

INTEGRINAUTICS
Experimental License Renewal
1505 Adams Drive
Menlo Park, California 94025
Call Sign: WA2XYP
Original Application File No: 0097-EX-PL-1999
Renewal Application File No: 0275-EX-RR-2000

EXHIBIT

Explanation of the Project

Technical Characteristics:

The experimental program described in this renewal application continues IntegriNautics work with the development of terrestrial GPS pseudolites operating at the standard GPS L1 frequency, 1575.42 MHz as described in the original application. The pseudolites will continue to be used to transmit various combinations of the signal formats and pulse formats. 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 SC-159 committee. Emissions will be confined to the bands 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 2 Watts or less. Continuous (non-pulsed) transmissions have been and may occasionally continue to be made at greatly reduced power, to calibrate the receiving instruments. These continuous wave transmissions have been made at a significantly reduced power level - less than 1 microwatt - and have been coordinated with the FAA Office of Spectrum Policy and Management, to the extent that continuous wave transmissions were used for experimental purposes.

One objective of the program is to investigate the required power levels and pulse patterns with the purpose of minimizing power used.

Program Description/Objectives:

In this application, IntegriNautics is seeking to continue its experiments with pseudolites by renewing its license to operate pseudolites. Operations at the locations on the license will take place during the period immediately following grant of this application.

The applicant's experimental program responds to an invitation from the federal agencies responsible for administration of the GPS system to companies that are interested in producing pseudolite systems that augment basic GPS satellite services. Such companies were invited to test, document and demonstrate prototypes that have been developed using RTCA SC-159 standards. IntegriNautics recognizes that it is to bear its own costs in this program. If the tests prove successful, however, many applications could be discovered for this technology.

Already, the tests of the technology have led to additional experiments in the fields of remote mining and intelligent transportation systems, as well as advanced navigational experiments that may have applicability for remote navigation of the surface of Mars. The experiments are expected to lead to applications that will enhance the safety of life for aircraft as well as for enhancements of highway safety technologies.

Work in the past two years – and expected during the renewal term – is leading to resource efficiencies in mining, resource and man-power efficiencies in farming, including reducing pollution by minimizing use of chemical fertilizers, and enhanced safety and resource conservation in the field of construction. Additionally, work with pseudolites continues to be fruitful in the area of navigation of Mars and other non-earthbound locations. It is necessary to undertake further work to prove the viability of the technology in such settings, which is a reason for filing this renewal application.

The purpose of continuing the experiments is to complete the research into the uses of the technology under development. And, to make full use of this technology for aircraft safety, it will be necessary to continue to test the veracity of the data and the integrity of the pseudolite system. For this reason, it is expected that experiments with pseudolites will need to continue for five additional years.

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 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.