

ARCS PROCEDURE:	AERI MIRROR OBSTRUCTION REMOVAL AND/OR CLEANING	PRO(AERI)-011.000
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AERI Mirror Obstruction Removal and/or Cleaning

I. Purpose:

We are trying to figure out why there is constant red flags on the LW & SW responsivity on the AERI. This is a troubleshooting procedure to use when AERI red-flags on the LW and SW responsivity become prevalent. The object is to check for obstructions (wasp nest, dead birds, etc.). A) if the obstruction can be removed, do not clean the mirror. B) If there is no obstruction, clean the mirror. Previously, Connor noticed some anomalous behavior from one for the AERIs at SGP. The SW responsivity kept successively getting worse and worse in fairly abrupt jumps. Mirror cleaning did nothing to resolve the matter. Ultimately, during a mirror cleaning by a site technician, it was noticed that a mud dauber nest had been built in the opening to the hot blackbody and was obstructing the view of the blackbody. This problem isn't easy to diagnose from the data and such an obstruction isn't easily visible while the system is operational. You pretty much have to remove the front end as if preparing for a mirror cleaning to get a view of the blackbody entrances. Anyway, it is possible that something similar is happening at Nauru. To verify it for sure will require that we do the mirror cleaning procedure as outlined in the AERI Users Manual provided previously and still present on site. Although not really too difficult, the mirror cleaning procedure can be a bit intimidating at first and is really a two-person task. Additionally, while the front-end with the mirror has been removed, visually look up into both blackbody cylinders, examining them for foreign objects. It may help to use a small elbow mirror and flashlight. Before actually doing any of this, please read the relevant portion of the User's Manual and ask questions for clarification if necessary.

Connor is available to help, especially if you do the procedure in the morning.

II. Cautions and Hazards:

- Make sure power is turned off to the AERI before performing this procedure.
- Do NOT touch the mirror.

III. Requirements:

None.

IV. Procedure:

A. Steps:

1. Turn off or unplug the large AERI BLOWER located in the antechamber.

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2. Shut down AERI according to AERI Shutdown Procedure (see MAN(AERI)-002.000 Operations and Maintenance Manual for the AERI).
3. Remove the right-hand side insulative panel separating the antechamber from the inside of the AERI Shelter.
4. While one person supports the mirror motor assembly, have another person unfasten the four hex-head screws which fasten the trapezoidal mount plate of the mirror motor assembly to the front end. (Don't loosen one screw very far before going to the next screw. Instead, loosen each one just a tiny bit, a half-turn or maybe on full turn. Then loosen each screw another turn or so. Repeat until all four screws holding the trapezoidal mount plate are removed.)
5. Carefully remove the mirror motor assembly from the front end by supporting it and drawing it straight back out. The assembly has a thin sheet metal tube inside which shouldn't be bent. (If it gets a tiny bit bent out of round, just carefully bend it back with your hand but don't touch the mirror while doing so.)
6. While one person is holding the mirror motor assembly, the other person can look up into the blackbody openings, maybe with a small mirror and flashlight. The insides of the blackbodies are very black. If everything is okay, it should be almost impossible to discern any detail inside the blackbody.
7. If, however, some kind of debris or obstruction is present, either in the opening of the blackbody or in the blackbody itself, remove the debris or obstruction.
8. If an obstruction was observed and removed, do not clean the mirror unless some really obvious contamination is present such as serious raindrops or bird droppings. If the mirror is just a bit dusty, leave it alone. It is more important to determine if the problem is due to obstructions at this point.
9. If no obstructions were observed, clean the mirror as described (See MAN(AERI)-002.000 Operations and Maintenance Manual for the AERI):
 - a. Rinse it with a steady stream of water. Position the mirror motor assembly such that the water runs off the mirror but does not drip down along the motor or into the electronics. A small wooden frame exists for this purpose but it is confusing to use. It's just as well to have a person hold the mirror motor assembly.
 - b. Rinse it with a steady stream of isopropyl alcohol. A supply was left for this purpose by the recent Wisconsin repair team.

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- c. Repeat a) and b) until the mirror looks cleaner. Finish with a water rinse. **At no point should the mirror surface be touched, rubbed, or scrubbed.** Only the water or alcohol should contact the mirror.
10. Replace the mirror motor assembly by sliding it directly forward into the front-end. No side-to-side motion. Once the assembly has slid into place, press the assembly up and in to make sure the trapezoidal mount plate is registered upwards. (That is, it should be making firm contact at the top and sides.) As one person supports the mirror mount assembly, the other should replace the hex-head fasteners. Don't tighten any one fastener all the way right off. Leave each fastener just a bit loose until all four have been replaced. Then one by one, tighten each until all four have been replaced. Then repeat for each fastener, turning just a tad more.
11. Replace the insulative panel.
12. Turn on the AERI and AERI Blower.

V. References:

MAN(AERI)-002.000 Operations and Maintenance Manual for the AERI

VI. Attachments:

None