Essential for Research

a- Nature of Research: Pharmasat: The research being conducted by this NASA satellite involves studying 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.

COTSat: The research conducted by this NASA spacecraft involves using a CCD detector to collect photometry data from several Extended Red Emission (ERE) targets within the galaxy. This will inform our understanding of the influence ERE has in the radiative balance within the interstellar medium, reveal the distribution of carbon in the interstellar medium, and provide information regarding the role that extra-terrestrial organics may have played in the origin of life. In addition, several low-cost design strategies will be evaluated through the performance assessment and long-term characterization of novel platform components.

b - Necessary for Project: Pharmasat: 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 large, articulating, parabolic dish to support 2-way communications.

COTSat: The communications facility being requested for this project is essential to mission success. Like other spacecraft being developed by NASA Ames, this satellite uses a very low power transmitter thereby requiring a large, articulating, 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 proposed station, which will provide critical backup for the main station at Stanford, will test a very low-cost solution through development of a relatively small, low cost, high efficiency antenna and the installation of our own custom communications and command and data handling equipment.