

DONALD A. BEATTIE

Consultant

13831 Dowlais Drive
Rockville, Maryland 20853

(301) 460-6187

July 10, 1989

Dr. Jack L. Kerrebrock
Associate Dean of Engineering
Massachusetts Institute of Technology
77 Massachusetts Avenue
Cambridge, MA 02139

Dear Jack:

As promised, here are a few thoughts on how to move forward on the concept of the Space Station as a future NASA Center. Let me say at the outset that, in spite of my questions at the last meeting, I support the concept and believe that NASA would gain at many levels by approaching its development with this thought in mind and overtly advertising it as such.

First, I don't believe that thinking about the Space Station as a future NASA Center means that there must be major changes in its configuration, or deployment scheme. It does mean, in my judgement, that great care must be given to making it "user-friendly". What does this mean? It means that just as we know that all NASA Centers are conducting research for which the Centers did not originally plan, they are also carrying out core research by which the Centers earned their original recognition. Microgravity research, human response to the space environment, and the use of space as a place from which to make observations would be examples of core research that NASA management understands as being important; the unplanned research is, by definition, much more difficult to know how to accommodate. This is made all the more challenging by the Space Station's very location and the difficulty and expense of adding-on or modifying. To me this means that "hooks and scars" must be given special attention, perhaps by our committee.

Second, I think there are two time frames that must be considered in the evolution of the Space Station as a research center, the near-term (first 5-10 years) and the long-term (next 20-25 years). The first 5-10 years should be approached, philosophically, as a learning experience. I would be surprised if any of the original NACA Centers jumped to the forefront of science and engineering during their first 5-10 years. Without having researched the subject, I suspect that those years were spent, primarily, getting facilities on-line and building staff. If my surmise is correct, I think that should be a crucial analogy for all the decision makers and potential users; don't expect too much from Space Station research, too soon. However, I also expect that

there will be enough interesting news, both scientific and of other types, coming out of activities at the Space Station to continue to generate interest in this new facility. The 20-25 years following the initial activation will be the critical years. And this presents a paradox, because by this time, the Station and its equipment will be 20-30 year old technology. Planning for and understanding this paradox is where the ORU and pallet design approach becomes critical. Questions such as those raised by our Committee on how will the Station accommodate new computer technology are especially important. I sense that NASA is asking the right questions on this matter, but, I am not sure that they are developing the right answers. I'm not sure anyone can, but this aspect deserves special attention. And here is a second paradox, this second phase will be highly user driven. But the users who must be involved now in the planning for future research will in many, or most cases, not be participants in the research; their active research careers will have been completed before the full fruits of the research are known.

Finally, there is the question of staffing, the most critical issue for any research institution. The Space Station will represent a unique challenge in this regard. Most of the results of the research will accrue to researchers who will not have had hands-on involvement. Only a few will have this opportunity, the vast majority will be back on Earth doing the preliminary or back-up experiments. It is for this reason that I think the idea of having a earth-based Center counterpart of the Station has the most merit. Doing research by proxy is difficult. It will require a special understanding and commitment to assure the most productive results. I don't believe that anything we have done to date in space research comes close to duplicating the magnitude of the effort that will be required. It will mean the recruitment of scientists and engineers who will see this way of doing business as an advantage and not a drawback. It will not be difficult to recruit the on-orbit researchers (although the qualifications should be carefully arrived at). The support teams, and in many cases the leaders of the research, will have to be a new breed or, at least, an evolving breed from today's typical researcher. How much of the terrestrial counterpart should be centralized and how much should or could be decentralized, is a question that deserves much, additional thought.

One additional, extraneous thought. The Space Station Office and its present user community need to "advertise" much more widely what is going on. The process of selecting experiments, who is involved, what has been the debate, the kinds of equipment selected or rejected and the whys and wherefores. I think that there should be regular articles in Science and other journals written by members of the user community such as those at the meeting we attended. It seems to me that this is the only way to encourage support by the potential user community. Without this insight and understanding I believe we will only see continued polarization of the research community.

Hope these thoughts are useful. Call me if you want to discuss them further. Hi to Vicki; see you in October.

Best regards,

DAB/ab

cc: L.J. Adams