

This exhibit address: Form 442 Question 7: Experimentation Description

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Synthetic Aperture Radar Experiment from High Altitude Balloon Platform

Funded through Operationally Responsive Space (ORS) North and JIATF South

Project Summary

In recent years, advances in Synthetic Aperture Radar Imaging (SAR) have led to hardware of small size and weight with low power consumption requirements. This makes possible the use of SAR on platforms where it was previously impossible due to the size of traditional radar systems. One of these platforms are high altitude balloons.

High altitude balloons, or stratollites, have also advanced in capabilities. Recently, the ability to guide the path of a stratollite has been developed and is possible by increasing or decreasing the altitude of the balloon to catch the air flowing in the desired direction of movement. With advanced computer controls, this allows the stratollite to stay in an area for weeks at a time.

Stratollites therefore make a good potential platform for intelligence, surveillance, and reconnaissance (ISR) sensor systems. The ARTEMIS SlimSAR is the first SAR system that will be flown on a stratollite. The experiment entails the following:

- 01 October 2017: Stratollite launch from Key West carrying the ARTEMIS SlimSAR
- 01-02 October 2017: Operation of the SlimSAR over the water in the area surrounding Key West.
 - The SlimSAR will create SAR images of wide swaths of the ocean, and use that imagery to detect and track ships and boats.
- 02-03 October 2017: Stratollite floats to South Dakota
 - The SlimSAR will infrequently take SAR images of rural areas as it passes over the central USA.
- 04 October 2017: Stratollite is recovered in South Dakota

The dates listed here are contingent on weather conditions. The goal of the experiment is to show the viability of using a small SAR as an ISR payload on the stratollite to support national security around the world.