SKYLAB MEDICAL EXPERIMENTA ALTITUDE TEST

OBS DETAILED TEST OBJECTIVE

I. EXPERIMENT/OPERATIONAL SYSTEM

A. Title - Operational Bio-Instrumentation System (OBS)

B. Requirements Developer - Dr. J. F. Zieglschmid

C. Project Engineer - S. Luczkowski

II. PURPOSE AND BACKGROUND

A. Purpose of Experiment

The OBS will be used to determine its response to the simulated space environment. Man/machine interactions will be evaluated in donning and using the OBS, as well as interfaces with the Constant Wear Garment (CWG) Harness, and the communications headset.

B. Justification for the Experiment

In Skylab, the OBS will be used for launch, EVA, and re-entry. Since these activities will not occur in the chamber, selected periods and activities on SMEAT have been planned to provide an assessment of those OBS measured parameters. These selected periods will be periods of high physical output, such as ergometer exercising. As a contingency mode of operation, the OBS will be used for continuous monitoring of a crewman in the event of an illness. what kind? Useless in most—

III. PARTICIPANTS

A. Number of Crewmen Required

Three crewmen

B. Function of Each Crewman

The instrumented crewman performs the ergometer or other exercising. A support crewman assists in placing the electrodes on the instrumented crewman.

IV. FUNCTIONAL OBJECTIVES

FO1 Monitor electrical activity of the heart, heart rate, respiration rate, body temperature, and subject identification for high physical activity.

FO2 Monitor electrical activity of the heart, heart rate, respiration rate, body temperature and subject identification of an ill or injured crewman.

V. TEST CONDITIONS

A. Environmental Requirements

No special requirements

B. Crew Constraints

Crewmen must have individually molded ear molds (same as M171)

VI. HARDWARE REQUIREMENTS

A. Identification and Purpose of Hardware

Identification	Purpose
1. ECG Module (Electrocardiogram)	1. Provides an analog waveform of the electrical activity of the heart.

VI. HARDWARE REQUIREMENTS (cont'd)

Identification	Purpose
2. CTM Module (Cardiotachometer)	2. Counts the QRS signals from the ECG module and processes it into an analog output voltage that is proportional to the crewmember's heart rate.
3. ZPN Module (Impedance Pneumo-graph)	3. Measures changes in transthoracic impedance that represents respiration rate and develops it into an output signal.
4. TEM Module (Body Temp. Measure-ment System)	4. Measures ear canal temperature near the tympanic membrane with an ear probe and mold. The module conditions the signal for telemetry.
5. SID Module (Subject Identifica-tion Module)	5. Provides positive identification of each crewman by means of discrete and fixed voltage outputs for each crewman.
6. DCC Module (DC to DC Power Converter)	6. Provides positive and negative excitation power to each module.
7.1 Bio-Harness	7.1 Provides positive and negative excitation power to each module and data transfer.
7.2 CWG Harness	7.2 Provides power and data connection between the suit harness and the special chamber cable.

VI. HARDWARE REQUIREMENTS (cont'd)

Identification	Purpose
8. ECG Harness	8. Provides cabling with 3 electrodes to sense electrical activity of the heart.
9. ZPN Harness	9. Provides cabling with 2 electrodes to sense changes in transthoracic impedance.
10. Electrode Kit	10. Contains electrolyte pads, cleaner, and adhesive for proper installation of the ECG and ZPN electrodes.

B. Identification and Purpose of GSE

Identification	Purpose
1. Bio-Instrumentation Console	1. Provides for monitoring the crewman during the test and adjusting the OBS modules for an individual crewman.
2. Special Chamber Cable	2. Connect to 37 pin connector in place of SIA cable (speaker Interface Assembly). Must be long enough to reach from ergometer or bunk to connector(s).

VII. CHAMBER INTERFACES

A. Stowage Requirements

Stowage is required for one complete OBS with Electrode Kit.

B. Special or Unique Interfaces

The OBS uses special wiring with a 37 pin connector(s) for SMEAT.

Electrical power required is 14 to 20 VDC.

VIII. CREW TRAINING

A. Briefing Sessions Required

One briefing session of one hour's duration is scheduled for T-2 months.

VIII. CREW TRAINING

B. Training Sessions Required

Two training sessions each of one hour's duration is scheduled for T-30 days and T-15 days.

IX. SCHEDULING REQUIREMENTS

A. In Chamber

OBS will be used biweekly by each crewman when exercising on the ergometer or other exercising.

X. DATA REQUIREMENTS

A. Experiments Measurments List

1. Electrocardiogram
2. Respiration Rate
3. Body Temperaiure
4. Heart Rate
5. Subject Identification
6. Ambient Temperature, OWS
7. Ambient Pressure, OWS
8. Time Annotation

B. Unique Measurements to SMEAT

None

C. Data from other Experiments

None

D. Other Requirements

1. Logs

The OBS operational comments will be recorded in the Inflight Medical Log.

X. DATA REQUIREMENTS (cont'd)

2. Voice

Voice communications during OBS operation with the other crewman and test conductor will be maintained and recorded on magnetic tape. A typed hard copy will be prepared.

3. Computer Programs

None

4. Display Requirements

The first five parameters on the Experiment Measurement List (IXA), plus time, will be displayed on 5 channels of the strip chart recorder.

XI. FDF REQUIREMENTS

The Flight Data File OBS Procedures and Inflight Medical Log will be used. The mission time line will be required for OBS monitored exercises.

XII. DEVIATIONS FROM APPROVED SKYLAB EXPERIMENT

A. Only one OBS will be available

B. Skylab OBS connects to the Speaker Interface Assembly (SIA) Cable.

C. The A7LB suit is not currently planned for SMEAT.