

MMTO Conversion Internal Technical Memorandum #00-3



**Smithsonian Institution &
The University of Arizona***

MMT f/9 Secondary

Mirror Installation into Cell

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(derived from Install3 dated 30-Nov-99)

MMT f/9 Secondary Mirror Installation Into Cell

Preparation:

- i. Bond all pads onto the secondary.
Lateral and axial actuator attachments.
3 axial positioning rod pads
3 axial position measurement pads (if different from the axial positioning pads). Note, this function is provided by the mirror surface height reference tool P/N TBD.
- ii. Cell measurement points
3 pads for measuring mirror height and tilt.
(Two are provided near the face at the North and South Locations. East and West mirror height measurements must be taken from the aft cell flange. Note that the mirror surface height should be determined using tool XXXXX which indexes off the face and the face and back plate OD's and provides a surface that is 1.0" behind the mirror vertex.)
4 locations from which to measure radial position
These are provided by the North/South Reference blocks from which radial and tangential measurements to the N/S rods can be made.
2 locations from which to measure clocking
Accomplished using the N/S blocks and the Mirror mounted rods.
a surface from which to measure the lateral support plane.
The aft flange provides this reference surface.
- iii. Mirror lateral supports:
Install the lateral support rods and associated hardware on the mirror. Set the working height of the lateral support connection on each rod to within 0.005" of its nominal position defined in dwg ??????. Note that two long rods must be

installed at the North and South positions for the clocking measurement.

Miscellaneous:

1. We need a way of measuring from a Z height datum to the C/L of each lateral actuator ± 0.005 " (ref 4.0).
 2. We need pressure relief valves on all manifolds.
1. Orient Cell Nadir Pointing, extend the three axial swivel pads so they will support the secondary when it is placed into the cell.
 2. Lower the secondary mirror into the cell resting it on the swivel pads.
 3. Position the mirror in X, Y, Z, Tiltx, Tilty and clocking so that it is centered in the cell to ± 0.003 .

The height should be set to the nominal value of dwg ??????? to within ± 0.001 .

Tiltx and tilty are acceptable if the depth measurement at each of the three height measurement ports are within 0.001 of the nominal value.

Clocking must be to within 0.003.

Note: The tolerances specified at this step are not positioning requirements for the secondary mirror which are not as stringent. Tight tolerances here are specified because they are achievable and because it improves repeatability on re-installation.

4. Install all lateral actuators. The centerline of each actuator must be in the CG plane of the mirror to within 0.005" .

Notes: The CG plane is defined by drawing ??????? based on a Calculated CG location. This calculation is not accurate to ± 0.005 " . It is still essential that each actuator be positioned to within 0.005" of the specified height to

ensure that the angle of the support force relative to the CG plane is acceptably small (small Fz component).

5. Check the mirror position (optional) then attach the tangent rod assemblies.
6. Recheck the mirror position.
7. Attach the axial actuators.
8. Check the mirror position (optional) then attach the axial positioning rod assemblies.
9. Recheck the mirror position.
10. Lateral Support System Checkout and CG Verification.
 - 10.1 Mount the secondary cell on a rotatable platform.
 - 10.2 Rotate 90 degrees to horizon pointing (telescope) +/-1 arc-minute.
 - 10.3 Manually (or via the lateral support control system) set the Lateral support pressure to obtain a zero reading from the lateral tangent rod load cells (the axial support system pressure must be zero).
 - 10.4 Record tangent rod and axial support rod load cell readings.

Load Cell Readings, Horizon Pointing

Tangent Rod A _____
Tangent Rod B _____
Tangent Rod C _____

Axial Support Rod A _____
Axial Support Rod B _____
Axial Support Rod C _____

- 10.5 Compute the mirror CG location from the load cell readings:

Axial Support Rod B _____
Axial Support Rod C _____

12.3 The lateral rod force magnitudes must each be less than 0.25 lbs.