

American Aerospace Advisors, Inc.
1279 Gulph Creek Drive
Radnor, Pennsylvania 19087

APPLICATION FOR EXPERIMENTAL LICENSE

1. INTRODUCTION

This engineering attachment is submitted on behalf of American Aerospace Advisors, Inc. ("AAAI"). AAAI requests Experimental License Authority to operate the equipment shown herein for the purpose of mobile remote control and communications data linkage for an unmanned aircraft vehicle ("UAV") pursuant to Parts 15 and/or 18 of the Commission's regulations. The FCC 442 form does not directly specify options for mobile ground control to airborne communication systems.

Separate systems are employed for remote control of the unmanned aircraft vehicle ("UAV") and communications data linkage. The RF Data Link equipment operates in the 2400-2483 MHz ISM band; the RF C2 Link equipment operates in the 902-928 MHz band. Spread spectrum technology is utilized.

The remote control system is critical to stable and safe operation and control of the UAV. The proposed EIRP of the vehicle-mounted tracking antenna is 80.35 W (49.05 dBm) in the 2400-2483 MHz ISM band. Transmitter power and antenna gain combinations are permissible within this frequency range which permit as much as 158 W (52 dBm) EIRP. Experimental authority is requested to use the equipment as configured as shown in the attached figures. Tests conducted under the requested Experimental License will determine the reliable service range for both the remote control system (RF Data Link Equipment) and telemetry (RF C2 Link Equipment). The tests will also allow AAAI to improve any proprietary algorithms to the control and telemetry systems, EMC compatibility, and provide operational data for this system.

A transponder is specified for the UAV. This equipment is required for the aircraft. The transponder operates in the 1090 MHz band with 11M0P1D emission. The MicroAir T2000AAV (FCC ID NS901P5) and the Sagetech XPS-TR Mode S transponders are approved for Part 15 and Part 87 use under Commission regulations.

2. EMISSIONS:

The MicroHard MHX-910 spread spectrum transceiver is rated at +30 dBm (1 watt) in the 902-928 MHz band. The emission designator is 350kF1D.

The Persistent Systems WR-RTR2-03030303 spread spectrum transceiver (Quad Radio Router) is rated at +27.8 dBm (0.6 W) in the 2402-2438 MHz band. This equipment is FIPS140 Level 2 validated and is on GSA Schedule GS-35F-0168Y.

3. INTERFERENCE

The propagation mode for this equipment effectively is free space. The ground-based equipment will operate in a ground to air mode, and the aircraft equipment will transmit using omni or "blade" antennas to the vehicle-mounted control equipment.

Band pass filters are employed with each emitter to contain the emissions within the specified band width. These filters are denoted in the block diagram for each system.

AAAI does not believe the 80.35 W (49.05 dBm) emission from the ground-based 2.4 GHz RF Data Link will create objectionable interference. The antenna is directed upward toward the unmanned aircraft. The time duration the 2.4 GHz RF Data Link antenna will be directed on the ground is during UAV takeoff and landing. AAAI does not believe this system will create objectionable interference to other airborne or space based systems.

4. RADIATION HAZARD COMPLIANCE

AAAI proposes to operate this equipment in FULL COMPLIANCE with the Commission's non-ionizing electromagnetic radiation ("NIEMR") requirements. The appropriate contours for radiation compliance are 3.05 mW/cm² for the 902-928 MHz systems, and 5 mW/cm² for the 2.4 GHz RF C2 Link equipment.

The required clearance for the 902-928 MHz system with 0.824 W EIRP is 0.2 meter (calculated at 915MHz). In normal use, the 902-928 MHz antennas are well out of contact range by staff or observers. Bench test personnel should observe this clearance unless a suitable resistive, shielded dummy load is substituted for the antenna.

The required clearance for the 2.4 GHz ground-based, vehicular mounted station is one (1) meter with 49.05 dBm (80.35 W) radiated from the dish antenna. This determination is calculated for antenna boresight. Since the antenna is auto-rotatable, the roof area of the vehicle is off limits when the equipment is energized.

5. PROPOSED TEST LOCATIONS

Upon grant of the experimental license, AAAI proposes to test the complete system at two locations initially. The two locations are Cape May, New Jersey, and the government proving ground at Warren Grove, New Jersey. Maps showing the proposed test areas are attached since the electronic FCC 442 form does not allow for detail definition of the service area.

Cape May operations will originate from the United States Coast Guard station, using a decommissioned helicopter takeoff/landing area. The proposed operational test area for Cape May is primarily over the Atlantic Ocean, within 20 kilometers of the coast line. The tests will be coordinated with Coast Guard and Federal Aviation Administration officials. EMC compatibility of the aircraft/aircraft control equipment will be tested, along with EMC compatibility with nearby Coast Guard shore or vessel equipment.

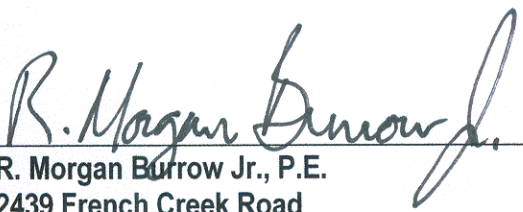
The Warren Grove, New Jersey location is a United States military test range. This range is located west of Barnegat, New Jersey. An aircraft landing strip is located on the grounds of the test range. The Warren Grove facility occupies approximately 9,400 acres of land within the New Jersey Pine Barrens. There is ample area to test the UAV and the associated control system over land without the risk of tests conducted over populated areas. The tests will be coordinated with military officials in charge of the Warren Grove facility.

6. EQUIPMENT

The system block diagrams provide the make and model of the transceivers, bandpass filters, interconnect line, and antennas. The transmitters are commercial and have FCC registration. Losses inherent at UHF frequencies include connector and interconnect line losses, and insertion losses of band pass filters. A conservative value of 1 dB is used for connector losses. Manufacturer data is used for cable and bandpass filter insertion losses. Antenna gain data is from manufacturer's data. These losses are used to determine the EIRP of the transmit systems.

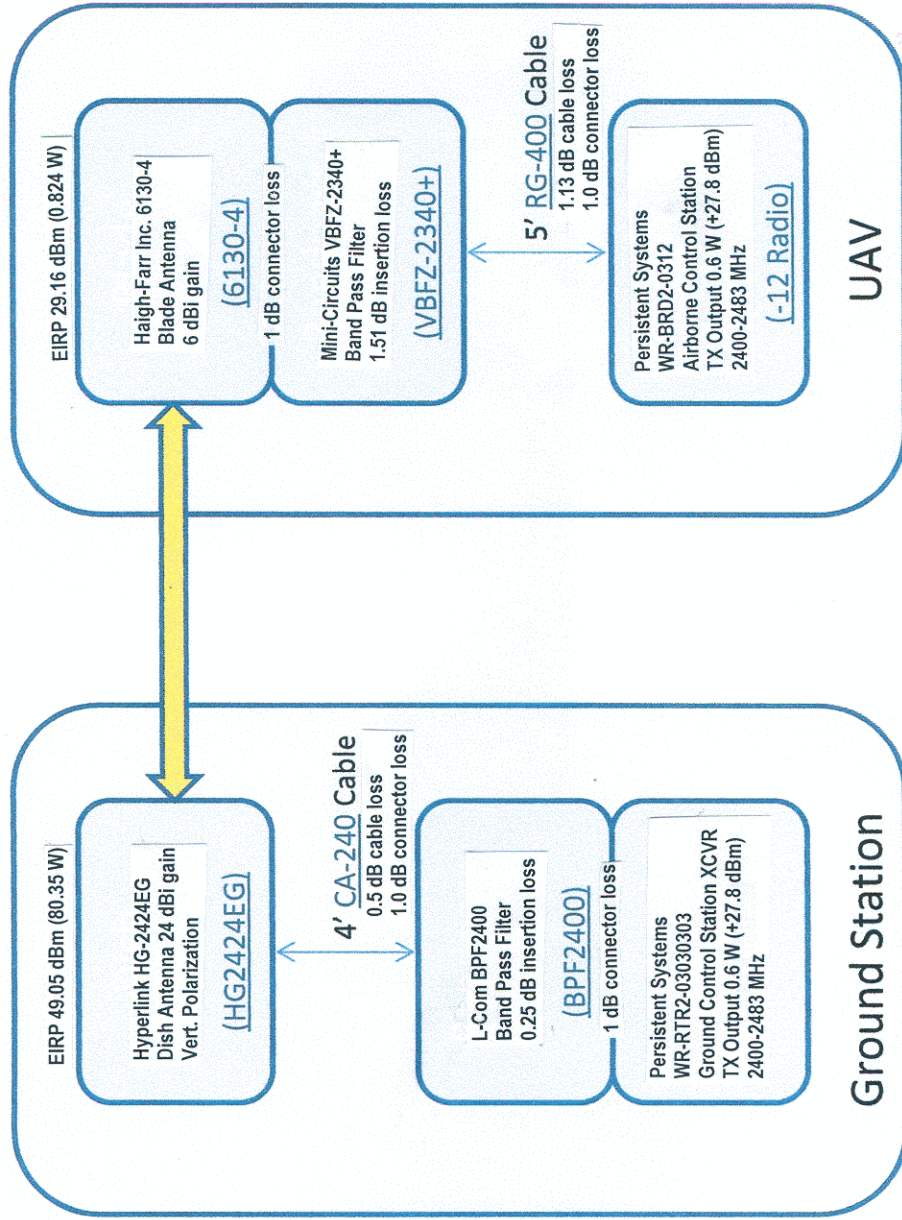
7. SUMMARY

American Aerospace Advisors, Inc. ("AAA") requests experimental license authority to operate the equipment specified in this application for aircraft control and data transmission purposes. No known further information is required to conform this application.

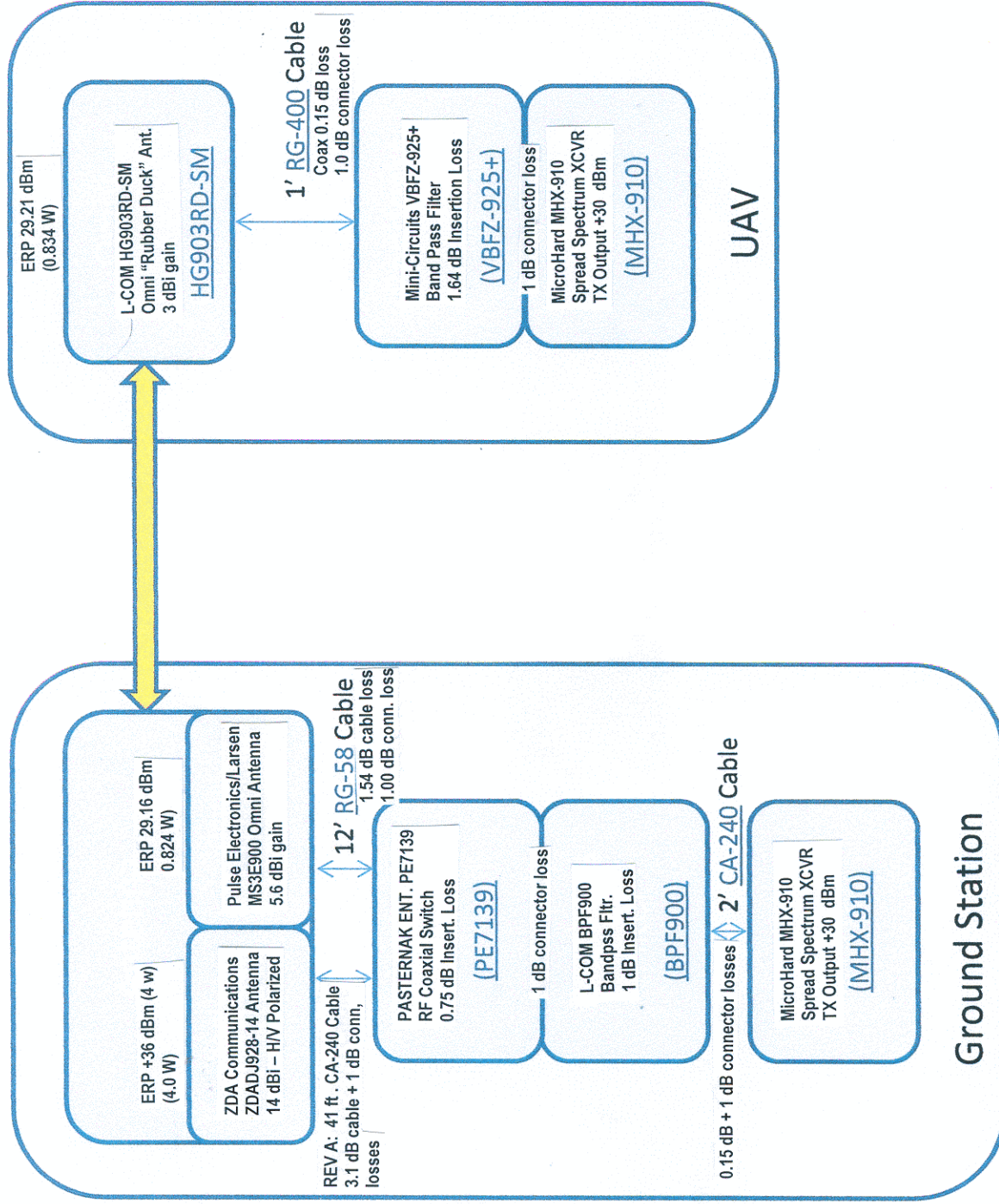


R. Morgan Burrow Jr., P.E.
2439 French Creek Road
Everett, PA 15537
(814) 735-2300
VA Registration 17424
rmburrow@frontier.com

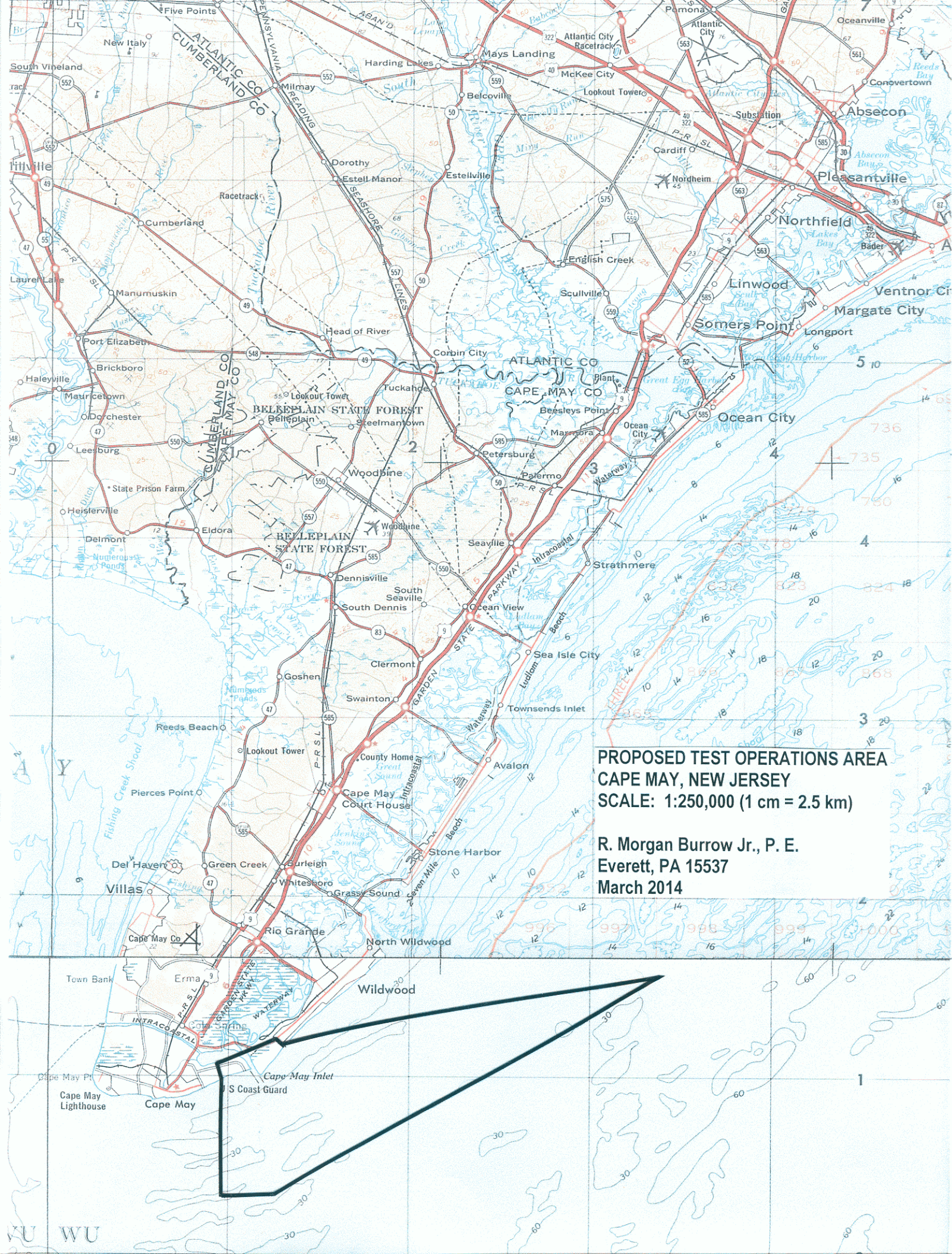
26 March 2014.



RF Data Link Equipment



RF C2 Link Equipment



PROPOSED TEST OPERATIONS AREA
CAPE MAY, NEW JERSEY
SCALE: 1:250,000 (1 cm = 2.5 km)

R. Morgan Burrow Jr., P. E.
Everett, PA 15537
March 2014

