DETAILED TEST OBJECTIVE (DTO) APPROVAL SHEET

TITLE: COMMAND MODULE CO_2 ABSORBER ELEMENT

NO: ____________________

Roger M. Tanner — 4/27/72

Project Engineer — Date

D. Hughes for E. H. Samonski — 5/1/72

EC3/Chief, ECLSS Branch — Date

for [illegible] — 5-2/72

EC/Chief, Crew Systems Division — Date

A W Jasl[illegible] — 5/3/72

PD9/Systems Engineering Branch — Date

____________________ ________

Chairman, SMEAT Steering Commitee — Date

THIS DTO WAS APPROVED BY THE ____________________
ON ____________________.

SKYLAB MEDICAL EXPERIMENTS ALTITUDE TEST

DETAILED TEST OBJECTIVE

I. EXPERIMENT

a. Command Module CO_2 Absorber Element

b. Project Engineer - Roger N. Tanner

c. Subsystem Manager - Donald F. Hughes

II. PURPOSE AND BACKGROUND

a. Purpose: The purpose of this experiment is to aid in the verification of analysis showing that exposure to the Skylab atmosphere does not cause excessive degradation of the CO_2 Absorber Element.

b. Justification: Successful completion of the test will serve to verify that the analysis of degradation of the elements is correct and that the proposed Skylab stowage of the CO_2 Absorber Elements will not excessively degrade the element's ability to absorb carbon dioxide during the return mission.

III. PARTICIPANTS

This test requires no participation on the part of the test crew.

IV. FUNCTIONAL OBJECTIVES

This test consists of exposure of Class I (acceptable for flight) CO_2 Absorber Elements to the carbon dioxide and humidity levels inside the chamber, which are considered to be representative of the Skylab levels, and determine if the proposed stowage configuration of CO_2 Absorber Elements allows undue depletion of the lithium hydroxide by absorbing carbon dioxide from the chamber atmosphere. Three elements will be used for the test. Two shall be stowed in a Apollo command module A-9 locker which closely duplicates the Skylab command module stowage configuration. One of these shall be stowed in the current flight configuration,

IV. FUNCTIONAL OBJECTIVES (Continued)

the second stowed in the current flight configuration except that it will be wrapped in a barrier wrap to reduce diffusion of water and carbon dioxide into the element. The third element will be stowed "loose" in the chamber with no protection or provisions for reduction of diffusion of carbon dioxide into the element. Depletion of the lithium hydroxide, or reduction of the element's capacity to absorb carbon dioxide will be determined post-test by lithium hydroxide/lithium carbonate analysis of the contents of each of the elements tested. A test plan for the three elements with the analysis techniques and success criteria will be prepared as a separate document by the ECLSS Branch.

V. TEST CONDITIONS

a. Environmental Requirements - SMEAT carbon dioxide and humidity levels.

b. Crew Constraints - None

VI. HARDWARE REQUIREMENTS

a. Identification of Hardware

The test hardware will be one command module A-9 stowage locker, three CM CO_2 Absorber Elements, a barrier wrap bag and stowage shims and pads as required.

b. Purpose of Hardware- Self-explantory

c. Identificaion of GSE- None

d. Purpose of GSE - None

e. Identification of Grant- Inhouse funds.

VII. CHAMBER INTERFACES

a. Stowage Requirements - As available, access not required during test. "Loose" element will be stored on its side, flow direction horizontal, with insurance that it is not blocked from free exposure to the cabin atmosphere.

b. Reference ICD- None

c. Special or Unique Interfaces - None

VIII. CREW TRAINING

None

IX. SCHEDULING REQUIREMENTS

Test hardware will placed in the chamber at the initiation of the 56 day test to allow exposure to only the test atmosphere.

X. DATA REQUIREMENTS

a. Unique Measurements from this Experiment - None

b. Data from other Experiments - None

c. Other Requirements - Time vs. carbon dioxide and water vapor partial pressures and chamber temperature plots will be required.

XI. FDF REQUIREMENTS

None

XII. DEVIATIONS FROM APPROVED SKYLAB EXPERIMENT

Not applicable