



**Aerospace
Systems Division**

Results of Feasibility Tests Performed
to Determine the Handling and Mating
Aspects of the HFE - Astronaut Connector

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This is an unscheduled ATM which presents the results of the feasibility tests performed to determine if there are any astronaut problems associated with handling the HFE - Astronaut Connector, used in ALSEP Array D.

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A. Introduction

On July 21 the Crew Systems and Operations Group performed a pressure-suited 1G mating test with the HFE-Astronaut Connector for Array D Heat Flow Experiment.

The purpose of this test was to determine if the chosen configuration of the Astromate Connector would present any handling and coupling problems to the crew.

For this purpose mockups were designed and fabricated from pre-released drawings and assembled with a flight model connector (Microdot) by the Crew Engineering test laboratory.

R. Deppe was Test Conductor, R. L. Redick the suited subject.

B. Hardware Used

The prototype connector was supplied by Microdot. Type MD 53-01E (male) and MD 53-02E (female).

It is a spring-loaded connector type, mechanically aligned by a key inside the connector.

Because this alignment key is very small and not visible to the astronaut, two white alignment stripes were provided on the outside of the connector at the 6:00 position during the test.

C. Test Procedure

The test was performed in the Crew Engineering laboratory. As described in the Array D deployment procedure, the HFE-Subpallet mockup was removed from SP II and deployed by the space-suited Engineer who performed the test in the following steps:

1. The subject took the Astronaut Connector in one hand and checked the interface to the thermal glove.
2. The subject approached the subpackage and held it with his other hand for stability.
3. While mating the plug to the connector he looked for the visible white alignment marks.



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C. Test Procedure (Continued)

4. After visible orientation of the alignment marks the subject pressed down on the plug to lock the outer mechanism.
5. Checkout of the locking quality by attempting to remove the whole connector assembly with his hands, to verify positive attachment, was performed.

D. Results and Conclusions

1. Connector Handle

Glove interface was good for the right or left hand with equal acceptance.

Two grips (in principle) are possible:

- 1.1 Grip I by inserting the ring finger, middle finger and index finger in the opening.
- 1.2 Grip II by inserting the ring and middle finger in the opening.

2. Connection

No tactile indication of connection was noticed in the pressure suit.

3. Visual Cues

- 3.1 Alignment striping on Astronaut Connector.
- 3.2 Continuation of alignment striping on the Package I connector mounting brackets.
 - 3.2.1 This requires that the mounting bracket has to be black on the outside for continuation of the white alignment stripes.

Drawing No. 2339004 and Drawing No. 233001 will require review by Engineering to incorporate this color change.



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D. Results and Conclusions (Continued)

4. Positive Lock Fastening

Physical removal was attempted as an indication of positive locking and this provided a valid indication.

Figure #1 shows that the glove interface of the connector handle.

Figure #2 illustrates step No. 4 of the Test Procedure; visible orientation of the alignment marks and engagement of the plug.

Figure #3 illustrates step No. 5 of the Test Procedure; checkout of the locking quality. This picture demonstrates also that the connector mounting bracket for the Package I connector which will be recommended as black for continuation of the white alignment stripes.

Additional Crew Engineering Tests will be performed to verify the conclusions recommended in this report after liaison with design engineering personnel.

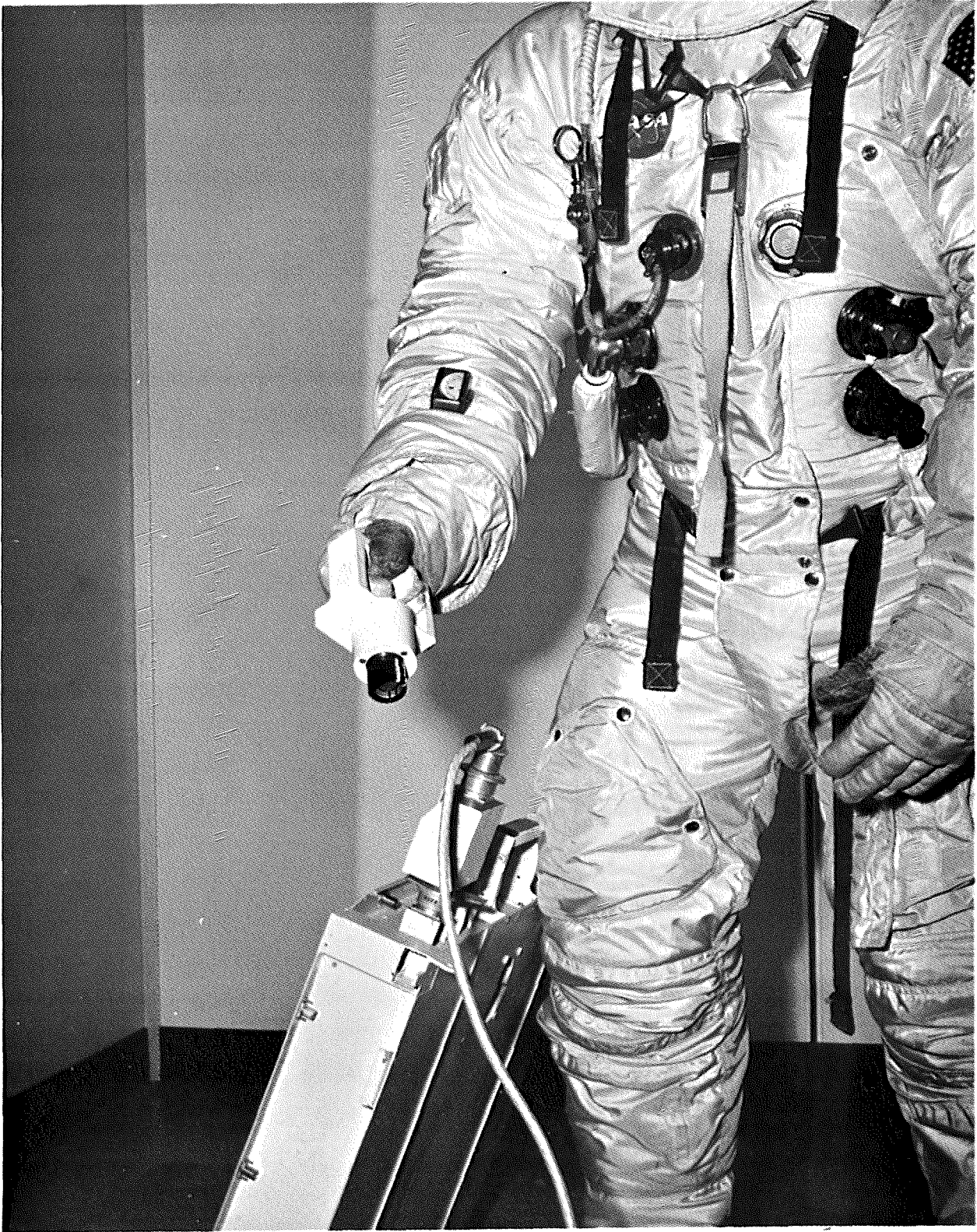


Figure 1 Glove/Connector Handle Interface

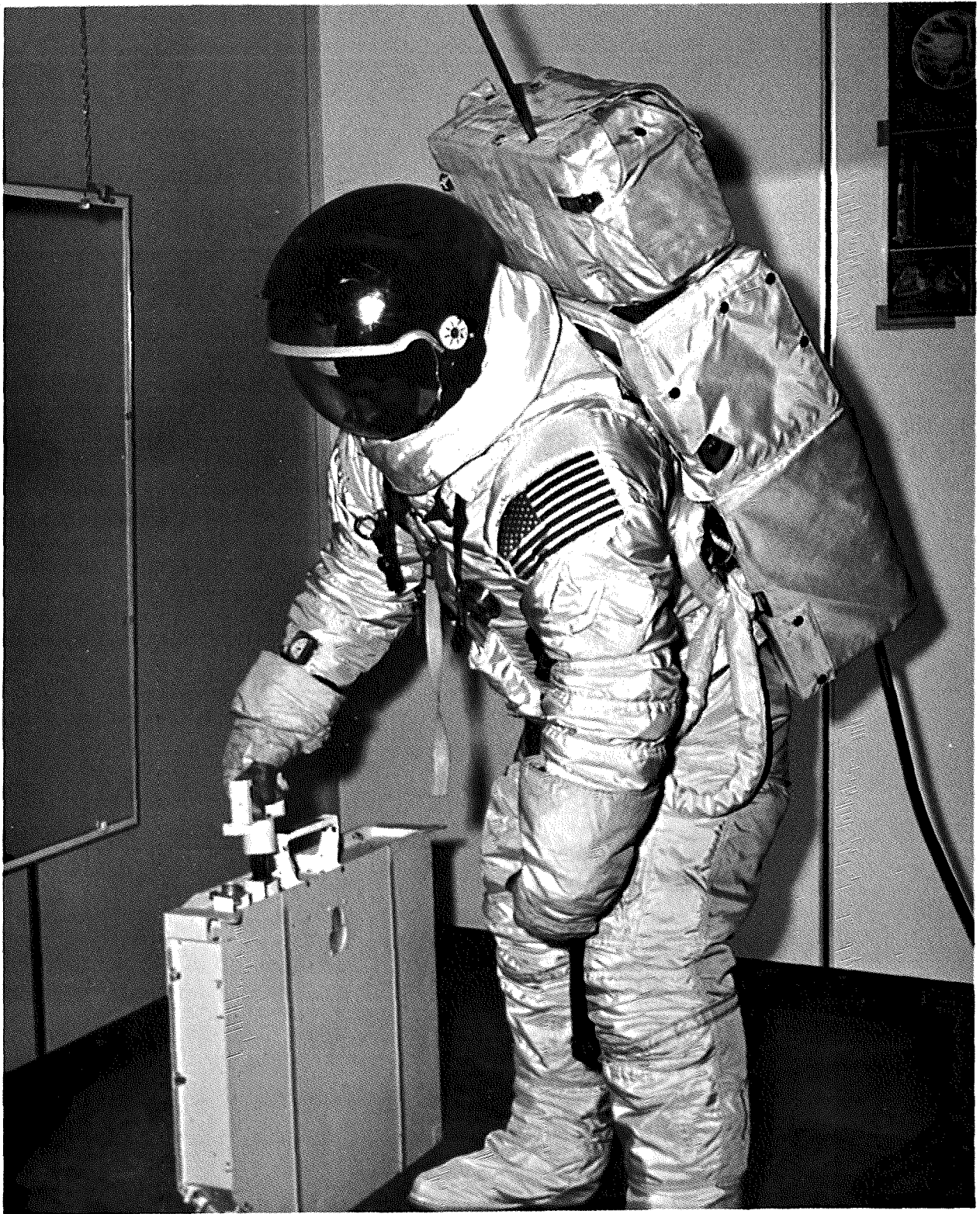


Figure 2 - Visible Orientation of Alignment Marks



Figure 3 - Checkout of Connector Locking Quality.