

Exhibit 1

Title:

Four Dimensional (4D) Oceanographical Instrumentation: Ultra Wide Band Synthetic Aperture Radar for Unmanned Aerial Vehicles. This is a Small Business Innovative Research (SBIR) program.

Description:

The overall objective is to develop sensors and measurement techniques to obtain marine atmospheric and oceanographic variables in three dimensional space and time. The Ultra-Wide Band Interferometric Synthetic Aperture Radar will make measurements of the sea and land surfaces in the littoral zone to provide data for landmine detection, and sea surf conditions in the littoral zone as well as other ocean characteristics of interest to the Office of Naval Research (ONR) and the Naval Research Laboratory (NRL). This system has also many uses for detection and imaging of hidden targets, mapping of terrain, and other measurements like crop density and foliage measurements. Our goal is to make a system capable of making the desired measurements from a small manned aircraft and eventually from an Unmanned Aerial Vehicle (UAV).

Agency:

The Office of Naval Research, 800 North Quincy Street, Arlington, Virginia, 22217-5660.

Contact:

Program Manager: Dr. Dennis Trizna, Office of Naval Research, (703) 696-8380.

Areas of operation:

Warrenton-Fauqueir Airport, Located at Midland, Virginia - used for calibration of navigation and radar systems and the detection and imaging of hidden targets and detection research.

Area within 20 miles of the Midland, VA - used for crop measurements, mapping and elevation measurements and research.

Areas within the lower Chesapeake Bay and the mouth of the Bay - used for oceanographic measurements and research for wave and salt water plum studies and research measurements.

Areas near Cape Henelope, NJ - used for oceanographic research and wave measurements.

Areas just off-shore and the shore line of Duck, NC. - used for sea surf measurements and research, mine detection research and other littoral zone measurements.

Exhibit 2

The areas of operation will be within the areas outlined in blue.

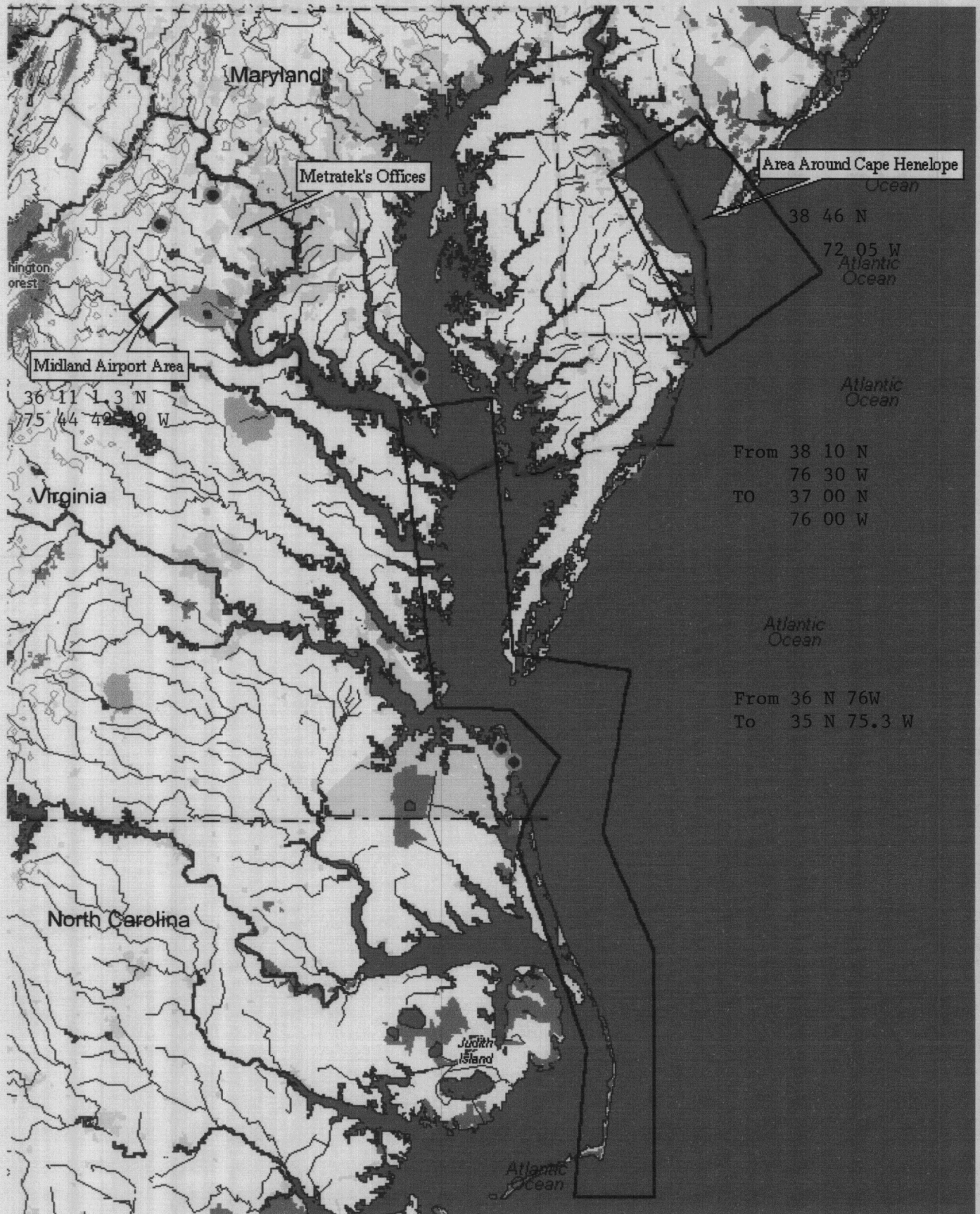
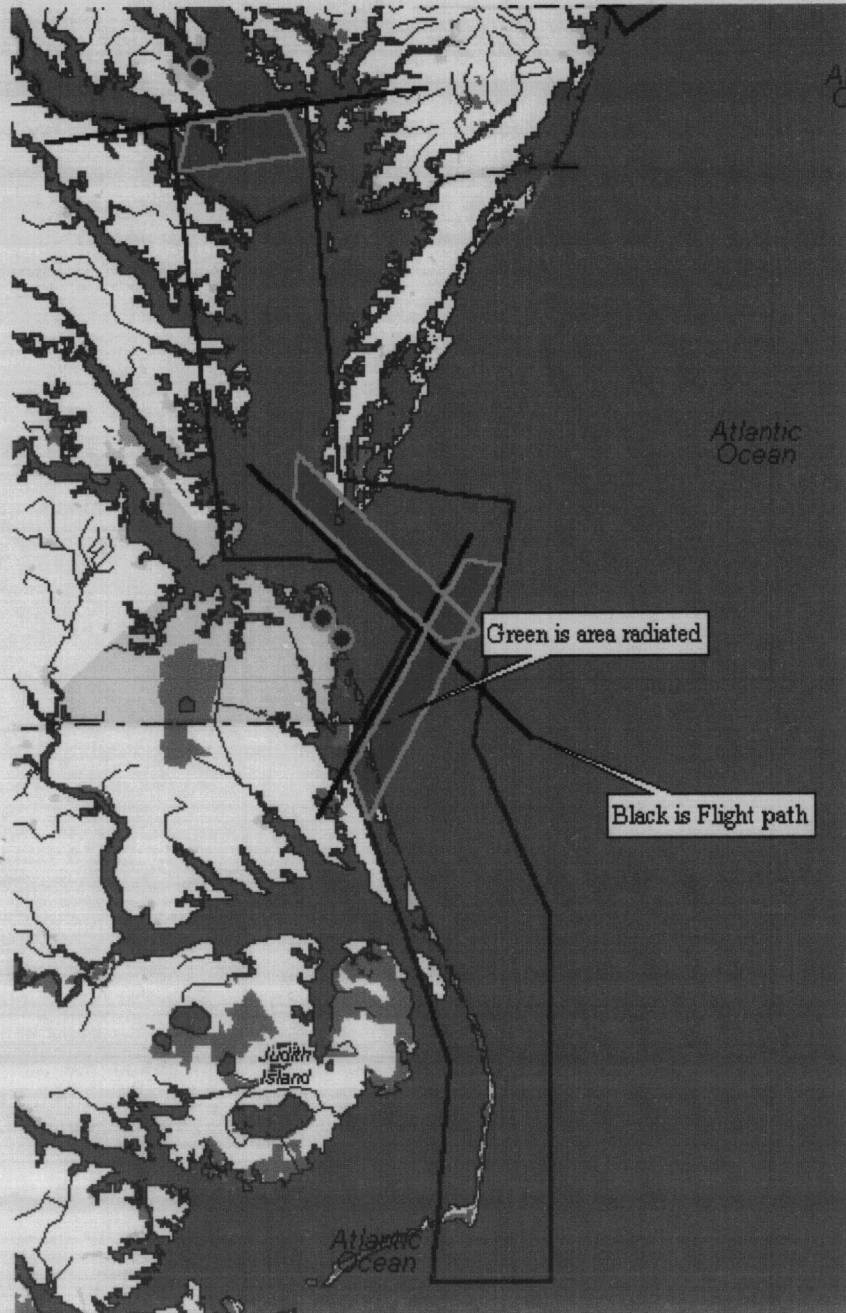


Exhibit 3



The WINSAR system can only radiate out of the port side of the aircraft. All flight paths will be coordinated so that when we are operating near a radar installation we will only radiate away from them. We will be radiating only within the areas outlined in blue. The system uses the latest GPS and INS to plan, guide and manage all flights. Our pilot coordinates the flight paths with all the air-space controllers at Patuxent and Oceana Naval Bases.

Our measurements are for sea, surf, and wave conditions in these areas. We will also conduct research to detect the fresh water plume that flows out of the bay areas into the ocean. We have no need to radiate towards any ground radar sites.

All of our littoral zone and land measurements will be at the Army Corps of Engineers site, located in Duck, NC. They have various instruments set up to measure the sea and surf conditions which will provide ground truth data for our research. They also have mine-like targets in the sand and in the surf so we can research the detection capabilities of the system.

The area around the Midland Airpark (not shown on this figure) is used to calibrate the various navigation systems and the radar. It is also used to test the remote sensing capabilities for detection and imaging of hidden targets and some ground penetrating techniques.