

Essential for Research

a- Nature of Research: The research being conducted includes the space operation of a NASA-funded science mission involving the effects of microgravity on biological activity. In particular, the working hypothesis for the PharmaSat mission is that antifungal drugs are less effective in the microgravity environment. To test this hypothesis, a yeast bioreactor is being developed as the PharmaSat payload and will subject multiple yeast samples to varying concentrations of antifungal drugs. Yeast metabolism will be assessed through optical techniques based on specimen luminosity.

b - Necessary for Project: The communications facility being requested for this project is essential to mission success. The spacecraft being developed is very small (~5 kilograms and only 1/9th of a cubic foot) and has a very limited ability to generate power to support communications with the ground. As a result, we require a very large, high-precision, parabolic dish to support 2-way communications.

c – Existing Facilities Inadequate: Given the size and special capabilities required for the ground station, very few facilities exist which are capable of providing such performance; those that do exist (e.g., within the NASA Deep Space Network, the Air Force Satellite Control Network, etc.) are significantly oversubscribed and very high-cost. The low earth orbit satellite is only in the sky above a particular site or a few minutes, a few times per day. The proposed Kentucky station is already constructed and available, and by its' location will allow command and control of the satellite, and data acquisition, during orbital passes which cannot be monitored from the only other available station at Palo Alto, CA . We have implemented a very low-cost solution through the installation of our own custom communications and command and data handling equipment.