

UNITED STATES GOVERNMENT

Memorandum

Shocaton

TO : All Astronauts

DATE: JAN 9 1970

FROM : CB/P. K. Chapman, K. G. Henize

SUBJECT: The coating on the Surveyor 3 mirror

On 8 January Don Lind, Dick Truly and we together with Carroll Alley and Tommy Gold had an opportunity to observe the mirror of the Surveyor 3 TV system as it went through its preliminary examination at the LRL. The most important results are as follows:

a. The mirror coating was not completely opaque but allowed a fair amount of specular reflection - something on the order of 10 to 50 per cent.

b. A crescent-like segment at the bottom of the mirror (where it is protected more by its cowling) was not coated as heavily as the top two-thirds of the mirror. There is a well-defined, though diffuse, boundary between the two areas. The boundary area has a somewhat greenish color suggesting that it consists of a very thin layer of particles small enough to create interference effects with visible wavelengths of light.

c. The streak on the mirror caused by Pete's wiping it with a finger has a considerable dust coat on it. It's not nearly as bright as a region at the upper edge of the mirror which was accidentally wiped as the mirror was taken from its wrappings. This suggests that some dust has moved about within the mirror's package as it was transported back to the LRL.

It was generally agreed by all present that the coating seen on the mirror was caused primarily by dust and/or exhaust gases during the initial landing of the Surveyor. This conclusion is supported partly by the pattern of dust observed on the mirror (which indicates the coating particles came up from below) and, more importantly, by the fact that both Gold and JPL scientists had deduced from the Surveyor photographs that the upper two-thirds of the mirror were obscured by some material leaving a reflectivity in this area of about 30 per cent.

It seems probable that no gross degradation of the mirror surface took place during the 2 1/2 years subsequent to the landing of Surveyor 3, a point of particular importance to experiments, such as Alley's corner reflectors, which propose long-term operation of optical devices on the lunar surface.

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