



TEST OF PROTECTED SILVER COATING ON ALUMINUM SAMPLES OF ARIEL MAIN TELESCOPE MIRROR SUBSTRATE MATERIAL

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INTRODUCTION

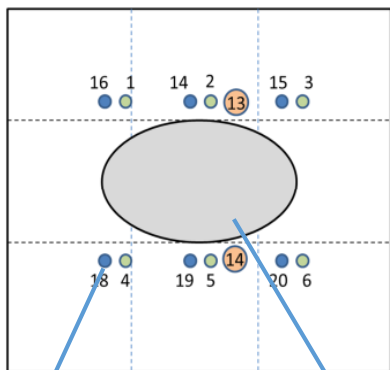
Ariel: ESA M4 mission to survey the atmospheres of known exoplanets, with an all-aluminum telescope optimized for spectroscopy between 0.5 μm and 8 μm .

Protected silver coating selected for telescope optical surfaces to increase reflectivity and prevent oxidation.

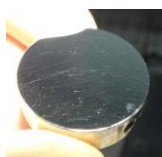
Scope of this work: verification tests, as part of the coating qualification campaign to assess durability and performance, on a new set of samples and a full-size demonstrator of the primary mirror (PTM).

ITEMS UNDER TEST

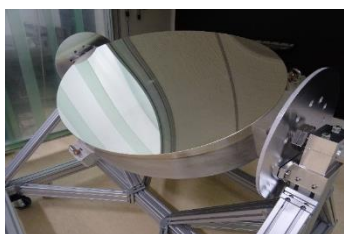
Coating loading map of Al samples and PTM. Coating process: physical vapor deposition through magnetron sputtering. Provider: CILAS-ArianeGroup



(credit: CILAS Arianespace)



ø 25 mm
Al Samples



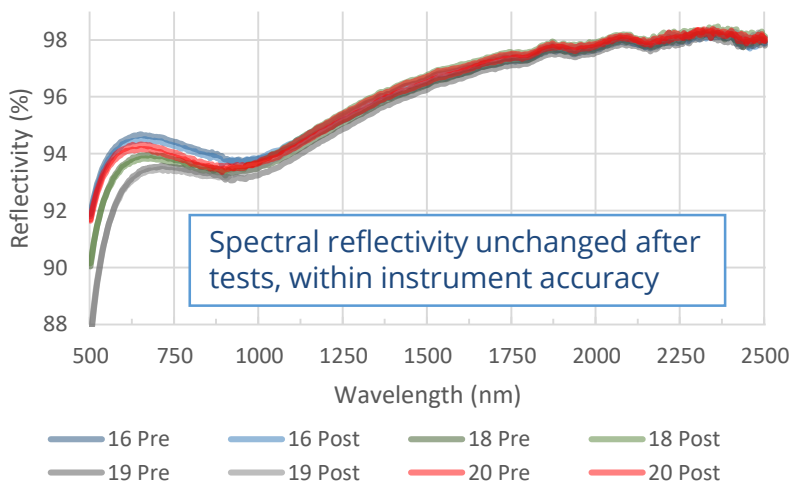
PTM Mirror
Optical aperture: 1.1x0.78 m

TESTS AND RESULTS

Samples with * are kept as aging references	Cleanability	Abrasion	Temp. Cycling	Humidity	Adhesion
Sample 14*					
Sample 15*					
Sample 16	✓	✓			
Sample 18			✓	✓	✓
Sample 19			✓	✓	✓
Sample 20			✓	✓	✓
PTM					✓

Humidity: 24 hours at 90% humidity, 55 °C
Temperature: 30 cycles, -40°C / 70°C, 2°C/min.
Abrasion/adhesion: ISO 9211-4

Al Samples Relative Reflectivity Before/After Tests



CONCLUSIONS

Visual inspections and reflectivity measurements showed no alteration in appearance imputable to deterioration or delamination of the coating, nor a degradation in optical performance in the waveband 500–2500 nm, consistent with results from the previous qualification phase.



S/C artist's rendering (credit: Ariel/ESA)

