

**Lyndon B. Johnson Space Center**  
Houston, Texas  
77058

Reply to Attn of:

SD5-90-545

SEP 14 1990

William Thornton, M.D.  
SD/NASA Johnson Space Center  
Houston, TX 77058

Dear Dr. Thornton:

You have been asked to serve as a member of the Discipline Implementation Team (DIT) of the Exercise Countermeasures Project for the Extended Duration Orbiter (EDO). We are to meet in Houston, October 22-24. The objective of the meeting is to determine the physiological and psychological problems anticipated in EDO flights of 13 or more days and to suggest countermeasures to deleterious adaptations. As a member of the Instrumentation Group, we have two goals. Primarily, we want to familiarize ourselves with the hardware/equipment/instrumentation available for physiological and psychological research and countermeasures in space. Secondly, we want to develop some guidelines for equipment identification, development, and procurement for future research and countermeasures. As you already know, getting equipment certified to fly on the Shuttle is a lengthy and complex process. We will need to remind our DIT colleagues that the time schedule precludes very much equipment development for EDO. To help emphasize this point, and to familiarize everyone with the available exercise and measurement equipment which is presently available, we will host an equipment display of flight-ready and near-flight-ready equipment at the DIT meeting.

The schedule for the DIT meeting won't apply to the Instrumentation Group exactly. We plan to introduce the Instrumentation Group to all the current equipment at the display room in the Hilton on the afternoon of October 23. The equipment display for the whole DIT will be that night, and Dr. William Thornton will introduce the equipment display at the evening DIT dinner. On Wednesday, October 24, we (the Instrumentation Group) will be briefed early by Flight Certification person(s). The remainder of Wednesday morning we will try to develop some procedures to recommend to the Exercise Countermeasures Project for equipment identification, development, and procurement. Wednesday afternoon, we will split up to visit the other group meetings (cardiovascular, muscle, and biomechanics/bone--according to your expertise) to assist them/advise/anticipate instrumentation and hardware problems. The Instrumentation Group will meet briefly at the end of the day to exchange notes.

As it now stands, we intend to show the listed equipment:

- Treadmills
  - Training version of MK I (Shuttle)
  - MK II
  - Instrumented treadmill
- Upper-body exercisers
  - Seat isometric dynamometer--need seat from Shuttle
  - Isotonic body ergometer--need base platform
- Rowing machine
- Some illustrative mass measuring device
- SLS-1 ergometer
- Medgraphic VO<sub>2</sub> analyzer

K<sub>2</sub> VO<sub>2</sub> analyzer  
Holter monitor  
Suntech blood pressure device  
Poster of flight LBNP  
Central venous pressure device  
Pictures/posters with captions of:  
    Whole body (Universal gym type) exerciser  
    Next prototype of treadmill

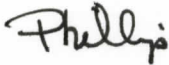
The emphasis is on EDO equipment which is flight certified or nearly so.

I will take care of moving all equipment and securing necessary NASA paperwork to move offsite to the Hilton. Hardware will be moved over on October 22 and back on the evening of October 23.

We will not have much time to work, so the more advance preparation the better. I am including copies of small parts of some of the documents that outline equipment requirements and restrictions. I am arranging for a presentation on this topic, but these may help you appreciate what is involved. You should also be receiving some reprints of some review articles on space physiology. Dr. Thornton is preparing a booklet describing some of the exercise equipment, which will also be forwarded as soon as it is ready.

If you have any suggestions, please send them to Phillip Bishop, Human Performance Laboratory, P.O. Box 870312, Tuscaloosa, AL 35487-0312.

Sincerely,



Phillip Bishop  
Chair, Instrumentation Group



Michael C. Greenisen, Ph.D.  
Manager, Exercise Countermeasure Project

Enclosure

cc:  
Dr. William Squires