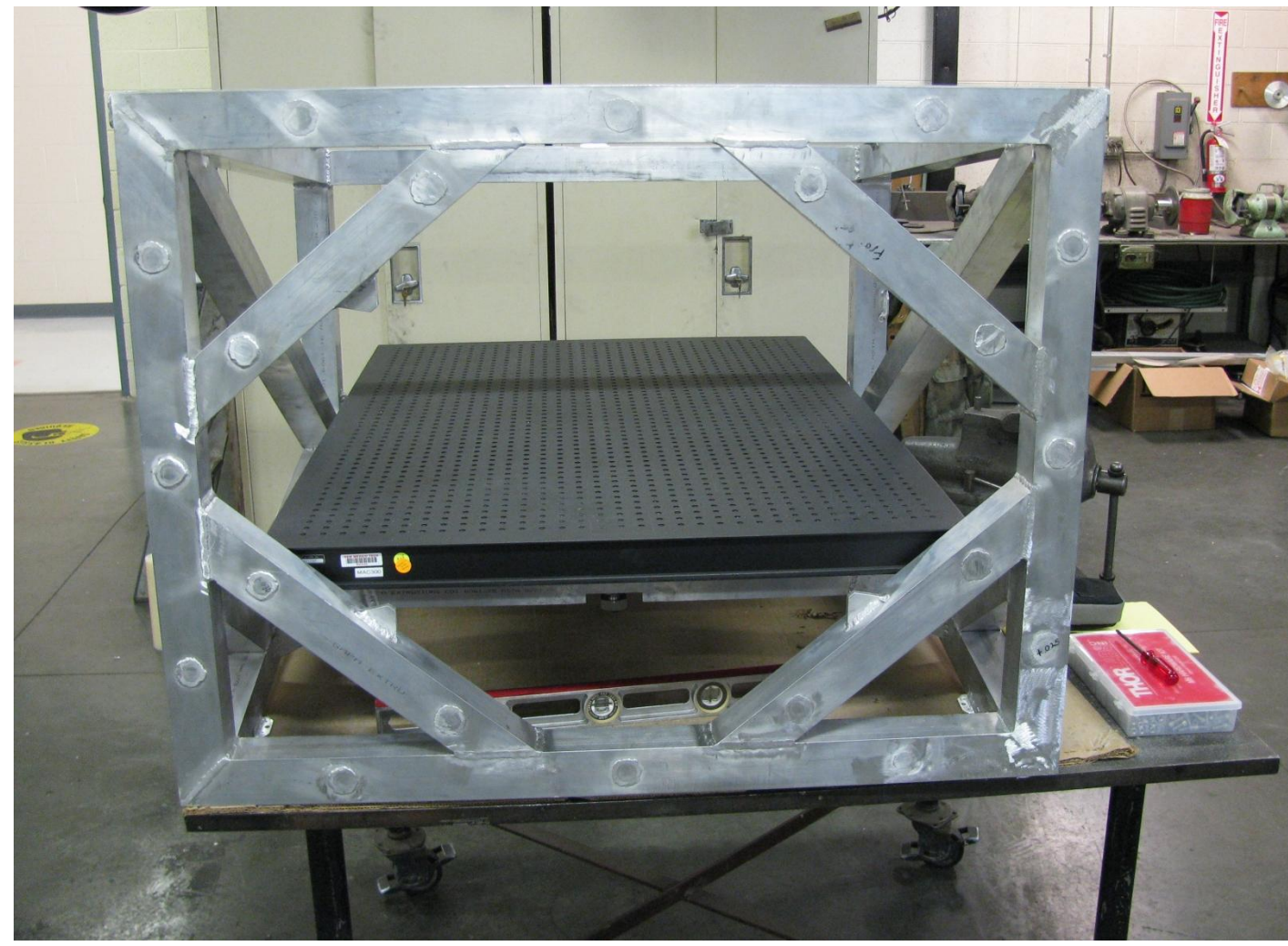


ASSEMBLY AND TESTING OF AMASING, AN APERTURE MASKING INSTRUMENT

Luke Schmidt¹, Colby Jurgenson², Fernando Santoro², Michelle Creech-Eakman¹, Dave Westpfahl¹

¹New Mexico Tech, ²Magdalena Ridge Observatory

AMASING



The aluminum frame has been adjusted so the front face is vertical and the optical table is mounted and placed at its nominal height and leveled.



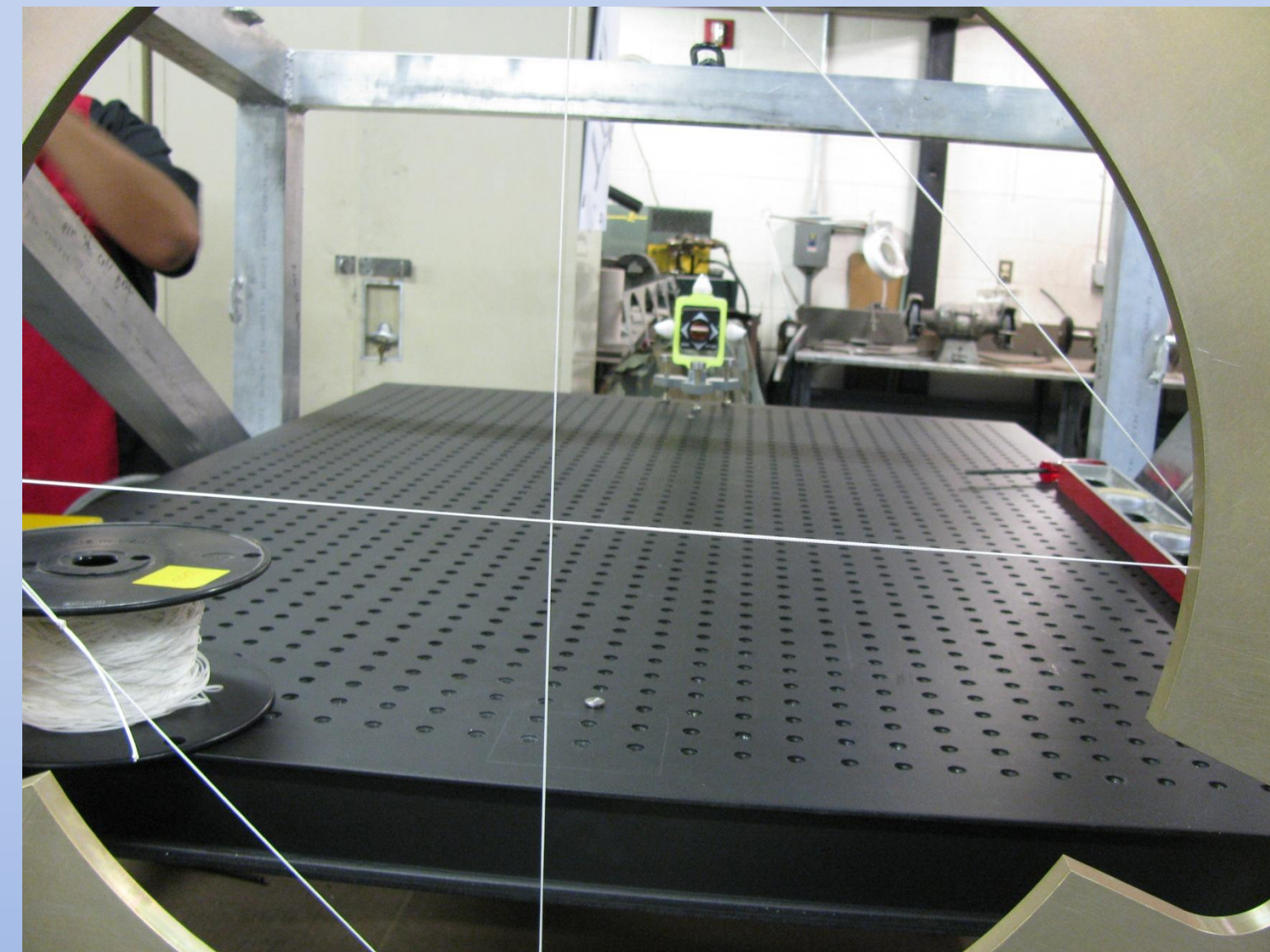
Setting up the total station that is used to sight along the mounting holes of the optical table and then align the mounting plate to the frame.

What is AMASING?

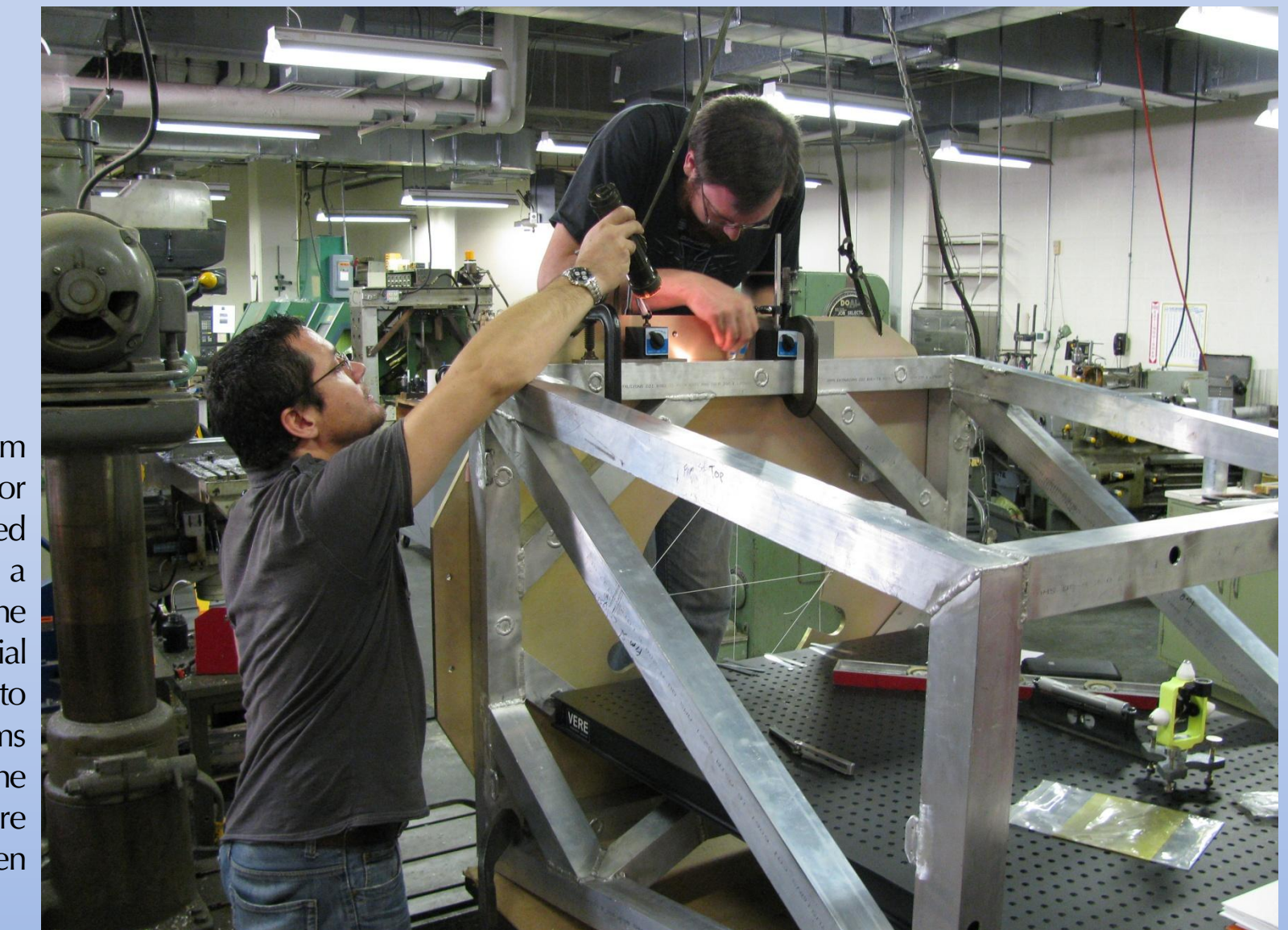
AMASING (Aperture Masking And Speckle ImagiNG) is a high speed aperture masking camera designed for narrow bandwidth observations at optical wavelengths. It includes the choice of several mask options that are placed in the re-imaged pupil. These masks are either non-redundant or semi-redundant and sub-apertures are sized to the coherence length (r_0) of the atmosphere. The resulting image is a two dimensional interferogram, effectively converting the full aperture of the Magdalena Ridge Observatory 2.4 m telescope into a multi element interferometer. Visibility and closure phase information is extracted and can be used to construct diffraction limited images of the target object using standard interferometric image reconstruction techniques. AMASING also includes unique features such as a pupil viewing camera and selectable image rotation angle.



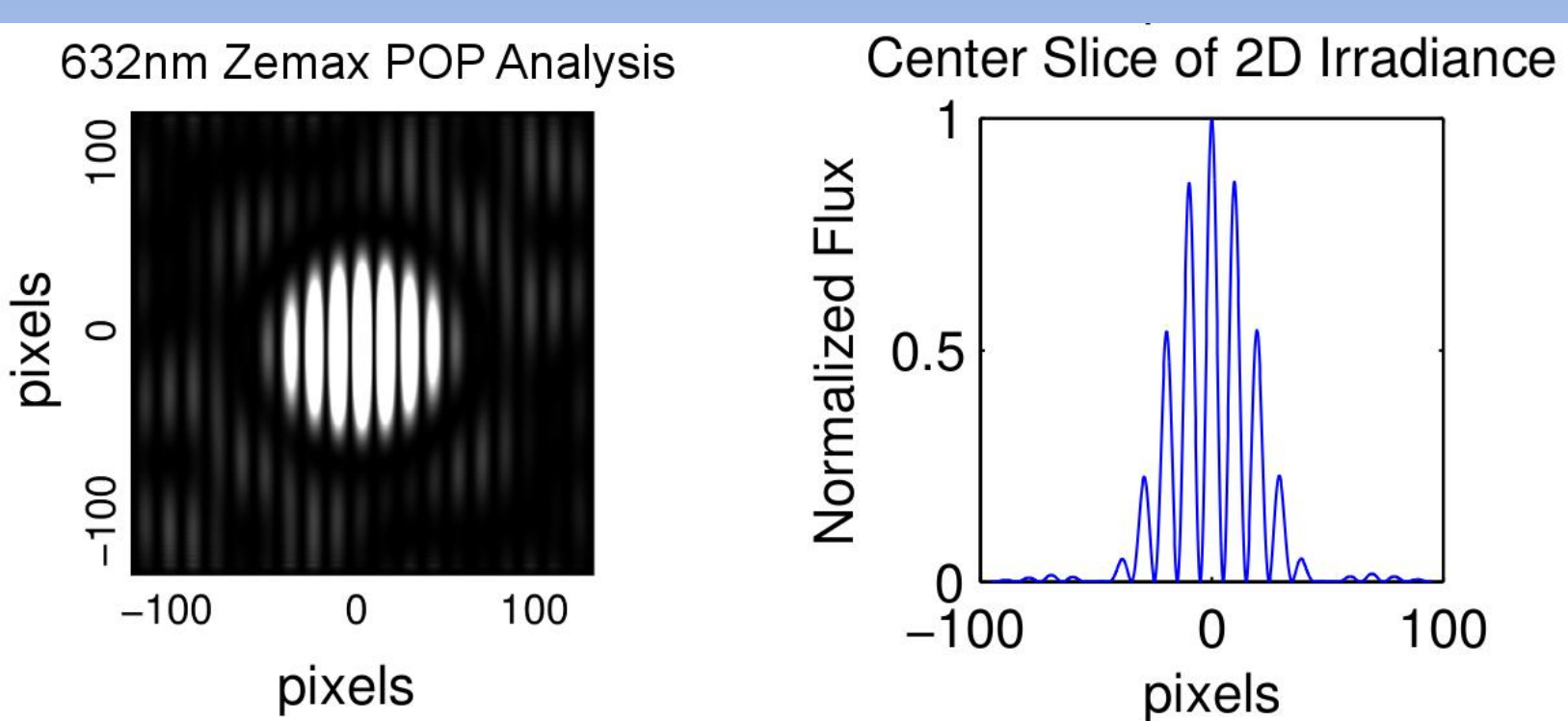
Adjusting the plate in height, left-right position and clocking relative to the frame and optical table.



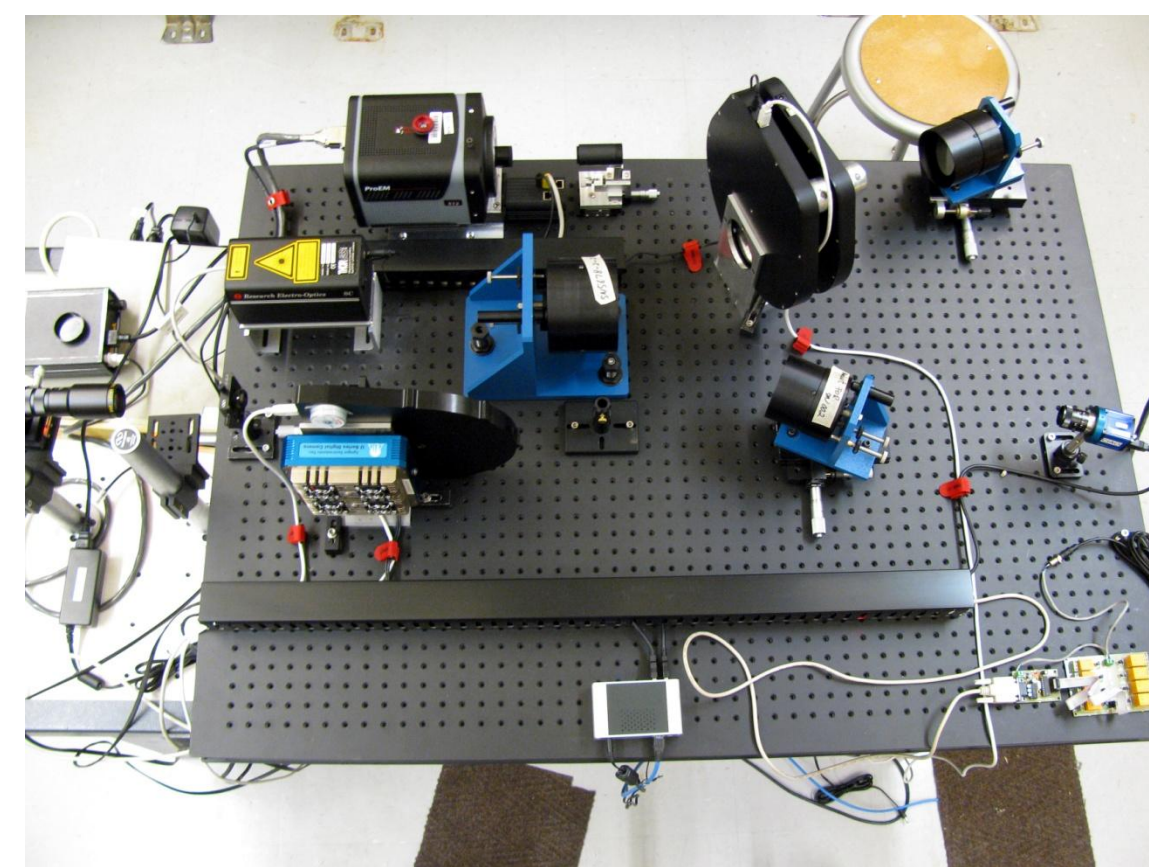
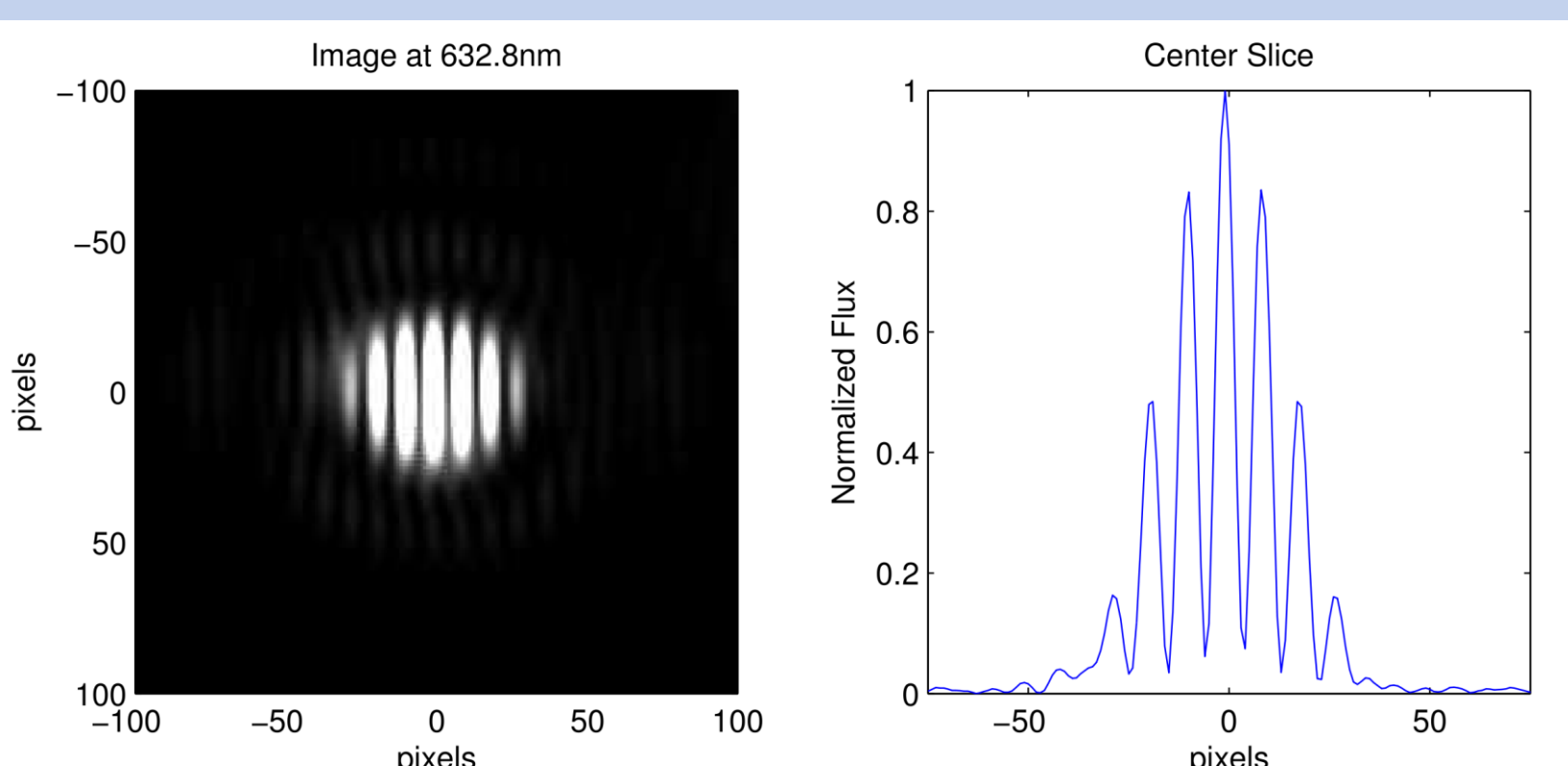
Cross-hair made from string that is wrapped around 3mm screws that were located along the centerlines of the plate during fabrication. The corner cube reflector used to set up the total station is visible in the background.



Welding of the aluminum frame and aluminum inserts for mounting the plate caused slight warping. Each bolt has a custom shim to ensure the plate is not warped. A dial indicator was mounted next to the bolt being adjusted. Shims were placed between the plate and the frame until there was no plate deflection when the bolt was tightened.



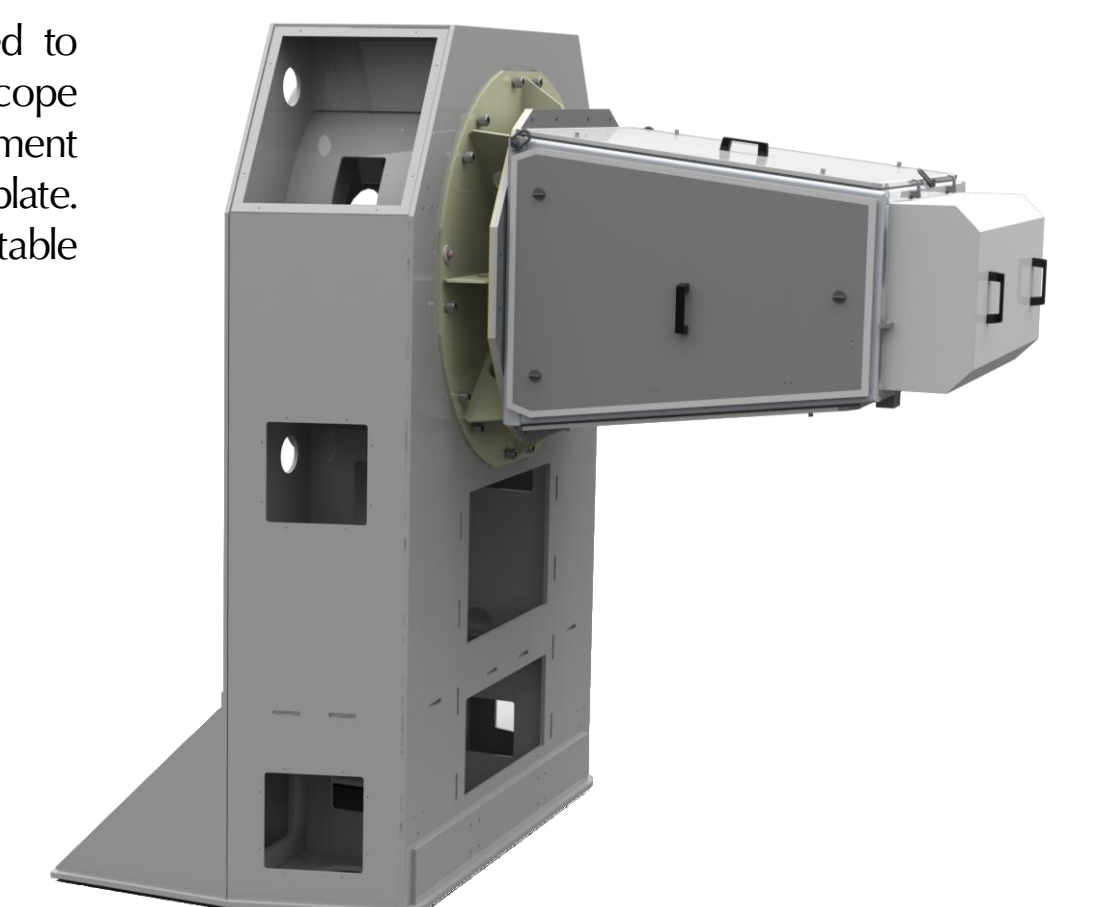
A comparison of ZEMAX physical optics propagation (POP) model (top) and the first laboratory fringes obtained with a simulated telescope and HeNe laser (bottom). The slight asymmetry in the lab image is due to an alignment problem that has since been fixed.



The optics and electronics that make up AMASING are shown mounted on the optical table in the lab. Light from the telescope enters from the left.



The adapter plate is mounted to the Nasmyth port of the telescope first, and then the main instrument structure is mounted to this plate. Alignment pins ensure repeatable installation.



A rendered image of AMASING mounted on one of the Nasmyth ports of the MRO 24m telescope.

Special Thanks to Fernando Santoro, Michael Chavez, Andres Olivares and Chris Salcido for their help with mounting the adapter plate.

What's Next?

Construction of AMASING is almost complete. The structure pictured above was moved to a lab for final assembly, software integration and acceptance testing on Oct 13, 2011. First light is scheduled for November 3 & 4, 2011. For more pictures and updates as commissioning progresses, you can visit <http://infohost.nmt.edu/~lschmidt/index.html>