Mt. Hamilton Optics Cleaning Trip

David Hilyard and Brian DuPraw

2/13/13

Shane 120” Primary

The 120” primary was dustier than we had been seeing lately, which may be due in part to its not having been CO2 cleaned in 4 months. This, in turn, was due to an EH&S concern that the scaffolding system used in the process was inadequate. On the plus side, there weren’t too many oil spots. There were a few bird “strikes,” though.

We measured the reflectivity to be 86% in the red and 82% in the blue, relative to the reference mirror.

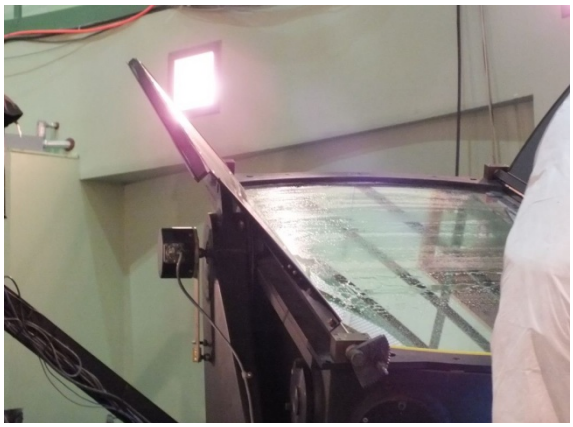
Coude Secondary

The Coude secondary mirror seemed to have developed new coating blemishes, or existing ones had grown larger. Attempts to clean small regions showed it to be ineffective. The mirror was measured to be 88% reflective in the red and 87% in the blue.



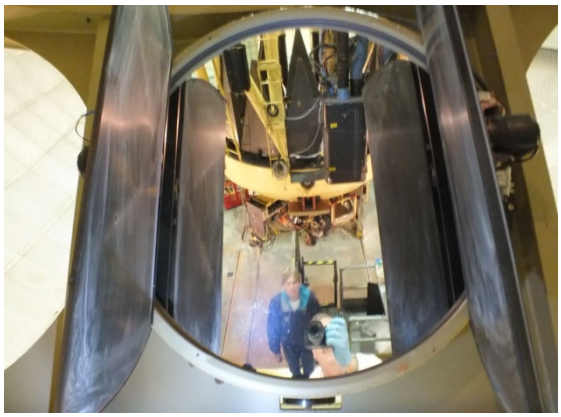

Coude #3

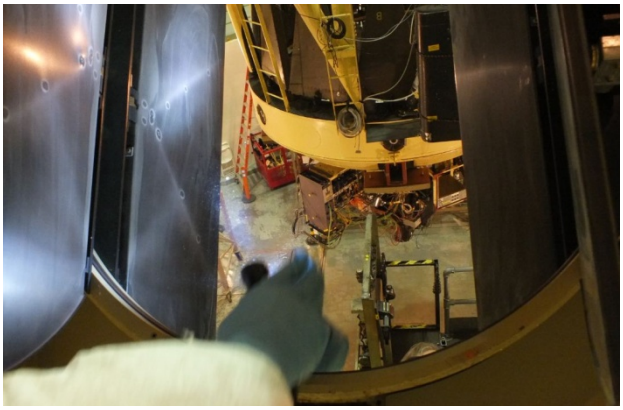
Coude mirror #3 was on the dome floor. It was dusty so Dave cleaned it with Orvus/acetone/H2O, then just H2O, followed by ethanol and then acetone. It was very cleanable, in that it was robust. We measured 91% reflectivity in the red before cleaning and 94% after. With the blue filter it was 86% before and 88% after.

Coude #4

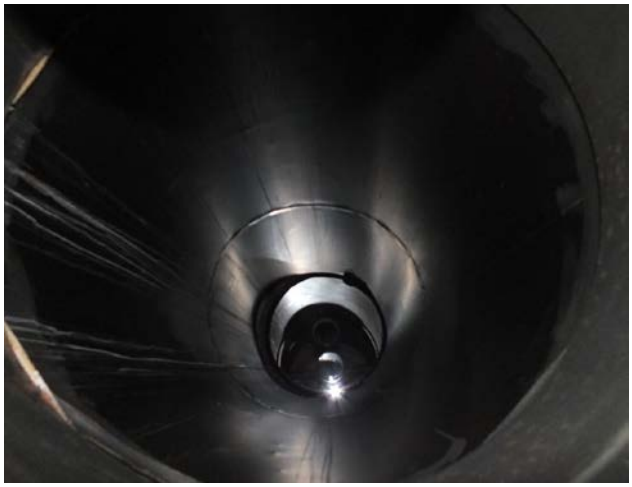
Coude mirror #4 was not too bad. It is downward-facing and it sounds like it hadn't been used too much, lately. We measured 94% reflectivity in the red and 93% in the blue.





CAT Primary

The Coude Auxiliary Telescope's upward facing primary mirror was as dirty as usual, and maybe more so. Access for cleaning is very difficult, as can be seen in the photos. Nevertheless, Dave cleaned it with compressed air, then H2O, then ethanol, then acetone. We made an attempt to get the reflectometer in through the access hole before deciding that it wasn't worth the risk of scratching the mirror.



CAT Primary From Above

CAT Fold Flat

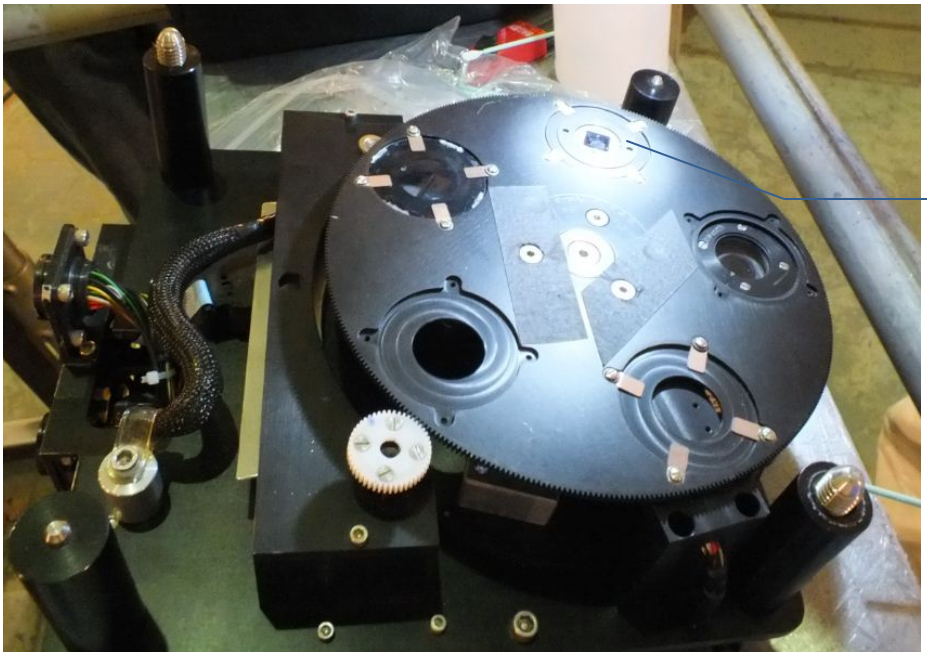
This 45 degree downward facing mirror did not look like it could be improved upon by cleaning, so we left it alone. We did measure the reflectivity to be 86% in the red and 84% in the blue.

CAT Secondary

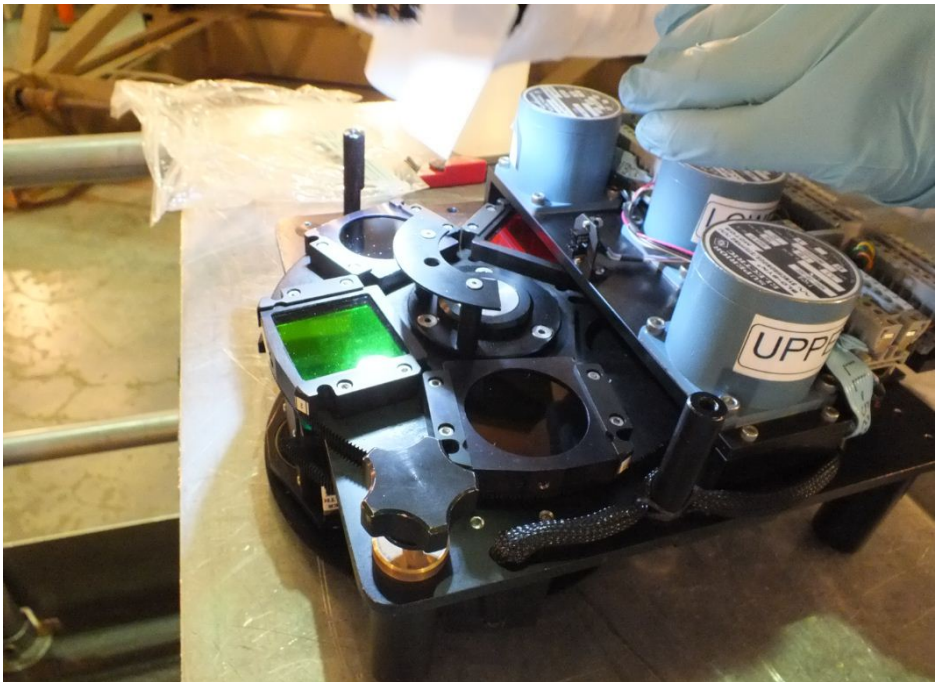
The downward-facing secondary was not cleaned. We did measure 48% reflectivity with the red filter and 69% with the blue. These low numbers could be due to the curvature of the mirror exceeding the limits of the reflectometer (it's always low).

KAST Waveplate

This optic was a film, rather than being glass, and was installed in the back side of the fixture that holds the red side filters. It had been flagged because of a large spot covering half the square centimeter or so of the waveplate's total area. Dave tried to clean it with water on a Q-tip but to no avail. It may have been caused by acetone melting the film on a prior cleaning attempt. Dave cleaned other optical surfaces in the accessory, including the glass filters on the other side, which were removed by sliding outward.



Waveplate (Spot Visible)

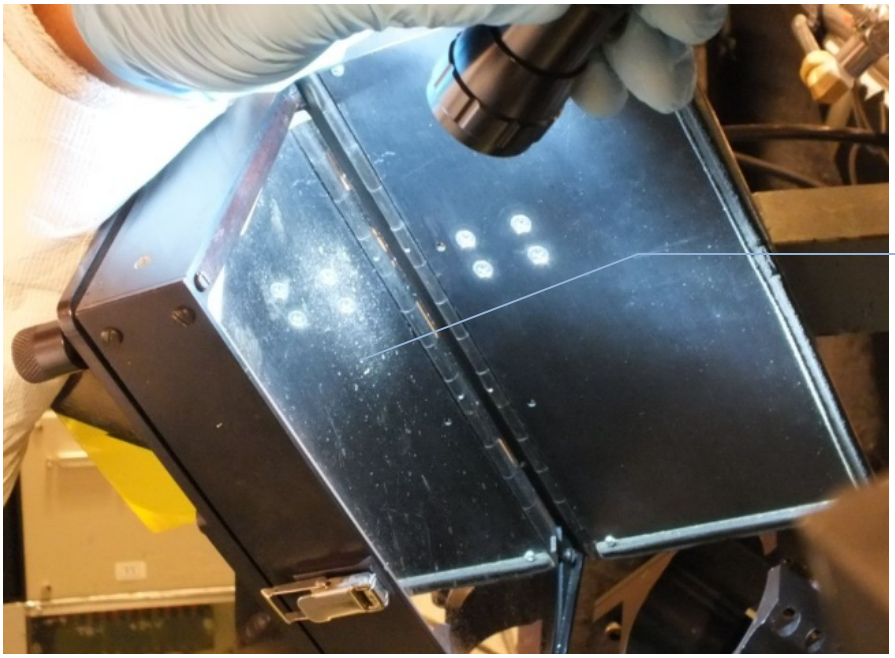


Coude #1

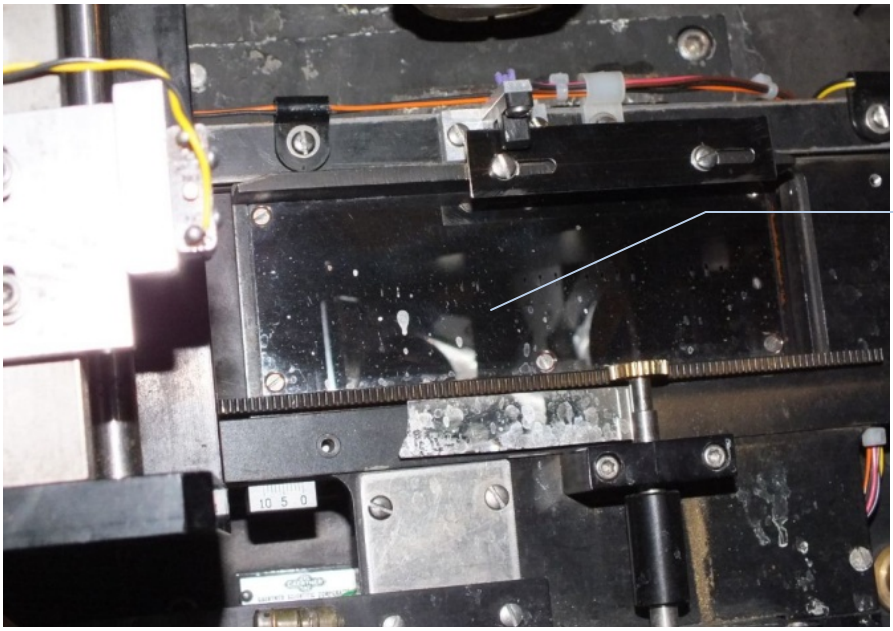
This was the large mirror out in a shed next to the 120” dome. It was very dusty, as can be seen by the finger mark in the dust in the second image. We measured 83% reflectivity in the red and 87% in the blue before cleaning. Dave blotted with Orvus/acetone/H2O then rinsed with more H2O, followed by ethanol and acetone. After the first acetone application it was slow to evaporate; Dave applied another round and it was clean afterwards… it may have just needed more time after the first application, but in any case the second acetone application left it quite clean. We measured 86% reflectivity in the red afterwards and 93% in the blue.

Slit Room

Dave cleaned the pick-off mirror in the slit room… it didn't sleek but it didn't get much cleaner, either. What was left was in the coating. He also tried cleaning the aperture plate but there were water spots from a leak event that wouldn't come off. He also blew off the filters in a wheel using canned air.



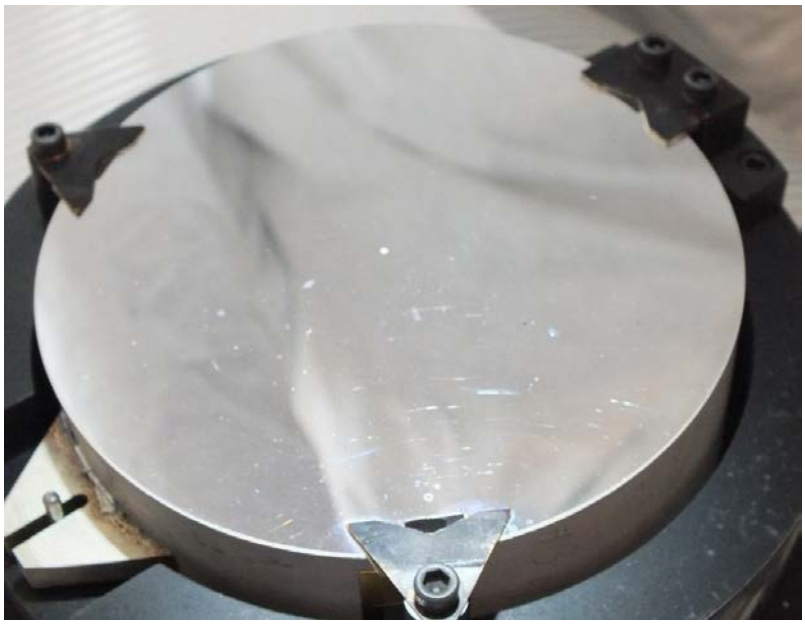
Pick Off Mirror (After Cleaning)



Aperture Plate with Water Spots

KAST Red Collimator

The KAST red collimator was brought into the Gemini room of the dome, where we often clean filters, et cetera. It was a little sleeky, but Dave was able to clean dust off it without adding to them. The dot in the center of the mirror is for alignment.



Summary

On this trip we encountered a lot of dusty optics but few surprises. The deteriorating condition of the Coude Secondary and the water spots on the aperture plate in the slit room stood out for me.