GPS Networking, Inc.
Experimental License Application
Pueblo, Colorado

EXHIBIT 3

Explanation of the Project

Technical Characteristics:

The experimental program described in this application involves the indoor-only re-radiation of the standard GPS L1 and L2 frequencies as described in Exhibit 1. The re-radiators will transmit the signal formats described in Exhibit 2. The starting point for these experiments will be the signal format and pulse format defined by the RTCA SC–159 committee. Emissions will be confined to the L1 and L2 bands previously allocated for GPS signals (bands 24 MHz wide, centered on the L1 and L2 frequencies).

The experiment relies on receiving a GPS signal at a roof antenna with 40dB low noise amplifier mounted outside of the GPS Networking facility. The initial signal is received at approximately -160 dBW. It is then passed through a low loss RF cable, which has a loss of 8-10 dBm per 100 feet. The cable is connected to a 23dBm standard Line amplifier. The amplifier is directly connected to the GPS Passive antenna which re-radiates the signal. The amplifier gives the system a maximum net gain of 53 dBm, depending on how long the cable is. The longer the cable, the weaker the signal. Thus, the maximum signal strength is approximately -130 dBW, and this is perceived inside the laboratory.

The re-radiated signal has exactly the same information that is collected by the outdoor antenna. Re-radiating signals include timing information and location information from satellites allowing GPS devices to be used indoors as if they were operating in sight of the satellite constellation. The experiments are intended to determine the effectiveness of re-radiated signals in indoor settings where the satellite-based signal cannot reach.

The signal is very weak, with a power output of no more than $1x10^{-16}$watts (0.0001picowatts). Such a weak signal attenuates rapidly; it is blocked if there is a gypsum-based wall board wall in between the re-radiator and the GPS device.

Program Description/Objectives:

In this application, GPS Networking, Inc. is seeking experimental authority to use a GPS re-radiation device at this location. Operation will take place immediately upon grant of the application. The re-radiator will be used by the applicant only indoors, at the power levels specified in the application.

The objective of the experiment is to work with standard GPS receivers and location devices indoors to improve their use in public safety applications as well as to enhance the effectiveness of GPS navigation to aviation safety. The indoor usage allows engineers to ensure the proper functioning of navigational instruments vital to aircraft, both military and civilian. Further, these experiments are designed to test the effectiveness of continuous GPS signal availability to the function of GPS-based direction systems used by police, fire, and rescue workers. If the experiments prove successful, the technology should be effective in reducing the time it takes for Emergency Medical Service providers and police, fire and rescue workers to reach trouble spots because of the increased availability of direction systems.

In normal use, a GPS receiver takes time to download information from the constellation of satellites. The time delay in downloading that information can be detrimental to the use of GPS in emergency settings. The experiments proposed here are largely intended to help minimize the time that navigation systems are unavailable to public safety and military users.

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

The experimental program is based upon the precept that the use of re-radiation of GPS signals indoors will lead to

an augmentation of GPS that will lead to an improvement and expansion of the use of GPS services. GPS supports navigation by the US Armed Forces, at sea, on land and in the air. Further, GPS supports commercial aviation navigational systems and safety. Telecommunications carriers who attempt to provide Automated Location Information in wireless telecommunications systems to aid in response to wireless 911 calls may be relying on location information provided through the GPS system.

The objective of this experiment is to determine whether additional uses of GPS technology, especially when the technology is integrated with other position location technologies can also support other safety of life applications, including improved safety on the roads, in the air, and at sea. These applications 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.