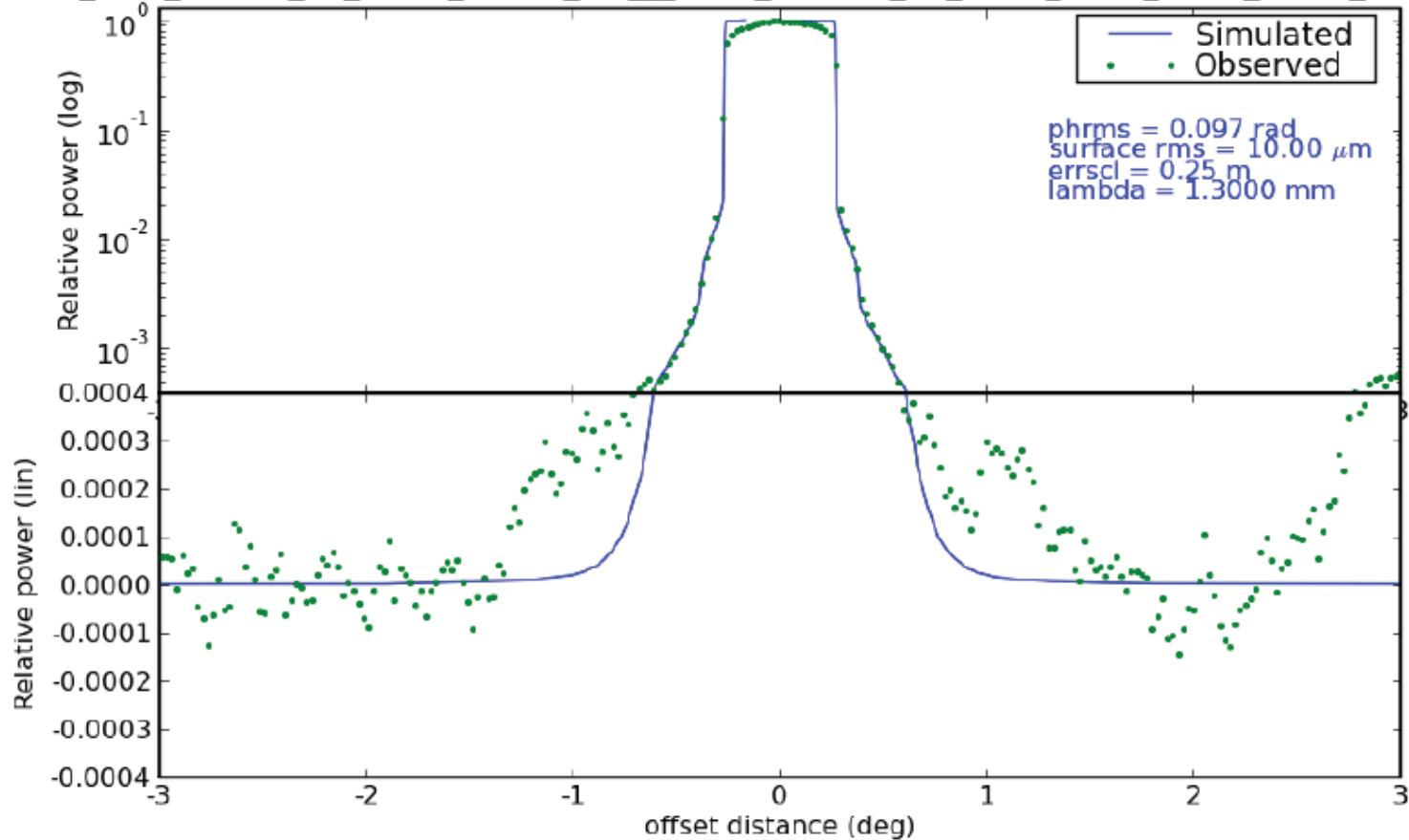


Summary

1. When we measured the effective rms of the surface on scales of less than a meter using scans of the moon we found a larger value than expected.
2. Doing “astro-holography” – interferometric beam scans with a planet as the source – showed that there were indeed errors.
3. When DV02 was brought down for servicing this was confirmed and the surface was readjusted. After a few weeks back at the high site it looked as if errors were appearing again.
4. DV01 was brought down and it was again confirmed with “tower” holography that there were significant errors. Rms surface contribution was about 13 microns.
5. Investigations showed that some of the nuts where the adjusters are attached to the backing structure were loose. More importantly that the ones where there were errors had been over-tightened and that this had damaged the locking mechanism
6. The damaged ones have been replaced and we will monitor DV01 after it goes back up
7. The other Vertex antennas will have to be fixed at some future time.

Moon Scan – measures far-out sidelobes

n_0.097_0.25_0.0013_45_32.37_vertex_uid__A002_X8c309_X1_DV01_N601_Moon_32.37_band6_45de

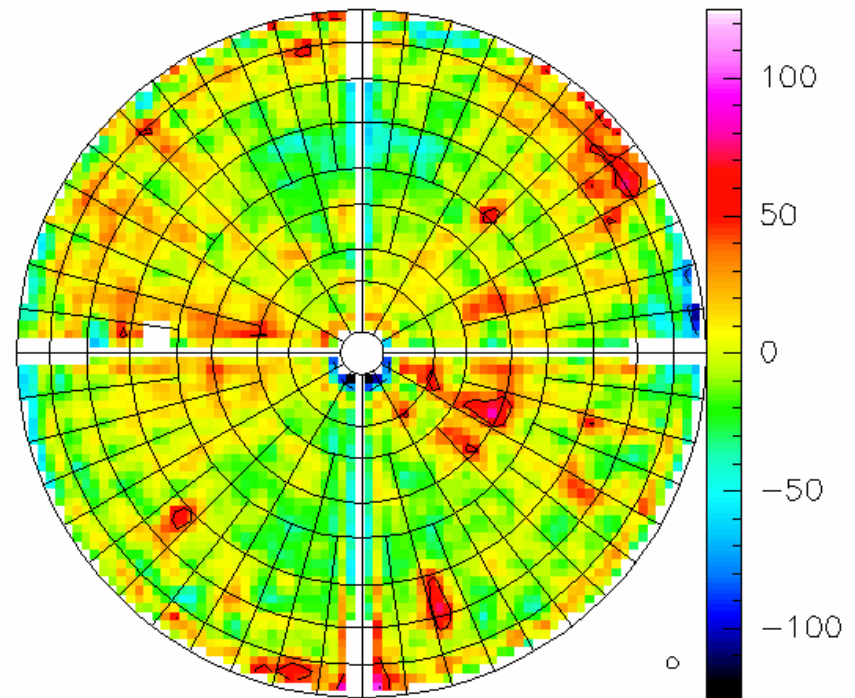
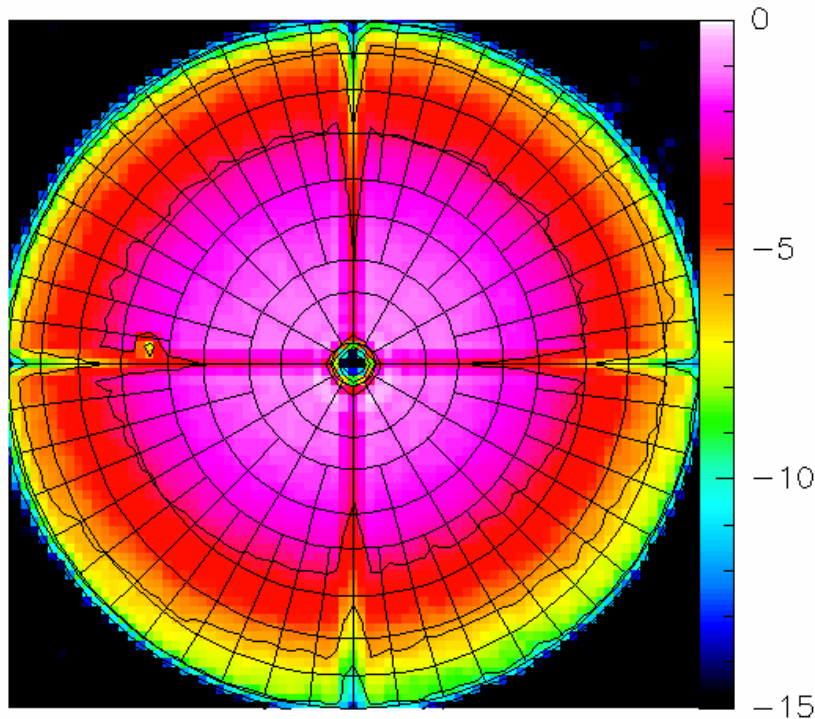


- DV01 at AOS 19 August “astro-holography”

```

uid A002 X10d81c X3dd - uid A002 X10d81c X3dd Far Field No Grav No Temp
RF: Uncal.C - 20-AUG-2010 02:00:09 - evillard@gns.tfsd.st - DV01 - ALMA/Vertex 12-m
Am: Rel.(B) Saturn OSF scans 1 to 1 19-AUG-2010 21:37UT El: 43.30
Ph: Rel.(B)
rms Pha. Edge taper = 13.48x 16.25 dB - offset X= 0.18 Y= 0.20 m
12 4.24 Focus offsets (X,Y,Z) = -0.08 -0.29 0.19 mm; Astigmatism = 10.0 μm ( 177.4deg.)
Phase rms (unweighted)= 0.071 (weighted)= 0.070 radians
Surface rms (unweighted)= 20.00 - (weighted)= 19.84 μm
ηA( 84.243 GHz) = 0.826; ηA(230.0 GHz) = 0.801; ηA(345.0 GHz) = 0.766
S/T( 84.243 GHz)= 29.544 Jy/K; S/T(230GHz)= 30.485 Jy/K; S/T(345 GHz)= 31.873 Jy/K
ηI= 0.830 -ηS= 0.813 -ηP( 84.243 GHz)= 0.995 -ηP(230 GHz)= 0.964 -ηP(345 GHz)= 0.922
Rms/ring: 30.5 17.8 20.5 18.7 17.0 16.9 17.1 25.0
Amplitude (front view) Normal errors (front view)
-15.000 to 0.000 by 3.000 -125.000 to 125.000 by 50.000

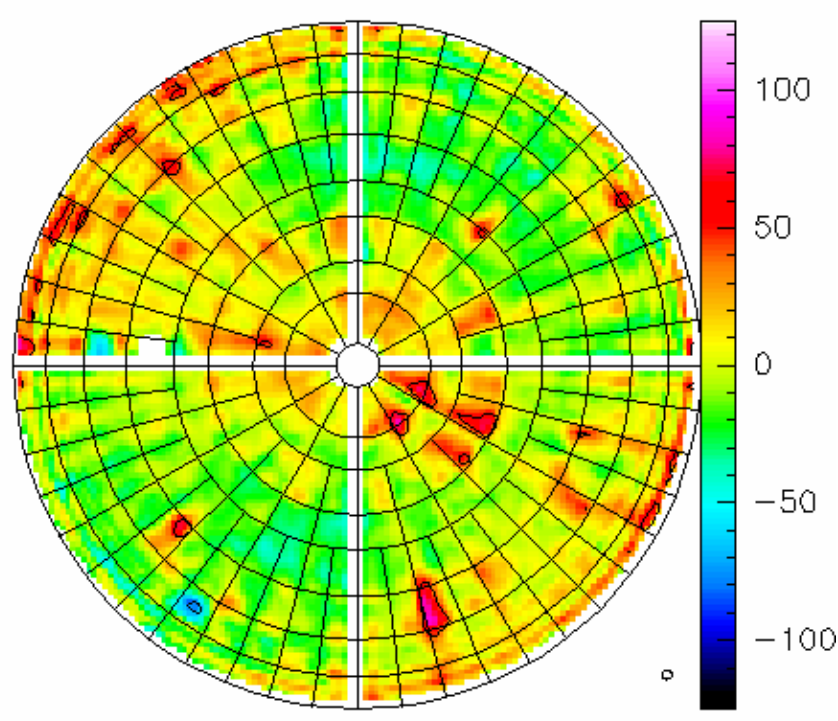
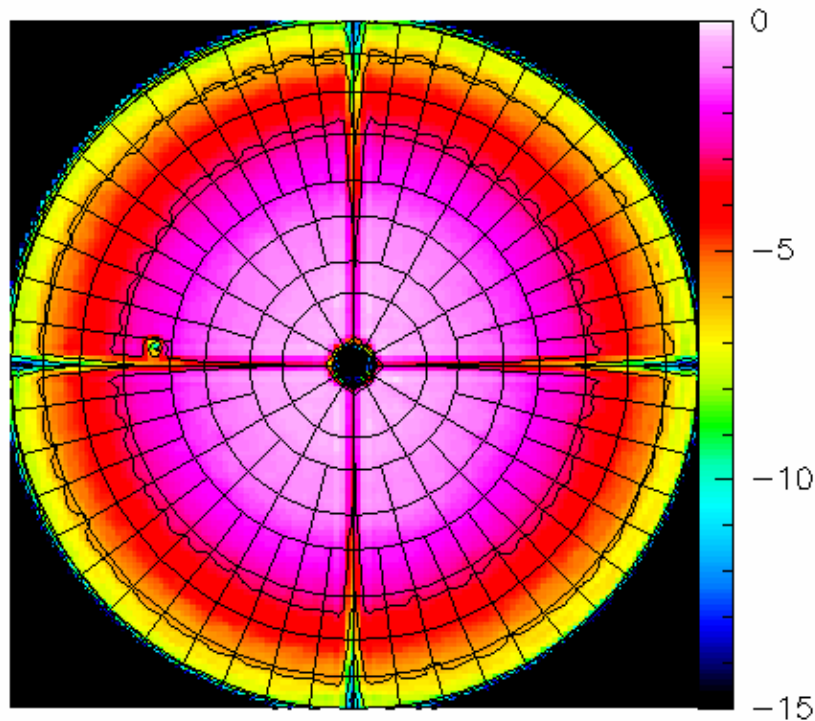
```



- DV01 at OSF 24 Aug 2010 “tower holography”

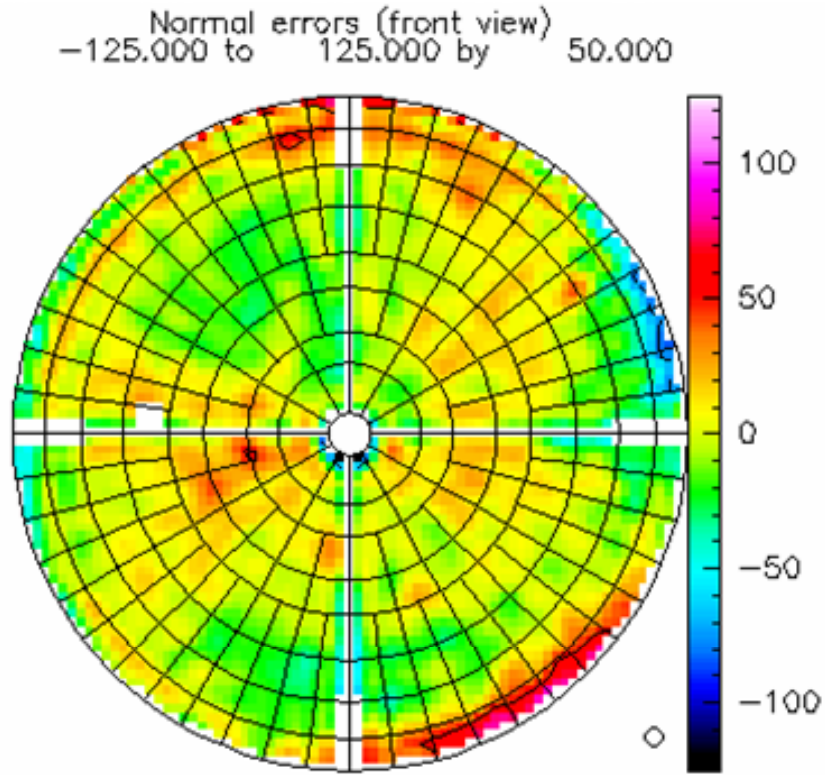
```

uid X67 X213 X1 - uid X67 X213 X1 D=325.993 Gray: 20.0 90.0 No Temp
RF: Uncal: LIC - 24-AUG-2010 06:37:13 - almaop@oper03 - DV01 - ALMA/Vertex 12-m Antenna
Am: Rel.(B) ATFTower OSF scans 2 to 270 24-AUG-2010 06:29UT El: 9.74
Ph: Rel.(B)
rms Pha. Edge taper = 15.31x 15.15 dB - offset X= -0.02 Y= -0.06 m
12 0.401 Focus offsets (X,Y,Z) = 0.62 -0.29 1.49 mm; Astigmatism = 0.0 μm ( 180.0deg.)
Phase rms (unweighted)= 0.078 (weighted)= 0.078 radians
Surface rms (unweighted)= 17.96 - (weighted)= 17.84 μm
ηA(104.020 GHz) = 0.813; ηA(230.0 GHz) = 0.794; ηA(345.0 GHz) = 0.766
S/T(104.020 GHz)= 30.016 Jy/K; S/T(230GHz)= 30.729 Jy/K; S/T(345 GHz)= 31.878 Jy/K
ηI= 0.818 -ηS= 0.827 -ηP(104.020 GHz)= 0.994 -ηP(230 GHz)= 0.971 -ηP(345 GHz)= 0.936
Rms/ring: 15.2 16.2 16.7 14.1 13.7 17.5 16.3 19.2
Amplitude (front view) Normal errors (front view)
-15.000 to 0.000 by 3.000 -125.000 to 125.000 by 50.000
  
```

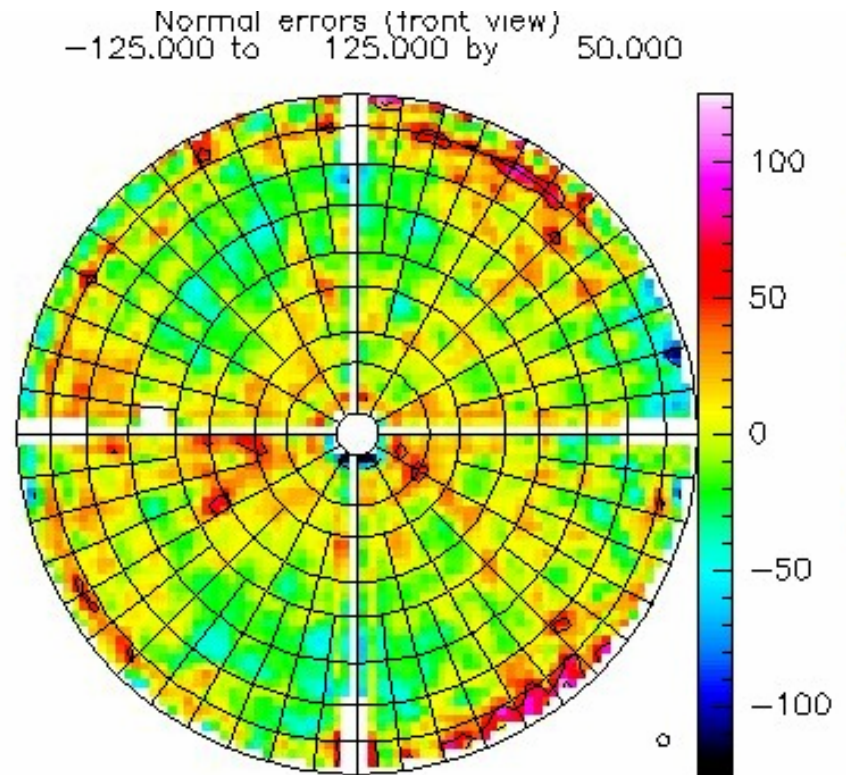


• DV02 04 June 2010 (AOS)

30 Aug 2010 (AOS)



Map has lower resolution



Map somewhat noisy

Diagnosis by Vertex

- The effect appears to have been caused by damage to the anti-slip devices on the bolts that attach the adjusters to the Back-up Structure. It appears that these have been over-tightened.



Rough adjustment Z- Adjuster
(screwed into the BUS)



Overstressed clamp