NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
RESEARCH AND TECHNOLOGY RESUME

TITLE

SUBMILLIMETER HETERODYNE RECEIVER FOR THE CSO TELESCOPE

PERFORMING ORGANIZATION

JET PROPULSION LABORATORY
4800 OAK GROVE DRIVE
PASADENA, CA 91109

INVESTIGATOR'S NAME

Gulkis, S.

DESCRIPTION (a. Brief statement on strategy of investigation; b. Progress and accomplishments of prior year; c. What will be accomplished this year, as well as how and why; and d. Summary bibliography)

a. **Strategy:** This task is to build a cryogenically cooled 620-700 GHz astronomical receiver that will be used as a facility instrument at the CalTech Submillimeter Observatory on Mauna Kea, Hawaii. The receiver will have applications as a very high resolution spectrometer to investigate spectral lines in planetary and satellite atmospheres, and comets. The receiver will also be used to make continuum measurements of planets, satellites, and asteroids.

b. **Accomplishments:** During FY88, a scale model (200 GHz) SIS mixer radiometer was built and integrated into a cryostat designed for use on the CSO telescope. This system will serve as a model to guide the work on the higher frequency mixer. A solid state local oscillator source that covers two bands in the 600-700 GHz has been developed under contract to JPL and will be delivered before the end of the year. Work has continued on the SIS materials needed for the 620-700 GHz mixer. Test hardware has been developed which allow the I-V curves for SIS material to be easily measured.

c. **Anticipated Accomplishments:** The major effort during FY89 will be to integrate a 600 GHz SIS mixer into the cryostat and to optimize the system for use as a spectral line receiving system on the CalTech Submillimeter Telescope.

d. **Publications:** Gulkis, S., Frerking, M.A., Swanson, P.N., Wannier, P., and Wilson, W.J.: Submillimeter Heterodyne Receiver for the CalTech Submillimeter Telescope on Mauna Kea: proposal submitted to the NASA Aeronautics and Space Administration Office of Space and Application.