

FCC Form 442 – Federal Communication Commission
Application for New or Modified Radio Station Under Part 5 of FCC Rules
- Experimental Radio Service (Other Than Broadcast)

7.

If all the answers to Items 4, 5, 6 are “NO”, include as an exhibit a narrative statement describing in detail the following items:

- a. The complete program of research and experimentation proposed including a description of equipment and theory of operation.
- b. The specific objective sought to be accomplished.
- c. How the program of experimentation has a reasonable promise of contribution to the development, extension, expansion or utilization of the radio art, or is along line not already investigated.

Response:

This experimental project is funded as part of BAE SYSTEMS’ internal research and development (IR&D) program at its Greenlawn, NY facility. Presently, BAE SYSTEMS provides airborne reconnaissance systems to the US Air Force and Navy that provide electro-optical (EO) and infrared (IR) imagery. The US Air Force has identified the need for all weather, day/night reconnaissance capabilities. They have included the development of a synthetic aperture radar for their tactical airborne reconnaissance system as part of their growth plans. The addition of a synthetic aperture radar sensor system will provide this capability. In response to this need, BAE SYSTEMS has embarked on the subject IR&D project.

BAE SYSTEMS has selected the AN/APY-8 Synthetic Aperture Radar (SAR) as the radar sensor system they will use for this research project. The AN/APY-8 is an active coherent radar system produced by General Atomics, San Diego, CA, that is currently deployed with the USAF for UAV and helicopter operations. The theory and operation of synthetic aperture radar is well know and documented. A synthetic array antenna aperture is form by transmitting coherent sets of radar pulses at precise intervals as the aircraft is flown along a prescribed path. By forming extremely large synthetic array apertures the effective beamwidth can be narrowed down to a small fraction of a degree providing very high azimuth resolutions comparable to that achieve with reconnaissance cameras. Implementation of synthetic aperture radar on a tactical jet aircraft such as the F-16 poses significant challenges including packaging, stabilization and image processing requirements. The research project addressed the implementation of the AN/APY-8 into an F-16 Theater Airborne Reconnaissance System (TARS) pod that can be flown on the USAF Air National Guard version of the F-16. The SAR system will use the TARS pod sensor controller to control its operation during flight further demonstrating its compatibility with the current USAF TARS architecture.

The objective of this research project is to demonstrate the feasibility of obtaining high resolution synthetic aperture radar images using an already deployed synthetic aperture

radar with a tactical aircraft such as the USAF F-16 for airborne reconnaissance missions. To achieve this objective, the radar will be flown on an USAF Air National Guard configured F-16 at Eglin AFB, Ft. Walton Beach, FL, by the USAF 46th Test Squadron. Since this research project is being funded by BAE SYSTEMS it is classified by Eglin as a commercial contract and an FCC license for the radar will be required for the test flights.

Successful demonstration of the radar's imaging capability on a tactical aircraft will demonstrate to the USAF the ability to provide the all weather, day/night reconnaissance capabilities they desire using a synthetic aperture radar system that is presently in their inventory. This will save the government significant development costs that would be required if a new radar system was to be used.