

N O T I C E

THIS DOCUMENT HAS BEEN REPRODUCED FROM
MICROFICHE. ALTHOUGH IT IS RECOGNIZED THAT
CERTAIN PORTIONS ARE ILLEGIBLE, IT IS BEING RELEASED
IN THE INTEREST OF MAKING AVAILABLE AS MUCH
INFORMATION AS POSSIBLE

NASA CR-
160360

FINAL REPORT
STARPAHC
SPACE-ORIENTED MEDICAL EVALUATION
CONTRACT NAS 9-14513

October 12, 1979

(NASA-CR-160360) STARPAHC SPACE-ORIENTED
MEDICAL EVALUATION Final Report (Boeing
Aerospace Co., Houston, Tex.) 6 p
HC A02/MF A01

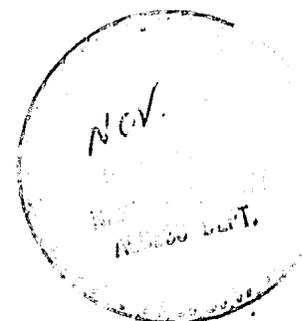
N80-11763

CSCL 06E

Unclas

G3/52 46040

Boeing Aerospace Company
Houston, Texas



This final summary report is submitted in accordance with Article XVII, Report of Work, Contract NAS9-14513 and summarizes the activities accomplished under the original and all subsequent modifications or additions to the Statement of Work. This report is herewith submitted as a closure to all technical activity performed under the Work Statement of this contract.

W. B. Lewis

W. B. Lewis, Life Sciences Manager
Boeing Aerospace Company

NOTE:

As directed by NASA letter BC72(17) dated September 6, 1979, the contract was ceased two months early because of budgetary constraints. Accordingly, it was decided mutually between the Boeing and NASA technical contract monitors to minimize the effort spent in preparing this final report in order to better utilize the available funds. The report includes only a brief summary of work accomplished as all prior work has been submitted in detail in previous transmittals to the NASA technical contract monitor.

1.0 INTRODUCTION AND BACKGROUND

The National Aeronautics and Space Administration (NASA) has had experience in providing remote health care services to crewmembers on Earth, on the lunar surface, and during spaceflights of durations up to 84 days and involving mixed populations (U.S. and Russian). Part of this experience involved a limited telemedicine test during one of the Skylab missions. Telemedicine is a system by which a physician, remotely located from the patient and the attending paramedic or nurse, can use voice, data, and video communications to perform examinations and to establish diagnostic and treatment protocols. As defined, telemedicine has considerable promise as an important element of the health care systems being designed to support future manned spaceflights and orbital operations.

In January 1975, NASA and the Indian Health Service (IHS) of the Health, Education, and Welfare (HEW) Department began a 2 year STARPAHC test demonstration program on the Papago Indian Reservation at Sells, Arizona. The IHS performed a medical evaluation of the system, and NASA performed an equipment evaluation and a space-oriented medical evaluation of the system.

The Boeing Company was selected to perform this space-oriented medical evaluation of the STARPAHC system because of its extensive experience gained during the evaluation of the Phase B-3 Integrated Medical Behavioral Laboratory Measurement System (IMBLMS) breadboards. These breadboards were developed by the Lockheed Missiles and Space Company (LMSC) and General Electric (GE) and were used as the basis for developing the advanced equipment comprising the STARPAHC system. Additionally, The Boeing Company worked directly with NASA in the analyses and definition studies used for STARPAHC equipment, site selection, system elements, and site implementation requirements. Because of this experience and allied experience in the flight medical monitoring of previous spaceflights, subsequent changes and extensions were developed to the original Statement of Work so that The Boeing Company

could integrate and apply the experiences to the development of operational planning and implementation of a flight medical monitoring system for the Space Transportation System (STS) Orbital Flight Test (OFT) and mature operations spaceflights.

Performance on this contract involved four major areas of activities as follows:

1. Identification of the medical contingencies in future space missions and the probability of occurrence.
2. Using the experience gained in STARPAHC operations and performance assessments useful in the definition of requirements for health care systems for future space operations bases.
3. Develop scenarios which can be used for assessing the STARPAHC telemedicine system space related capability and limitations and support the execution of these scenarios at the STARPAHC site on the Papago Indian Reservation.
4. Utilizing the STARPAHC assessment results and flight monitoring experience gained from previous spaceflight programs, develop on-board and ground based flight medical monitoring system requirements, training requirements and plans, data system and console equipment, configuration documentation and operational procedures for the Space Transportation System during OFT and mature operations phases of the Shuttle.

2.0 PERFORMANCE

All the tasks as defined in the original and modified Statement of Work were accomplished in accordance with the Statement of Work or directions received from the Technical Monitor. All aspects of the task performance were dutifully and meticulously reported as required by Article XVII, Report of Work. In addition to these requirements, two interim reports were also submitted. The total number of reports submitted including monthly, interim and final reports equals 58 reports and does not include the large number of 2-way memoranda used to report specific studies and results directly to the Technical Monitor.

3.0 RESULTS

The results from accomplishing the first 3 major areas of the contract Statement of Work (see Section 1.0) were compiled in a series of separate reports. These separate reports were then gathered into a single Interim Report titled STARPAHC Space-Oriented Medical Evaluation, dated March 1976 and transmitted to the Technical Contracting Officer. Subsequently a compendium of this report was developed using the same title and dated April 1977. This compendium was also transmitted to the Technical Monitor. In addition, a monthly report was submitted summarizing incremental activities performed on these tasks.

Upon the conclusion of the first three areas of contract performance, the fourth area began. This area involved the development of the STS OFT and mature operations phases flight medical monitoring systems, training plans, requirements, implementation plans and operations procedures and was completed in September 1979. Work on the tasks associated with this area was extensively reported on by 2-way memorandum with attachments and delivered directly to the

Technical Monitor and also in monthly status reports as required under Article XVII. Products developed and furnished with this part of the contract included the following:

- Data Pack inputs for configuring the MCC OFT Medical Consoles and Systems.
- Program Requirements Document inputs for establishing the required capabilities at remote operation sites.
- Program Directions
- Flight Medical Mission Rules
- Memorandum establishing current and future monitoring requirements.
- Medical Operations Requirement Document inputs.
- Medical Operations Implementation Plan inputs.
- Medical Operations Handbook with operational procedures for the OFT flights.
- Flight Controller Operations Handbook inputs.

These products have formed the foundation for an updated flight medical monitoring system for the Space Transportation System upon which an active flight medical monitoring program can be developed and with periodic updating should suffice for the length of the Shuttle Operations Program.