Program Justification for RA 621

In the development of the designs and in the execution of the programs, the Astroplane, Diemos and Orion projects will require inputs from Life Sciences and Life Support Systems research scientists. For example, in a recent discussion with the engineer responsible for the design of the life support system on Diemos, he stated that the pressure and composition of the specified atmosphere had been "more or less picked out of the air." In the development of the Orion concept the very large number of "independent man days of operation" clearly implies the requirement for a completely regenerative life support system. The development of such a system depends on the acquisition of a lot of hard facts relating man to his physical environment (and vice versa) which are not presently available anywhere.

The sources of the required information are threefold. Some may be obtained from research conducted in government (Air Force) research laboratories. These data are available and much of the information is useful but the programs are not oriented toward support of any particular system. They therefore produce much information which lacks the specificity required for application to Diemos, Astroplane or Orion.

The second source is other industrial research laboratories. It is patently obvious that data developed by North American, Republic, Vought, Northrop or any of the other systems oriented missile manufacturers will not be given to us to support our efforts in the management of large manned space systems. The information, with rare exception, is not being generated by small independent industrial laboratories as may be the case, for example, in the electronic industry.

We must conclude that in order to have the capability of developing and managing large manned space programs we must conduct the necessary Life Sciences Research - and that we must obtain and maintain a reasonable staff of competent scientists who will be available when needed on these programs. The acquisition of adequate facilities and the staffing of the laboratories cannot be accomplished after the program is obtained. In fact, without a solid nucleus of facility and talent in this area no large manned space systems will be forthcoming to the company.

We can maintain and build our staff with support from smaller individual research projects. A conservative estimate of the FY 63 research contract market available to Denver Life Sciences research is about 5 million dollars. It is obvious that we could not handle anywhere near this volume with present staff and facilities. We believe that we can handle up to 500 K in FY 63 with only very moderate facility additions and with some additions to the existing staff. (It should be noted that a billing of 500K implies a minimum working staff of 20 people with no corporate participation at all).

In the development of military manned space systems we must have competence in human physiology. Our program of research in human physiology must be preceded and continuously supported by research in animal physiology. Therefore we must have the required facilities. Without them we will have no staff, no program, no Diemos, no Orion and probably no Astroplane.