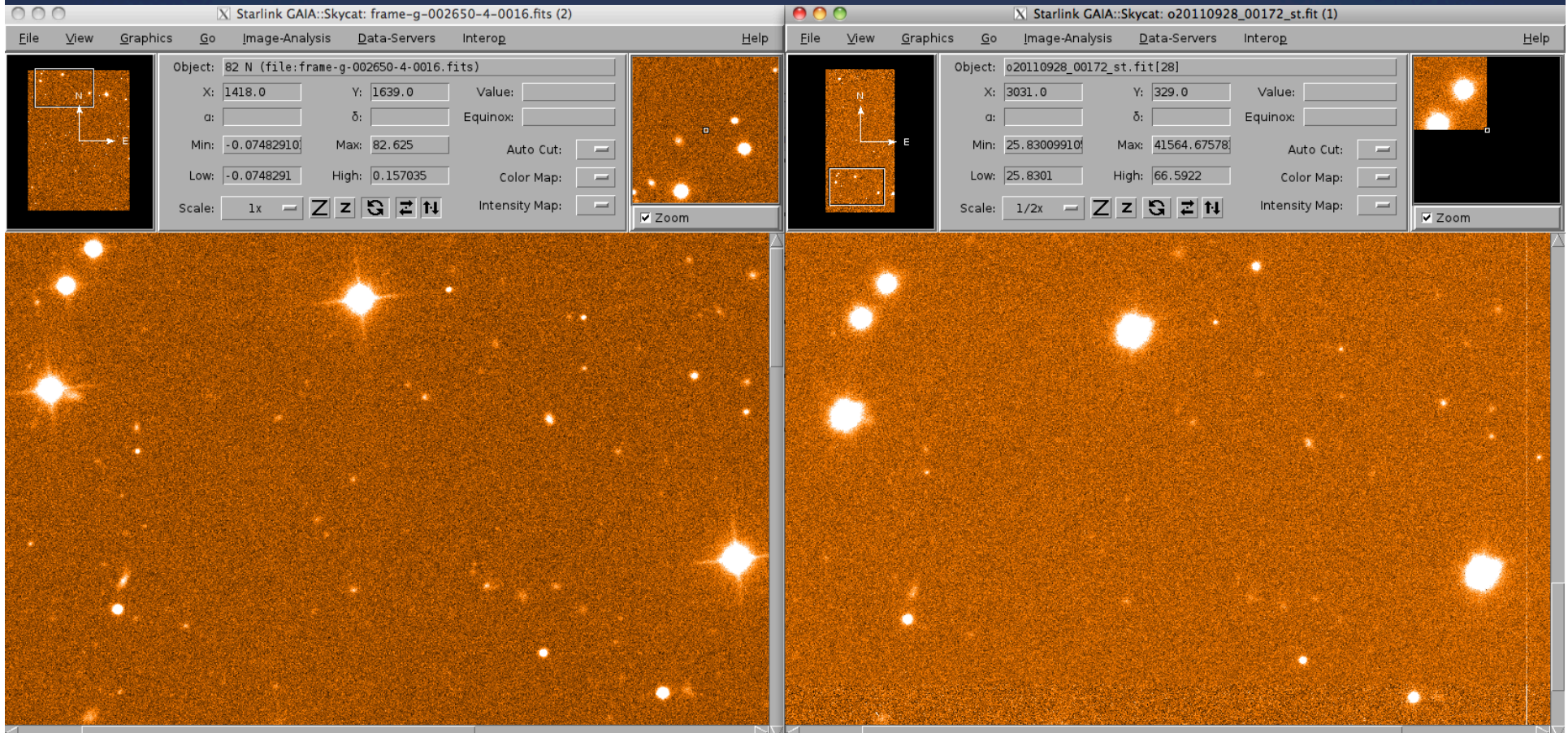
SDSS

ATLAS

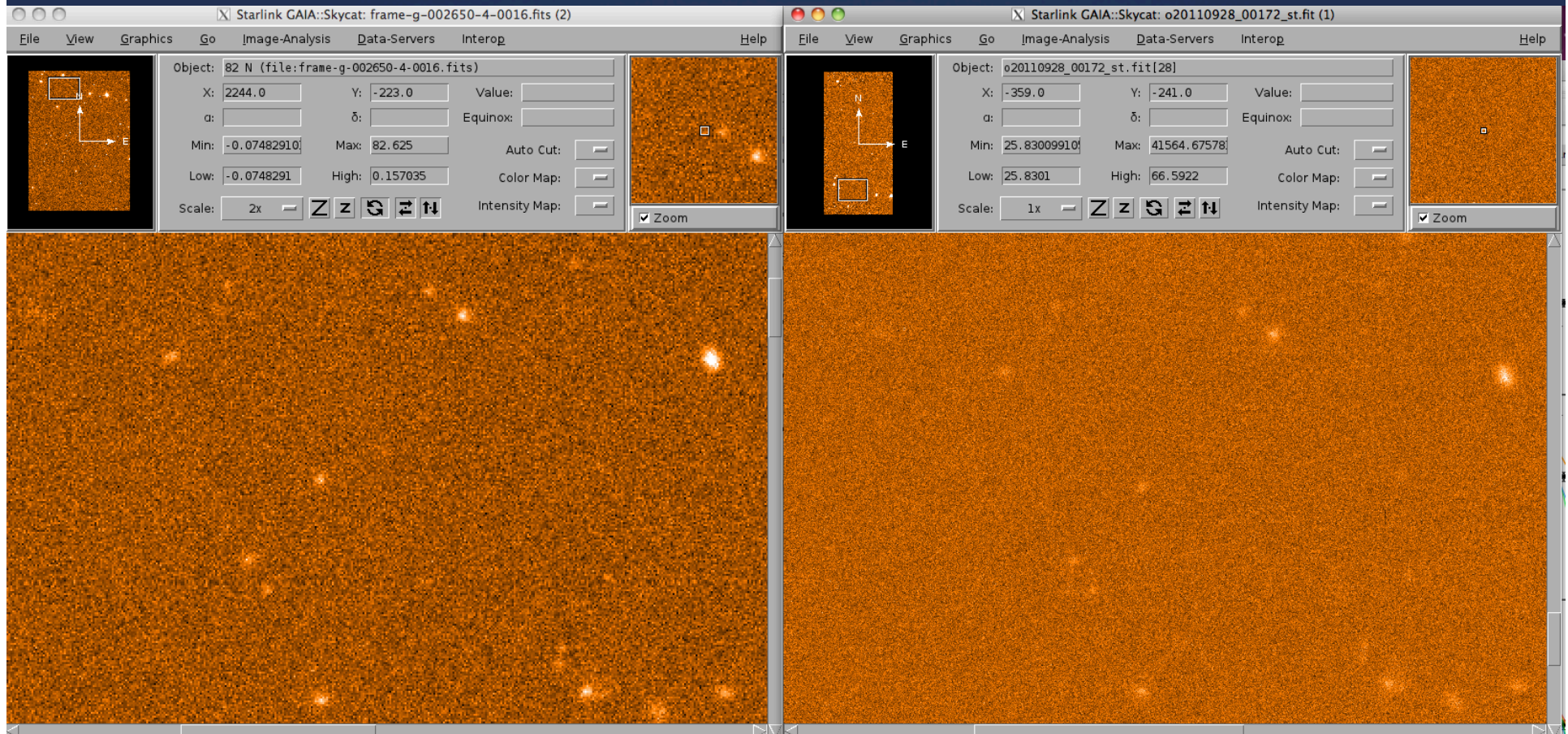
# SDSS-ATLAS zoom - r



# SDSS-ATLAS no-zoom - g

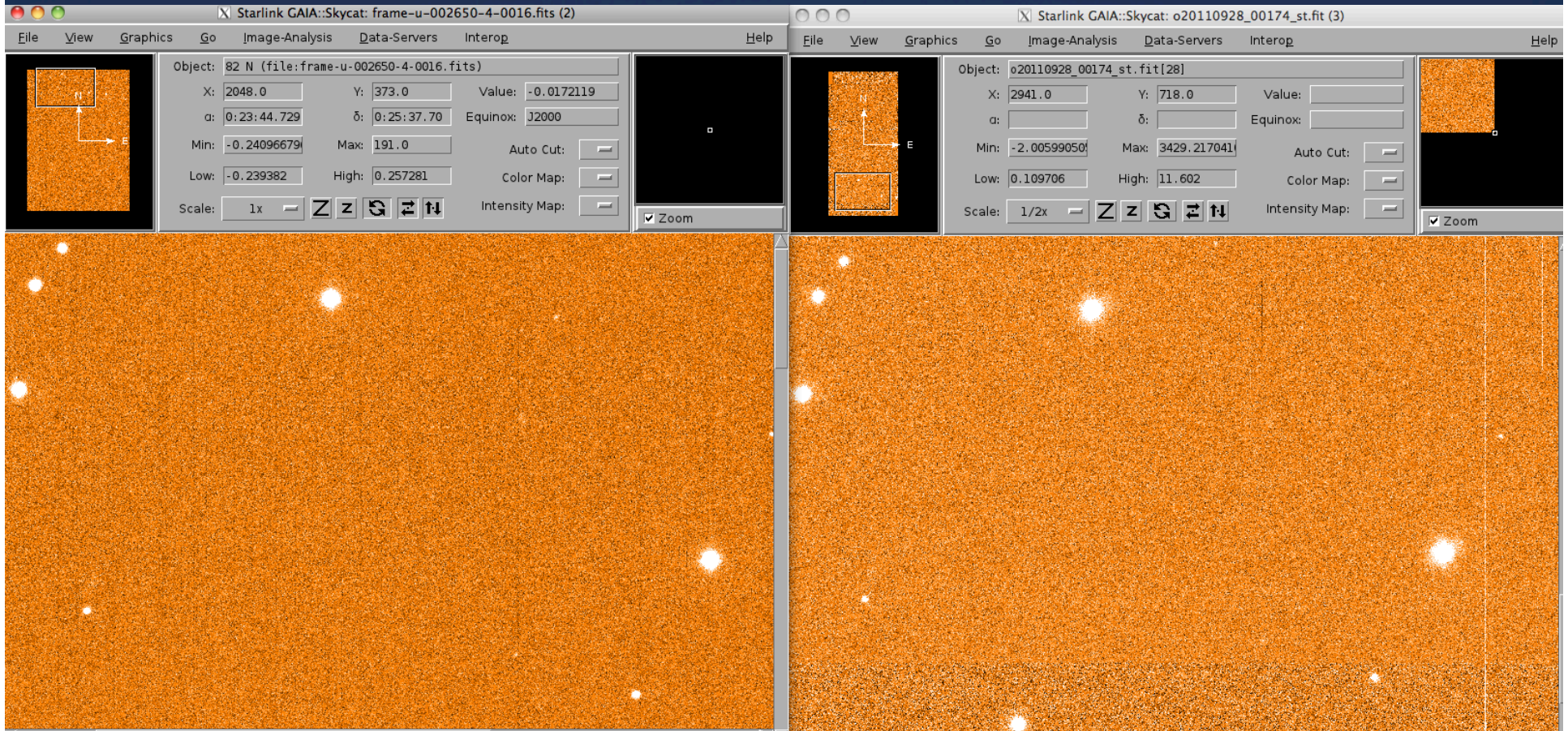


# SDSS-ATLAS zoom - g

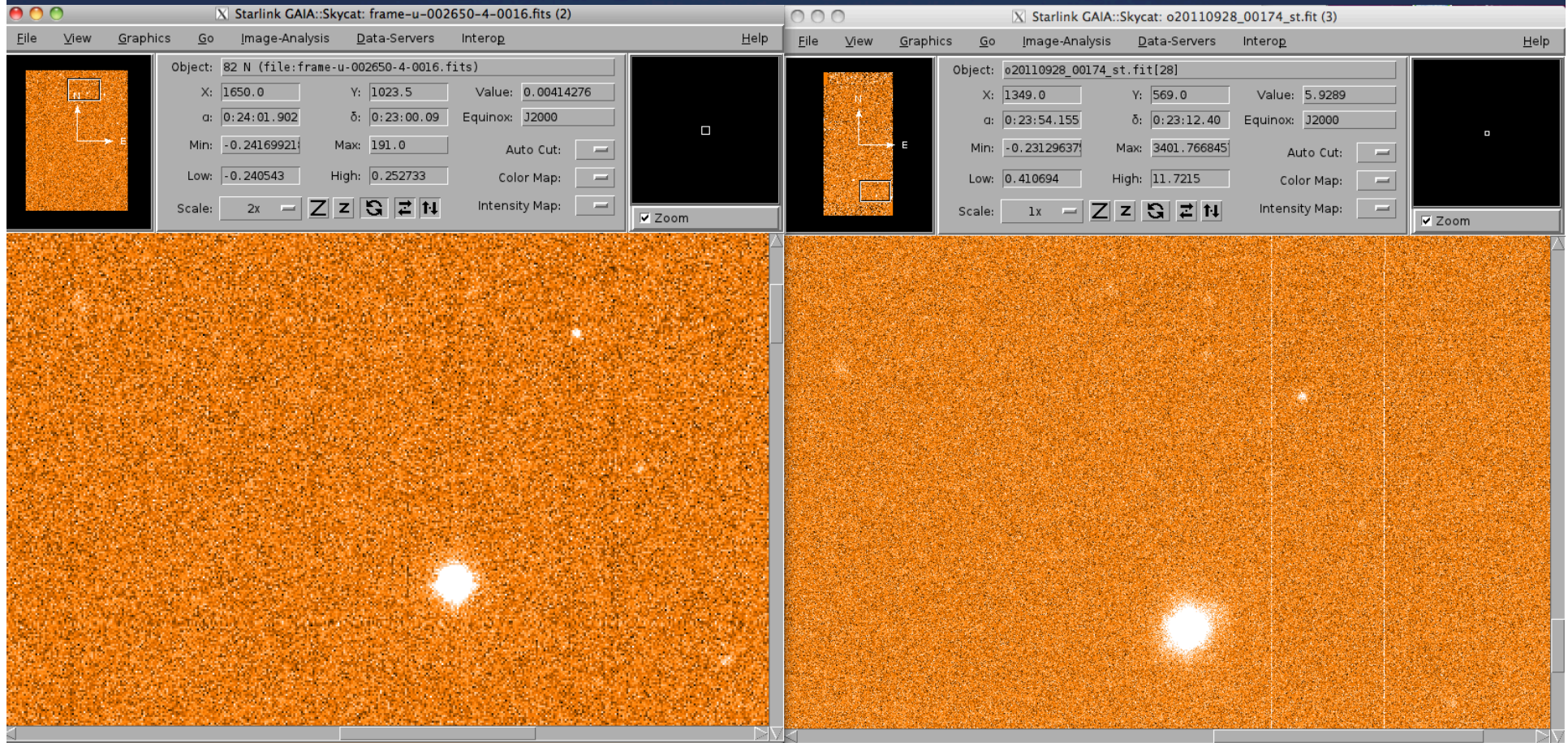




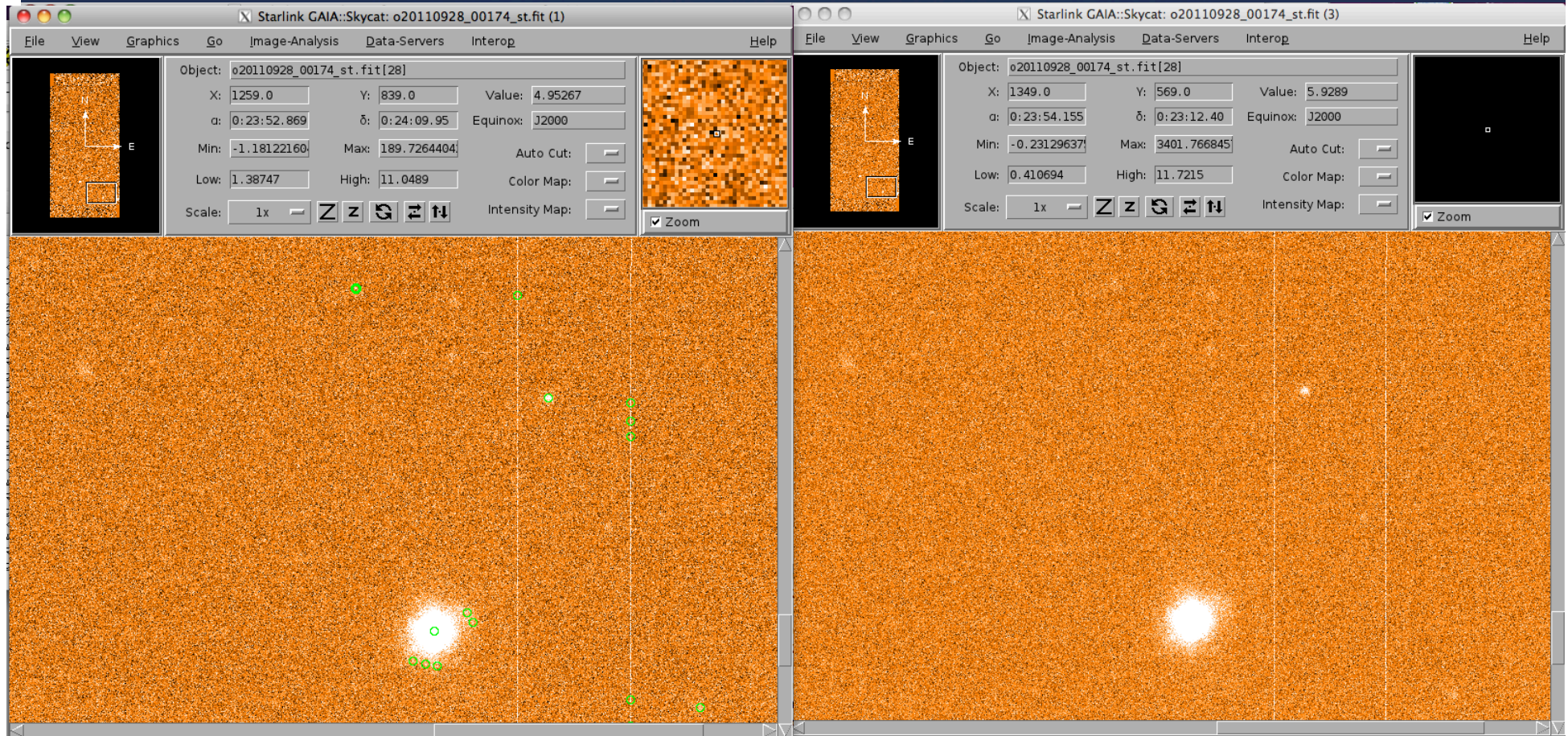
# SDSS-ATLAS no-zoom- u



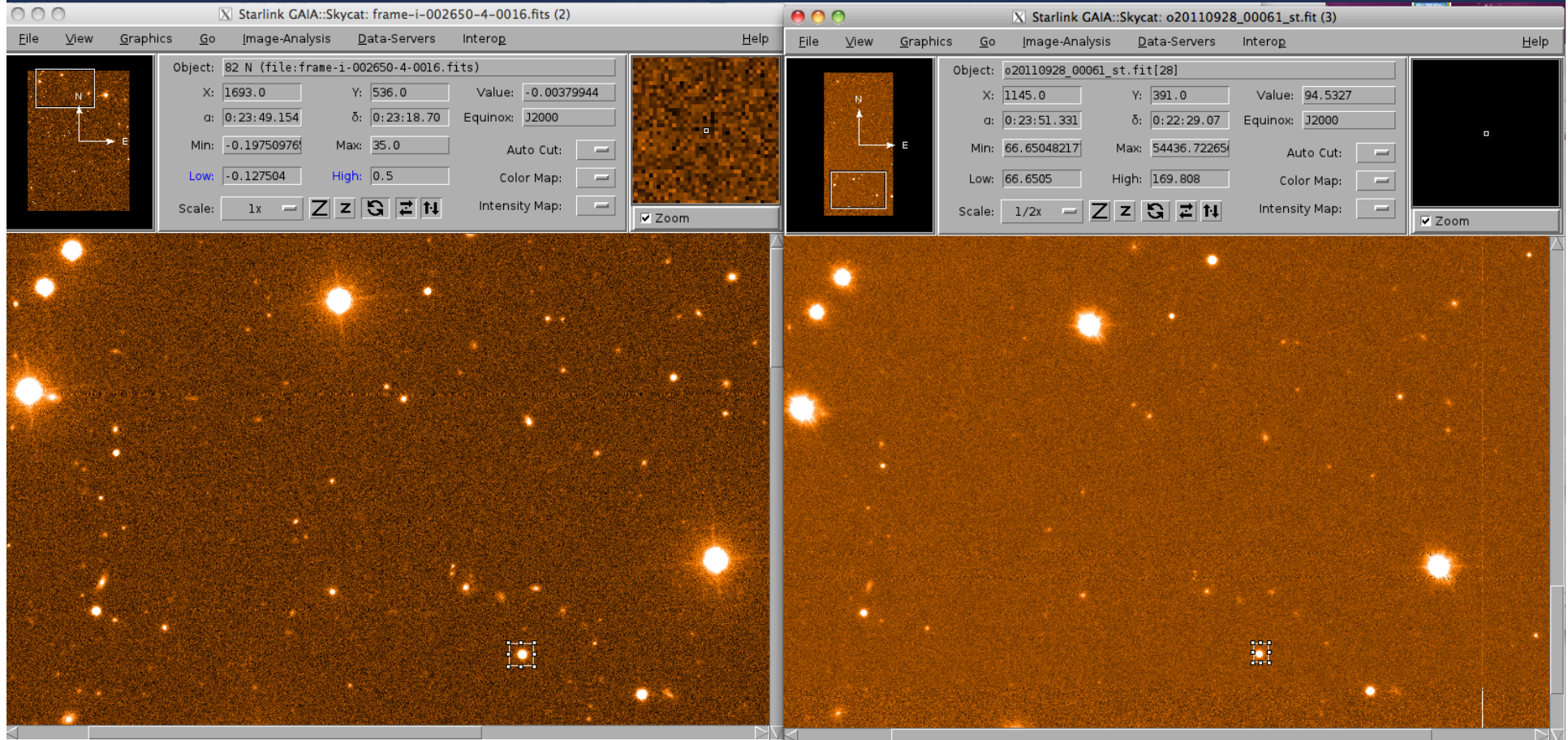
# SDSS-ATLAS zoom - U



# ATLAS CASU ids



# SDSS-ATLAS no-zoom - i



# SDSS-ATLAS zoom - i

The screenshot displays two windows from the Starlink GAIA software interface, each showing a zoomed-in view of an astronomical field. The left window is titled "Starlink GAIA::Skycat: frame-i-002650-4-0016.fits (2)" and the right window is titled "Starlink GAIA::Skycat: o20110928\_00061\_st.fit (3)".

**Left Window (frame-i-002650-4-0016.fits (2)):**

- Object: 82 N (file:frame-i-002650-4-0016.fits)
- X: 1894.0, Y: 533.0, Value: -0.0222473
- $\alpha$ : 0:23:49.075,  $\delta$ : 0:24:38.30, Equinox: J2000
- Min: -0.19750976, Max: 35.0, Auto Cut:
- Low: -0.127504, High: 0.650045, Color Map:
- Scale: 2x, Intensity Map:
- Zoom:

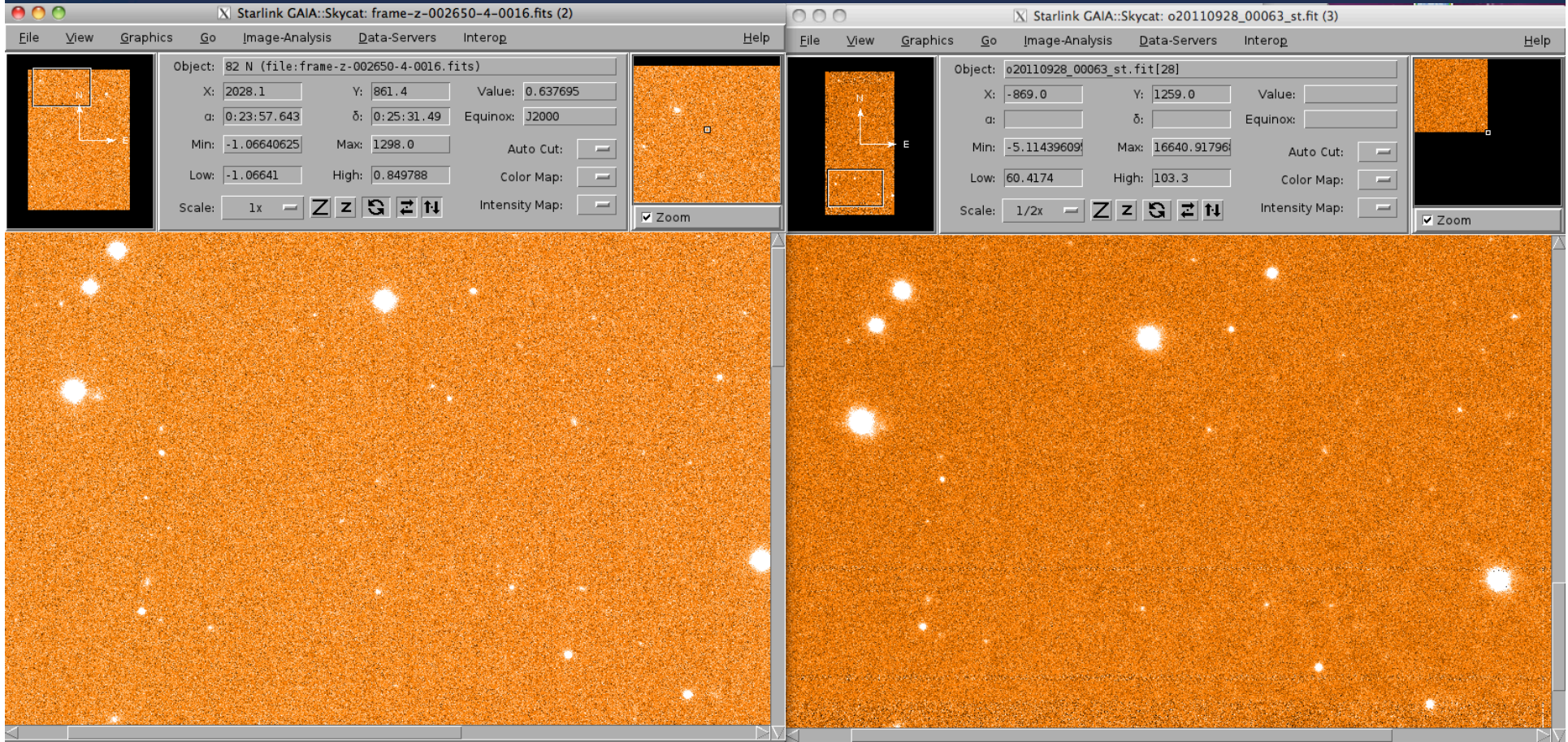
**Right Window (o20110928\_00061\_st.fit (3)):**

- Object: o20110928\_00061\_st.fit[28]
- X: 677.0, Y: 1076.0, Value: 101.635
- $\alpha$ : 0:23:44.664,  $\delta$ : 0:24:54.96, Equinox: J2000
- Min: 66.65048217, Max: 54436.72265, Auto Cut:
- Low: 66.6505, High: 186.88, Color Map:
- Scale: 1x, Intensity Map:
- Zoom:

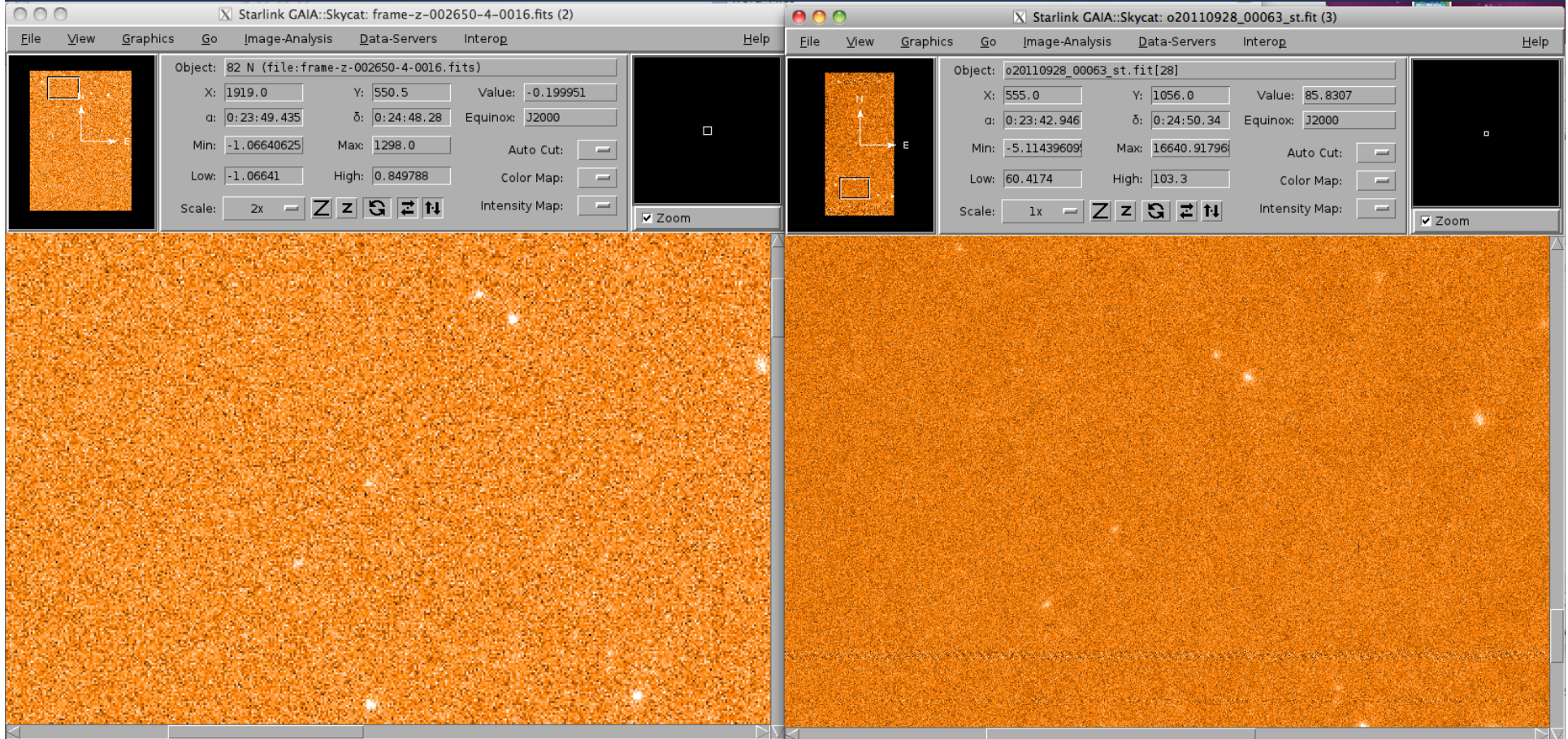
Both windows show a dense field of stars in a reddish-brown color palette. The left window is zoomed in by a factor of 2x, while the right window is at 1x scale. The software interface includes standard menu options (File, View, Graphics, Go, Image-Analysis, Data-Servers, Interop, Help) and a toolbar with navigation and analysis tools.

At the bottom of the left window, a status bar reads: "Pan window: = position image, = zoom in, = zoom out".

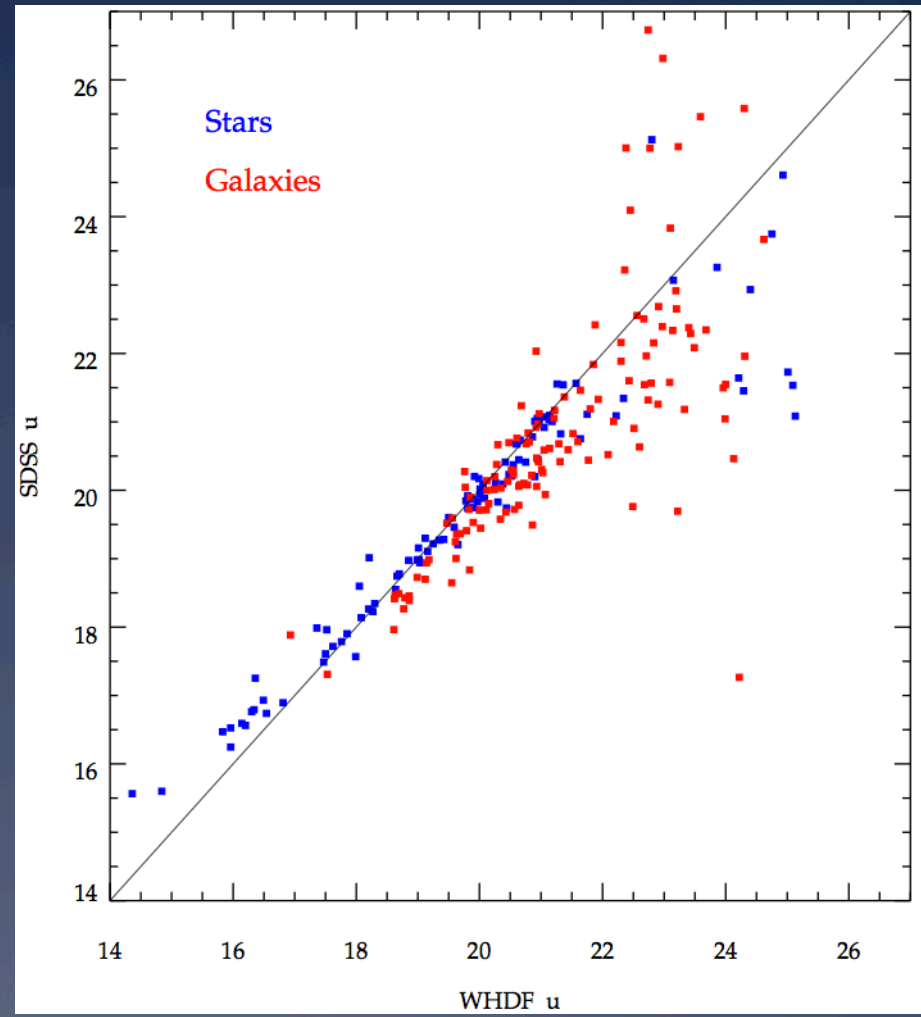
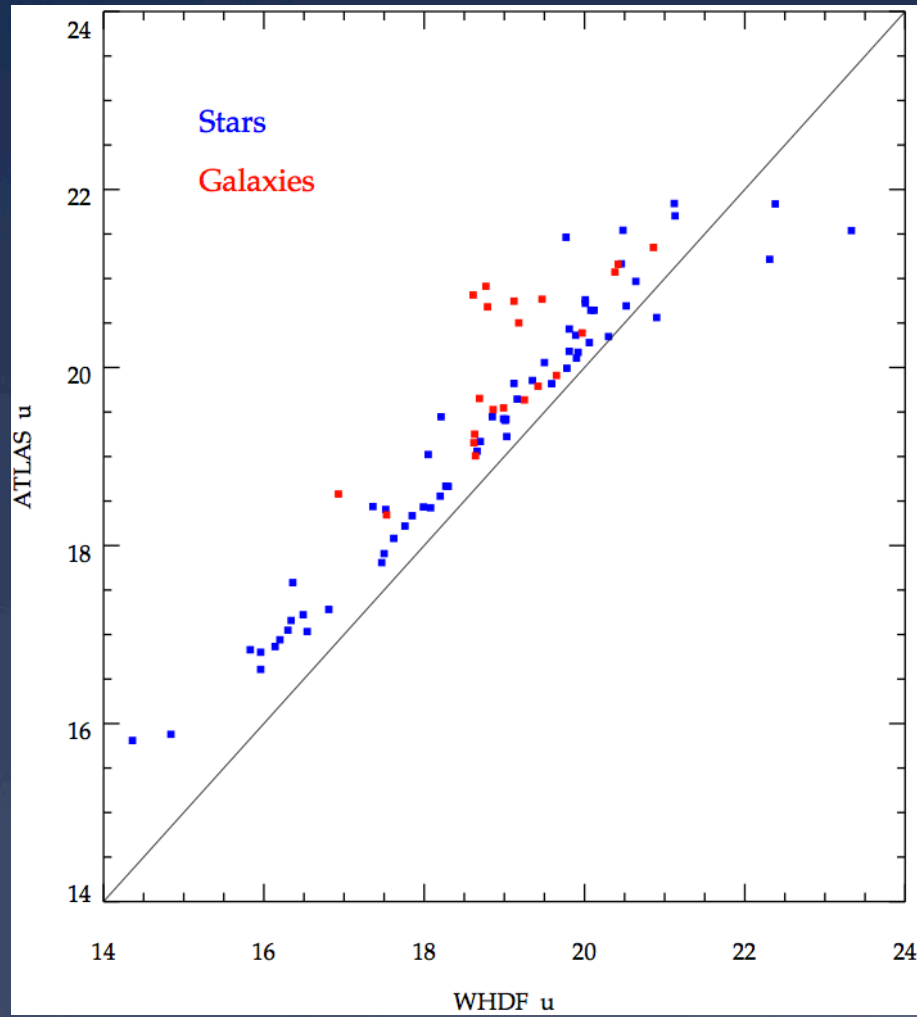
# SDSS-ATLAS no-zoom - z



# SDSS-ATLAS zoom - z

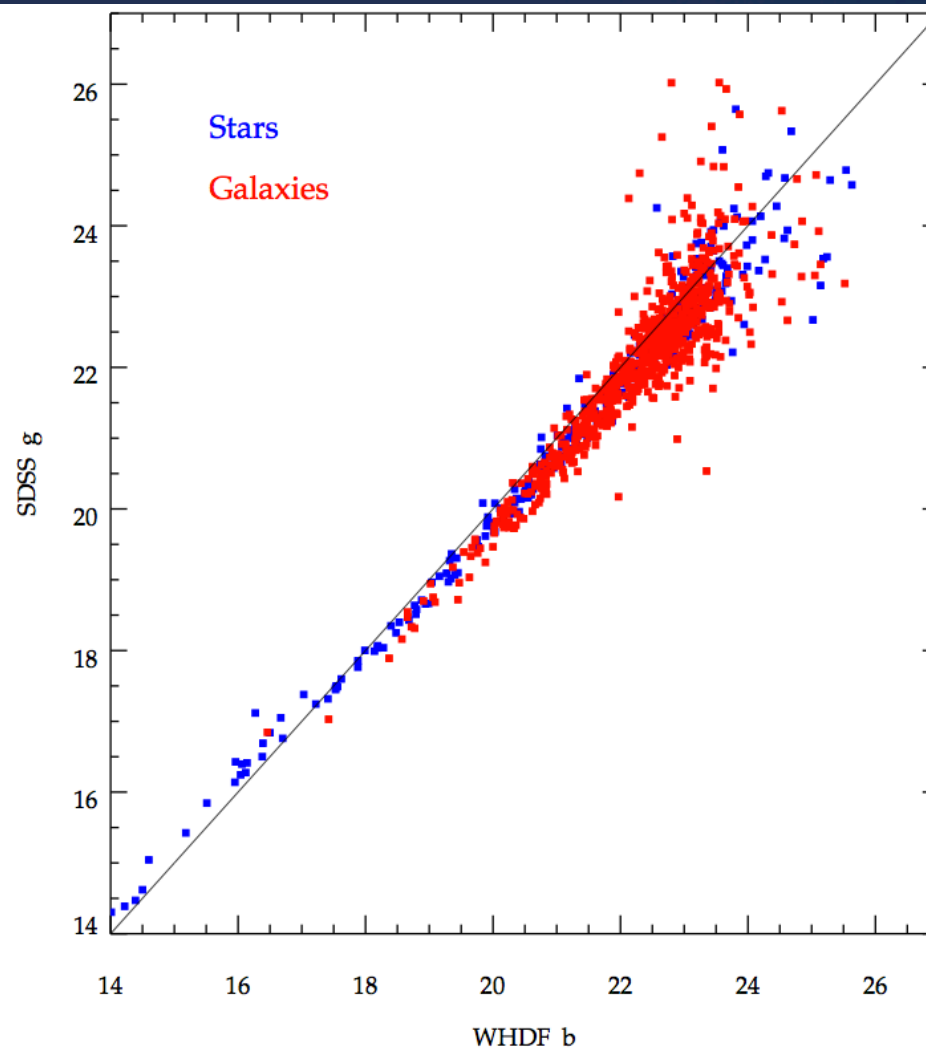
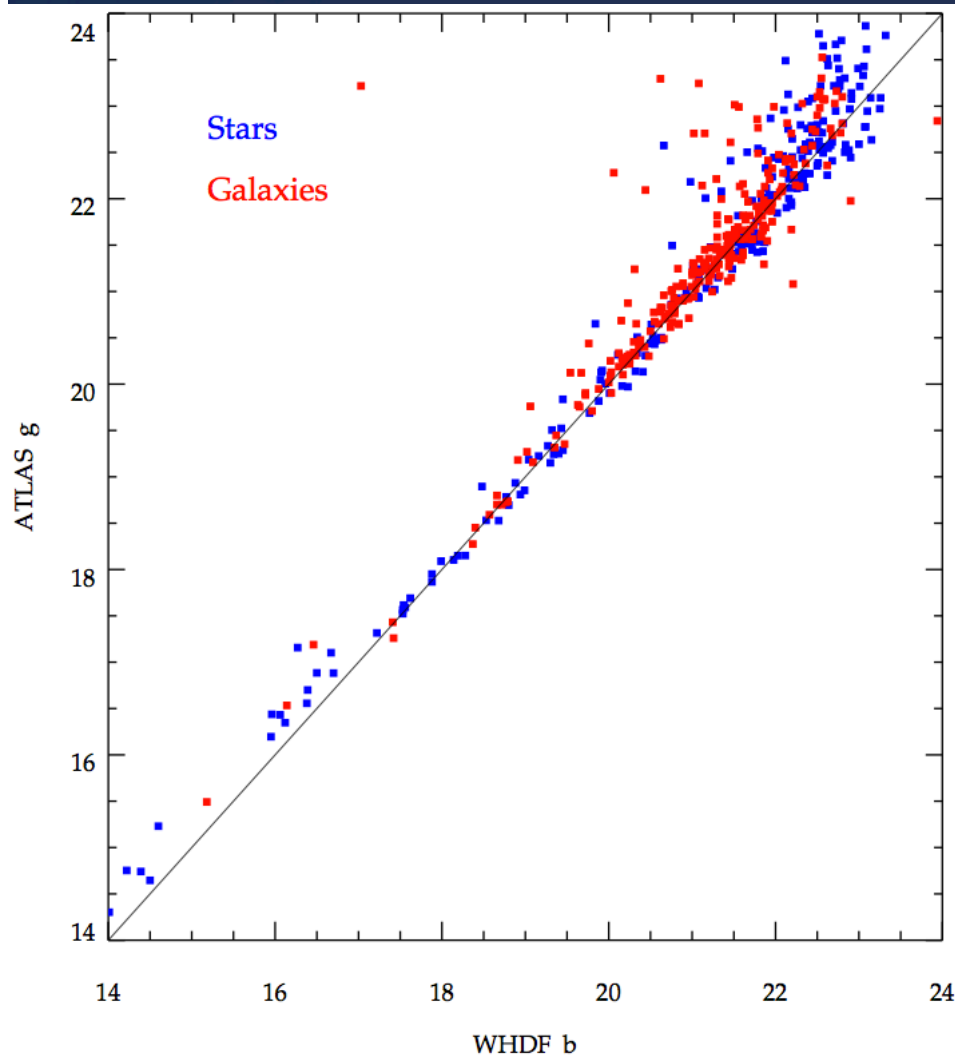


# WHDF $\nu$ ATLAS + SDSS - U

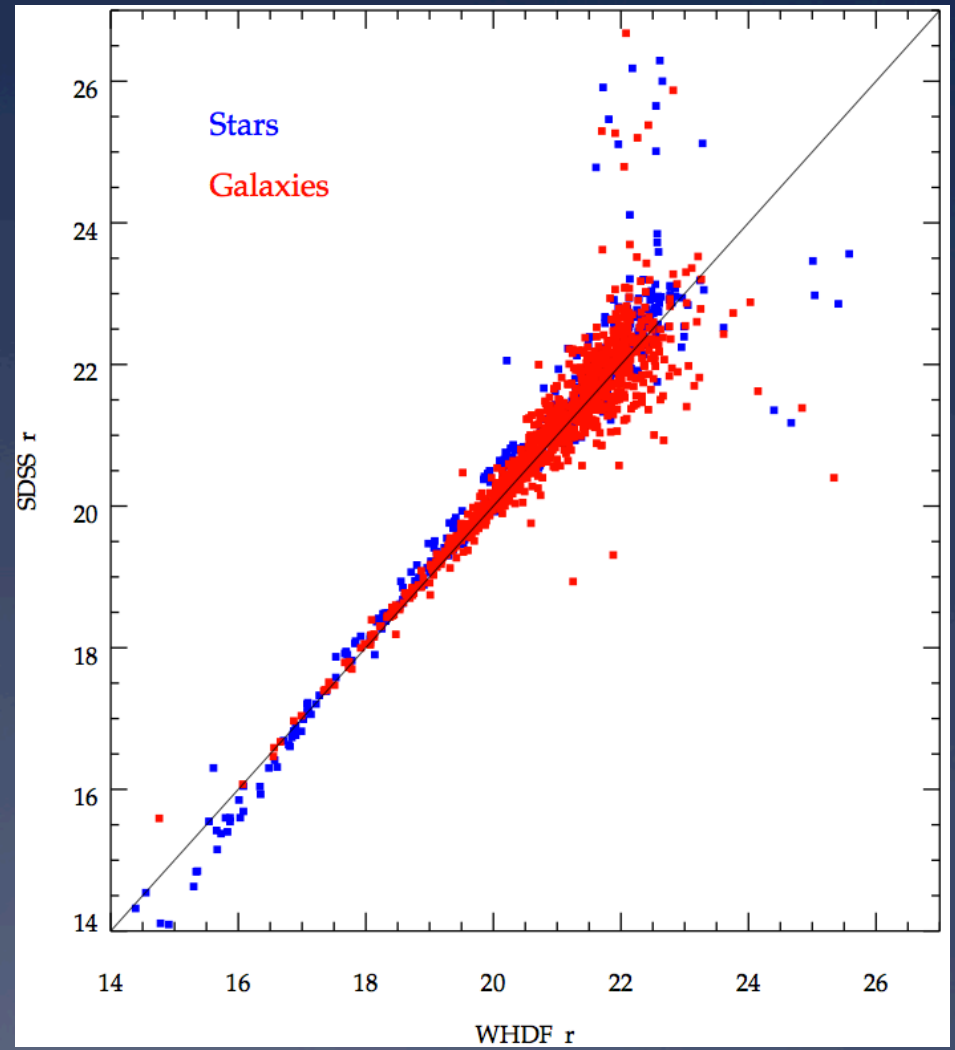
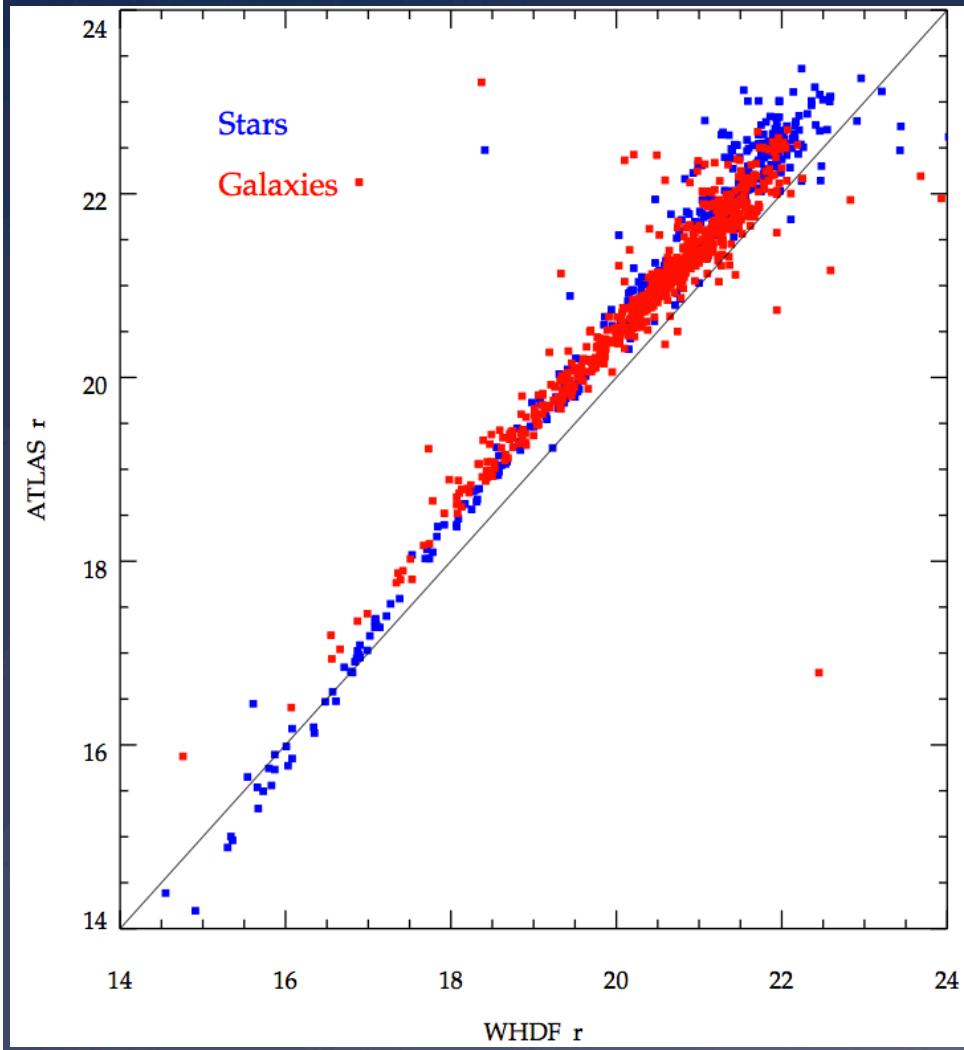




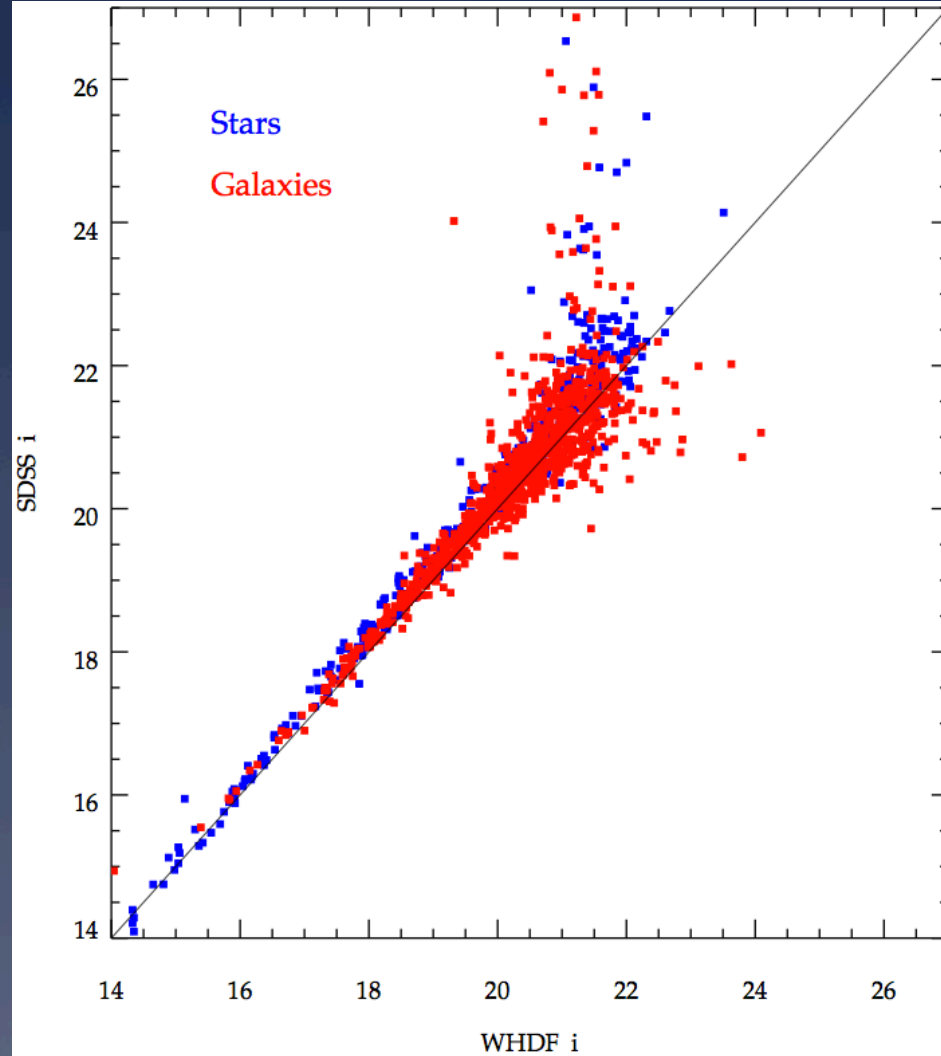
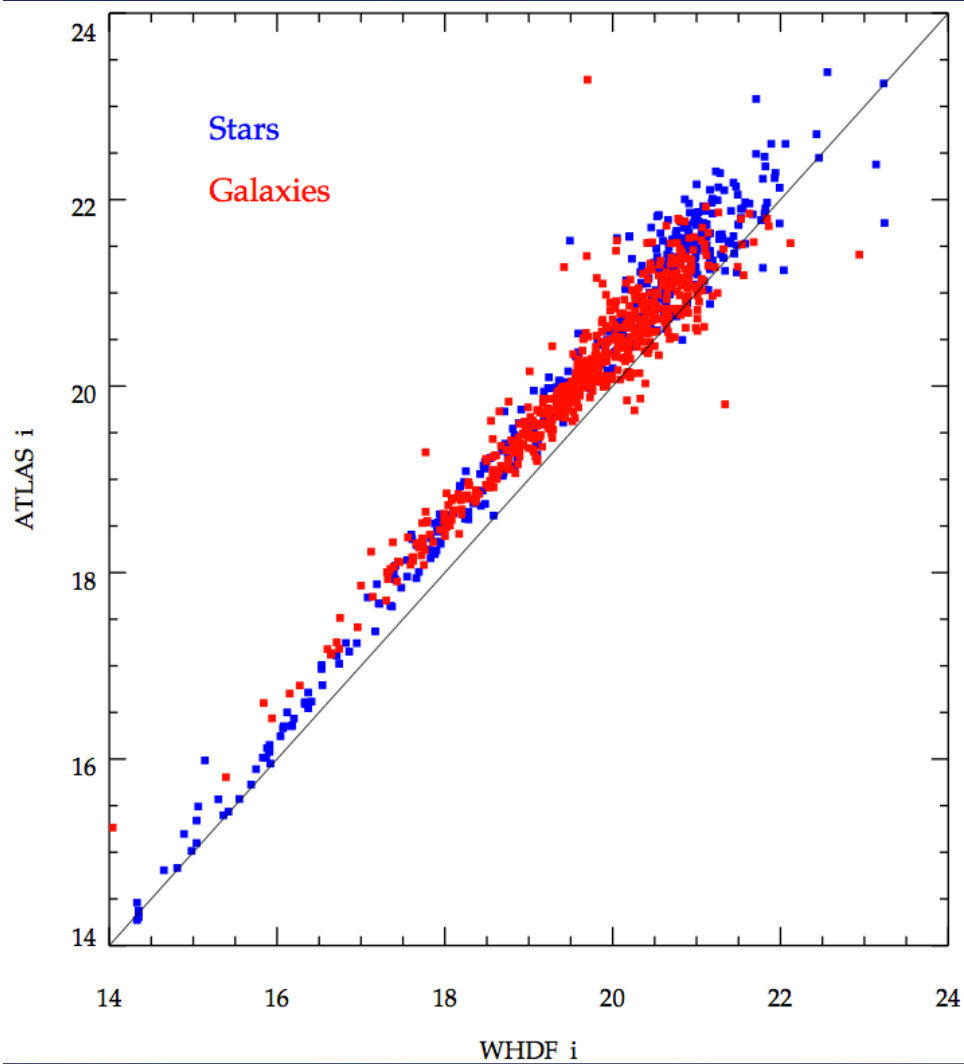
# WHDF v ATLAS + SDSS – b vs g



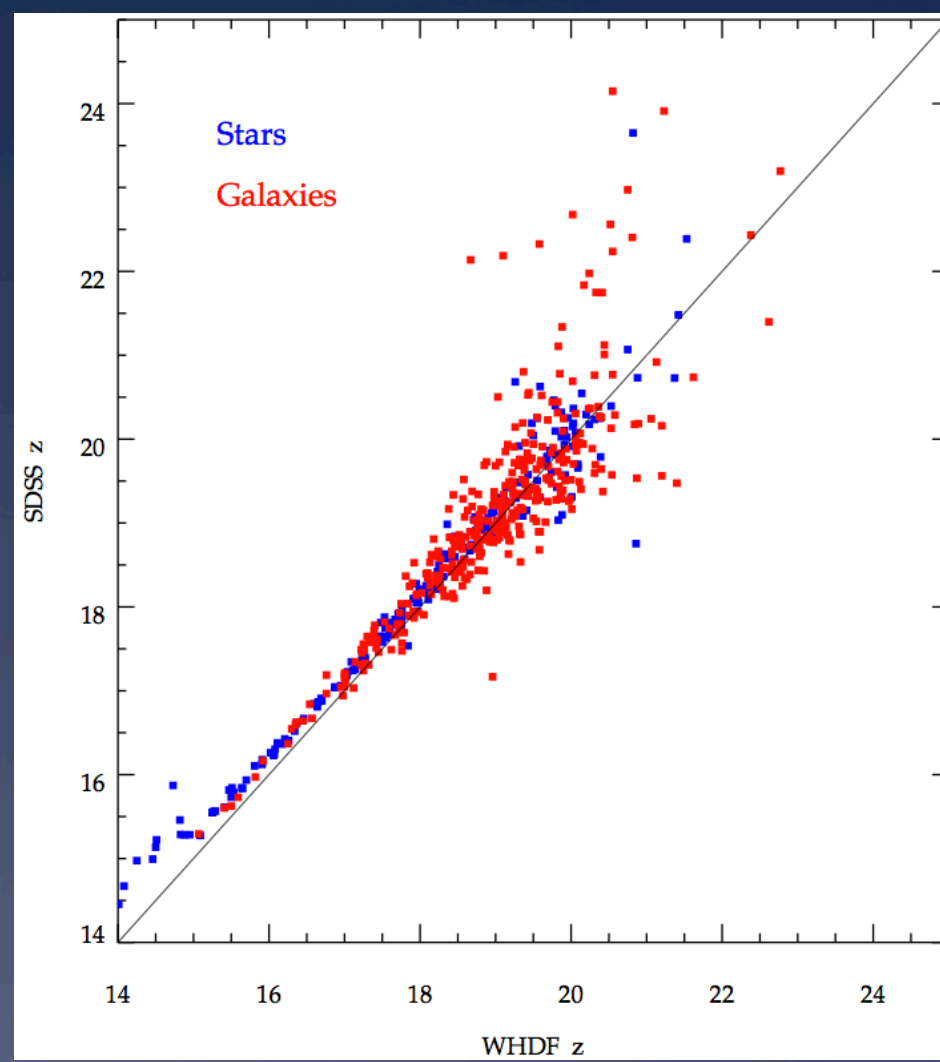
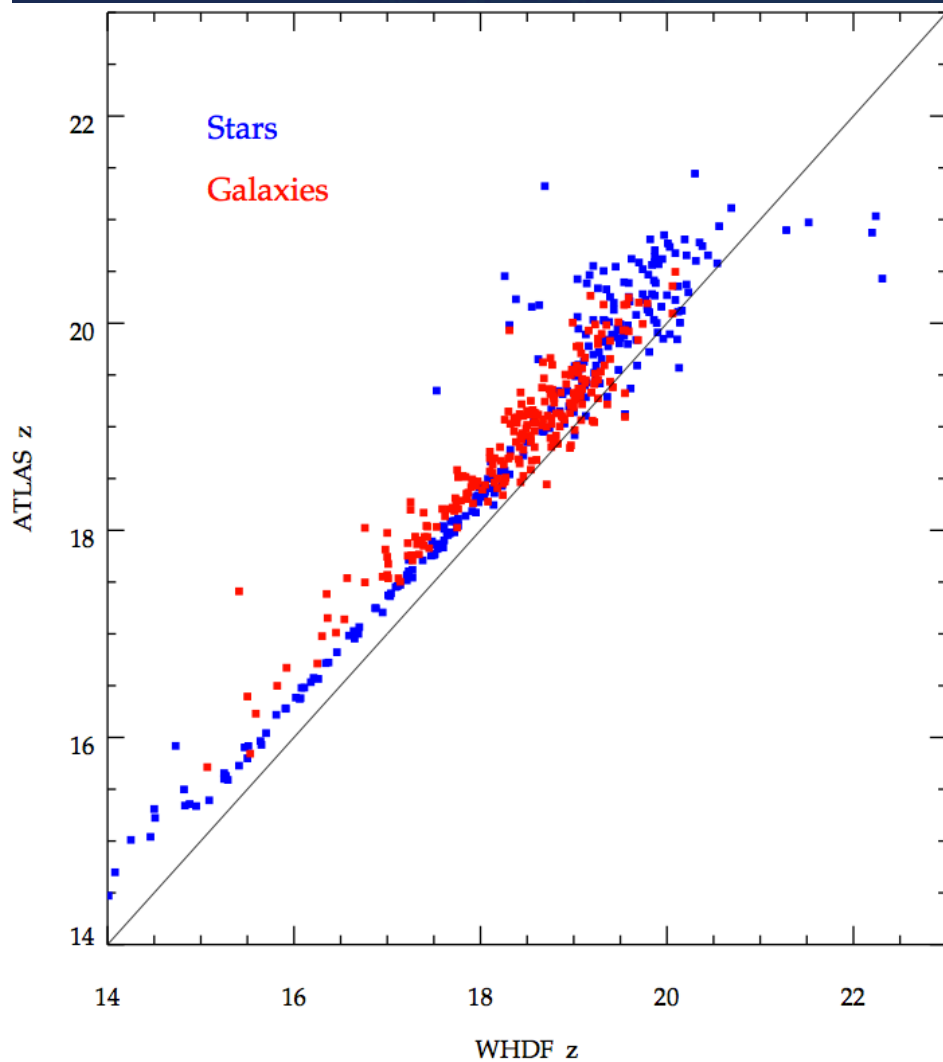
# WHDF vs ATLAS+SDSS - r



# WHDF vs ATLAS+SDSS - i



# WHDF vs ATLAS+SDSS - z



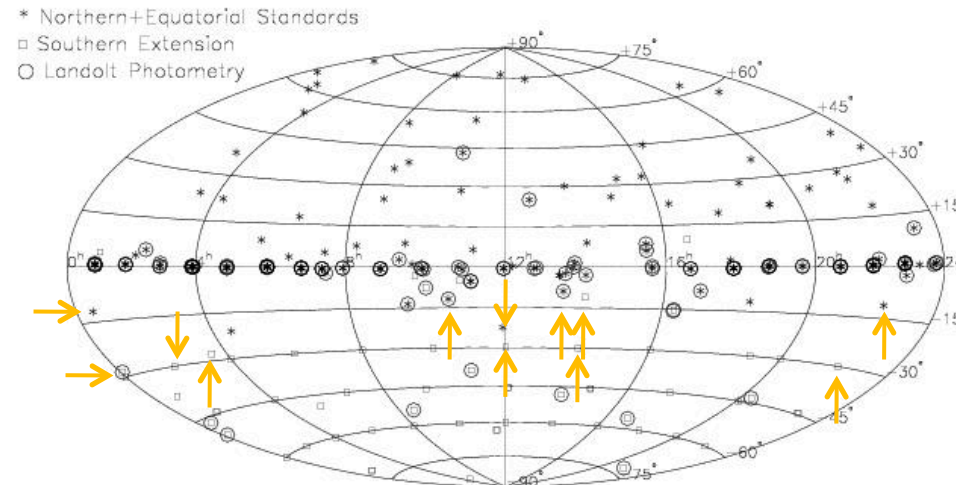
# FNAL/CTIO ugriz standards

## Southern Standard Stars for the u'g'r'i'z' System:

### Main Page

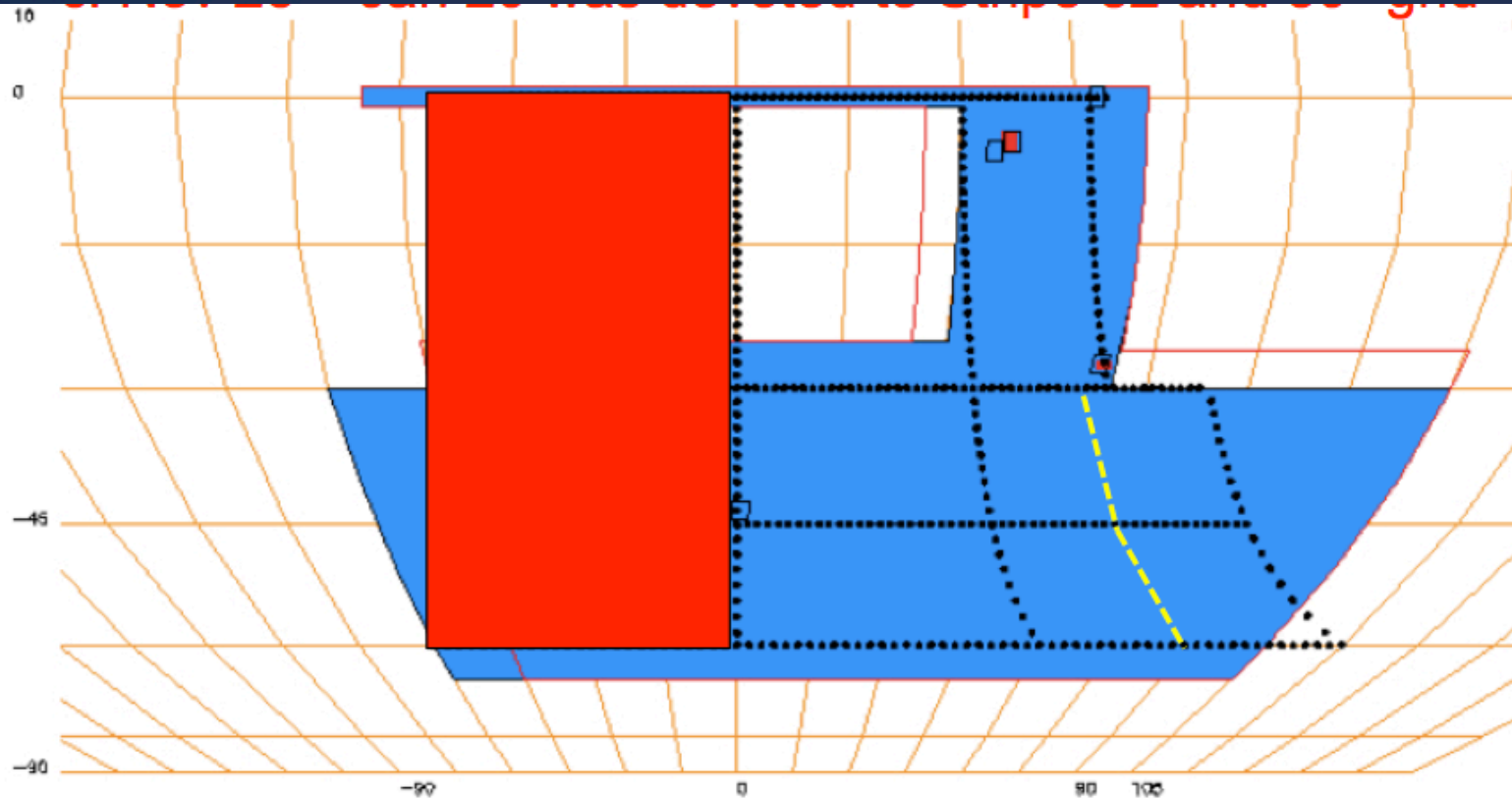
*"Having a photometric system without standard stars is like measuring the distance from New York to Paris in meters without defining the length of the meter."*

--Arne A. Henden & Ronald H. Kaitchuck  
"Astronomical Photometry"  
(copyright 1990, Willman-Bell, Inc.)



Locations of the 158 Smith et al (2002) primary standards (asterisks) and the 58 fields of the southern extension to the primary standard star network (unfilled squares). Circled symbols indicate u'g'r'i'z' standard stars or fields for which there are currently Landolt UBVRcIc photometry (Landolt 1973, 1983, 1992) or for which Landolt is currently obtaining UBVRcIc photometry (Landolt, in prep)

# DES Pre-Cam calibration

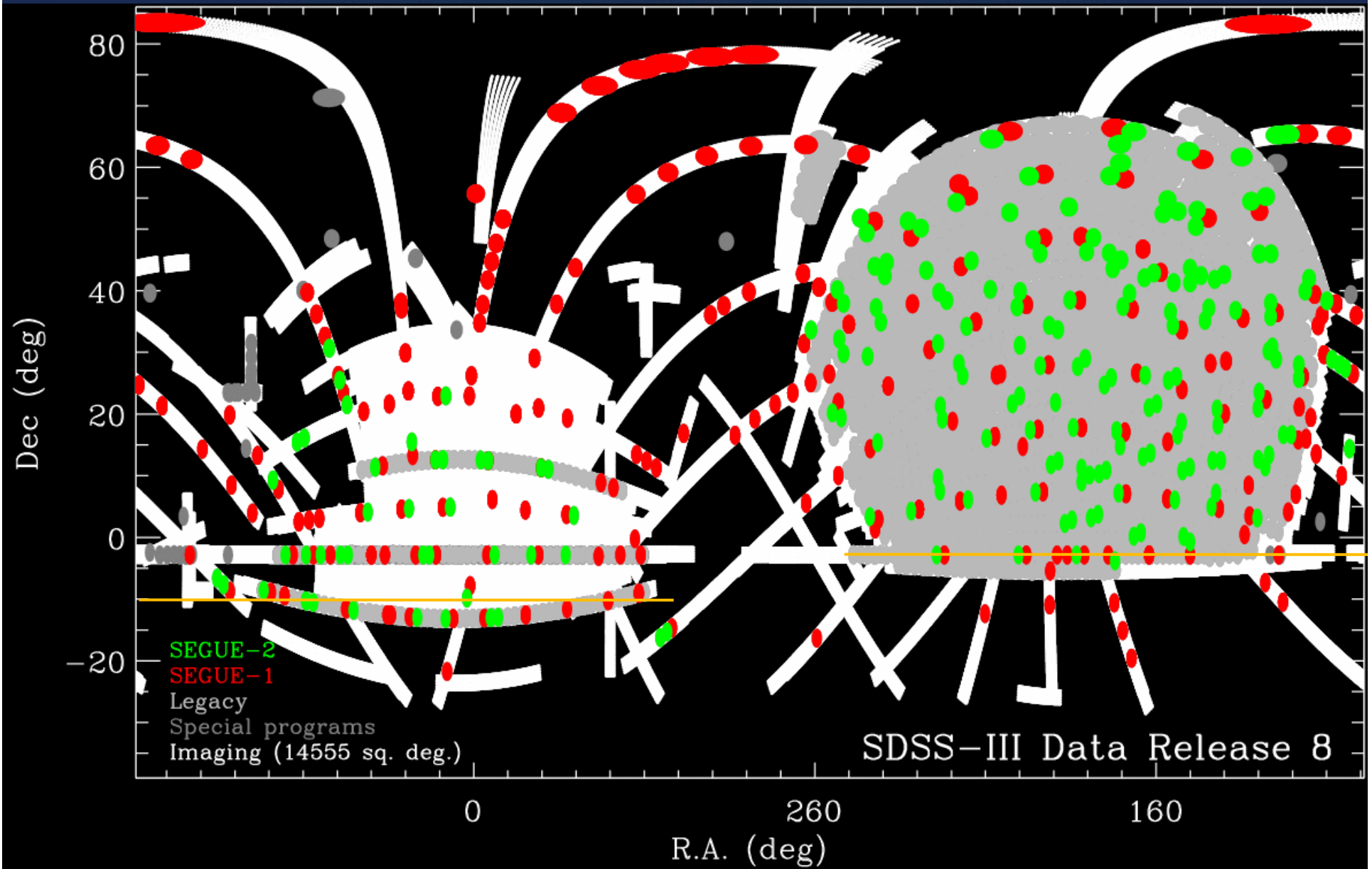


Stripe 82:  
10x in *grizy*

30° grid:  
6x in *gri*

Curtis-Schmidt gri standards to  $g \sim 18$

# SDSS Overlap

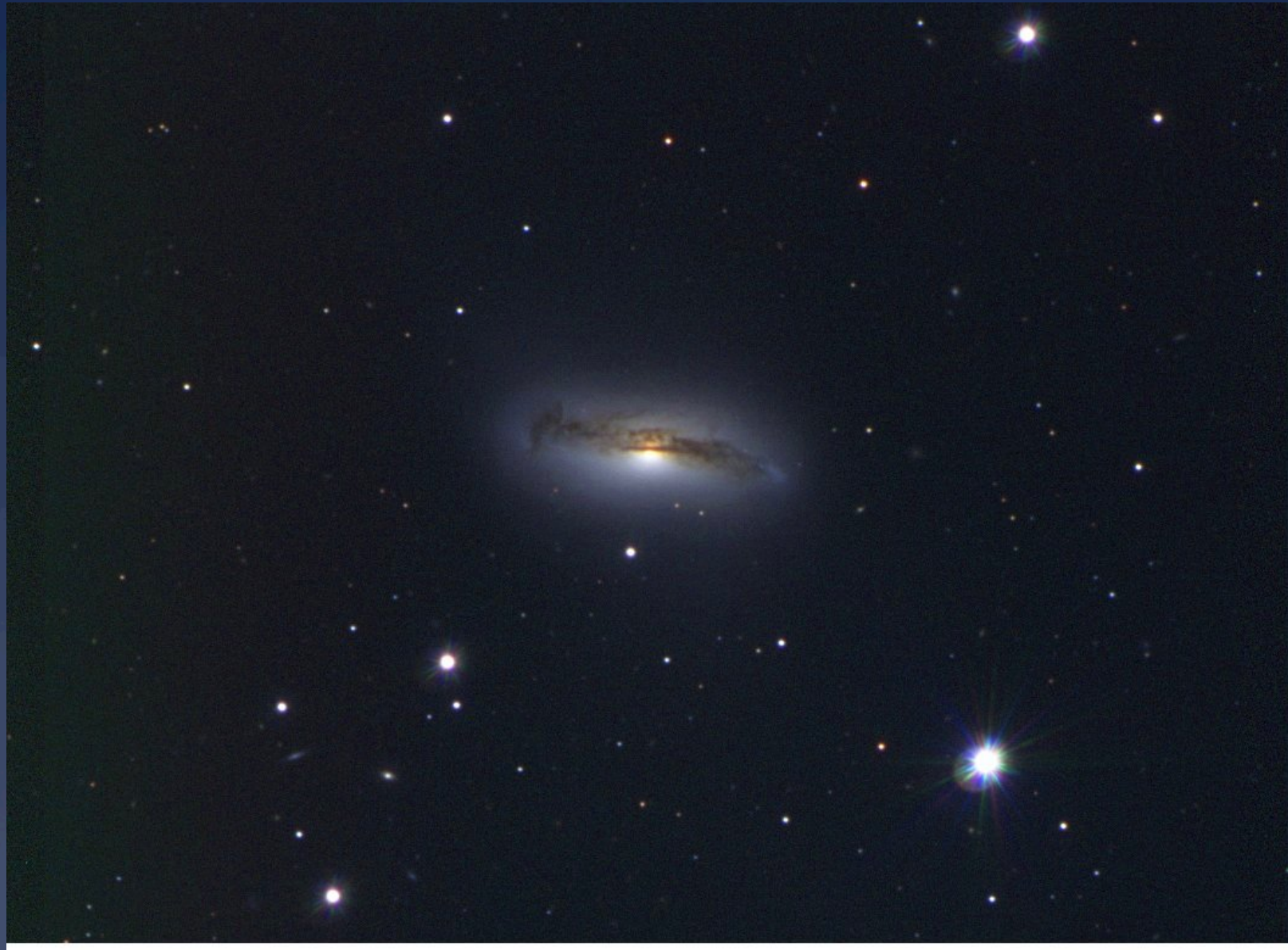


# ATLAS – NGC289





# ATLAS – NGC7172



# ATLAS – NGC7173+4+6



# Summary

- \* 500deg<sup>2</sup> surveyed by ATLAS in SGC KIDS-S already
- \* More or less achieving SDSS depth in ugriz
- \* Plenty of standards available to calibrate photometry...
- \* .....plus 2' overlaps to give global calibration
- \* Chilean proposal to double u exposure time submitted in P89
- \* CASU up-to-date with (preliminary) pipeline processing
- \* Some fields may need repeating due to 20" offset problem
- \* Otherwise congratulations and thanks to VST+OmegaCAM builders, ESO observers and CASU...