



TIMELY – RELEVANT – PREDICTIVE

# Agile Aperture Antenna (A<sup>3</sup>) Test Bed High-Speed SATCOM Capability for Remote Sensors

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**Classification: UNCLASSIFIED**



# Maritime Domain Awareness

Maritime Domain Awareness (MDA) is part of an U.S. Government interagency and international maritime security effort. The Maritime Domain is defined as all areas and things of, on, under, relating to, adjacent to, or bordering on a sea, ocean, or other navigable waterway, including all maritime-related activities, infrastructure, people, cargo, and vessels and other conveyances. Maritime Domain Awareness is defined as the effective understanding of anything associated with the maritime domain that could impact the security, safety, economy, or environment of the United States and its allies.

- Maritime Security Policy (NSPD-41/HSPD-13)
- National Strategy for Maritime Security
- National Plan to Achieve Maritime Domain Awareness
- Maritime Domain Awareness in the Department of Defense
- Maritime Domain Awareness in the Department of the Navy



# Proposed Antenna

## High Speed SATCOM (Agile Aperture Antenna)

- Narrow beam @ 500 kbps (near video streaming)
- Micro-size moving parts (different from Phase Arrays/Gyroscopically stabilized)
- Steerable beam for satellite tracking (40° beam width)
- Low power consumption
- Low operational cost
- Flat
- Small size (11" x 11")
- Useable with numerous remote sensors
- Technology proven / demonstrated in a static configuration
- Can be used to transmit or receive with tuneable frequencies

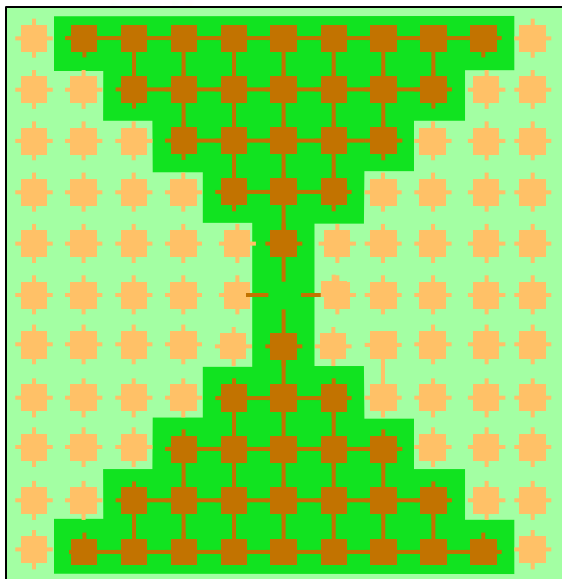


# Static Concept

## Static Aperture Antenna

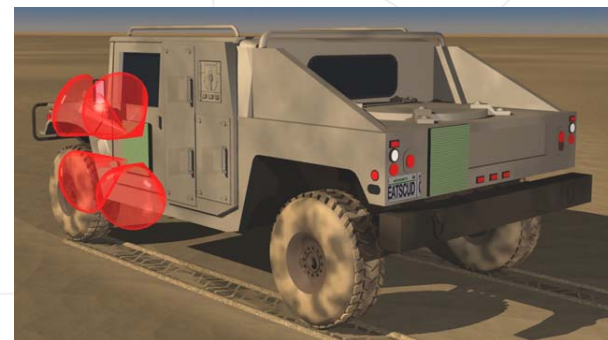
**Concept:** Design a low-cost antenna which can be steered and have variable bands of operation using a single antenna feed

**Solution:** Adaptive Aperture that Reconfigures By Opening and Closing Connections Between Electrically Small Conducting “Pads”<sup>1</sup>



### Antenna Performance

- Tuned band up to 3GHz
- Tuned bandwidth from 5 to 50%
- Steered to 60°
- 10ms switch speed
- Uses simple FETs to steer, no phase shifters



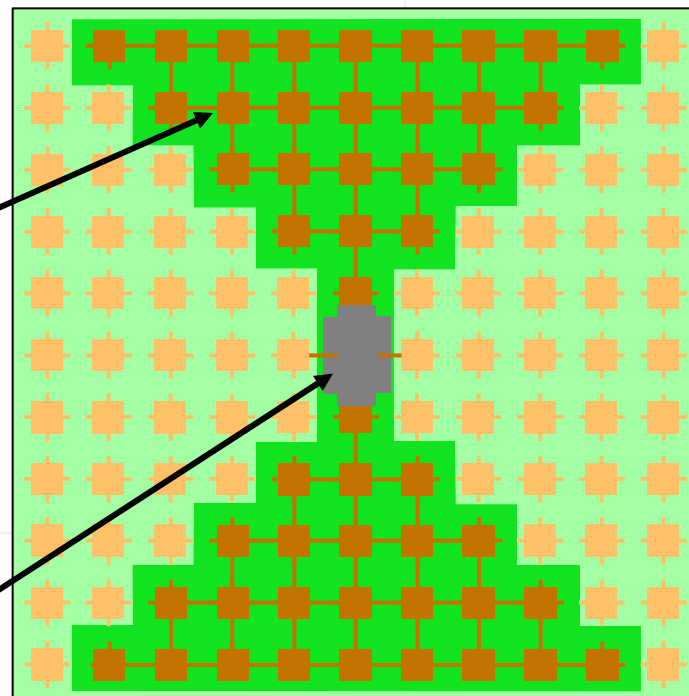
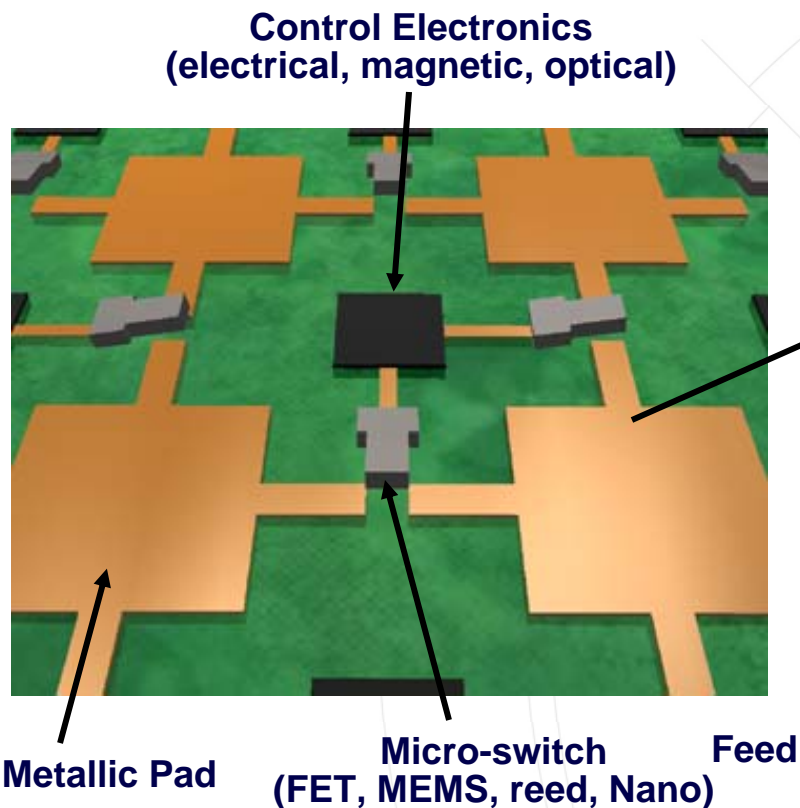
**Array of four antennas fielded at Snake River during an FCS Field Test**

1. Pads are Not Patch Antennas, But Simple Conducting Structures



# Baseline Architecture

Agile Aperture is reconfigured by opening and closing connections between electrically small conducting “pads”





# CEROS Need

## Test Platform for A3

- Remote controlled or autonomous
- Persistent surface presents
- Capable of staying out to sea for months without maintenance or intervention
- Low cost
- Green type technology



TERRORISM, AIR AND SEA, SMALL ATTACK CRAFT, MAJOR SURFACE COMBATANTS, DIESEL SUBMARINES, NUCLEAR POWER, SUBMARINES, MINES, THEATER BALLISTIC MISSILES, ANTISHIP BALLISTIC MISSILES, CRUISE MISSILES, AND

NW



# Questions ?

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