# Removing MagAO-X from the Telescope

**XWCL**

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## Contents



This procedure describes how to remove the MagAO-X instrument on the Magellan Clay Telescope.

Estimated Time to Complete: 2 hours

This document can be downloaded as a PDF: Removing MagAO-X from the Telescope

## 1 Initial Conditions

- Instrument on Magellan Clay Nasmyth Platform, operating.

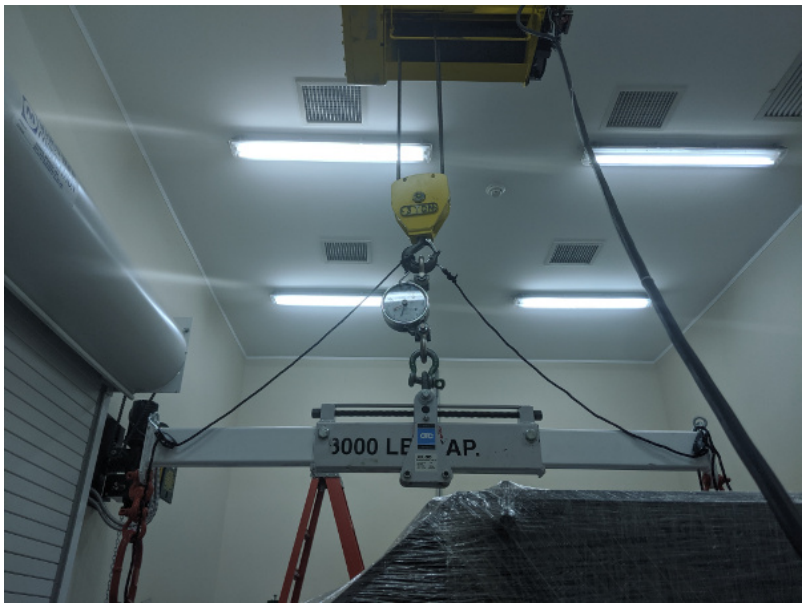
## 2 Shutdown

- At the end of the last night, have the TO position the telescope so that the NASE platform faces the elevator.
- Power down all of MagAO-X
  - Ensure that `stagepickoff` is in the `tel` position.
  - Place the k-mirror at 0 degrees.
  - Select the Ha-narrow and CH4-875 filters on fwsci1/2
  - turn off power for all devices on MagAO-X following the regular shutdown procedure.
  - use the `shutdown -h now` command to halt both RTC and ICC

  - once the computers are off, turn off all things in the rack.
- Remove blower hose and cover the hole.
- Remove all cables
  - See detailed procedure for removing MEMS DM cables
- Electronics Rack
  - Ensure that roll-out shelves are restrained
  - Power off the UPS located in the electronics rack
  - Close and lock doors
  - Tape keys down
- Instrument
  - Install window cover
  - Remove eyepiece
  - Remove bumpers and pusher hardware
  - Remove air connection
  - Remove the PEPS II
  - Tape over any exposed holes (from cables, etc)
  - Secure any loose cables
  - Shrink wrap the instrument
  - Install solar blanket over shrink wrap
- Cart and Rigging
  - Verify all cart hardware is in-hand
  - Verify two wire harnesses are in-hand

# 3 Rig Onto Cart

- Lower table legs onto the casters by turning the 16 leveling bolts, and remove the metal pads
- Roll the instrument away from the telescope
- Assemble the cart around the instrument
  - **CAUTION:** be careful to not bump the legs with the cart
- The 8 large bolts on the cart should just be touching the washers, but the washers should still spin.
- Attach the lifting wire-harness to each side of the cart
- Attach the load spreader with straight extensions to the crane, using a crane scale



*The load spreader attached to the crane for lifting the cart*

- Place the load spreader in the center position (the cart is symmetric)
- Lift the load spreader, and position it over the instrument
- Being careful to not bump the instrument, lower the load spreader and attach the lifting harness D rings. Use 4x shackles to extend the length to reach the cart on the floor.

*Lifting harnesses attached with shackle extensions*

- Position a person at each end of the cart

  **CAUTION:** Do not allow the cart to bump the legs or the table uncontrolled

- Slowly lift the cart (**320 lbs**) until it is touching the bottom of the table

*The cart being lifted to the bottom of the table.*

- Install the 4 bolts attaching the cart to the table. Use only the 4 outboard bolts. Loosen bolts on the cart as needed to adjust.
- Once the cart is bolted to the table bottom, while **320 lbs** is still on the crane, tighten all cart bolts. Do not over-tighten: make 1/4 turn after the washers are no longer free. This is to avoid excessive stress on the table.
- Reposition the load spreader center to the instrument + cart position marked on it.
- Install the triangle stabilizing ropes between the crane hook and the lifting fixture in accordance with the below figure. Tighten, but do not cause them to pick the load.


*The triangle stabilizing ropes should be tight, but not become the lifting point for the load.*

- Ensure that there is room to move the legs out from under the table towards the telescope.
- Position a person at each end of the cart to stabilize it during the lift.

- Position two people to remove the legs from under the table
- Lift the table off the legs.
- Move the legs out from under the table.


*The cart and instrument ready to be set down on the wheels, with legs out of the way.*

- Set the cart down on its wheels.
- Move MagAO-X onto the elevator, and remove from the dome
- When cart is on concrete outside Clay, move very slowly to avoid excessive vibration

# 4 Transport MagAO-X To The Clean room

- Ensure that the lift gate at the summit has been adjusted for slow smooth operation as is done for the asm
- Push MagAO-X onto the lift-gate
- Raise the lift-gate to the height of the flatbed truck
- Move MagAO-X onto the truck, using the come-along

*MagAO-X is loaded at the telescope using the lift gate, adjusted for slow operation.*

- Secure the instrument by strapping the cart down at 4 points as illustrated in the below figure.

*MagAO-X will be strapped to the Isuzu.*

- Slowly drive the truck to the cleanroom
- Back the flatbed truck up to the lift gate.
- Next, using the come-along, carefully move MagAO-X onto the lift gate.
- Move MagAO-X into the cleanroom.
- Return to the top with the flatbed and move the legs to the cleanroom.
- Placed on 2 dollies as in the below image.

*Legs on 2 dollies placed in the middle of the table under each lower long tie bar (away from basket).*

- Move the legs to the flatbed and strap them down.

*Legs strapped to the truck.*

# 5 Transport Electronics

- remove the earthquake bar
- Move the rack to the lift gate, and load it on the pickup.
- place foam between the rack side and the truck to protect cable connectors


*The electronics rack has many delicate connectors on the side.*

- strap the rack securely to the truck

*The rack on a truck for transport.*

- drive the truck to the cleanroom
- unload the rack using the lift gate

# 6 Remove AOC from Control Room

- power down AOC and COC
- remove monitors and pack
- move AOC and COC to cleanroom.