

MEMORANDUM

Lyndon B. Johnson Space Center

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William Thornton

SUBJ: Report on DSO 439 on Flight 41G

Background: Space motion sickness (SMS) differs in many of its signs and symptoms from lg motion sickness, so much so that the traditional signs of MS cannot be used to evaluate the presence, severity or treatment of SMS. On STS 7 and 8 it was found that bowel sounds were strikingly absent during SMS and that the GI symptoms were consistent with a ileus (temporary paralysis of the stomach bowel). A method of recording bowel sounds had been devised and demonstrated on STS-8. A ground based study of subjects with acute MS was also done. This DSO had three objectives:

1. To demonstrate that presence or absence of bowel sound was related to SMS and especially GI symptoms.
2. To document any changes in motility, as evidenced by bowel sounds, produced by a drug known to effect GI motility in many situations.
3. To document any effects of weightlessness on bowel sounds on individuals not affected by SMS.

Methods and Protocol

The basic matrix for comparison of effects bewen those with and without SMS and of lg vs weightlessness is shown below.

	PRE OR POST FLIGHT	IN FLIGHT
AFFECTED	1	1
NOT AFFECTED	1	1

Early MD 1-2 , Late R-1 or 0

In addition those with SMS were requested to make a recording on the day of recovery from the symptoms with a non affected crewman making a control recording if possible. Anyone electing to use the motility stimulating medication was requested to make a 45 minute recording during the initial drug dosage. The hardware consisted of four miniature professional two channel tape recorders and two small microphones and miniature battery supply mounted on an elastic velcro coupled belt. Operations consisted of turning on the recorder, checking pre-set controls and connecting the microphone belt and placing it around the waist. A recording time of 45 minutes/cassette side was available and requested. The crewman was free to perform his usual tasks during the recording.

The recordings were analyzed by replaying and 1) recording through a filter on a high frequency two channel graphics recorder 2) having a skilled observer listen through stereo headphones and electrically mark the graphic record whenever a sound is heard. The marks were then counted, averaged over five minute epochs and plotted or otherwise analyzed.

Results - 3 subjects made a total of 4 inflight and 3 postflight recordings as shown in the matrix. Two of these were during the periods of SMS and one subject without

Pre or Post			
Not Affected	1	1	-
Affected	1	1	1
Affected	1	1	-
		Early	Late

SMS took the motility drug inflight. Since this was the first opportunity to use this methodology after STS-8 a number of points are of interest including: with a trained observer it is possible to reliably record and quantitate sounds in all but the most active or noisiest conditions inflight. Secondly the scheme works with a minimum of training and crew interference. Of even more interest is the unequivocal nature of findings. With SMS there is barely detectable activity and after recovery (MD-7) sounds were essentially normal. They were also normal in a third subject during the period of SMS who had been affected on a previous mission. The differences are orders of magnitude.

Conclusions: Since this was a shopping list item and since over a year had been spent in trying to get confirming results, this was a major step forward. Conversely no complete sequence was completed. On the basis of protocol none of the goals were completely met but on the basis of added knowledge 100% of the attempted recordings were successful. All the data has been analyzed and plotted and a medical report is in preparation.

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