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REPLY TO
ATTN OF: DF2/M011

OCT 21 1974

MEMORANDUM

TO: Distribution

FROM: DA/Director of Life Sciences

SUBJECT: JSC Life Sciences Payload Development

In a previous memorandum (DF, dated August 26, 1974) I outlined a series of steps concerning the development of the JSC Life Sciences Payload. This memorandum proposed the establishment of the Payload Selection Team and called for the implementation of a plan to define the direction and scope of a long range program of medical research in space by the LSD through the 1980's. The critical objectives of the LSD program are to provide management with an appreciation of our demonstrated ability to conceptualize and implement a Life Sciences Payload and to serve as a focus for the iteration of scientific payload development. In meeting these immediate objectives, the definition of a broad R&D program to give us the confidence to commit crews to missions of one to two years duration is assured. The major aspects of our approach to this goal have progressed to the point such that a more formalized structure of these efforts is now warranted.

The initial definition and scope of the Directorate's effort identified a series of steps leading to the call for experimental proposals for the first dedicated Life Sciences Payload in the Shuttle Program. I suggest that the development of scientific, experimental proposals targeted for the first LS mission will encompass a categorical listing of the current knowledge of man in space as well as identify those unknowns essential to long term flight commitment. From this understanding must come a series of goal oriented experiments, that when viewed collectively define the Directorate's goals for medical research in this decade. Accordingly, from each series of experiments, with priority ranking will come the initial increment, or basically, the JSC Life Sciences Payload experimental package for the first dedicated Shuttle mission. These experiments by necessity should follow the broad guidelines proposed in my initial memorandum on the subject. However, in expanding these earlier considerations, I suggest that the initial proposals for experiments not only reflect the overall plan,

but also these efforts must be applied goal oriented researches which will ultimately furnish relevant, useful data. I can see no benefit from expansive, all encompassing protocols which fail to address basic questions, nor protocols which simply repeat our Skylab Program on a new vehicle. Additionally, the inflight clinical applicability of these experiments should be addressed wherever relevant. In these experiments, I think we must pay close attention to the development and inclusion of "core" equipment that can be shared by groups of investigators on any particular payload. This emphasis on "core" equipment development need not be a justification, however, for proposal selection. I anticipate realistic concern on the part of the investigators to get "locked in" to an experimental design some six years prior to flight opportunity. It is not the purpose of this effort to accept a payload package that is inflexible, nor is it rational to burden ourselves at this date with highly detailed Experiment Implementation Plans and sophisticated weight, volume, and power considerations. I would like to see us pursue a rigorous scientific program from the onset and address the engineering and operational problems as our experimental approach evolves and matures.

Whereas the identification of an initial payload package is the first step, it must be taken cautiously in light of the present indecision as to individual Center roles in Payload Selection. I suggest that we continue our efforts toward the first dedicated mission, remaining cognizant of the fact, however, that other Centers and outside NASA investigators are competing as well for selection on the first mission.

The Payload Selection Team has been established and is a functional Directorate entity. To be effective, this team must serve as the focal point for coordination and integration of each Division's experimental objectives. The PST will correlate collection and review of candidate experimental proposals; will insure that the JSC Life Sciences Payload represents the overall interest of the Directorate; and will establish that individual experiments are commensurate with the goals of the program medical research for the 1980's. This team, with the equal representation of each LSD divisional element, will be the focal point for recommendation of payload considerations to the LSD CCB. The potential contribution to the overall program by each experiment, as well as a judgment of the relevance of each proposal to the overall goal defines the charter of the PST. Final approval of payload selection will be the responsibility of the LSD CCB, relying on the recommendations of the PST.

I consider a combined program of initial experimental proposals and validation in individual laboratories followed by high fidelity ground based verification testing in spacelab mockup facilities to be a realistic approach to meeting our critical objectives. So that management may have an opportunity to appreciate our capabilities and to insure a JSC

competitive role in the initial dedicated mission, I am proposing a schedule commensurate with our ASTP commitments and with the availability of personnel and equipment resources.

January 1, 1975 - Preliminary statements from each investigator defining overall research goals and a projected series of experimental areas worthy of long range investigations presented to Divisions. Divisions are expected to review and critique these broad plans prior to receipt of initial proposals for specific studies.

February 1, 1975 - Preliminary yet scientifically detailed experimental proposals submitted to Divisions for review. These proposals should be the initial experimental step by each investigative unit in their respective programs to commit man to long duration flight. These experiments may be designed to reflect the operational constraints of the early Shuttle/Spacelab system as to mission duration (five experiment days) and crew size (two active experimental participants). However, since mission duration and crew size are tradeoffs against payload weight, we would be prudent also to consider approaches which judiciously balance operational constraints and scientific yield. Candidate proposals will be returned to individual investigators after Division review for additional detail or changes, if indicated.

March 1, 1975 - Division selection of candidate experiments in refined form and presentation to the Payload Selection Team for review. This presentation will be in written form initially with each candidate experimenter invited for a subsequent verbal presentation to the PST.

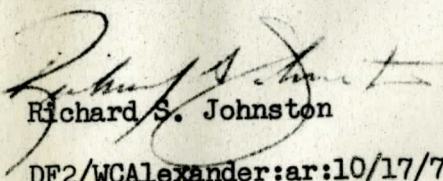
May 1, 1975 - Preliminary selection of candidate experiments by PST. Experiments cataloged and submitted for engineering and operational compatibility studies.

June 1, 1975 - Candidate experiments returned to PST. Tentative selection of candidate package by PST. Package prepared for submission to the LSD CCB.

July 1, 1975 - Formal review of experimental series by LSD CCB and selection of the Payload package.

Although this schedule is realistic in light of our other commitments, I am hopeful that we can compress this activity in such a way that the selection of the payload package may be realized by May 15, 1975. I believe the Agency is prepared to move forward on payload definition and integration and the competitive position of JSC Life Sciences would be significantly enhanced if we were to define a well balanced package by this earlier date.

The selection of the candidate package for the initial dedicated mission is only the beginning. With a total of twenty-eight dedicated missions, and a projected launch schedule of two-to-three dedicated missions per year, it is imperative that follow-on proposals for subsequent experiments as well as new experiments be under consideration in conjunction with our work on the initial payload. I believe that the first opportunity for concept verification of the selected experimental package utilizing the payload mockup can be realized no earlier than January 1976. By this date we should have at least two tests in the Shuttle Spacelab mockup behind us and perhaps as much as a year to evaluate our experiments and overall experimental objectives in the laboratory. Ultimately, an orderly series of follow-on experiments and concept verification testing will ensue coincident with our initial efforts for the first dedicated mission. From this progression of conceptualization and ground based testing will emerge numerous possibilities to evaluate and refine our long range goals for payload considerations in subsequent dedicated missions.



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