Center for Analysis Systems and Applications

Developing next-generation analysis capabilities

SAND2015-5739D

CASA

CASL & SELFIE

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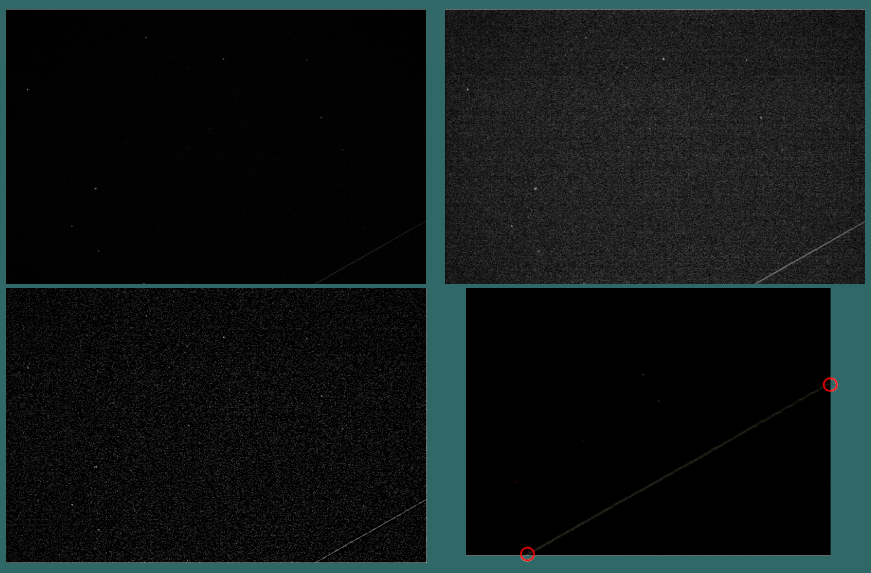
Capability and Service Library (CASL):

CASL is an R&D effort that optimizes, queries, exposes and helps to visualize big data. The CASL team investigated techniques to optimize data storage to allow for generic high speed queries on multiple data sources to increase modularity.

- **TARDIS:** The TARDIS satellite position database was rewritten to use Elasticsearch allowing for searching on a larger variety of terms.
- **DTED:** Designed and optimized the DTED database to allow for faster loading of digital terrain elevation data.
- **Star Catalog:** Exposed the Tycho-2 star catalog via web services. The catalog contains raw information regarding stars, and ingests that data into a database that is quick and easy to query. Through this database, other applications are able to expediently retrieve star information, estimate current and future star positions, and accurately model the behavior and states of stars.

Streak Extraction with Location Identification and Extrapolation (SELFIE):

- An automated image processing pipeline was developed that implemented streak detection (for any object in space), segmentation, and endpoint identification algorithms. After end points are identified, their RADEC coordinates are calculated using spatial location information generated by Astrometry to fit a set of 2D-polynomial functions that map pixel space to RADEC coordinates.



Top L: Raw image

Top R: Preprocessed image (CLAHE, Blurred, CLAHE, Sharpened)

Bottom L: Background removed

Bottom R: Zoomed-in on extracted end points (post-pipeline)

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