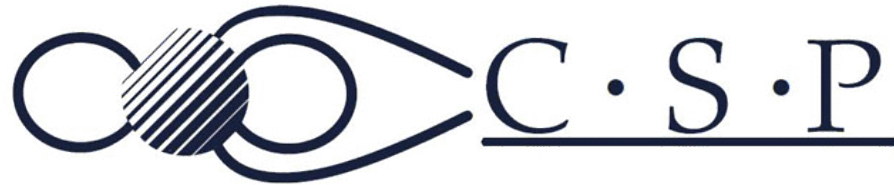
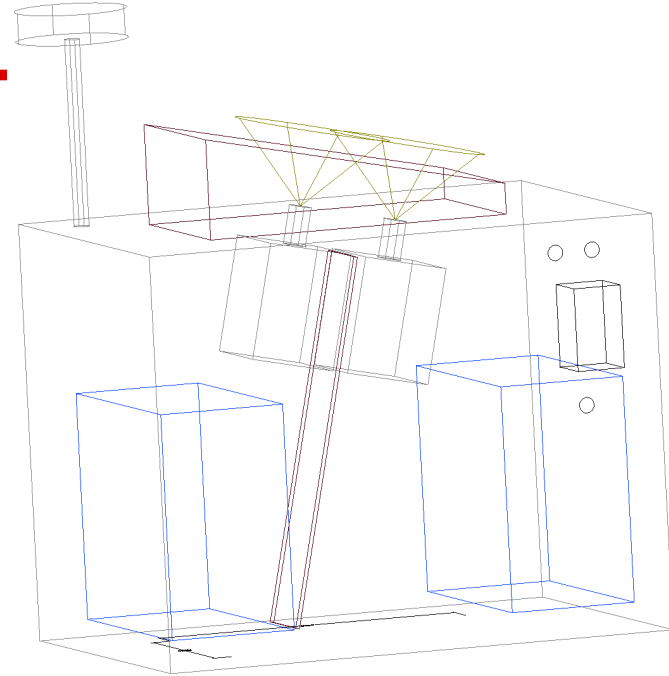
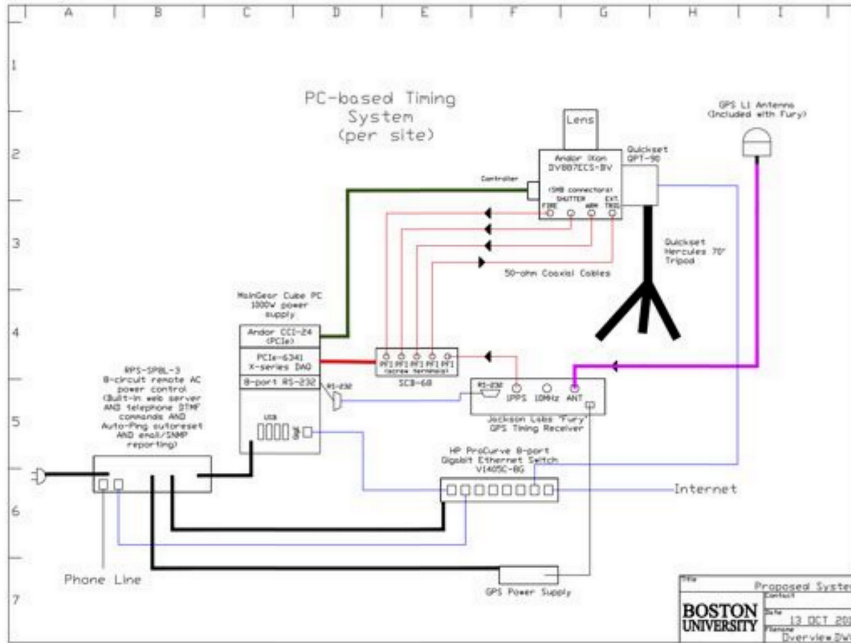

Temporal and Spatial Registration of Synchronized High Speed Auroral Video

CEDAR 2015 Workshop
25 June 2015



Michael Hirsch, Amber Baurley, Joshua Semeter
Boston University: Center for Space Physics

HIST Auroral Tomography

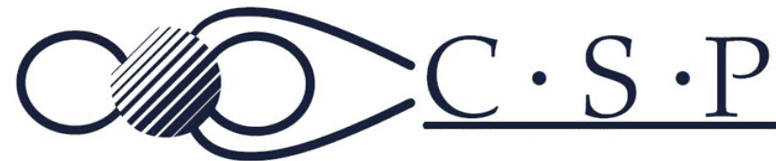


- Online Autonomous Auroral Discrimination
- Low bandwidth, self diagnosis.
- \$100/month/site operating cost

Michael Hirsch

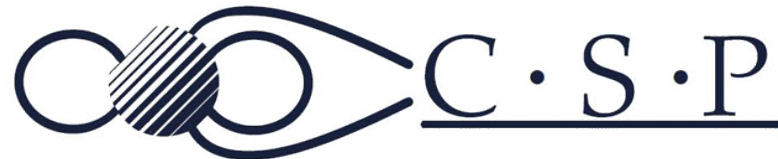
mhirsch@bu.edu

<https://scivision.co>



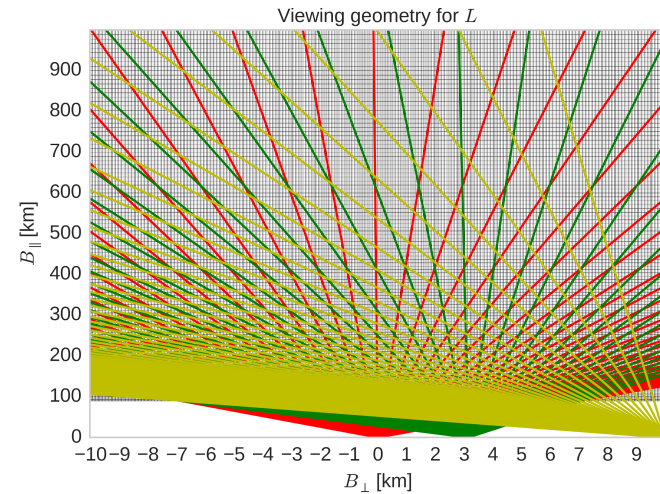
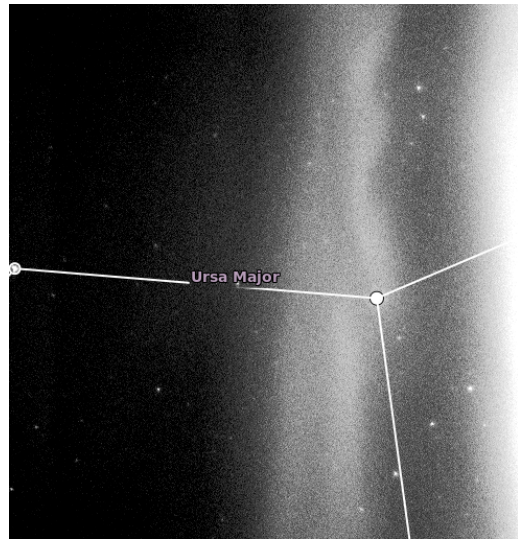
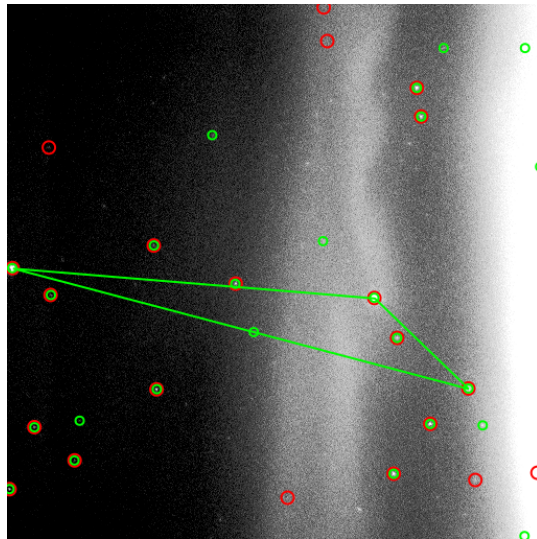
Register Well

- Meta-instrument paradigm requires calibrated data
 - More than morphology / “looks-like”
- Periodic checkups
 - fogging, performance degradations, moose
- Astrometry.net provides WCS FITS for wide class of images
 - “easy” Python Astrometry interface fits2azel



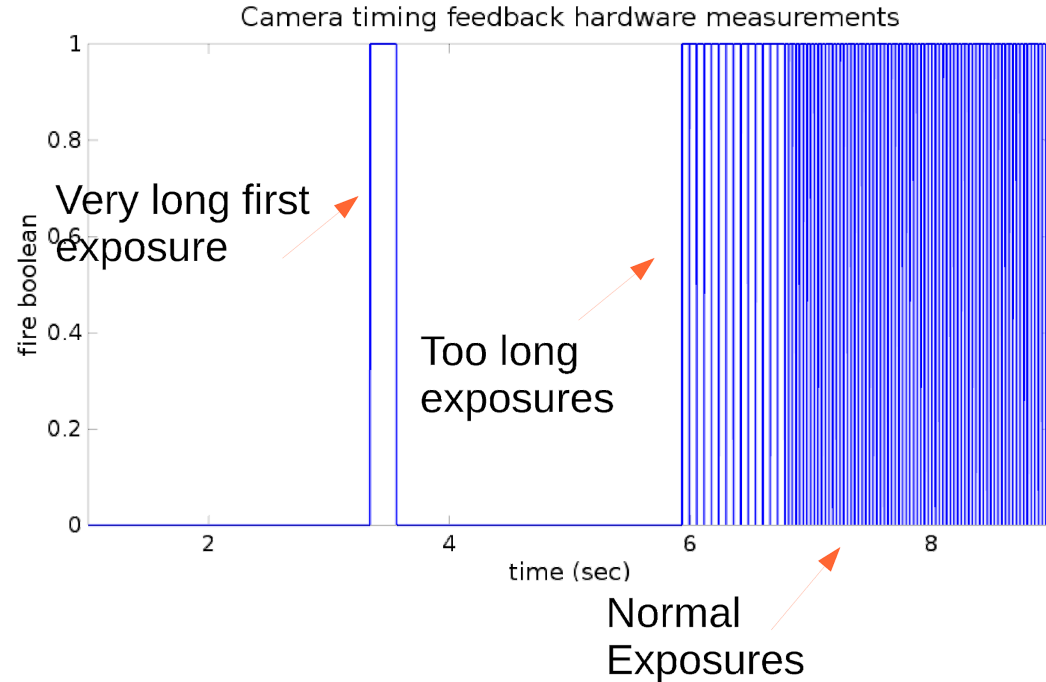
Auroral Tomography: Registration

6 degree FOV / 2560 pixels ~ 0.0023 deg/pixel



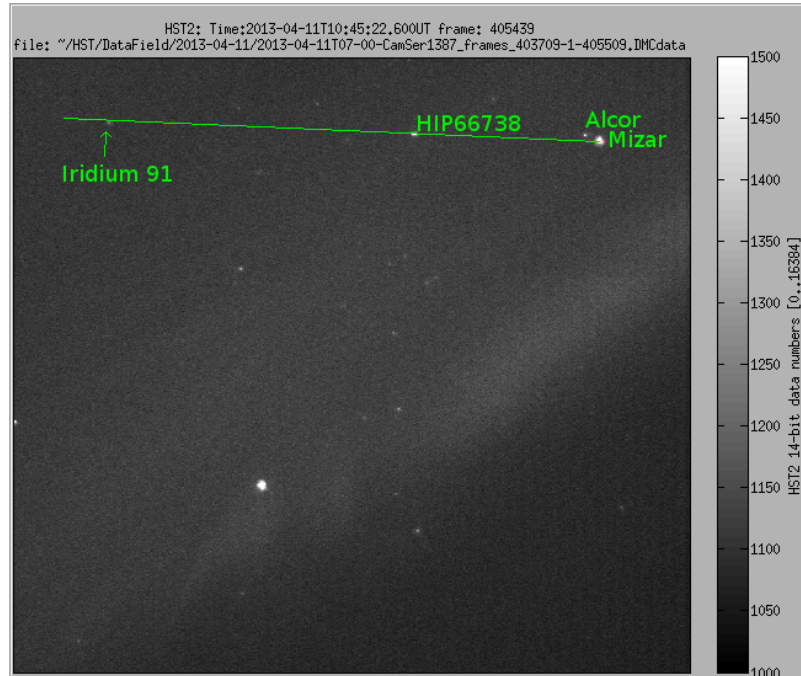
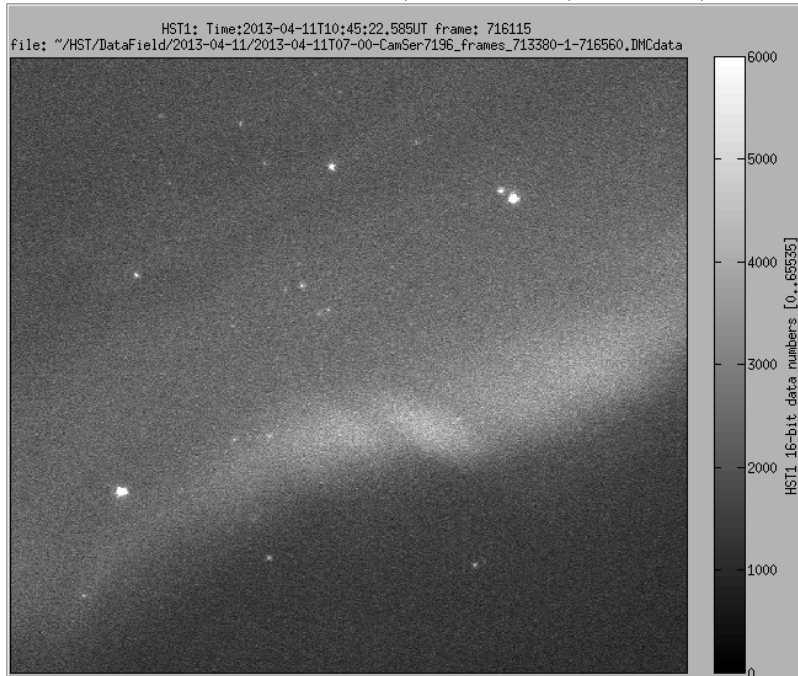
Quantitative Temporal Analysis (1)

- **Don't** Trust, ~~but~~ verify!
- Even \$40K cameras don't perform to spec.
 - Particularly when run all night



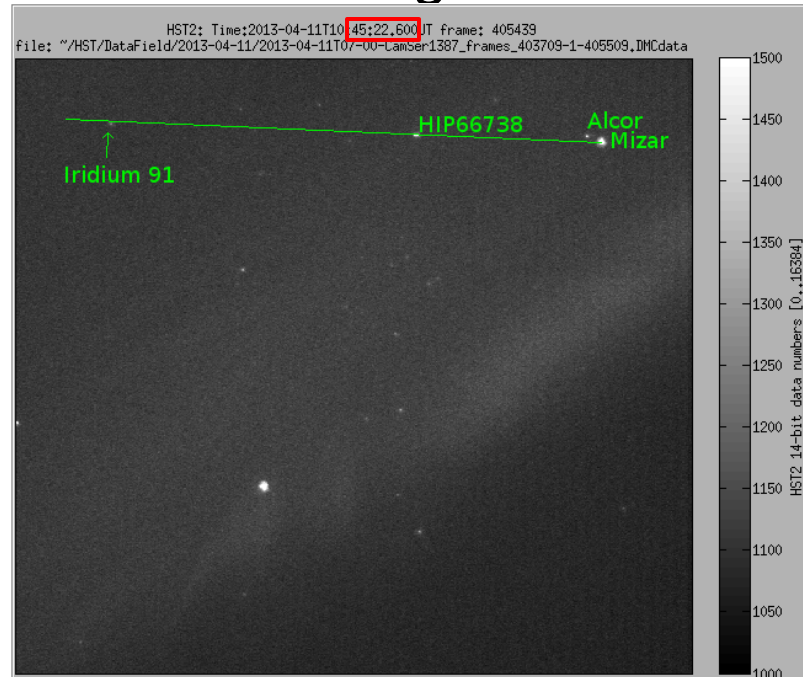
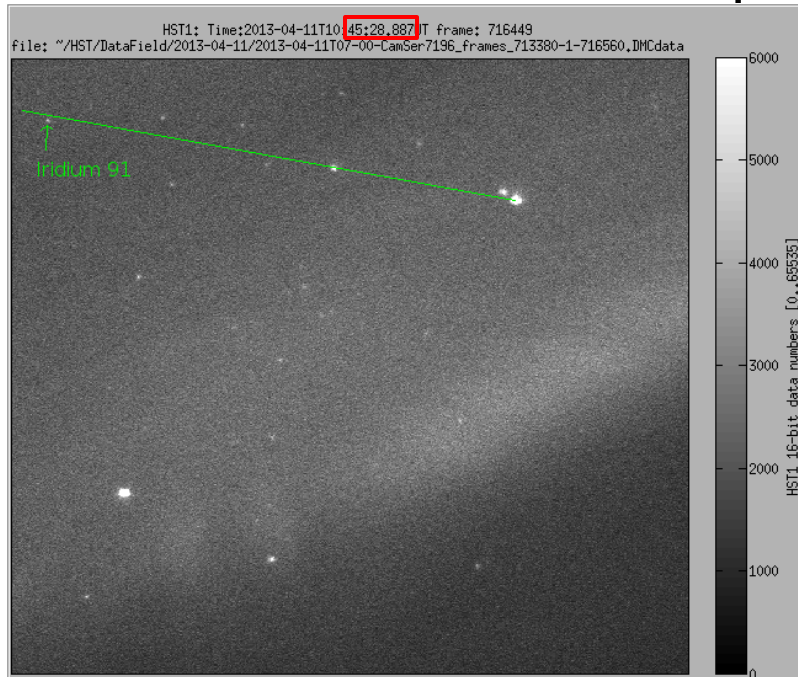
Quantitative Temporal Analysis (2)

- Can use known point sources for registration
 - Iridium, GPS, ISS, etc.



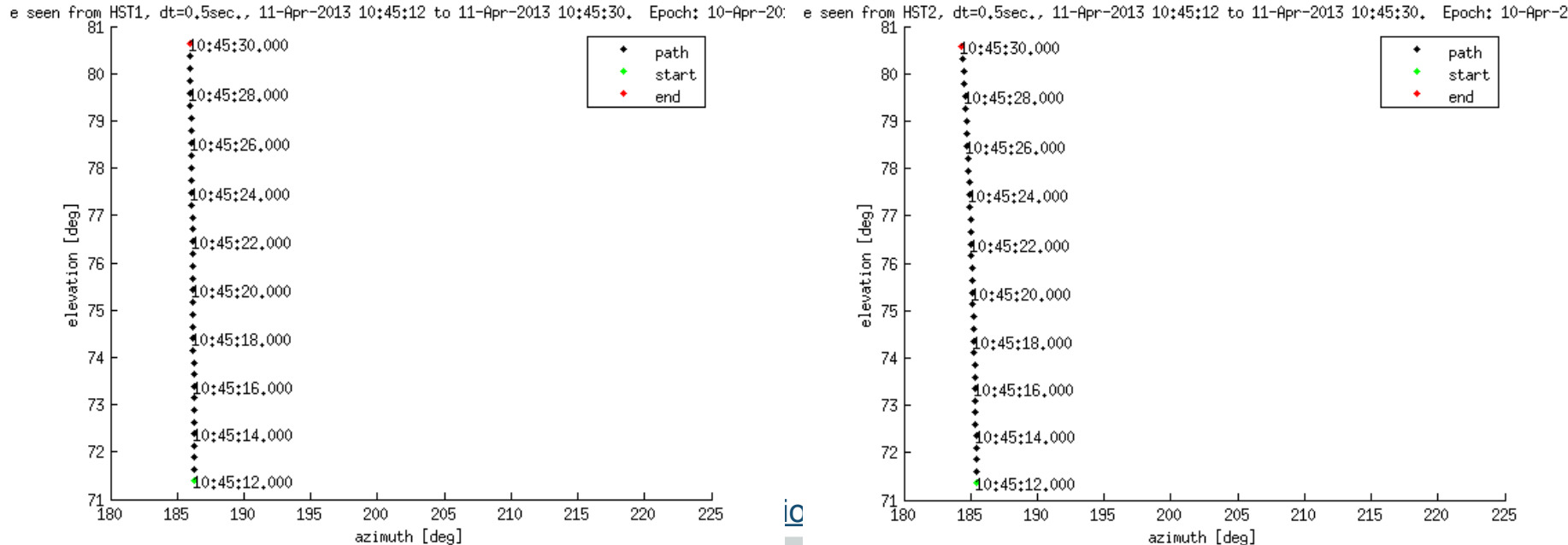
Quantitative Temporal Analysis (3)

- Can use known point sources for registration
 - Discovered time slips due to camera glitches



Quantitative Temporal Analysis (4)

- Can use known point sources for registration
 - “repair” existing datasets



Conclusion

Astrometry.net and satellite temporal calibration code:

<https://github.com/scienceopen>

Work together to make common toolsets

De-duplicate effort

Save on O & M 1.2TB --> 36MB daily data

