

UNITED STATES GOVERNMENT

# Memorandum

TO : KA/Manager, Apollo Applications Program Office

DATE: FEB 26 1970

FROM : EW/Chief, Spacecraft Design Office

In reply refer to:  
EW-KA-(O-00)93

SUBJECT: Habitability provisions of the Orbital Workshop

Yesterday, two of the crewmen of the "Ben Franklin," the undersea craft that drifted for 30 days submerged in the Gulf Stream, were here at MSC, and related many of their experiences and observations having to do with the habitability provisions of the "Ben Franklin" during its mission. The crewmen that talked to us were two of a crew of six. They were Jacques Piccard, another one of the famous Piccards, and Chester May, a MSFC engineer.

Both men considered the mission as a whole to be successful, but both were quite critical of certain features of the undersea craft, particularly its habitability provisions. Dr. Piccard even suggested that mission success was in spite of and not because of the habitability provisions of the craft. Both men implied that the inadequacies were all the more annoying when one reflected upon how little engineering attention would have been required to have alleviated most of the discomforts.

Let me list some of the inadequacies mentioned: there was no privacy; the lighting and acoustic control was poor, and interfered with sleep; thermal control was entirely inadequate, and there was no extra clothing available for that contingency; the food was dreary and unimaginative, and the hot water wasn't hot; the respirable atmosphere reached marginal levels of contamination; and worst of all, the crew had no means of objectively assessing the status of their environment and general situation. They sometimes became apprehensive unnecessarily.

After the meeting, I asked Dr. Piccard why the "Ben Franklin's" habitability provisions were inadequate when they were so readily discernable and correctable during the engineering stages. He replied that many had been recognized and pointed out, but that the people charged with engineering and development seemed unable to react to observations and suggestions that did not fall within the boundaries of a classic engineering discipline. Common sense seemed to have been afforded little credibility.

All the while that the inadequate habitability provisions of the "Ben Franklin" were being described, I could not help but reflect upon the similarity of the "Ben Franklin" and the Orbital Workshop in those respects. If I hadn't known better, I would have thought I was preparing to a debriefing of the first Workshop mission in 1973.



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I asked Mel Markey, who represented Headquarters, if AAP had been exposed to the "Ben Franklin" experience. He said that several briefings had been arranged at Headquarters and at Marshall, but he left me with the impression that AAP had been something less than attentive. Incidentally, Homer Dotts was the only AAPO man that I recognized at yesterday's briefing.

For over a year now I have been promoting improved habitability provisions for the Orbital Workshop - both as one interested in spacecraft design generally, and as Principal Investigator for Experiment M-437. For the most part I have been unsuccessful. The reasons are many, but many stem from the failure of NASA and its contractors to appreciate the importance of adequate comfort and convenience in long-duration spacecraft, or how to design for same, when they do appreciate the importance.

I bring all of this to your attention because I think it not too late for the Workshop to profit from the "Ben Franklin" experience. It is true enough that the lack of habitability provisions has had little deleterious effect upon the success of our manned spaceflight programs to date; but, according to Dr. Piccard, the 30-day mission of the "Ben Franklin" began to tell upon its crew, even with its much less primitive habitability provisions. It might be argued by MSC that crew motivation, training, selection, etc., may differ markedly between the "Ben Franklin" and the Workshop, and so invalidate any comparisons; but, I consider the "Ben Franklin" a better analogue of the Workshop than, say, Apollo 7. I strongly urge you to do likewise.

  
C. C. Johnson

cc:

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EW:CCJohnson:lgp 2-26-70