



# NRL/VXS-1



## 2011 UPDATE





# VXS-1 2010 Milestones

- NP-3D Missions
  - Iraq deployment in Summer 2010
  - OADT and PASS conducted throughout 2010
    - Local area and Barbers Point, HI flights
  - Missile Defense Agency, PMRF range clearance events
- RC-12 Mission
  - NRL Tactical Electronic Warfare vulnerability testing
  - NRL Advanced Network Communications (CABLE/DLB) demonstration
- Scan Eagle UAV aircraft
  - Ongoing NEO program flights
- Ion Tiger UAV
  - 26.1 hour endurance





# NRL: The U. S. Navy's Corporate Laboratory



## Establishment

- Idea followed the sinking of the Lusitania in 1915
- Secretary Josephus Daniels Established Naval Consulting Board with Edison Chair, meeting October 7, 1915
- August 29, 1916 Congress appropriates funds to establish the Lab
- Delayed by WW-I, Assistant Secretary of the Navy, Theodore Roosevelt, Jr. Commissions the Lab at Bellevue site on July 2, 1923



*"GOVERNMENT SHOULD MAINTAIN A GREAT RESEARCH LABORATORY TO DEVELOP GUNS, NEW EXPLOSIVES AND ALL THE TECHNIQUE OF MILITARY AND NAVAL PROGRESSION WITHOUT ANY VAST EXPENSE."*

THOMAS A. EDISON,  
THE NEW YORK TIMES MAGAZINE  
SUNDAY, MAY 30, 1915

## Mission

- To conduct a broadly based multidisciplinary program of scientific research and advanced technological development directed toward maritime applications of new and improved materials, techniques, equipment, systems and ocean, atmospheric, and space sciences and related technologies.
- Primary in-house research for the physical, engineering, space, and environmental sciences
- Broadly based applied research and advanced technology development program in response to identified and anticipated Navy and Marine Corps needs
- Broad multidisciplinary support to the Naval Warfare Centers
- Space & space systems technology development & support

## Lines of Business

- Sensors, Electronics, and Electronic Warfare
- Materials/Processes
- Battle space Environments
- Undersea Warfare
- Information Systems Technology
- Space Platforms
- Technology Transfer



# Scientific Development Squadron ONE (VXS-1)



- NAS Patuxent River, Maryland
- Military Certified and Operated
- Worldwide deployable
- Fixed Wing Research Aircraft
  - 2 NP-3D
  - 2 RC-12
  - 1 APS-145 Rotodome NP-3D
- Additional Available Platforms
  - 4 Scan Eagle UAS
  - 1 MZ-3A Airship
- Experience integrating a wide range of equipment and sensors
  - RADAR
  - LiDAR
  - Hyperspectral
  - Photogrammetric
  - Magnetic
  - Gravity
  - Electro-optic
  - Dropsonde





# Research Configured NP-3D



- Combat Theater capable
- Configurable Interiors
- Project/Research Electrical Load Centers
- 50 – 100 AMPs available
- Modified Bomb Bay equipment pallets
- 20” floor rails to accommodate up to 10 equipment/operator consoles
- 10,000 lb equipment payload
- Support up to 11 project specialists on flights up to 12 hours in duration
- Aircraft Navigational data access
- Wing wiring to support up to 10 external pod's
- Research configured nose/tail
- Project dedicated static pressure port
- Project Communication





# NP-3D Bomb Bay Equipment Platform



This is the main project payload mounting location for sensors, large antennas, radar, etc., and it can be outfitted with a large spherical radome.

**Dimensions:**132.36"L x 70"W x 35"H (Available volume shown on this slide)

**Dimensions (Radome):**72" Dia x 29"H

**Weight:**800 lbs

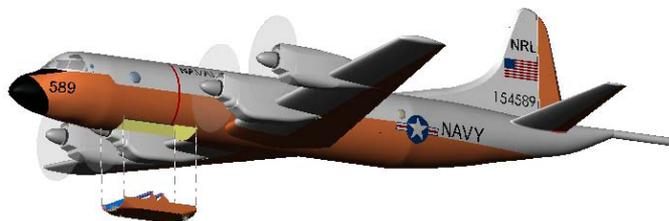
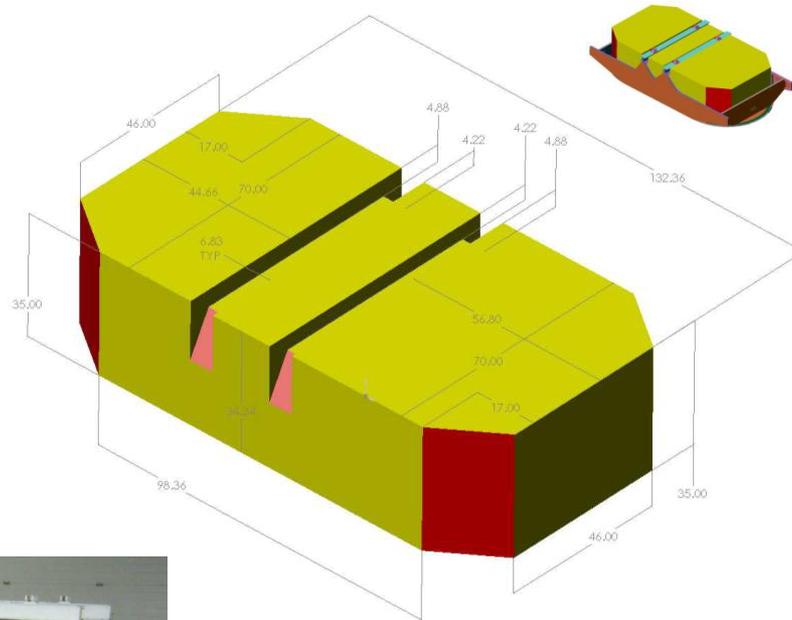
**Material:**Aluminum construction

**Payload:**Up to 3000 lbs

**Interface:**Standard P-3 Bomb Bay Pylons

Installs in P-3 Aircraft Bomb Bay

**Access to equipment:**Bottom

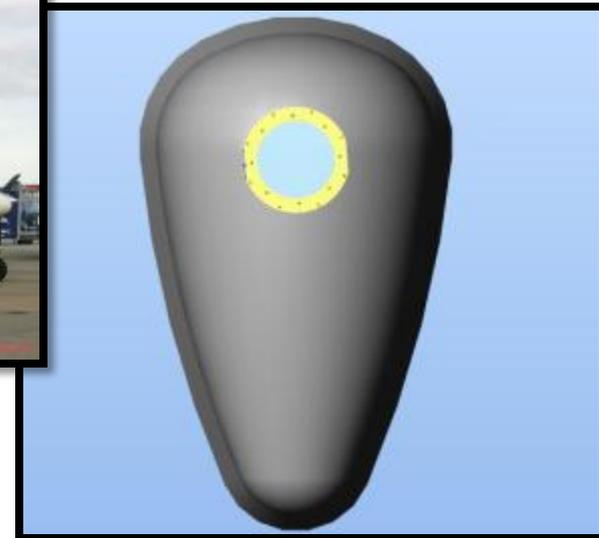
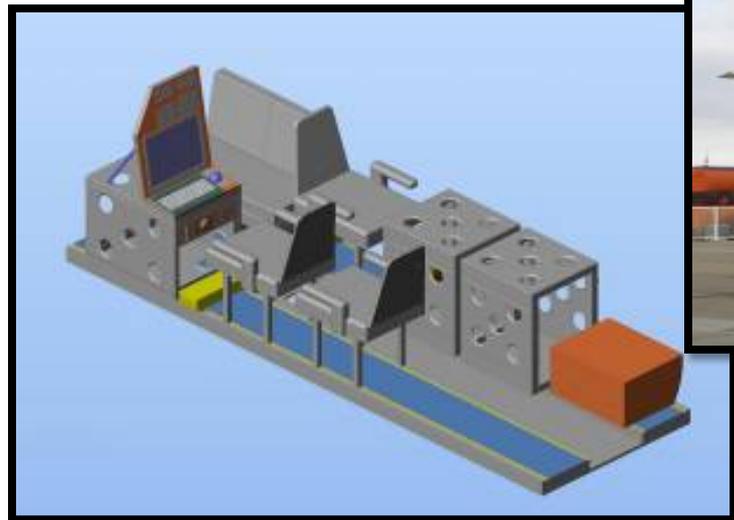




# RC-12



- Lower Belly Radome to accommodate radar/electro optic projects
- Engines wired to support project specific generator
- 25 or 60 AMPs available
- Research Load center
  - Provide Ckt breakered 115Vac for projects
  - Isolate projects from basic A/C systems
- Floor rails to support up to three operator/equipment stations
- 1,200 lb equipment payload
- Removable seats, (can be utilized for transporting personnel/parts in support of projects)







# Scan Eagle UAS



### PERFORMANCE

- Max Horizontal Speed 75 knots
- Cruise Speed 48 knots
- Ceiling 19,500 ft
- Endurance 12+ hours

### DIMENSIONS

- Wing Span 10.2 ft
- Fuselage Diameter 7 in
- Length 5 ft

### WEIGHTS

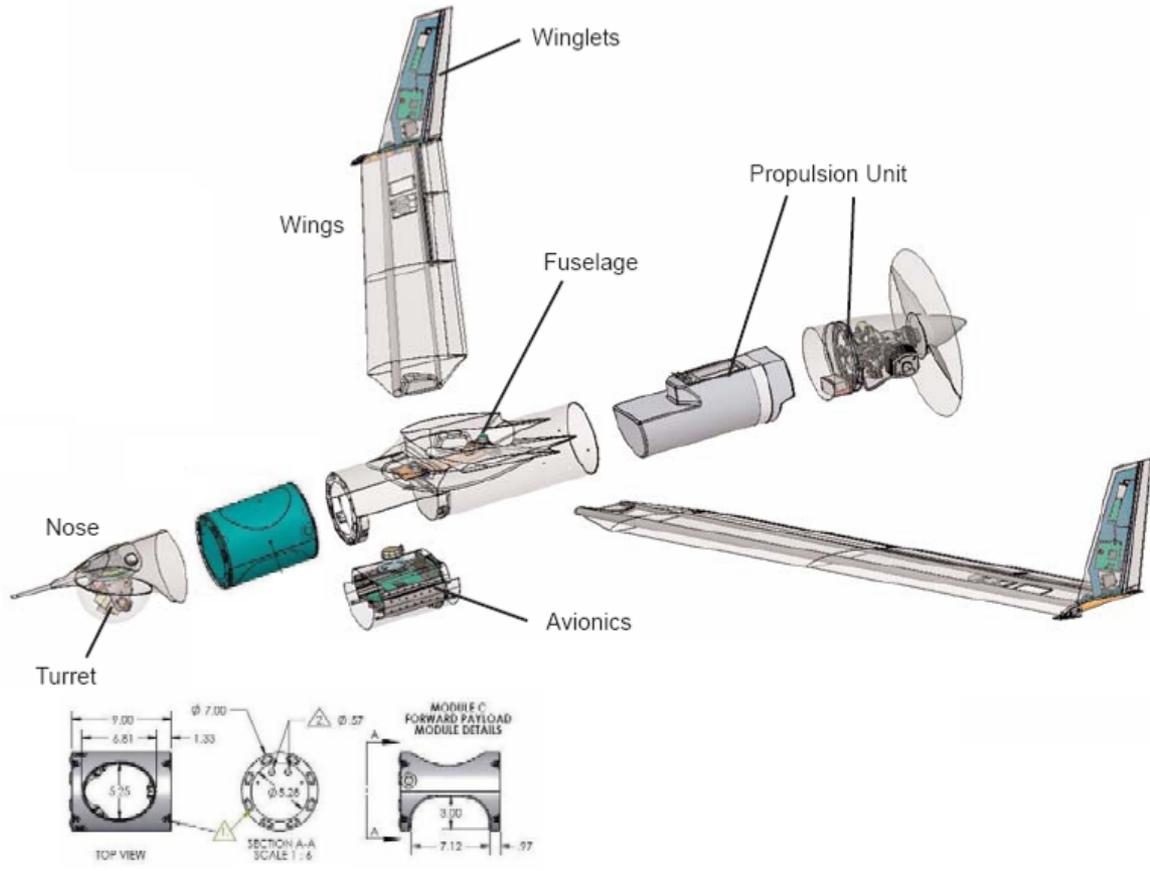
- Empty Weight 28 lb
- Fuel and Payload 15 lb
- Max Fuel 12.1 lb
- Max Takeoff Weight 44 lb

### FREQUENCIES (MHz)

- C2/Telemetry: 1350-1390
- Video Downlink: 2300-2500

### PAYLOADS

- Sony FCB-EX780 EO Camera
- DRS Tech. E3500 IR Camera

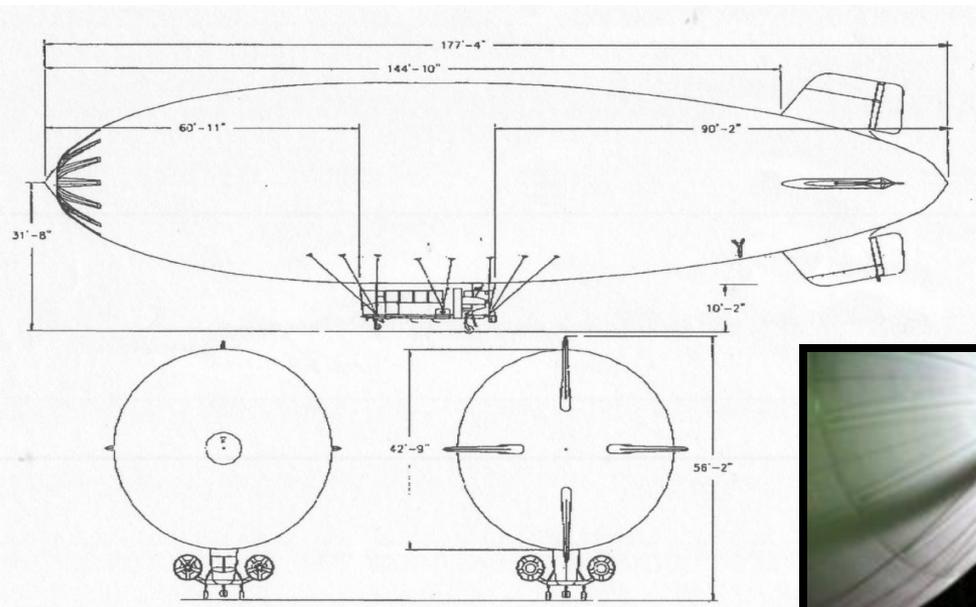


**SE UAS has over 100,000 hours of flight time in theater with clearance to operate at multiple locations**





# MZ-3A Airship



### DIMENSIONS

Length 178ft  
Height 55ft  
Width 46ft

### ENVELOPE

Volume 170,000 cu ft  
Length 175.5 ft  
Diameter 43 ft

### PERFORMANCE

Max Speed 45 KIAS  
Max Altitude 9500 ft  
Fuel Burn @ 30 KIAS = 11 gal/hr  
Max ROC / D ~1400fpm/2700fpm  
500-2500lb useable load  
12 hours max endurance

### MAIN PROPULSION

2 x 180HP Lycoming IO-360  
Prop 65" diameter, 5-blade

### CONTROL CAR/GONDOLA

Overall Length 25.5 ft  
Overall Width 6 ft  
Interior Length 11.4 ft  
Interior Height 6.3 ft  
Seating: Pilot + 9 passengers

### ELECTRICAL POWER

1x 28 volt DC 90 amp Utility Bus  
2.2 kw aux power unit  
Provides 2x10 amp 115/60

### MOORING RADIUS

Fixed Mast 300 feet  
Mobile Mast 200 feet





# XFC / Ion Tiger

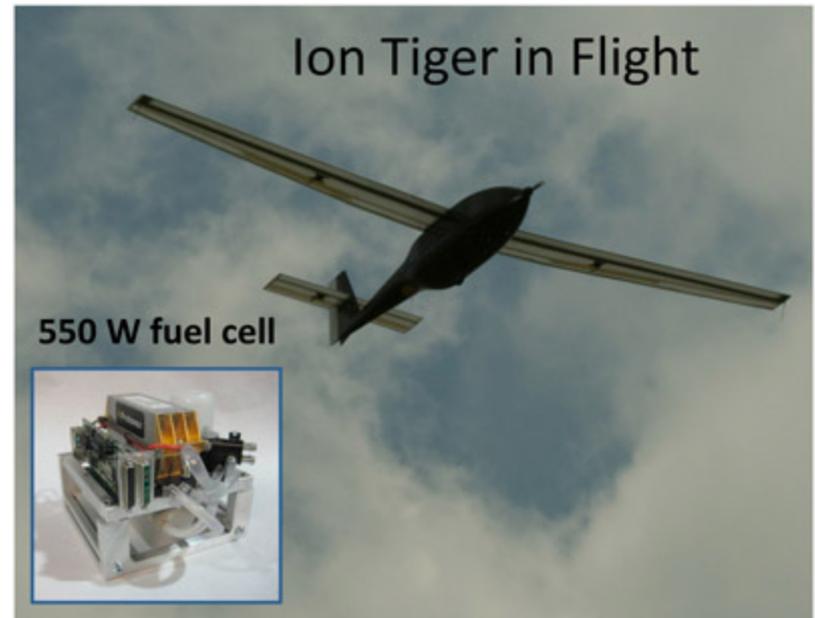


## Hydrogen Fuel Cell technology powers UAV's

XFC conducted endurance tests throughout 2010.



Ion Tiger completes a 26 hour and 1 minute flight on November 16<sup>th</sup> and 17<sup>th</sup> 2009.





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