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 HOUSTON, TEXAS 77058

JUL 3 1970
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REPLY TO
 ATTN OF: DB6-167

MEMORANDUM TO: DA/Director of Medical Research and Operations
 FROM : DB/Chief, Biomedical Laboratories Division
 SUBJECT : Data recording requirements for Skylab medical experiments

As a result of the recent review of the capabilities of the existing Apollo data recording system, you requested a summary of our requirements for postflight data acquisition during the Skylab program and whether the existing Apollo equipment could satisfy these needs.

The experiments which will require recording analog capabilities are M171, M092, and M093. The following is a list of the minimum data channels which must be collected during the postflight activities:

<u>M171</u>	<u>M092</u>	<u>M093</u>
1 Time	1 Time	1 Time
2 Heart rate	2 Heart rate	2 Heart rate
3 Blood pressure	3 Blood pressure	3
4 ECG (2 channels)	4	4 VCG (3 channels)
5	5 VCG (3 channels)	5
6 Workload	6	6 Workload
7 RPM	7	7 RPM
8 \dot{V}_{O_2}	8 Leg volume (2 channels)	8 Ambient Temp
9 \dot{V}_{CO_2}	9 Body temperature	9 Ambient Press
10 R.Q.	10 Ambient temp	10 Voice Annotation
11 Minute Volume	11 LBNP Temp	
12 Respiration rate	12 Ambient Press	
13 Body temperature	13 LBNP	
14 Voice	14 Voice Annotation	

It is anticipated that M171 will be run in parallel with one of the other two experiments in order to collect these data as soon after recovery as possible. Therefore, the recording equipment could not be shared during this period.

The Apollo system currently has the capability to record seven channels of analog data on magnetic tape and to display four of these channels graphically on chart paper. Although the system capability could be expanded by multiplexing on the FM recorder and slaving additional chart recorders to this device, this approach would require design and fabrication of external interfaces and would rapidly approach the undesirable configurations which were necessary during several of the Apollo post-flight tests.

The Skylab program is our first chance to attempt laboratory quality experimentation preflight, inflight, and postflight and this type of instrumentation approach cannot be supported as one assuring this level of investigation.

Since the purchase of additional instrumentation is tied in concept to an integrated trailer approach, the overall advantages of such a system are summarized below:

- a. Direct compatibility with laboratory instrumentation which will be used during preflight testing at MSC.
- b. Known capability to collect all data accurately and reliably.
- c. An experimental environment in which the thermal condition can be adequately controlled.
- d. The ability to conduct definitive system tests prior to shipping recording equipment to the recovery site.
- e. Minimal chance of damage during transit.
- f. The ability to easily incorporate new medical experimental requirements on future manned spaceflight programs.
- g. A mobile facility in which NASA's medical expertise and advances can be concentrated.

The last point, although not directly related to the Skylab program, is considered an important aspect of our overall program. The potential medical spin-off from such a facility could pay back many times the initial investment required. Presently, in our crowded and continuously changing laboratory facilities it is rarely possible to keep an assembled configuration of the latest developments which demonstrate the current state-of-the-art capabilities being developed.

In summary, although the present recording equipment which adequately supports the Apollo program could possibly be expanded to minimally support postflight Skylab requirements, it is our recommendation that an integrated mobile laboratory approach be pursued as being in the best interests of the Medical Directorate.



E. L. Michel

cc:

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Dr. B. D. Newsom

DC/Dr. W. W. Kemmerer

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DB6:JARummel:mr 6-29-70