BELLCOMM, INC.

SUBJECT: Trip Report - Discussions with General Electric on Assembly/ Sterilizer Facility Contracts Case 233

DATE: March 13, 1967

FROM: D. Macchia

[redacted]

MEMORANDUM FOR FILE

On January 16, 1967, the author visited General Electric (Valley Forge, Pennsylvania) to discuss their conceptual designs for a facility to assemble and sterilize spacecraft and a bio-isolator suit which is an integral part of the facility. Mr. James G. Crawford represented General Electric.

The Assembly/Sterilizer* is a facility for sterilization, assembly and repair of spacecraft. By means of bio-isolator suits, assembly, repair, checkout, insertion, etc., operations can be conducted after terminal sterilization. Malfunctioning spacecraft can also be removed from the launch pad and recycled through the facility without repeating the terminal heat cycle.

To explore possible problem areas, an analog of the A/S was constructed and testing is now in progress. The analog duplicates the A/S concept topologically and, in effect, is a glove box with various ante-chambers. Approximately 45 cycles on a simple electro mechanical assembly have been conducted to date with no contamination. Work is also currently in progress on a Bio-Isolator Suit System (BISS) at GE in addition to their Analog A/S contract.** General Electric has Phase A of the BISS development which covers system criteria, concept development, test planning, materials analysis, and production of mockups. A detailed configuration mockup of a bio-suit is near completion but it is not at present a bio-isolator.

Construction and testing of a Model A/S for Testing (MAST) is planned from mid '67 to early '69. Based on experience from the MAST facility, the full scale A/S design will be finalized. A/S fabrication would begin approximately in mid '69, and would be completed by the end of '71. Shortly after start of the MAST contract, Phase B of the BISS contract would begin. Phase B covers the detail design, fabrication and testing of an operational BISS. It is expected that the operational BISS will be available by the end of '68. Adherence to these plans depends on funding and Voyager Program requirements.

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*For a complete description see, "The Assembly/Sterilizer - A Facility for the Sterilization and Assembly of Spacecraft", J. G. Crawford, J. F. Zanks, AIAA Stepping Stones to Mars Meeting, March, 1966.

**Both the Analog and BISS contracts are being managed by LRC.

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Both the A/S and the BISS can have considerable impact on the proposed Mars flyby mission. The A/S would allow launch pad repairs, etc., of probes and low weight propulsion tankage (due to propellant transfer capability). It is noted that any realistic mission plan should allow for probe repair rather than replacement due to their size and complexity. A modified A/S and BISS might also be used as a probe hanger module since it would permit inflight maintenance. Furthermore, an A/S probe hanger (or bio-shield probe hanger) would permit elimination of individual probe bio-shields and could result in a simplified probe launch (i.e., individual probe bio-shields must be targeted to avoid planetary capture). The BISS concept also introduces interesting possibilities for the handling of Martian samples.

In conclusion, the current effort at GE and proposed future work may be completed well in advance of proposed planetary missions and should be included in current planetary program planning.

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