Stanford University Dept. of Aeronautics and Astronautics
Experimental License Application
Stanford University
Stanford, California

EXHIBIT 3

Explanation of the Project

Technical Characteristics:

The experimental program described in this application involves the establishment of terrestrial GPS pseudolites operating at the standard GPS L1 frequency as described in Exhibit 1. The pseudolites will transmit various combinations of the signal formats and pulse formats described in Exhibit 2. These combinations cannot be completely specified in advance, because the object of this experimentation is to determine the optimum combinations. The starting point for these experiments will be the signal format and pulse format defined by the RTCA SCB159 committee. Emissions will be confined to the L1 band previously allocated for GPS signals (bands 24 MHz wide, centered on the L1 frequency).

In general, the pseudolite signals will be transmitted in pulses less than fifteen percent duty cycle, to minimize interference with existing GPS receivers. The peak transmitted power (EIRP) will be 1 microwatt or less. One objective of the program is to investigate the required power levels and pulse patterns with the purpose of minimizing power used. Another objective of the program is to minimize pseudolite potential interference with other GPS uses.

Further, there is a specific study of the applicability for self-calibrating pseudolites to be used for rover navigation on Mars. These studies of the use of GPS signals without causing harm to current navigational uses could result in significant added use of the GPS constellation of satellites for safety, navigation, intelligent transportation systems, and precise, localized remote operation of robots or machinery.

Program Description/Objectives:

In this application, Stanford University Dept. of Aeronautics and Astronautics is seeking experimental authority to operate pseudolites at this location. Operations at this location will take place immediately following grant of this application.

The applicant=s experimental program responds to an invitation from NASA - with respect to navigation on Mars or other planets - and other federal agencies responsible for administration of the GPS system to entities that are interested in producing pseudolite systems that augment basic GPS satellite services. Such entities were invited to test, document and demonstrate prototypes that have been developed using RTCA SC-159 standards. Stanford University Dept. of

Aeronautics and Astronautics recognizes that it is to bear its own costs in this program. If the tests prove successful, however, and many applications could be discovered for this technology.

Contribution to the Development, Extension, Expansion or Utilization of the Radio Art:

The experimental program is based upon the precept that the use of pseudolites at the GPS L1 P(Y) code nulls is an augmentation of GPS that will lead to an improvement of GPS services. Pseudolites clearly have the ability to support aviation, particularly aviation safety in low visibility conditions. The objective of this experiment is to determine whether and to what extent pseudolites can also support other safety of life applications, including improved safety in mining operations. They are a complementary use to GPS of the aeronautical radio-navigation service/radio-navigation satellite service spectrum in the 1559-1610 MHz band and they enhance the already substantial value of the dual-use GPS utility.

The results of this experiment will help determine whether an array of pseudolites can self-calibrate, and thus be used as a basis for navigation. This application is particularly useful in an extra-terrestrial environment where the existing constellation of GPS satellites is unavailable for navigational purposes. Further, the technology may have applications in mines or other places where current GPS signals cannot reach, but where centimeter accuracy in movement or navigation can be used to save lives and minimize waste of natural resources.