

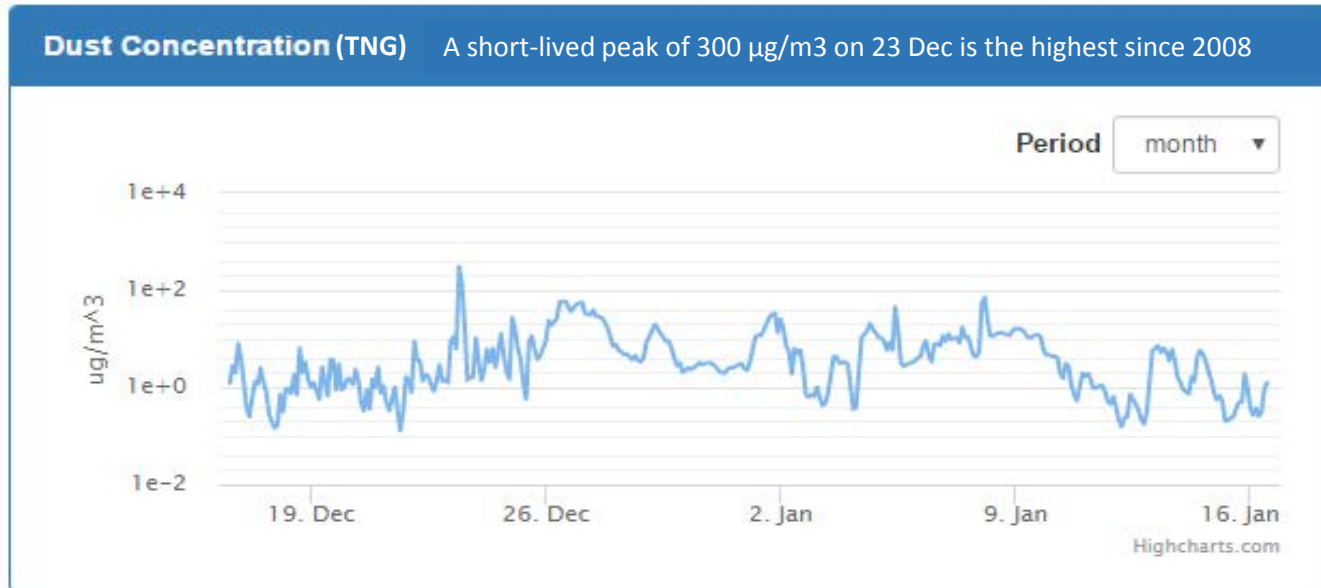
9 January 2017: Report on reflectivity maintenance and visual inspection of WHT Primary Mirror. Neil O'Mahony.

Approximately 2 weeks of Calima weather persisted from 24 December to 9 January, with TNG dust meter reading 30-70 ug/m<sup>3</sup>

Inspection: water stains covering an approx. area of 0.5 m<sup>2</sup>, located above the Nasmyth turret, probably due to condensed water falling during observing.

Only 0.5% improvement from CO<sub>2</sub> (N48) but accumulated 0.7% loss in reflectivity. General dust coating and small raindrops remain.

All values are percentages (CT7 only, no SMS due to battery and data transfer problems)



Measurements before cleaning follow. Note: CT7 was stuck in multiple-measurement mode, leading to some obviously invalid data (omitted from statistics).

Index	date- time	code	Temp/°C (CT7)	%R vs waveband (nm)							Dust Index						
				365	404	464	522	624	760	970	365	404	464	522	624	760	970
935	09/01/2017 09:46	1	14.5	8.6	11.3	15.5	16.5	23.9	28.7	27.2	31.3	50.1	53.6	39.3	26.6	22.2	28.8
936	09/01/2017 09:47	1	14.5	8.6	11.3	15.5	14.9	23.5	28.4	6.2	0.0	0.0	0.0	0.0	0.0	0.0	45.6
937	09/01/2017 09:48	1	14.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	31.6	56.6	55.5	75.7	26.8	15.5	2.1
938	09/01/2017 09:48	1	14.6	89.3	87.9	87.3	87.3	86.4	83.6	89.4	6.8	6.9	7.8	6.5	7.9	7.3	7.8
939	09/01/2017 09:49	1	14.7	89.3	87.9	52.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6
940	09/01/2017 09:49	1	14.8	72.1	88.4	88.2	88.0	87.3	84.5	90.3	6.7	6.6	6.8	5.7	6.5	5.8	6.3
941	09/01/2017 09:50	1	14.9	89.8	88.4	88.2	88.0	87.3	84.4	30.1	0.2	1.8	8.1	29.8	0.0	0.0	1.9

942	09/01/2017 09:50	1	15.0	41.5	25.7	1.1	80.3	1.4	33.1	90.2	7.9	7.6	8.4	6.3	7.9	6.7	6.8
943	09/01/2017 09:51	1	15.1	89.8	88.3	17.8	0.0	0.1	0.1	0.1	31.6	56.2	14.3	0.0	0.0	0.0	50.9
944	09/01/2017 09:51	1	15.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.9
945	09/01/2017 09:53	1	15.3	89.8	88.2	87.8	87.7	86.9	84.0	89.8	6.7	7.0	7.6	6.6	7.5	7.0	7.4
946	09/01/2017 09:54	1	15.4	89.9	88.4	87.8	87.8	87.2	84.1	89.6	6.2	6.1	6.8	5.8	6.6	6.2	7.2
averages (omitting invalid data)				89.7	88.2	87.9	87.9	87.0	84.1	89.9	6.9	6.8	7.5	6.2	7.3	6.6	7.1
change since last cleaning				1.3	1.3	1.3	1.3	1.3	1.6	2.0							

Measurements immediately after cleaning follow:

		location																
947	09/01/2017 12:15	1 right	19.4	90.2	89.0	88.5	88.6	87.5	85.3	91.1	6.0	5.6	6.1	4.9	6.0	4.7	5.7	
948	09/01/2017 12:16	1 right	19.4	90.5	88.9	88.5	88.8	87.8	85.1	91.8	5.9	5.8	6.3	4.7	5.7	5.1	4.3	
949	09/01/2017 12:17	1 right	19.4	90.6	89.2	88.7	88.9	87.9	85.3	91.5	6.0	5.9	6.2	4.7	5.5	4.7	4.9	
950	09/01/2017 12:18	1 bottom	19.3	90.8	89.5	89.0	89.4	88.5	85.8	92.3	7.8	5.5	5.7	3.9	4.5	3.6	3.3	
951	09/01/2017 12:19	1 left	19.3	90.5	88.9	88.5	88.4	87.8	84.8	91.1	5.8	6.2	6.4	5.3	5.8	5.5	5.5	
952	09/01/2017 12:20	1 top	19.3	89.1	87.7	87.3	87.0	86.3	83.6	89.4	7.3	7.3	7.9	6.8	7.9	7.3	8.1	
953	09/01/2017 12:21	1 top	19.1	89.6	88.1	87.7	87.7	86.9	84.0	90.1	6.3	6.5	7.4	6.0	7.1	6.7	6.8	
averages				90.2	88.8	88.3	88.4	87.5	84.8	91.0	6.4	6.1	6.6	5.2	6.1	5.4	5.5	
difference due to cleaning				0.5	0.5	0.5	0.5	0.5	0.7	1.2	0.4	0.7	0.9	1.0	1.2	1.2	1.6	
net accumulated loss in %R since 11/16				0.7	0.7	0.8	0.8	0.8	0.9	0.8								
ranges				1.7	1.8	1.7	2.4	2.2	2.2	2.9								
shortfall from fresh aluminium				2.9	2.6	2.6	2.5	2.5	2.4	2.2								
				365	404	464	522	624	760	970	365	404	464	522	624	760	970	
				%R vs waveband (nm)				Dust Index										

**Conclusions:** the lowest reflectivity and highest scattering (red highlight) coincide with location of water stains (i.e. above turret).

The range in measurements is now about double that in November, even following Algal2-CO2 effects of July. Probably due to raindrops.

As seen after previous cleaning (9 December) the improvement from cleaning is of the order of 0.5%.

However on this occasion, the mirror accumulated a net loss in reflectivity, of about 0.7%

This is likely due to condensation causing the dust to stick more. Next cleaning will be with Algal2 when humidity is minimal.

Evolution of average values (following cleaning) since aluminisation:

	365	404	464	522	624	760	970	DUST						
09/03/2016 pre-alum	89.4	88	87.9	88.5	87.8	85.3	91.6							
18/05/2016 Aluminisation	93.1	91.4	90.9	91.0	90.0	87.3	93.3	2.3	2.1	2.0	1.4	1.4	1.1	1.0
27/06/2016	92.7	91.0	90.6	90.7	89.8	87.0	92.9	2.4	2.2	2.2	1.7	1.8	1.4	1.5
13/07/2016	92.3	90.6	90.2	90.3	89.4	86.7	92.6	2.6	2.5	2.5	2.0	2.2	1.8	1.9
27/07/2016	92.2	90.6	90.0	90.1	89.2	86.4	92.2	2.9	2.8	3.0	2.4	2.7	2.3	2.4
16/08/2016	92.2	90.6	90.1	90.2	89.2	86.6	92.5	3.1	2.9	3.0	2.4	2.7	2.3	2.4
23/09/2016	92.1	90.5	90.0	90.0	89.2	86.6	92.6	3.2	3.0	3.2	2.5	2.9	2.5	2.6
10/11/2016	91.2	89.7	89.2	89.3	88.3	85.7	91.7	4.1	4.0	4.4	3.5	4.2	3.6	3.9
28/11/2016 Minimum - raindrops	90.7	89.2	88.7	88.8	87.9	85.2	91.2	5.0	4.9	5.3	4.3	5.1	4.6	4.9
07/12/2016	90.8	89.3	89.0	89.0	88.2	85.6	91.7	5.8	5.6	5.7	4.5	5.1	4.2	4.2
09/01/2017	90.2	88.8	88.3	88.4	87.5	84.8	91.0	6.4	6.1	6.6	5.2	6.1	5.4	5.5

This data is graphed on following page

Evolution of WHT Primary Mirror Reflectivity (per waveband/nm)

