



Automation of the OAN/SPM 1.5-meter Johnson Telescope for Operations with RATIR

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The RATTEL telescope project

- The telescope was put into operation at the Catalina Station by Harold Johnson in September 1965.
- It was moved to San Pedro Mártir in 1970.
- All the main mechanisms had been automated and brought under computer control before our project began.
- Project goal: Provide a robotic telescope for operations with the RATIR instrument (4-channel optical-NIR imager).

Challenges and solutions

- Pointing: Native performance was poor, errors up to 7 arcminutes.
- Guiding: Open loop tracking was inadequate for 60s exposures.
- Solution:
 - Twin finders are used to point in closed-loop and guide short exposures.
 - Both pointing and guiding based upon astrometry.net software (running locally with a tuned database).
 - The finders are focussed automatically, using the FWHM of the image autocorrelation function.

Performance

- Pointing is done iteratively:
 - Upon arriving at a field, images are taken with the finders, and corrections applied.
 - The final accuracy is 15 arcseconds rms, limited by residual flexure between finders and main telescope.
- Guiding
 - Images are taken repeatedly with the finders and the telescope's motion corrected appropriately.
 - Adequate for images up to about 60s duration.
 - Eventually, an imaging channel will be used to guide long exposures.