U.S. Government

MEMORANDUM

Lyndon B. Johnson Space Center

NASA

REFER TO:	DATE	INITIATOR	ENCL
CB-79-062	November 21, 1979	CB/JWYoung:mwk:11/21/79:3897	2

TO: CA/Director of Flight Operations

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FROM: CB/Chief, Astronaut Office

SIGNATURE
John W. Young
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SUBJ: Addition of Space Motion Sickness Testing on STS-1

The first enclosure is DSO-S141, "Validation of Predictive Tests and Countermeasures for Space Motion Sickness Testing." The second enclosure is the summary of the minutes of a meeting held on August 26, 1977, where the Director of Space and Life Sciences (R. Johnston) stated that we would not have to take the tests predicting zero-g motion sickness unless there was a "high degree of confidence" that such tests and training were related to zero-g motion sickness. Nevertheless, the DSO requires that the crew take tests to "experimentally" induce motion sickness. "Two different test methods will be used..." the DSO states "...The off vertical rotation tests and sudden stop tests, both involving the use of a servo-controlled rotating chair located in the JSC Neurophysiology Laboratory."

This DSO violates the agreement made by the Space and Life Sciences Director in August 1977. There has been no evidence presented to us that ground tests are space flight zero-g motion sickness related as per the agreement. The use of the Servo-controlled rotating chair constitutes cruel and unusual punishment since the object of these two sets of tests is to "experimentally" make the crewman sick! It should be noted that a sick crewman would be lost for the entire day and perhaps longer, not just the 2 hours per test. The STS-1 crews respectfully decline to participate in this medical experiment as per the agreement with the Director of Space and Life Sciences.

Furthermore, there is no time in the STS-1 mission for the crew to record the details as requested by table 5.2 of the first enclosure. This should be done postflight.

PAGE 1 OF 1	FLIGHT REQUIREMENTS DOCUMENT CHANGE REQUEST			CR NO. 040
APPLICABLE TO FLIGHT STS-1 DOCU. JSC 10780 Basic Rev C	INITATOR R. Maloski	PHONE 333-2030	DATE 11-08-79	ORGANIZATION Rockwell-Houston
	CHANGE TITLE Addition of Space Motion Sickness Testing on STS-1			

DESCRIPTION OF CHANGE

Addition of DSO S141 "Validation of Predictive Tests and Counter-measures for Space Motion Sickness"

REASON FOR CHANGE/IMPACT OF NONINCORPORATION

Inflight observation of the space motion sickness syndrome and medication effectiveness is required to validate ground based research. Inflight data required to reach final and valid solutions to this potential threat to the operational efficiency of crew members will not be provided.

AUTHORIZED SIGNATURE/DATE

EVALUATION/RECOMMENDATION

MISSION STAFF ENGINEER/DATE

DISPOSITION

- ☐ APPROVED
- ☐ APPROVED WITH MOD
- ☐ DISAPPROVED
- ☐ WITHDRAWN
- ☐ FURTHER LEVEL II ACTION REQUIRED
- ☐ ISSUE PRCBD

MISSION OFFICE MANAGER/ DATE

OPERATIONS INTEGRATION MGR.

FIGURE E-2

NASA-JSC

Enclosure 1

5.1.4 DSO S141 Validation of Predictive Tests and Countermeasures for Space Motion Sickness

5.1.4.1 Purpose and Background.

The objective is to conduct inflight observations, supported by a series of pre and post flight data collection procedures, of Orbiter crewmembers in an effort to validate ground based tests which are predictive of susceptibility to the space motion sickness syndrome. An additional objective is to implement crew procedures which will enable acquisition of data to be used in validating motion sickness countermeasures.

Experience from previous manned space flight indicates that the space sickness syndrome represents a potential threat to the operational efficiency and physical well being of future space flight crewmembers. Because of its complexity and uniqueness this syndrome cannot be resolved solely with ground based research. In order to reach final and valid solutions it is essential that data be obtained on individuals who fly Space Shuttle missions. To achieve these objectives at the earliest possible date it is necessary that crew data collection commence with the STS-1 mission.

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NOTE

Similar data collection procedures will continue to be implemented on subsequent flight crews in accordance with a longitudinal space motion sickness operational study plan.

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During the preflight period (approximately F-150 days) each crewmember will be required to complete a questionnaire designed to elicit pertinent information regarding past experiences with various types of motion environments and responses to those environments. The time required for this activity is about 15 minutes. In addition, responses to KC-135 parabolic flight exposure will be documented via a questionnaire and/or personal interview. These data will be acquired in conjunction with nominally scheduled operational KC-135 flights. No special flights are required.

Each crewmember will consult with the NASA flight surgeon to select a preferred anti-motion sickness medication. Each crewmember will be tested with the selected medication to determine the effectiveness of the medication in reducing susceptibility to motion sickness and any adverse reactions. Effectivity will be determined by exposing the crewmember to a motion sickness susceptibility test, first without and then with the selected medication. These two tests will be separated by a minimum period of two weeks. Subjective reporting by the crewmember will be used to identify any adverse reactions. If the selected medication is effective and produces no adverse reactions, no further tests will be required. If the medication is not effective or produces adverse reactions, testing with further medications will be necessary. Under nominal conditions the time required for these activities should not exceed 2 - 3 hours. These activities should be scheduled 120 - 150 days prior to launch. If suitable data already exists for the crewmember, no testing of this type is required.

Each crewmember will be trained on the self-recognition of his symptoms of motion sickness. This training will include instructions on the in-flight use of the symptom checklist and microcassette recorder. This activity will be performed in conjunction with motion sickness susceptibility testing and will not require additional crew time.

Preflight ground-based tests of susceptibility to experimentally induced motion sickness will be performed with each crewmember. Two different test methods will be used. These are the off-vertical rotation test and the sudden stop tests, both of which involve the use of a servo-controlled rotating chair located in the JSC Neurophysiology Laboratory. Each of these tests will be performed a maximum of three times on each crewmember during the F-120 to F-15 time period. The total test time required per crewmember is six hours.

Each crewmember will be required to participate in a postflight debriefing which will be directed toward elucidating inflight and approach and landing experiences related to vestibular system function. This debriefing, which will require no more than 15 minutes, should be scheduled prior to L + 10.

The following Functional Supplementary Objective requires accomplishment:

a. FSO S141-01 INFLIGHT MOTION SICKNESS DATA COLLECTION. Systematic crew reporting of symptomatology and anti-motion sickness drugs used.

5.1.4.2 Operating Conditions/Activity Required.

a. FSO S141-01.

An inflight motion sickness/disorientation debriefing is required from each crewmember on a daily basis. The crewmember will use a checklist (see Table 5.2) and microcassette recorder to systematically voice record the onset, character and time course of any symptoms or sensations experienced. (Systematic reporting of the lack of any such sumptoms or sensations is also required). Events associated with the use (if any) of anti-motion sickness medications will also be voiced logged. Approximately five minutes per mission day, preferably following the evening meal or prior to sleep, should be reserved daily for use of the checklist and microcassette recorder.

TABLE 5.2 SPACE SICKNESS INFLIGHT DEBRIEFING GUIDE

1. Verify cassette with adequate capacity in recorder.
2. Verify recorder ON and in RECORD mode.
3. State crew name/designation:
4. State mission day/mission elapsed time:
5. Specify with YES/NO response which of following SYMPTOM EXPERIENCED THIS MISSION DAY. For each symptom present state severity (mild, moderate, severe) and the course (onset, cessation):

   - o Decreased appetite
   - o Headache
   - o Dizziness
   - o Mental confusion
   - o Pallor
   - o Drowsiness
   - o Flushing/subjective warmth
   - o Increased salivation
   - o Cold sweating
   - o Epigastric awareness
   - o Epigastric discomfort
   - o Nausea
   - o Vomiting or retching
   - o General discomfort
   - o Other (describe)

6. State type, quantity and time of administration of anti-motion sickness drug(s) used.
7. Indicate if drug(s) was effective.
8. Indicate if head/body movements restricted to minimize symptoms.
9. Note any illusions/disorientation experienced. UFO's ?
10. Summarize overall time course of symptoms, if any, since launch.
11. Other comments.

5.1.4.3 Data Requirements.

a. Flight Data Requirements.

1. The microcassette recorders and microcassettes containing in-flight crew debriefing remarks/data pertaining to space sickness symptomatology, sensations and medications used must be removed from the Orbiter and returned to the Space and Life Sciences Directorate at JSC within 24 hours following landing. (M)

b. Preflight Data Requirements.

1. Crewman questionnaire providing motion environment experience history. (M)

2. Documentation (crewman questionnaire/debriefing) of KC-135 parabolic flight exposure response. (M)

3. Crewman report of selected anti-motion sickness medication effectiveness. (M)

c. Postflight Data Requirements.

1. Crew debriefing. (M)