

UNITED STATES GOVERNMENT

Memorandum

Thomson

TO : Memorandum for Record

DATE: October 6, 1969

FROM : CB/D. L. Lind

SUBJECT: Test report of the ALEM EVA recovery system

For the record let me jot down a few comments about the WIF evaluation of some ALEM EVA recovery concepts held at MSC on Friday, Sept. 26, 1969.

A. Mobility - A stanchion mounted next to the hatch precluded any evaluation of the handrail locations on the CM except for the handrail located furthest aft. The position was satisfactory; however, the gap between this handrail and the forwardmost handrail on the SM was probably larger than desirable. If that handrail can be extended approximately 4 inches further aft, it would be desirable. If this is not feasible, it's probably safe to cross this gap by positioning the body perpendicular to the line of motion which allows a wider arm motion. The shape of the handrails seems to be quite satisfactory. The location of the handrails around the SIM appears to be satisfactory with the exception that we need handrails athwartships either at the aft end of the SIM, or if possible, across one of the shelves near the midsection of the SIM bay. The handrail in the center of the SIM area seems extremely desirable, and every effort should be made for its inclusion in the final configuration.

Motion along this handrail system appears to be satisfactory from the standpoint of crew safety and accessibility to all points of the SIM. Obviously considerable care will have to be taken to avoid the region of the RCS thrusters. There appears to be no obvious way to avoid this problem except through crew procedures. If the body is positioned perpendicular to the line of motion and facing the RCS thruster as you cross the CM-SM interface, the clearance from the RCS thrusters seems satisfactory, although higher fidelity mockups will be needed to confirm this.

B. Crew work stations - As I am sure everyone agrees, the crew work stations must be face down looking into the SIM. It seems to be a fruitless effort to try to stand within the SIM bay since these techniques cannot be applied to later missions because of lack of room. Two types of work stations were evaluated in our test.

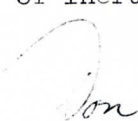
1. Waist tether between feet - A tether from the waist to a position between the feet and under slight tension gave far better stability than I would expect before this run. I was able to attach the tether to the handrails and while standing on the handrails stabilize myself with some success. Two features would probably have increased my stability and effectiveness considerably. One would be a larger area on which to rest the



feet. This technique used on a larger shelf area might show promise. The handrail offered only enough area for the toes and thus the position was somewhat unstable and slightly fatiguing. The second improvement which can be tried with this type of crew station is a knee brace. Some area or structure against which the knees could be braced would probably increase the effectiveness of this technique and should be evaluated. A tether from the waist to the mid SIM handrail was useful as a safety tether but had no effect on stability or mobility.

2. Golden slippers - These were attached at the base of the SM at a position below the 24" pan camera film cassette location. These shoes did not fit me; and I had trouble keeping the heels anchored. However, my impression was there was considerable potential in this type crew station, and I suggest that this technique be investigated for this application. Despite the poor fit, I was able to position my body in front of the work area and move with considerable latitude sideways. With properly fitting shoes which could be pre-installed at the proper locations or easily attached to the handrails, this might prove a very useful technique. I would recommend that we look into its capability without concern at present as to stowage problems, although these will have to face this problem eventually.

C. Transfer - I only participated in one transfer technique evaluation. This was the film cassette holster on the right leg. I had considerable difficulty in inserting the cassette into the holster which we were using, and considerably more effort must be exerted in holster design or some simple attachemnt technique. However, once the cassette was secured to my leg, I had no increased difficulty in traversing the handrails back to the hatch. The cassette did not interfere with my mobility, nor did I notice the increased moments of inertia due to this mass attached to my leg.


Don L. Lind

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