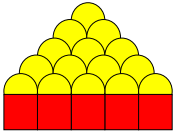


# ATMOSPHERIC & SPACE TECHNOLOGY



## RESEARCH ASSOCIATES

11118 QUAIL PASS • • SAN ANTONIO, TEXAS, USA 78249 • • (210) 691-0432

EIN: 20-2946717

DUNS# 60-1975803

### **Re: Application for Special Temporary Authority FCC Registration Number (FRN): 0015091481**

To Whom It May Concern:

This letter is written in support of an application being submitted to the FCC, to explain why a Special Temporary Authority is necessary. A second accompanying letter describes the project.

The request is to operate three transmitters in the Chesapeake Bay area, as part of an HF Doppler radar to measure traveling ionospheric disturbances (TIDs) in the F-region of the ionosphere. The radar operation will support a NASA rocket launch out of Wallops Island, MD as described in more detail below.

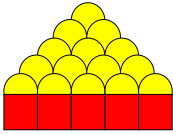
**Requested Dates of Operation:** The three transmitters would operate near the Chesapeake Bay for a maximum of 6 months from July 30, 2007 through January 30, 2008.

**Reason for Special Temporary Authority:** The radar will operate in support of a NASA rocket experiment, to be launched from Wallops Island rocket range, near Chincoteague, MD. The experiment is highly important to the national interest, as it will help to improve our understanding of ionospheric effects that can seriously impair the operation of surveillance, navigation and communication systems. The rocket experiment will also be supported by Air Force experimental radio systems and personnel.

The purpose of the rocket experiment and supporting radar measurements is to investigate mid-latitude ionospheric irregularities that can seriously impair radio propagation and systems on all frequencies. It has been suggested that the irregularities are seeded by gravity waves (AGWs) propagating through the bottomside ionosphere. The AGWs perturb the ionospheric electron density distribution, so they can be detected in the form of traveling ionospheric disturbances (TIDs). The proposed radar will provide one of the main criteria for the rocket launch: the radar will detect the presence of TIDs, and it may also detect the presence and growth of F-region ionospheric irregularities.

The rocket will fly through a Spread-F event while measuring the large and small scale neutral winds, electric fields, and plasma density variations. In addition, GPS data from

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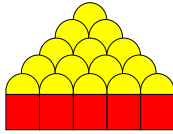
a receiver aboard the rocket will help to characterize the medium above the payload throughout the flight. The rocket measurements will be augmented by comprehensive ground-based observations. The data gathered during the rocket flight will allow for the first time a quantitative comparison between the F-region radio propagation and TID environment and the rocket "snapshot" of the key environmental variables during a mid-latitude spread-F event. In addition, the ground-based diagnostics will occur over a time span of several weeks than the rocket flight, allowing us to build up a series of observations to help characterize the radio propagation environment during both quiescent and active spread-F periods.

We request permission to operate the radar starting July 30<sup>th</sup>, 2007. This allows one month prior to the rocket launch, in order to ensure that the radar is fully operational, and to collect test data for days that do not experience F-region irregularities. The launch window for the rocket is September 11 - October 9, 2007. We further request permission to operate the radar until January 30<sup>th</sup> - this allows several months of data collection after the rocket launch, to establish a baseline dataset for comparison with the data obtained during the rocket flight. If the rocket launches early in the launch window, our radar will operate for less than 6 months.

The radar experiment is supported by NASA Grant NG04WC22G to Southwest Research Institute, San Antonio, TX. The Principal Investigator for the grant is Dr. Rudy Frahm of SwRI. SwRI has hired ASTRA (Atmospheric and Space Technology Research Associates) to deploy and operate the radar, and to analyze the data. The Project Manager is Dr. Geoff Crowley, president of ASTRA. Dr. Crowley is recognized as a leading expert in the field of TIDs and the use of HF radar to detect them, and has worked in this field for over 25 years. Until recently, Dr. Crowley was an employee of SwRI, where he successfully operated similar HF Doppler systems under Experimental Call Sign WC2XRM (File # 0161-EX-PL-2001, and File #0132-EX-RR-2003).

We have deployed and tested the radar (at higher frequencies) in San Antonio, TX. It appears to be working reliably and collecting good data. The radar was interfaced with a data-logging computer, and a real-time display capability was developed and tested. Web-access to the real time displays was also developed. This has been a major development over our previous systems. It was required to enable operations and monitoring from a remote location. It also allows a certain amount of ability to remotely modify and restart the system in the event of software errors. The Web-access and real-time displays have allowed us to recurrently notice and correct problems within hours of their occurrence, rather than the several days or weeks in the past. The complete system is ready for re-deployment to the Chesapeake region, as early as possible.

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Further information about the radar and the experiment is provided in the 2<sup>nd</sup> accompanying letter with this application.

Please contact Dr. Geoff Crowley at ASTRA with any additional questions. The NASA contract monitor for the radar, and the rocket is Dr. John Brinton, who is based at NASA Wallops (tel:757-824-1099). The SwRI PI for the project is Dr. Rudy Frahm (tel: 210-522-3855).

Your help in approving this application would be much appreciated.

Sincerely,

Dr. Geoff Crowley  
Atmospheric & Space Technology Research Associates  
11118 Quail Pass  
San Antonio, TX 78249  
Tel: 210-834-3475 (or 210-691-0432)  
Email: [gcrowley@astraspace.net](mailto:gcrowley@astraspace.net)