SKYSURF AWS Processing

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skysurf.asu.edu

SKYSURF

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- Largest Hubble Space Telescope (HST) archive program to date.
- Focused on classifying level of diffuse optical background in light UV to near-IR
- Two sides of program:
  - All surface background brightness measurement.
  - Low-surface brightness object counts.

Daniel Henningsen   *Image Credit: Metrohm AG*   *djhenni1 @asu.edu*
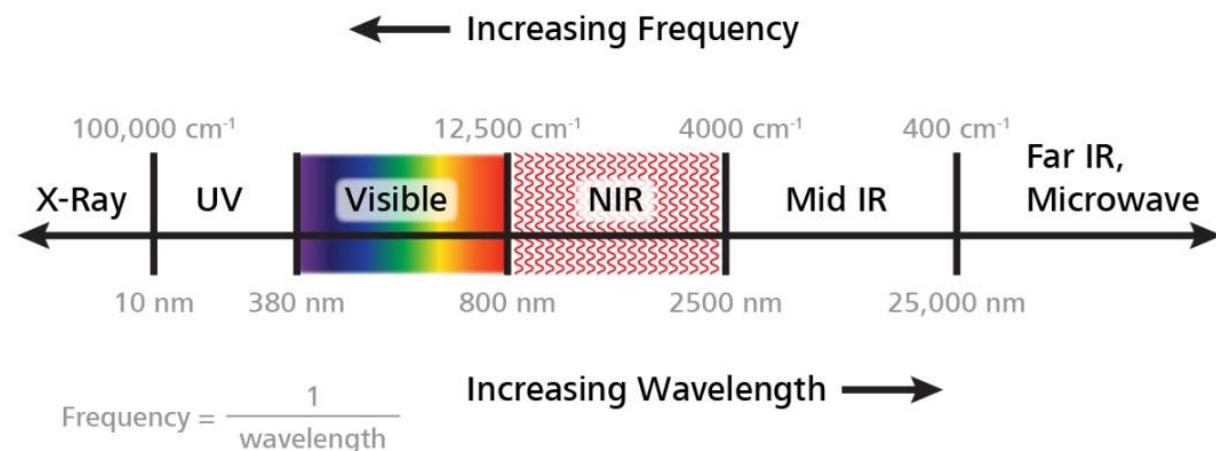
ProFound

- Measures the background of HST images.

- Masks bright objects (image) and calculates the background background from the image by looking at brightness of remaining pixels.
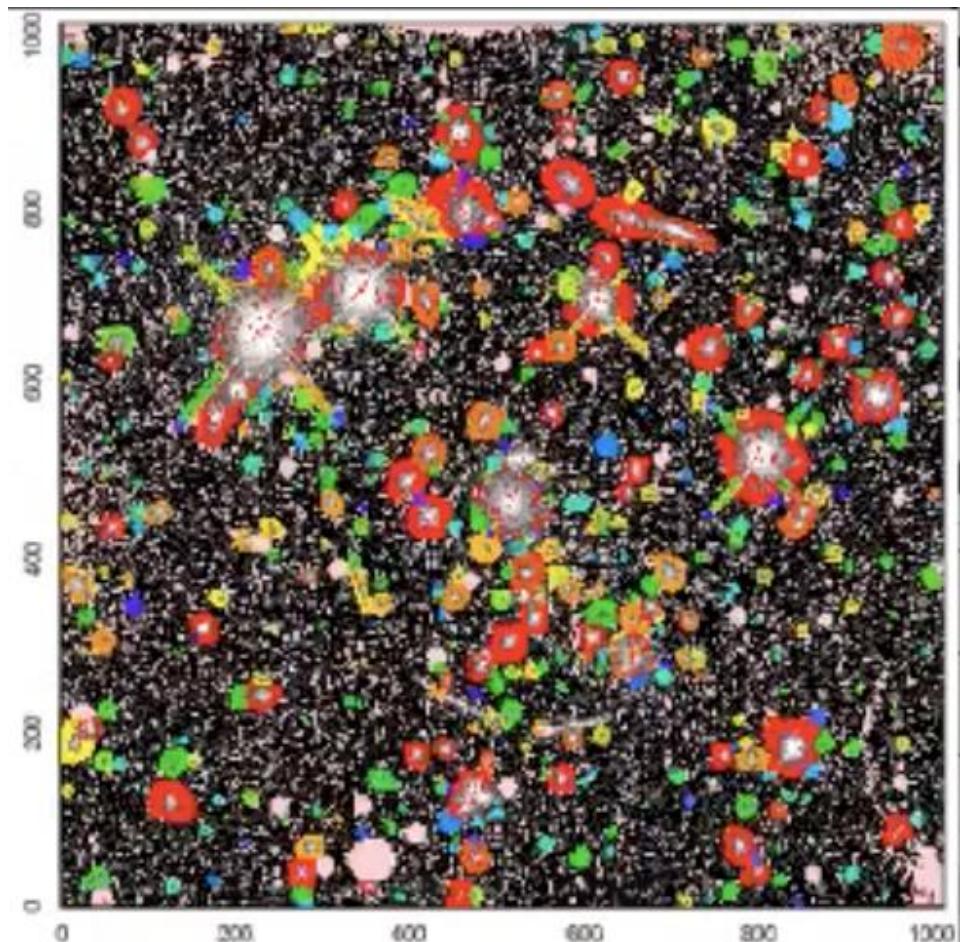
AstroDrizzle

- Drizzles together images from same HST visit to create a longer exposure and deeper image to detect fainter objects.

- After drizzling and taking ProFound's sky brightness values into account, Source Extractor will be able to count low-surface brightness objects.

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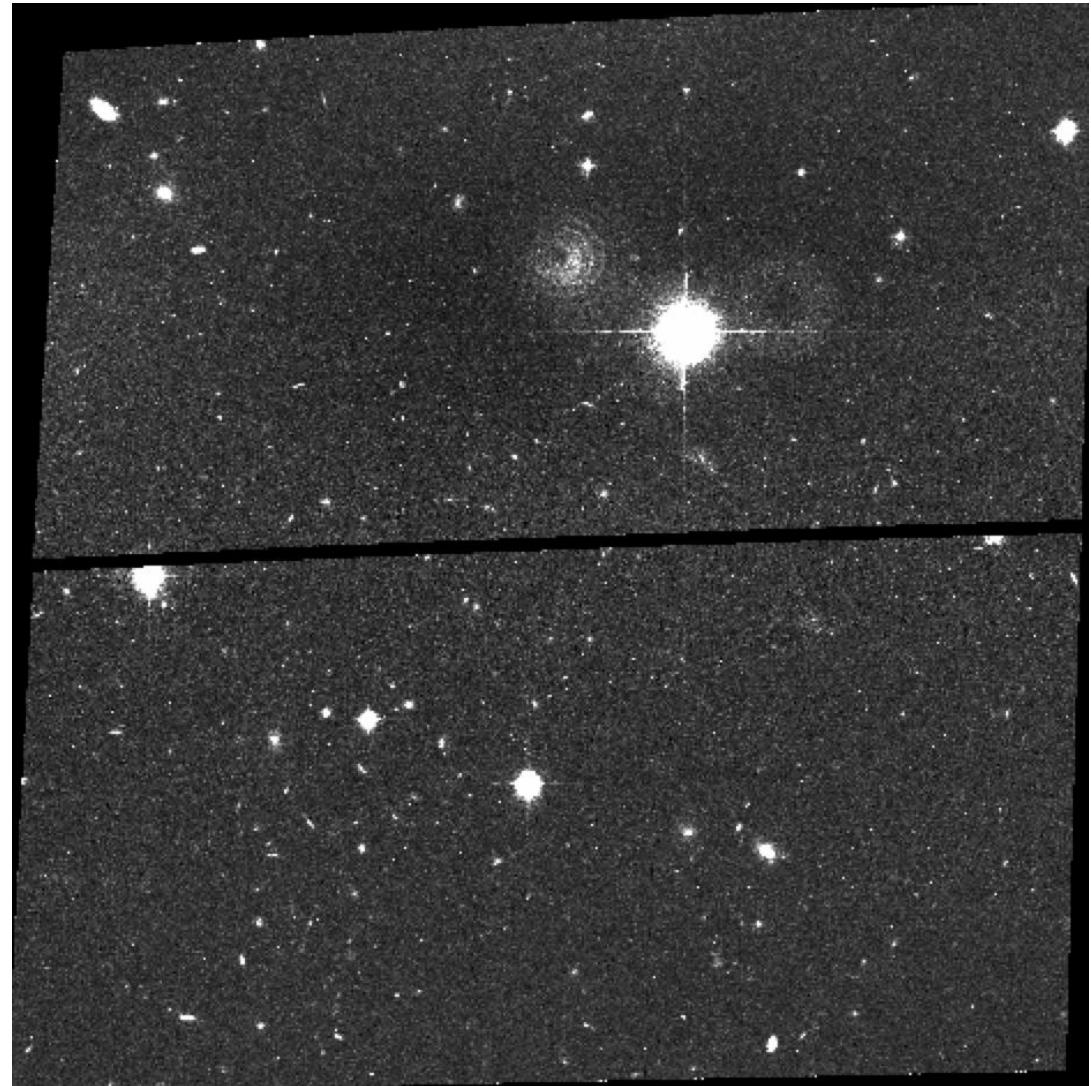
Amazon Web Services

- Needed a way to run ProFound and AstroDrizzle on over 57,000 datasets.

- Turned to AWS cloud computing to solve this issue.

- Needed to figure out how to minimize the cost of renting and running an AWS cloud computer(s).

Image Credit: Amazon Web Services

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Speed Tests

- Tested two AWS setups:
  - 16 GB RAM
  - 32 GB RAM

- Could run two images at a time by processing them in parallel on the 32 GB computer vs renting two 16 GB computers.

```
real        217m8.288s
user        186m19.465s
sys         27m13.605s
```

16 GB RAM Computer

```
real        184m6.790s
user        165m9.651s
sys         21m35.988s
```

32 GB RAM Computer

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Results & Next Steps

- Mass ProFound processing took 50 days to complete.

- AWS turned out to be a great solution for processing the large amount of data we had to work with. In addition to running ProFound.

- Mass AstroDrizzle processing begun in early April and will take a similar amount of time to finish.

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