



3.5 2019B Scientific Commissioning Plan

The following tasks will be completed during the 4 2019B nights allocated for MagAO-X commissioning.

Night 1:

- Perform final alignment (see 3.3 Alignment Plan)
- Verify K-mirror alignment of spiders
- Measure and calibrate wavefront control interface
 - tip/tilt offloading matrix to “aeg” TCS command
 - Focus offloading sign and units for “zimir” TCS command
- Verify K-mirror and ADC elevation tracking
- Verify pupil tracking during K-mirror rotation
- Initial closed-loop testing using woofer on a bright ($R < 5$) star
- Initial closed-loop testing using woofer & tweeter on a bright ($R < 5$) star
- Begin taking on-sky response matrices if needed
- Once closed-loop testing begins, LOWFS+NCPC DM control verification begins

Night 2:

- Complete taking on-sky response matrices (if needed)
- Verify system calibration
- Once LOWFS+NCPC DM control is verified, commence focusing the science channel in parallel with other tasks.
- Once system calibration is stable, begin Strehl performance characterization
 - In “bump-mask” pupil
 - Use list of stars with known riz photometry
 - Measure Strehl in all bandpasses for a range of star magnitudes (0 to 10th mag)
 - Take at least one data set with enough S/N for a throughput measurement in each bandpass

Night 3:

- Complete Strehl and throughput characterization
- Astrometric characterization.
 - Image the Theta-1 Ori B field in each bandpass
 - Image Theta-1 Ori C to characterize stability and resolution

Night 4:

- Commence vAPP Coronagraph Characterization



**MagAO-X Pre-Ship Review
2019B Scientific Commissioning Plan**

Doc#: MagAOX-002
Date: 2019-Aug-23
Status: Rev. 0.0
Page: 1 of 1

- Measure dark hole contrast on a range of guide stars
- In the H-alpha SDI mode
- In at least one broad band-pass (likely z)
- Observe several known systems with bright companions within the dark hole to verify vAPP detection capability.