

Naval Air Warfare Center  
Aircraft Division  
Patuxent River



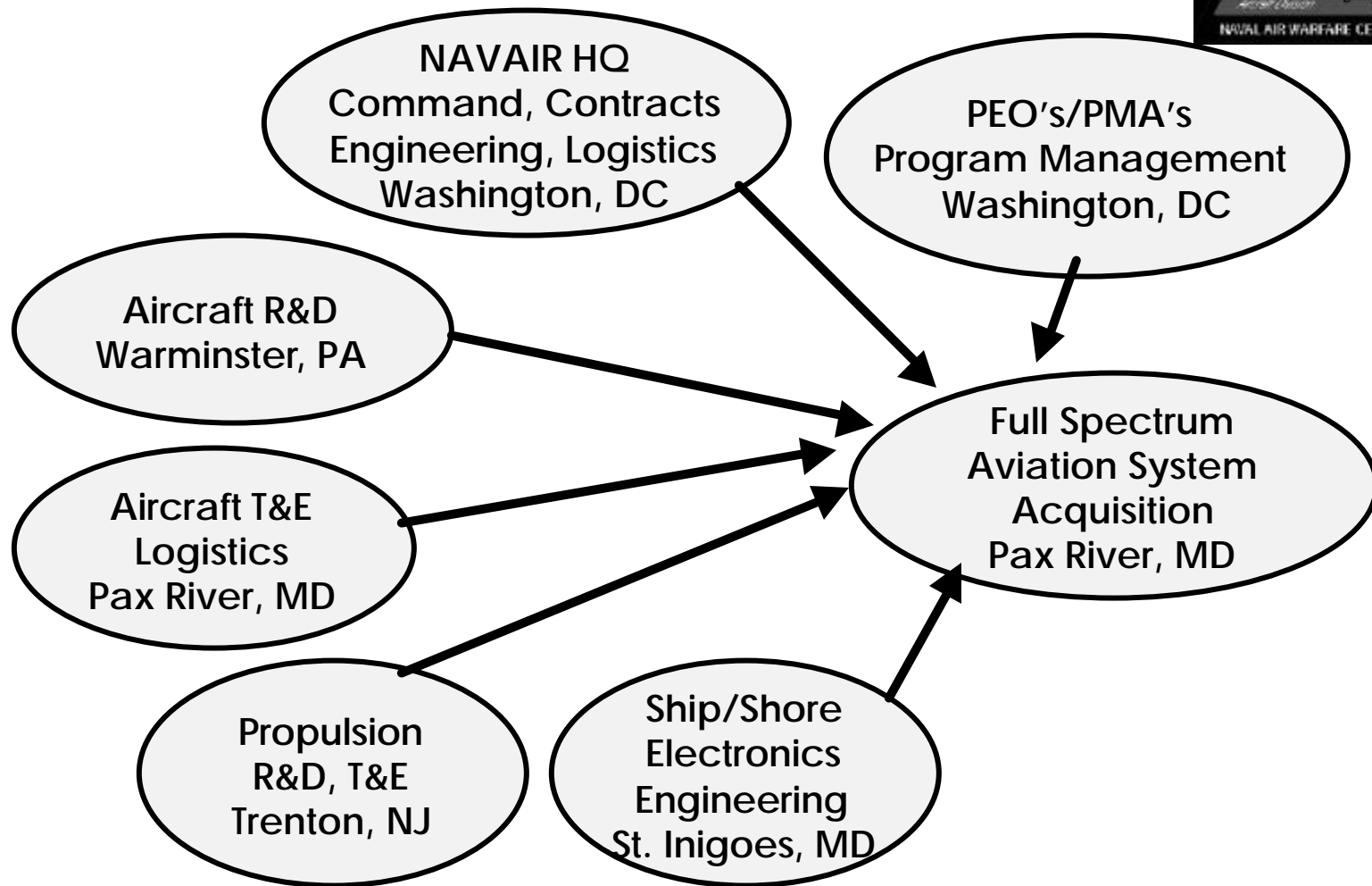
Overview

## Form SF298 Citation Data

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<b>Title and Subtitle</b> NAWCAD Patuxent River Overview Slides and Disk ATR Dynamic RCS Measurement Capability Viewgraphs ACETEF Facility Viewgraphs		<b>Contract or Grant Number</b>
<b>Authors</b> Zalesak, Philip		<b>Program Element Number</b>
<b>Performing Organization Name(s) and Address(es)</b> Naval Air Warfare Center Aircraft Division 22347 Cedar Point Road, Unit #6 Patuxent River, MD 20670-1161		<b>Project Number</b>
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<b>Number of Pages</b> 124		



# Consolidation at PAX



# Mission



➤ **To be the Navy's Principal Research, Development, Test, Evaluation, Engineering, and Fleet Support Activity for:**

↪ Naval Aircraft

↪ Engines

↪ Avionics

↪ Aircraft Support Systems

↪ Ship/Shore Air Operations

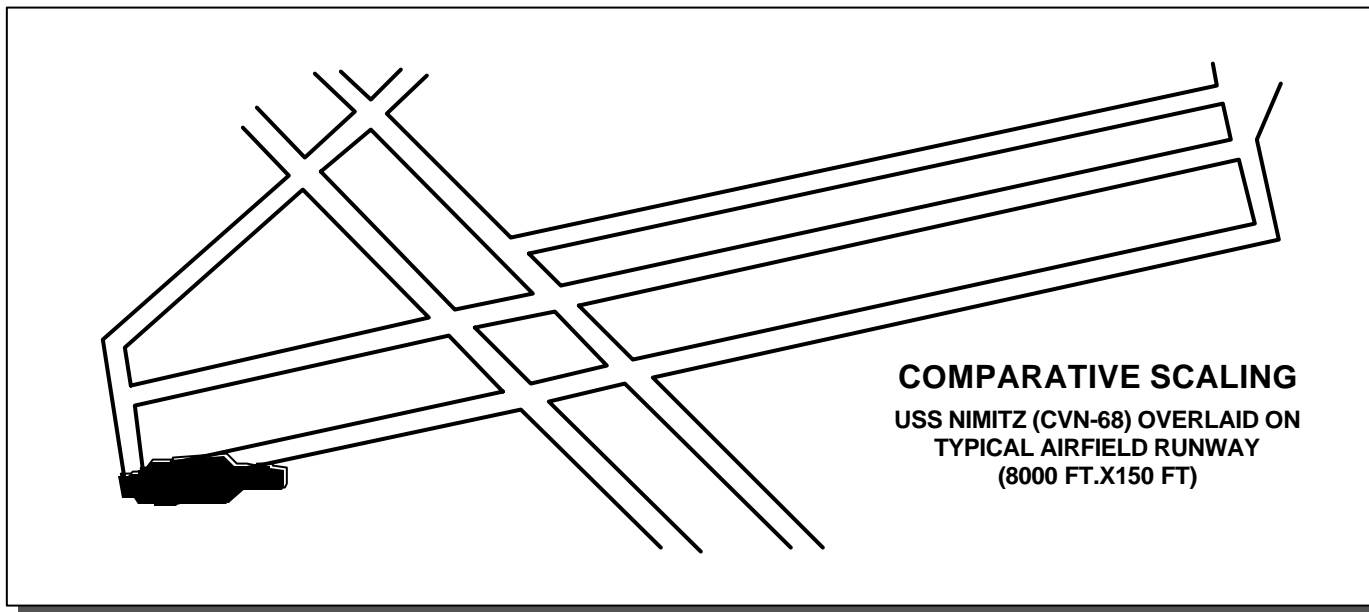
# The Business We Are In



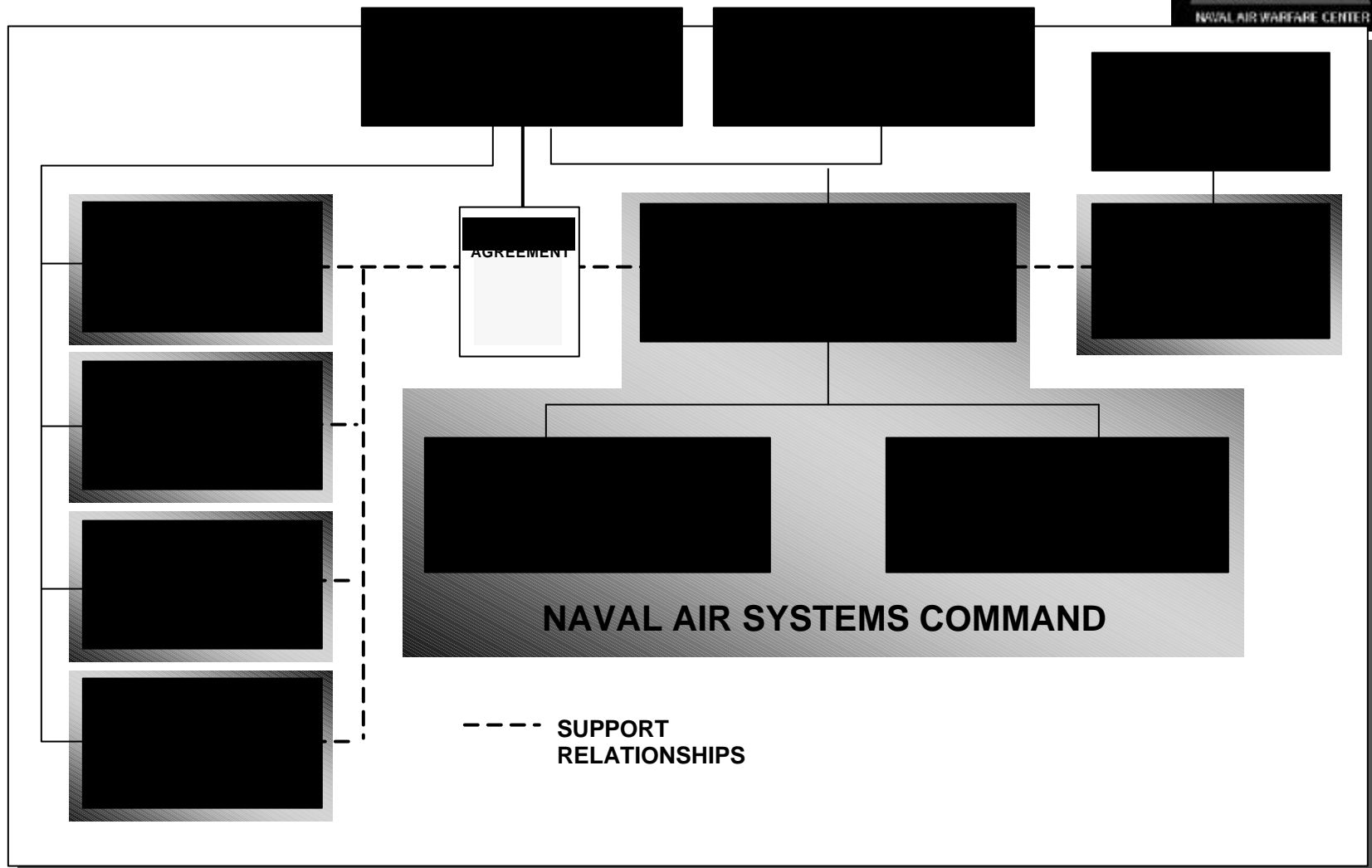
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- **Develop, acquire and support aircraft and related systems which can be operated and sustained at sea**

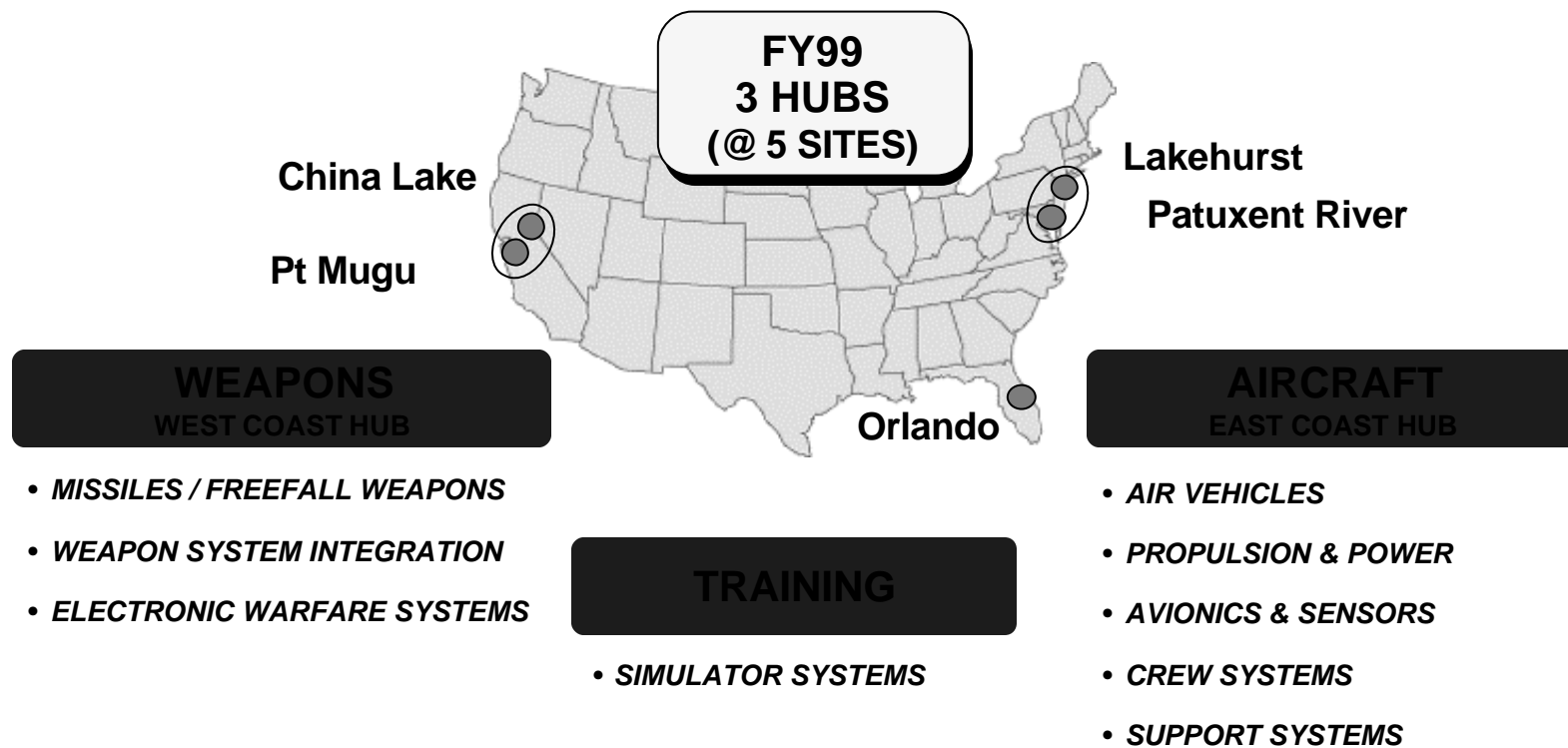
- **Work with industry on behalf of the user to deliver our products and services**



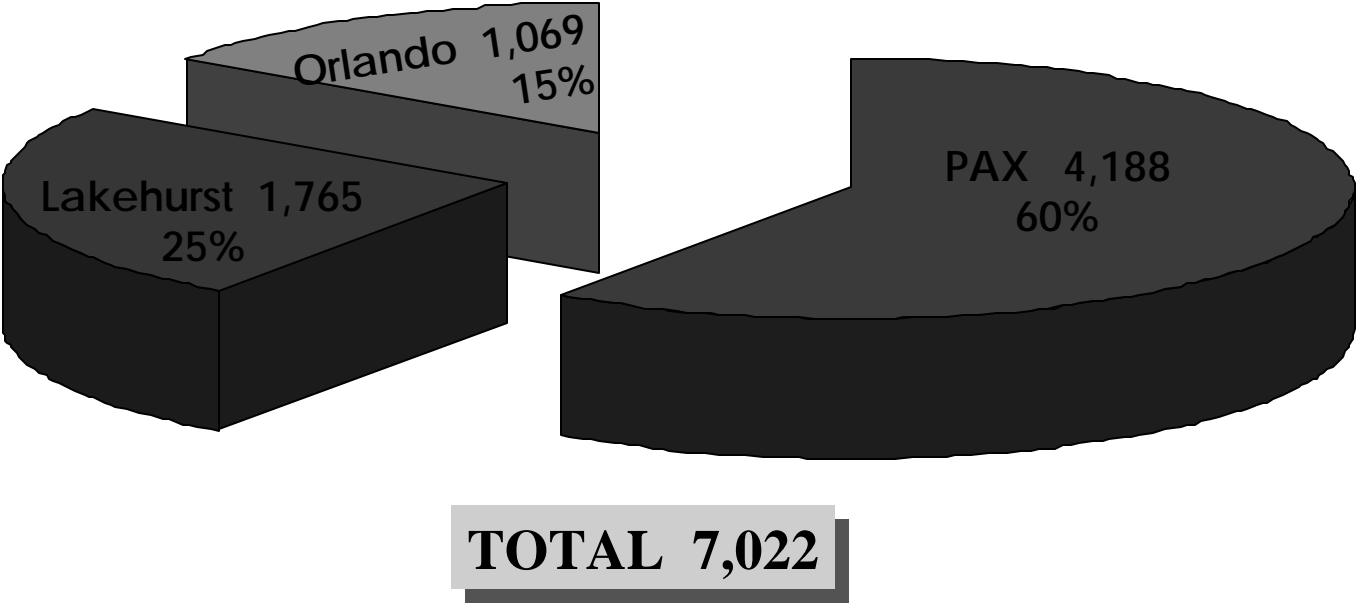
# Naval Aviation Systems Team Reporting Relationships



# Product Centers Work Areas

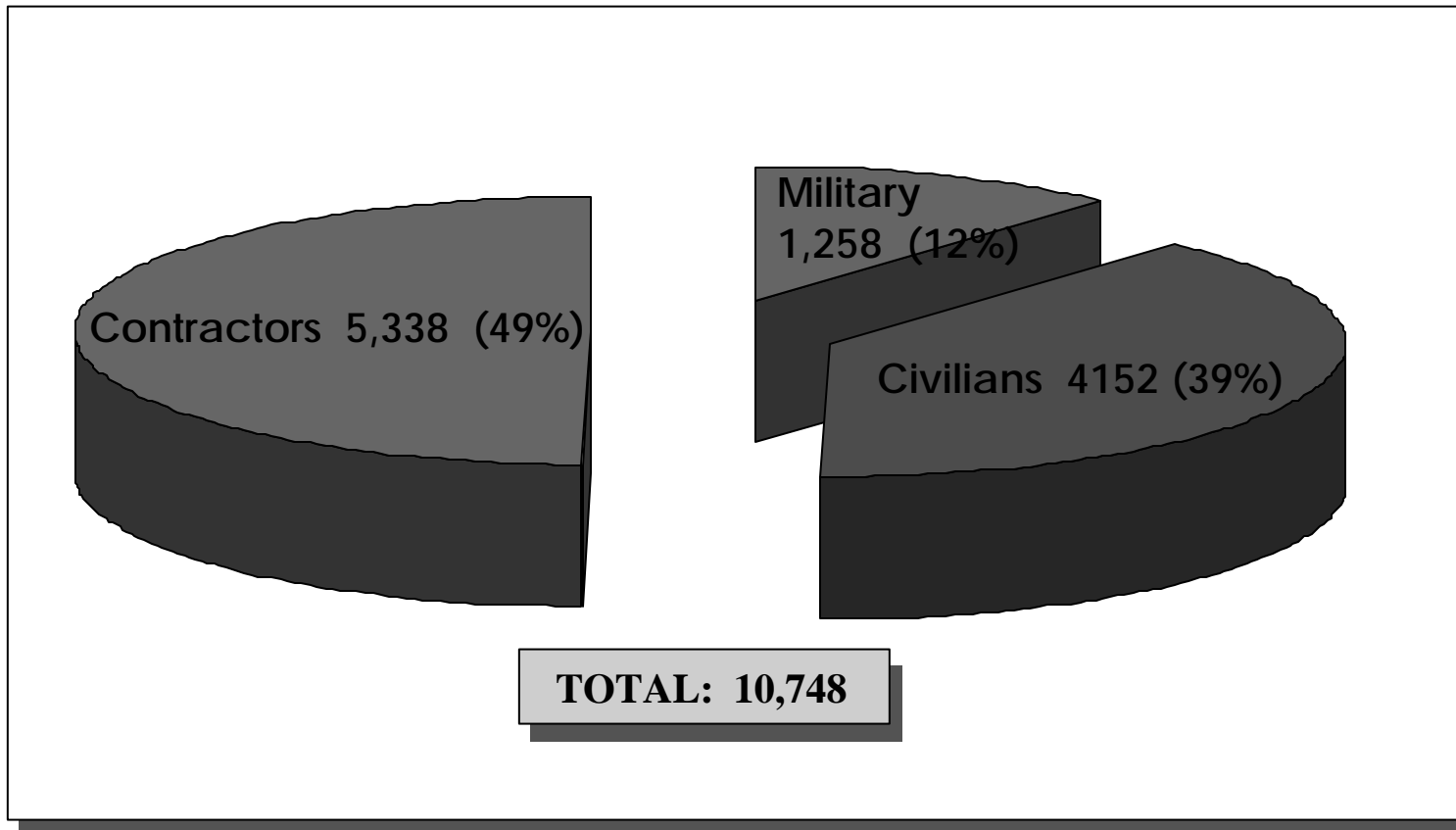


# NAWCAD (PAX/LKE/ORL) Civilians by Site



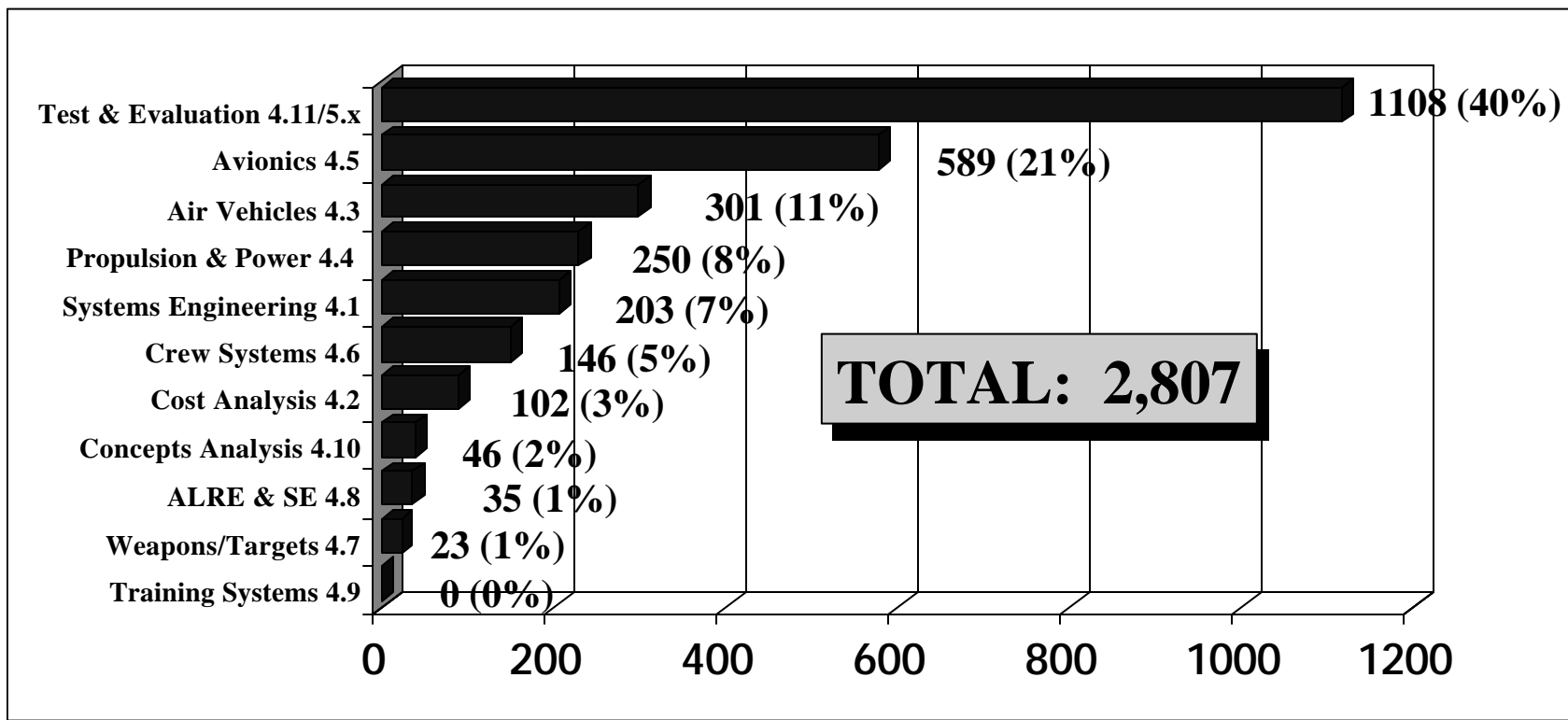
As of March 31, 1999

# PAX Aircraft Division Workforce



As of 30 Sept 1999

# NAWCAD (PAX) RDT&E Workforce



As of 30 Sept 99

# Research and Engineering Labs



## ➤ Patuxent River Facilities



# North Engineering Center





**Intermediate  
Maintenance  
Lab**



**S-3 System Readiness  
Facility**



**Maritime  
Surveillance  
Aircraft Software  
Production  
Facility  
(MSA-SPF)**



**P-3C Hardware  
Integration Center**

# South Engineering Center



**Adhesive Bonding  
& Technology Lab**



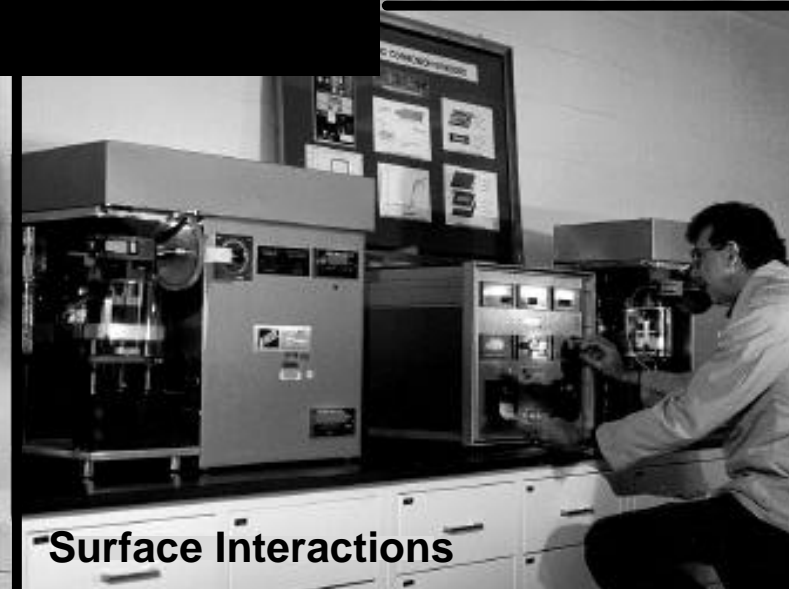
**Landing Gear Composite**



**Organic  
Coatings**

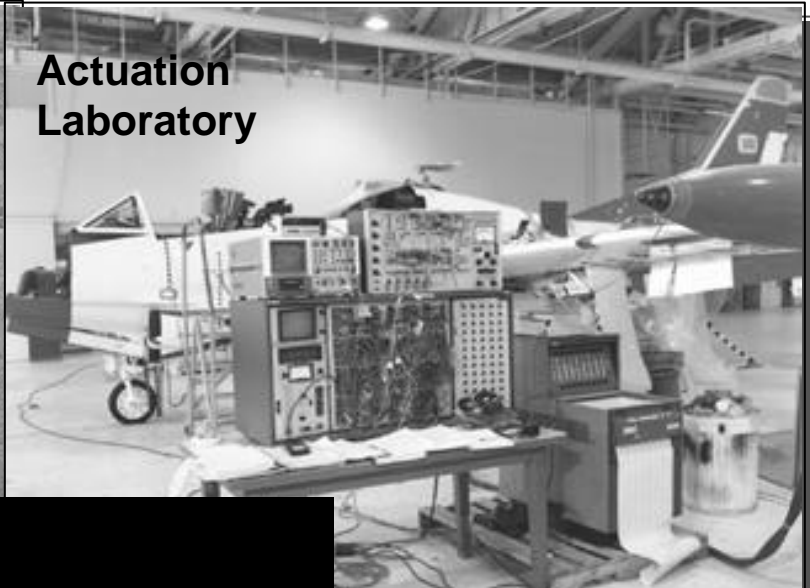


**Surface Interactions**





**Structures Test Facility**



**Actuation Laboratory**



**Wind Tunnel**



**Airframe Bearing Laboratory**

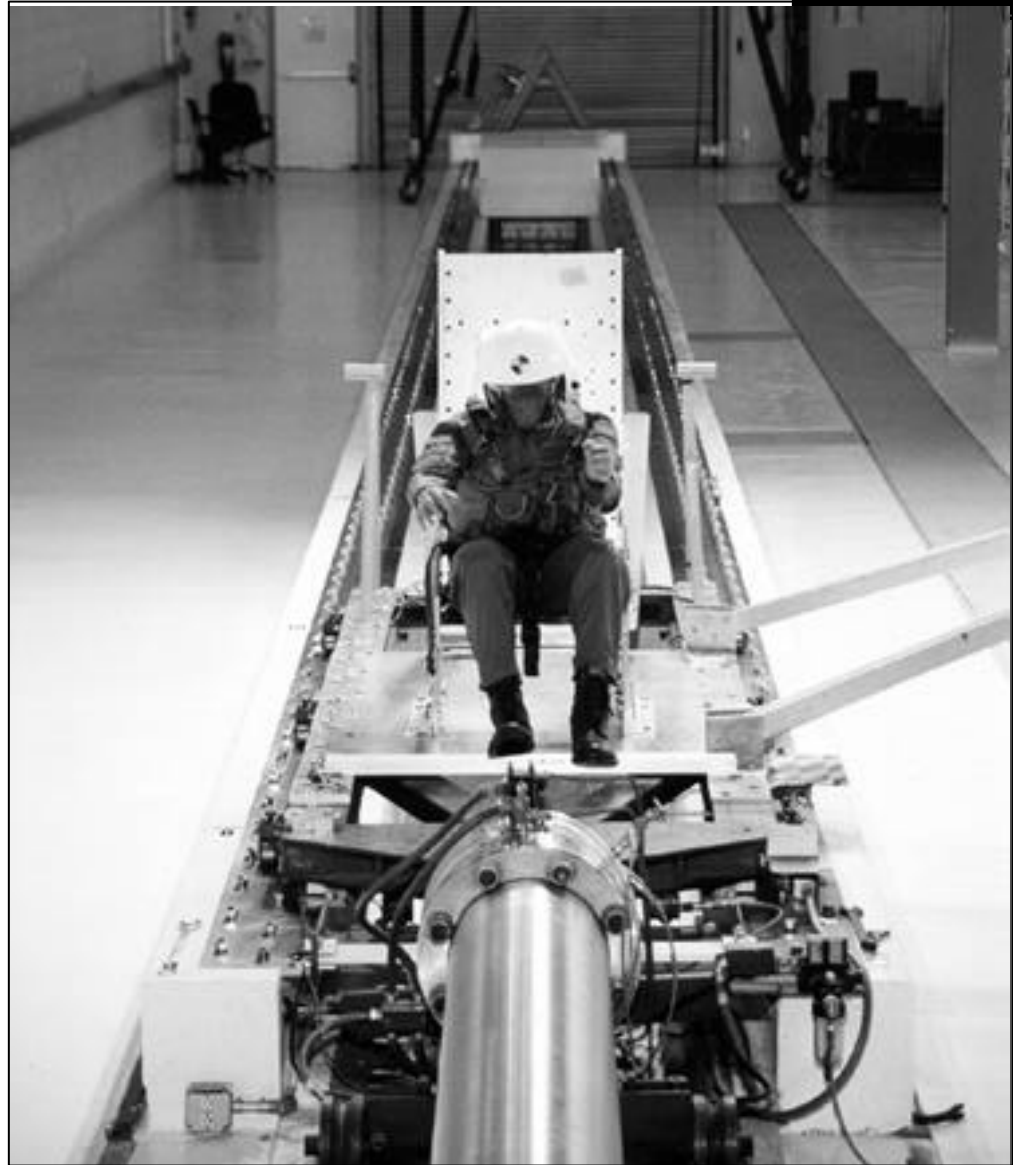
# Crew Station Technology Lab



# Thermophysiology Lab



# Horizontal Accelerator



# Ejection Tower



**Microwave Techniques Facility**



**Signal Processing Lab**



**Info Fusion  
Development**

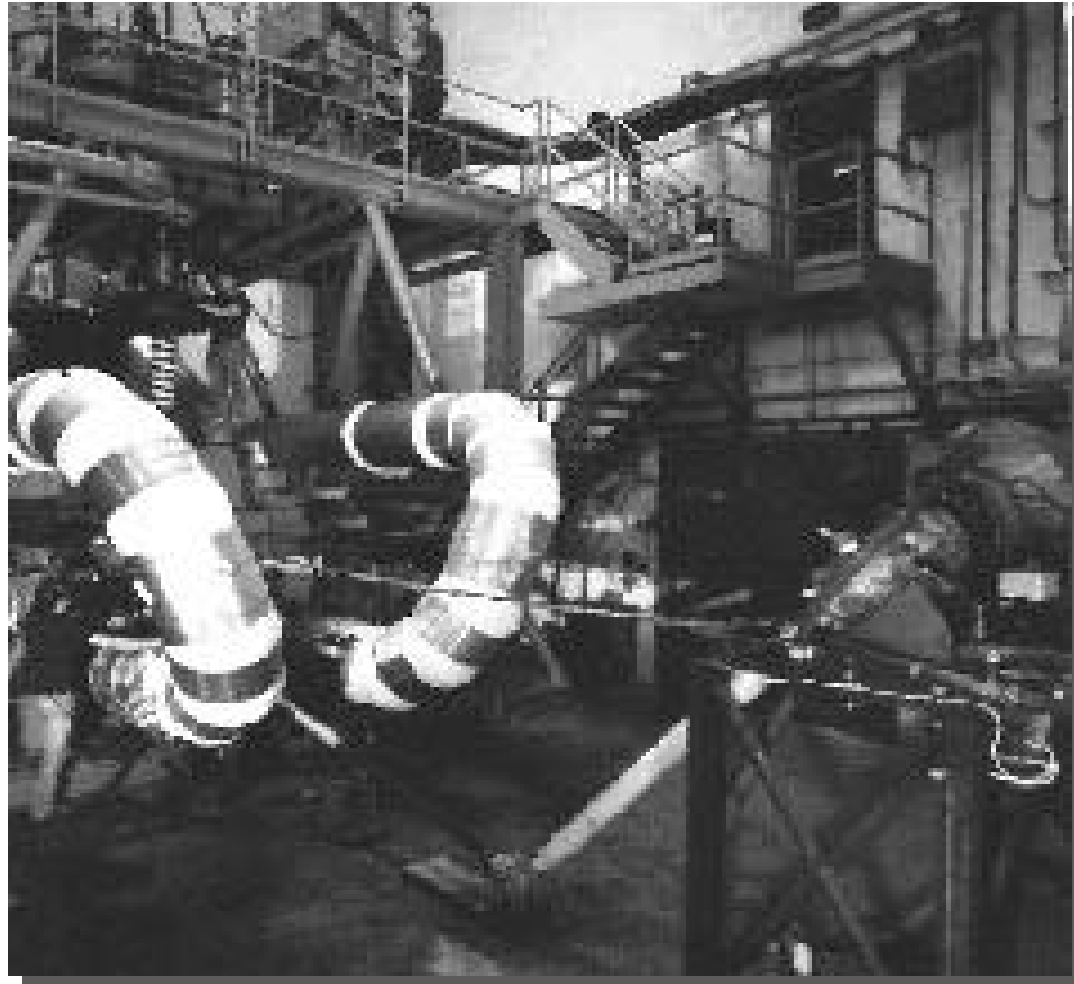


**Tactical Radar Lab**

# Propulsion & Power Labs



# Helicopter Drive System Test Facility



# Fuels and Lubricants



# Rotor Spin Facility



# Research and Engineering Labs



- **Pax  
Facilities**
- **St. Inigoes  
Facilities**



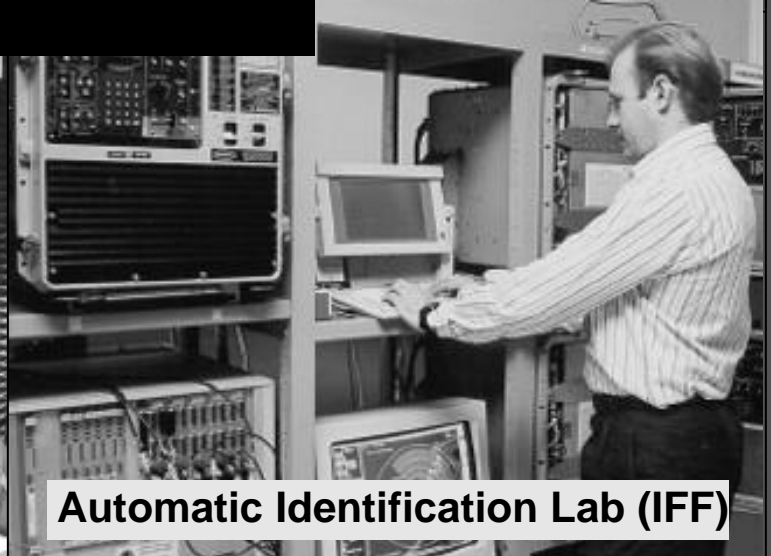
**Flight Area Control & Surveillance  
Facility Test Bed**



**Direct Altitude Identity Readout Lab**



**LAMPS Indoor Antenna Test Range**



**Automatic Identification Lab (IFF)**

**AEGIS**



**Combat & Communications Lab**



**Special Operations Group**



**Advanced  
Information  
Technology**

Test Resources



# Test and Evaluation Resources

# Test & Evaluation Group



- **Atlantic Wing**
  - ↪ **Strike Squadron**
  - ↪ **Rotary Wing Squadron**
  - ↪ **Force Squadron**
  - ↪ **Test Pilot School**
  
- **Atlantic Range and Test Facilities**
  
- **Test Article Preparation**



**F-14**



**T-45**



**F/A-18**



**EA-6B**



V-22



H-60



AH-1W



H-53



P-3



S-3



E-6



E-2

# R&D, DT and OT Collocation



# Test Pilot School Aircraft



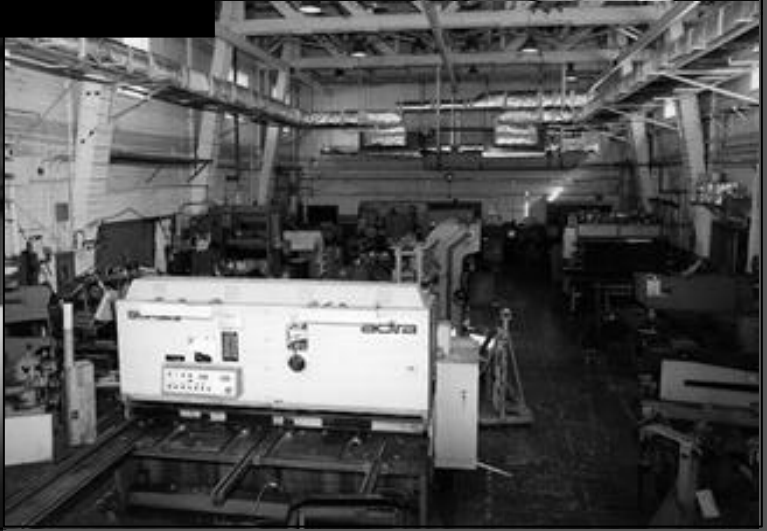
# Test Article Preparation

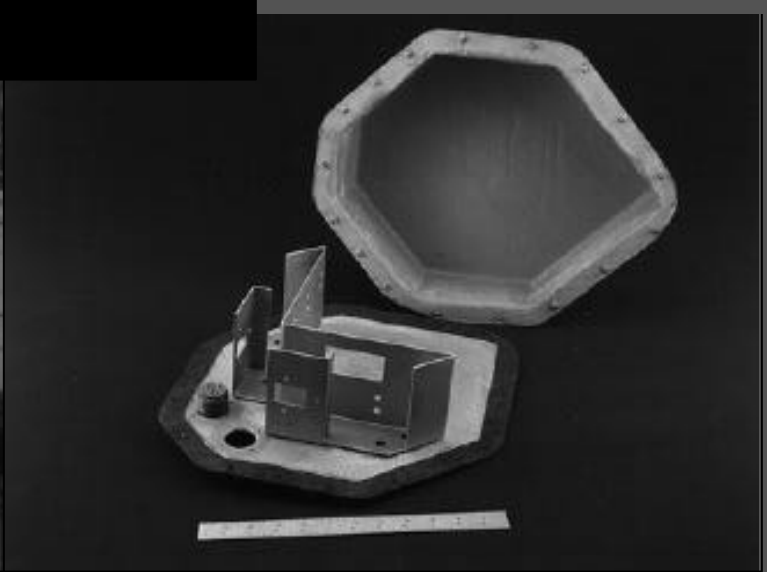


# Instrumentation









**OH-1 IR Suppression  
Installation**



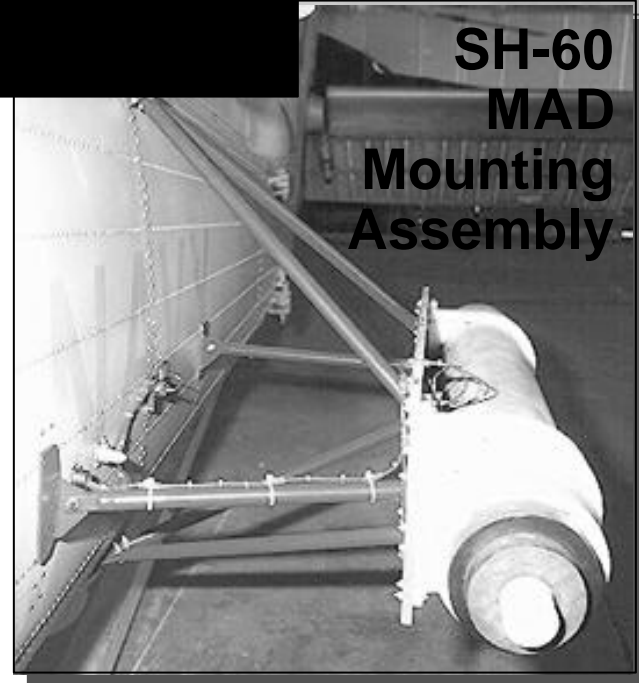
**P-3 OTH Antenna Installation**



**AH-1 Fuel Tank**



**SH-60  
MAD  
Mounting  
Assembly**



# Rapid Prototyping



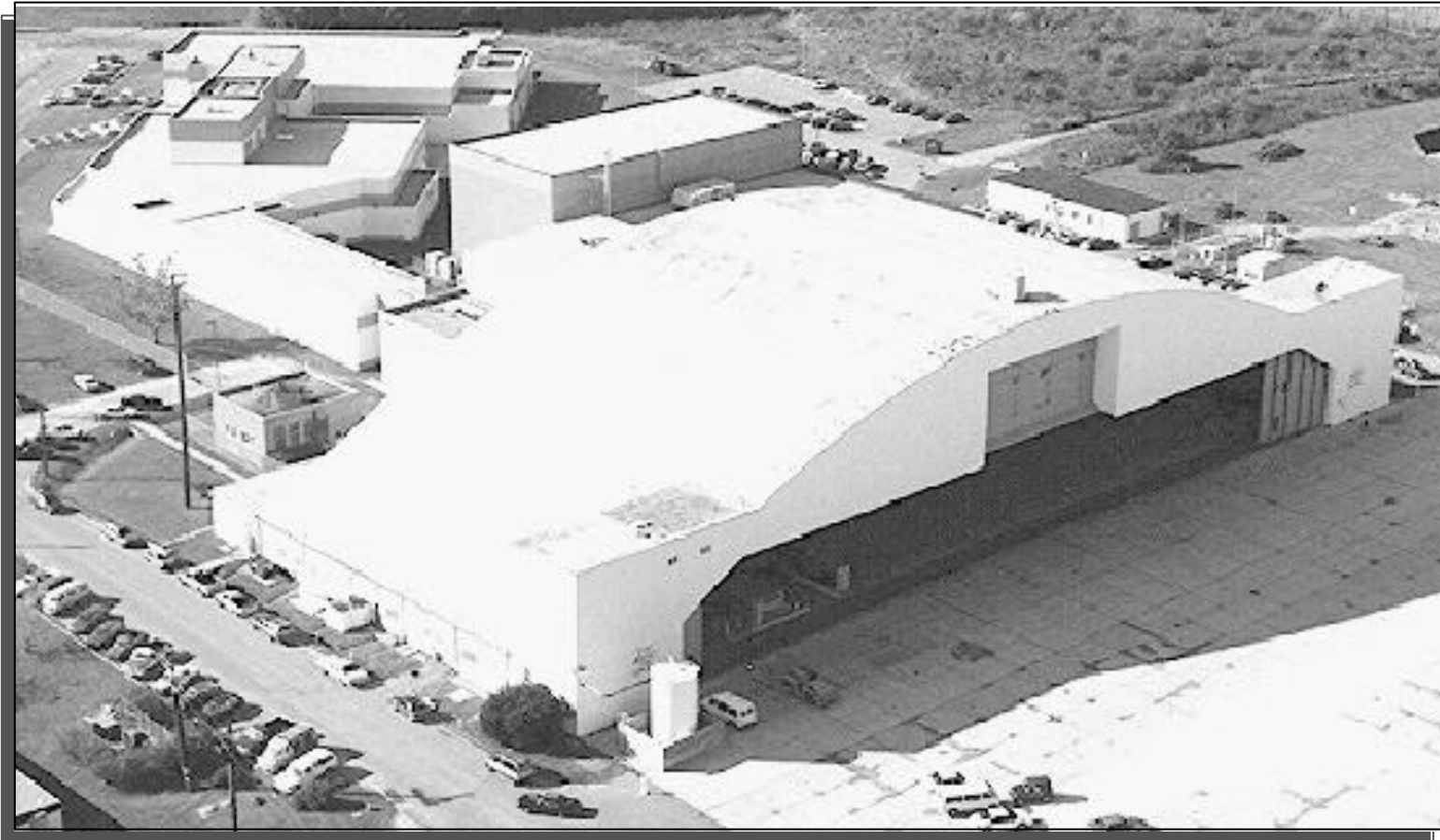
## SH-60 Gun Integration



# Systems Integration



# Air Combat Environment Test & Evaluation Facility (ACETEF)



# Lightning



# Electromagnetic Environmental Effects (E<sup>3</sup>)



# Precipitation Static



# Systems Integration Testing



# Large Anechoic Chamber



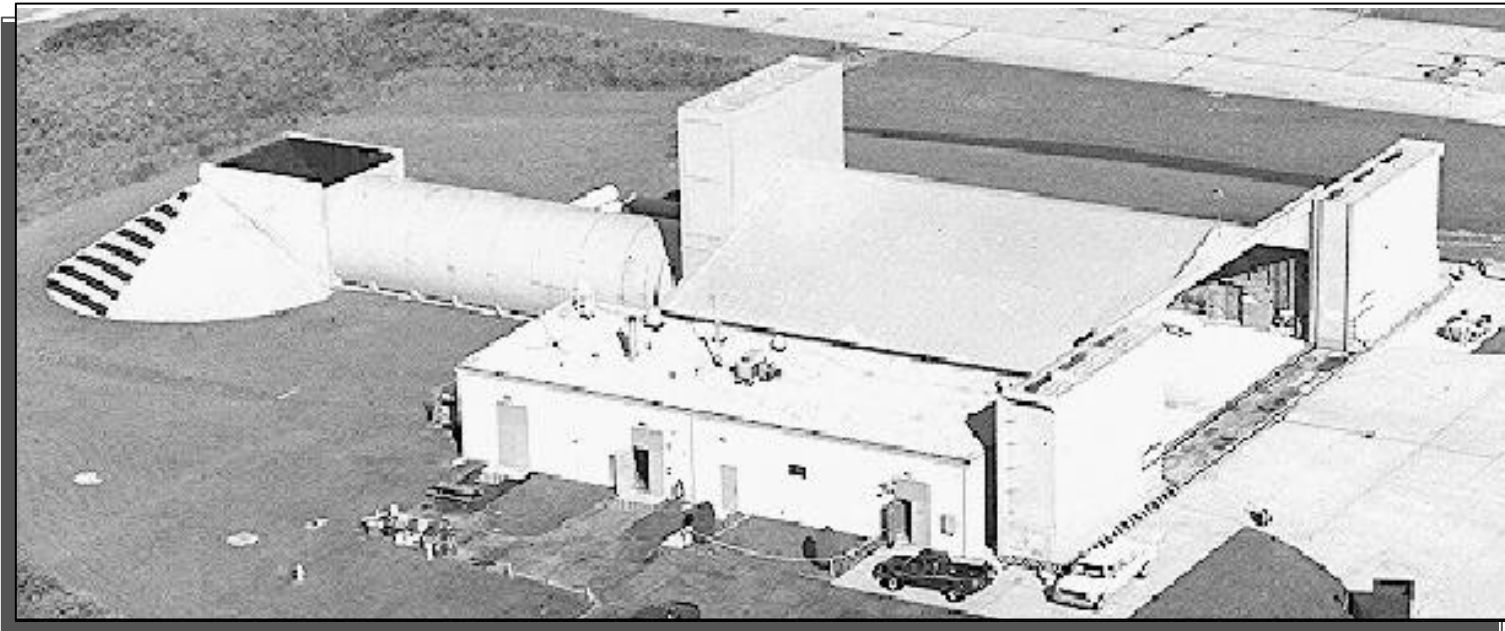
# Electronic Warfare Testing



# Dome Simulation



# Air Vehicle Systems Integration



# Hush House



# Night Vision Device Testing



# Atlantic Test Range



# Real-Time Telemetry Processing System



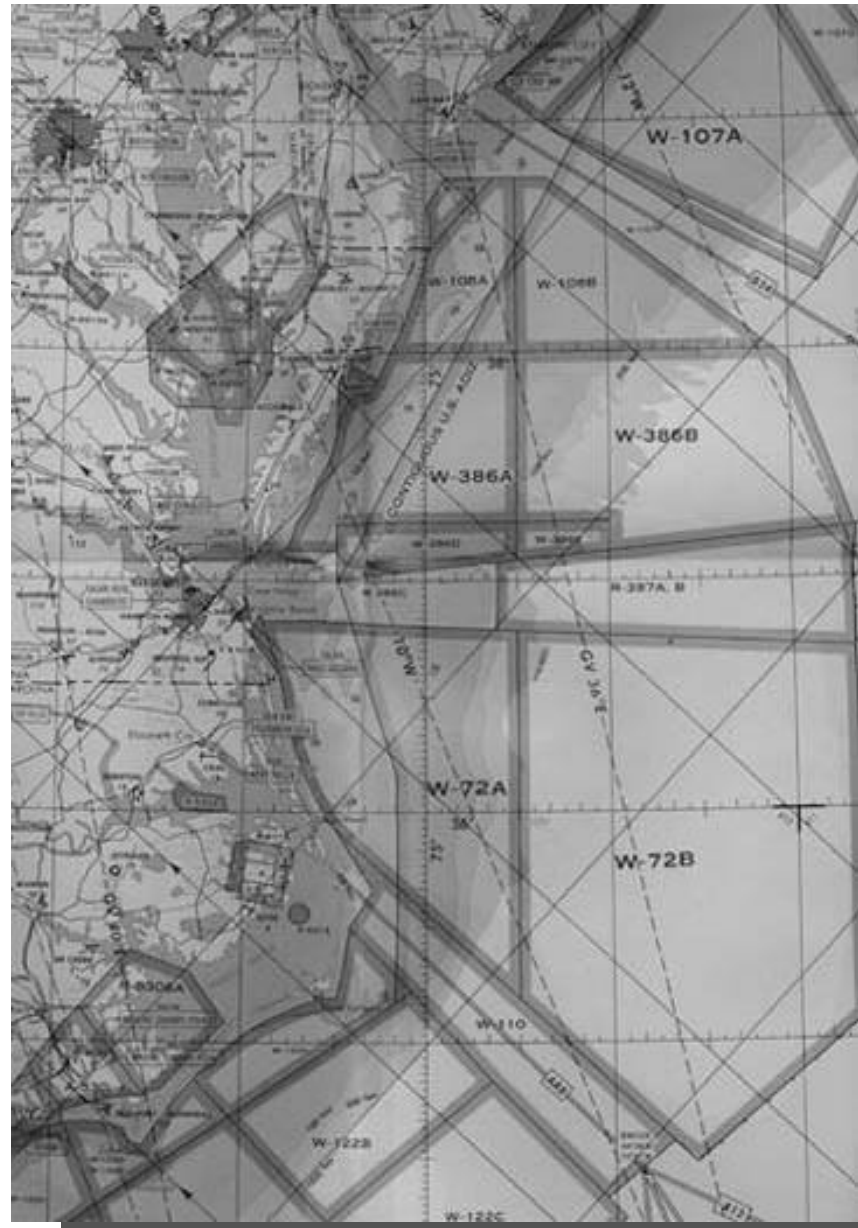
# EW Emitters



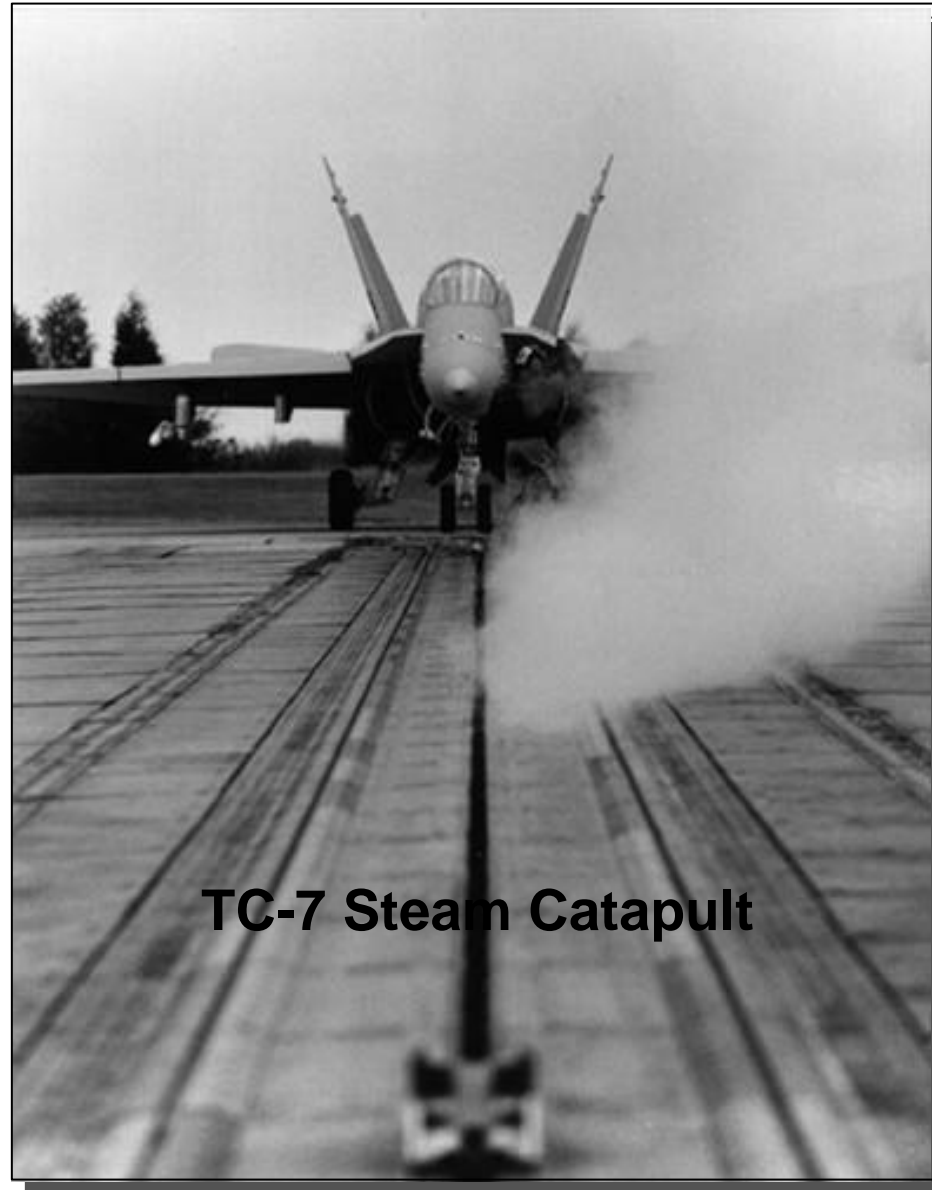
# Restricted Air Space



# Regional Warning Area



# Catapult



# Arresting Gear

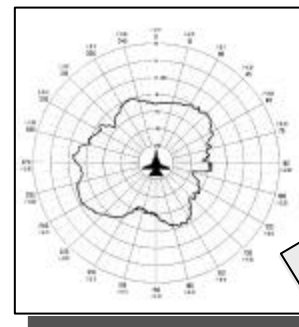
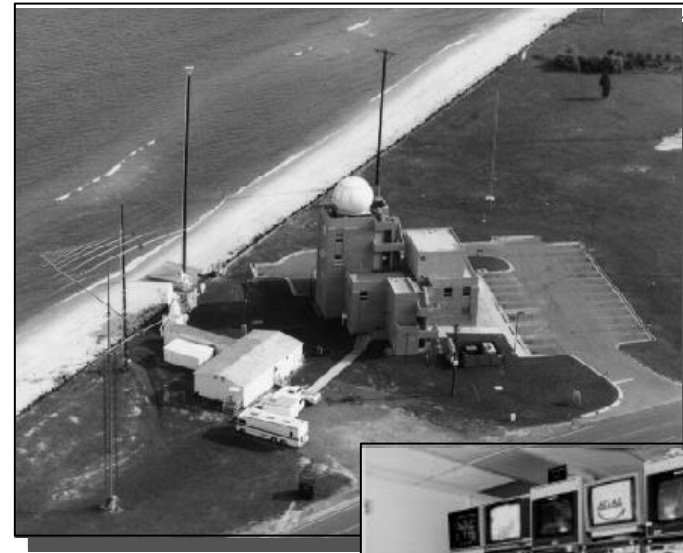


# Antenna Testing Laboratory Automated System (ATLAS)

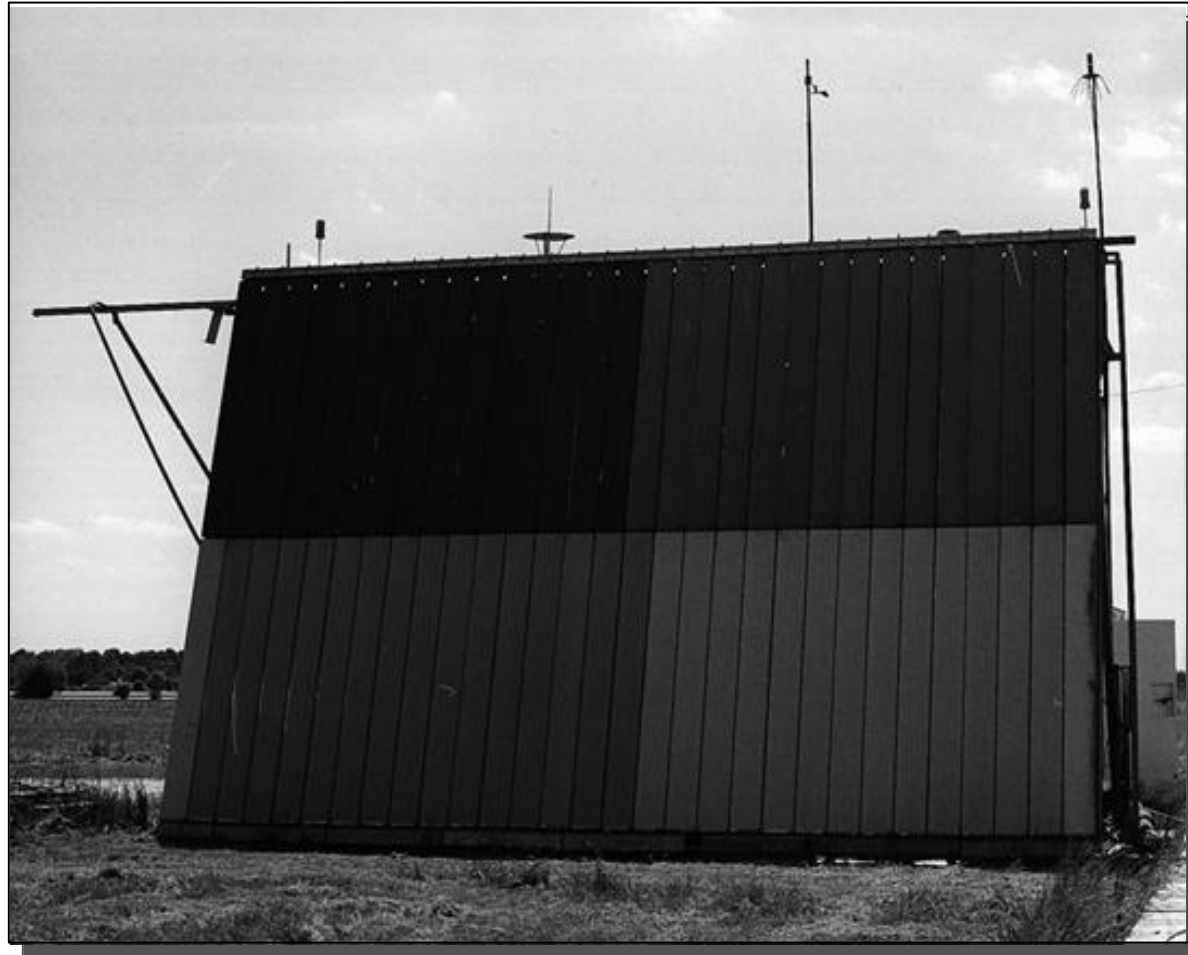


## ➤ In-Flight Antenna Measurements

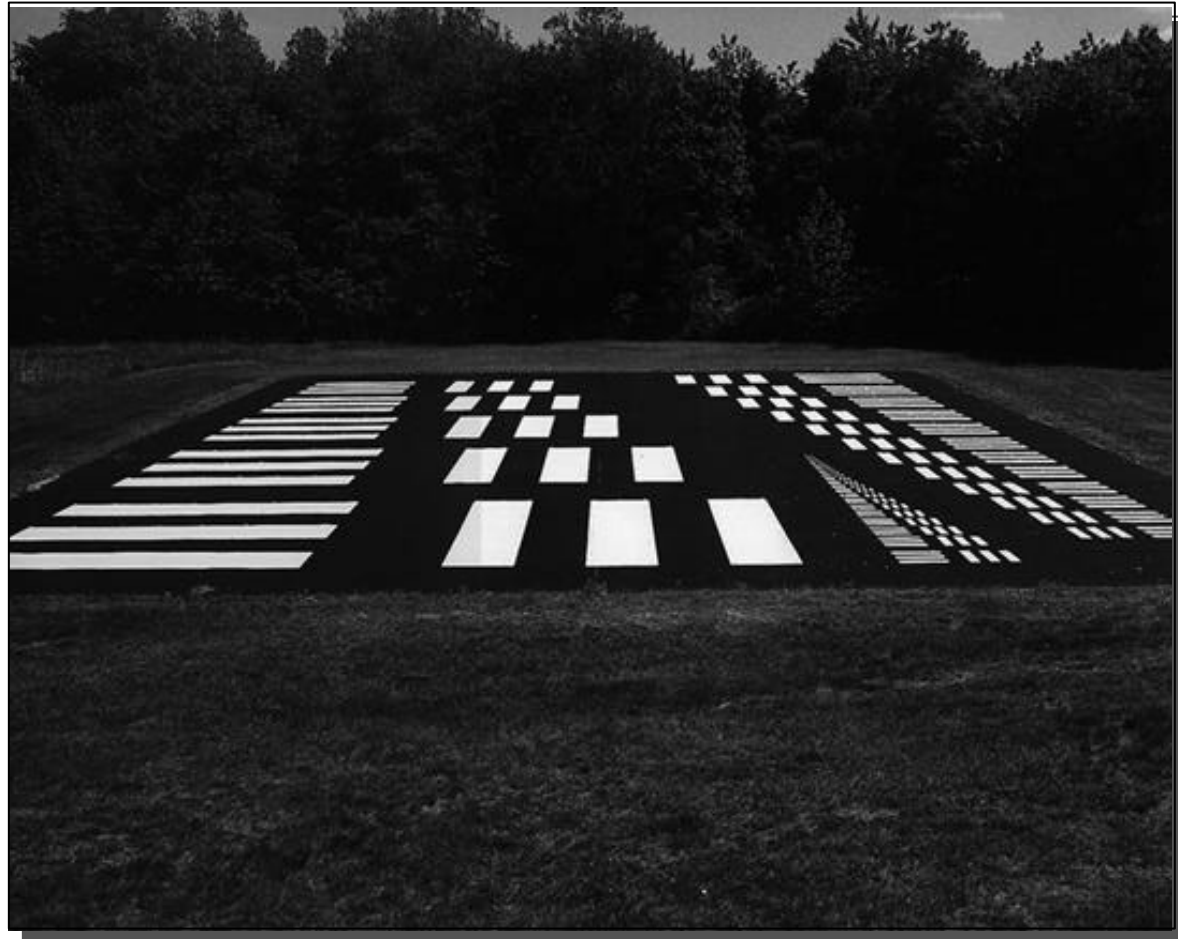
- 2 MHz to 18 GHz Free Space
- Pattern Measurements
- Referenced to Isotropic
- Automated
- Accurate
- Dedicated
- Unique Geographical  
Location
- Versatile

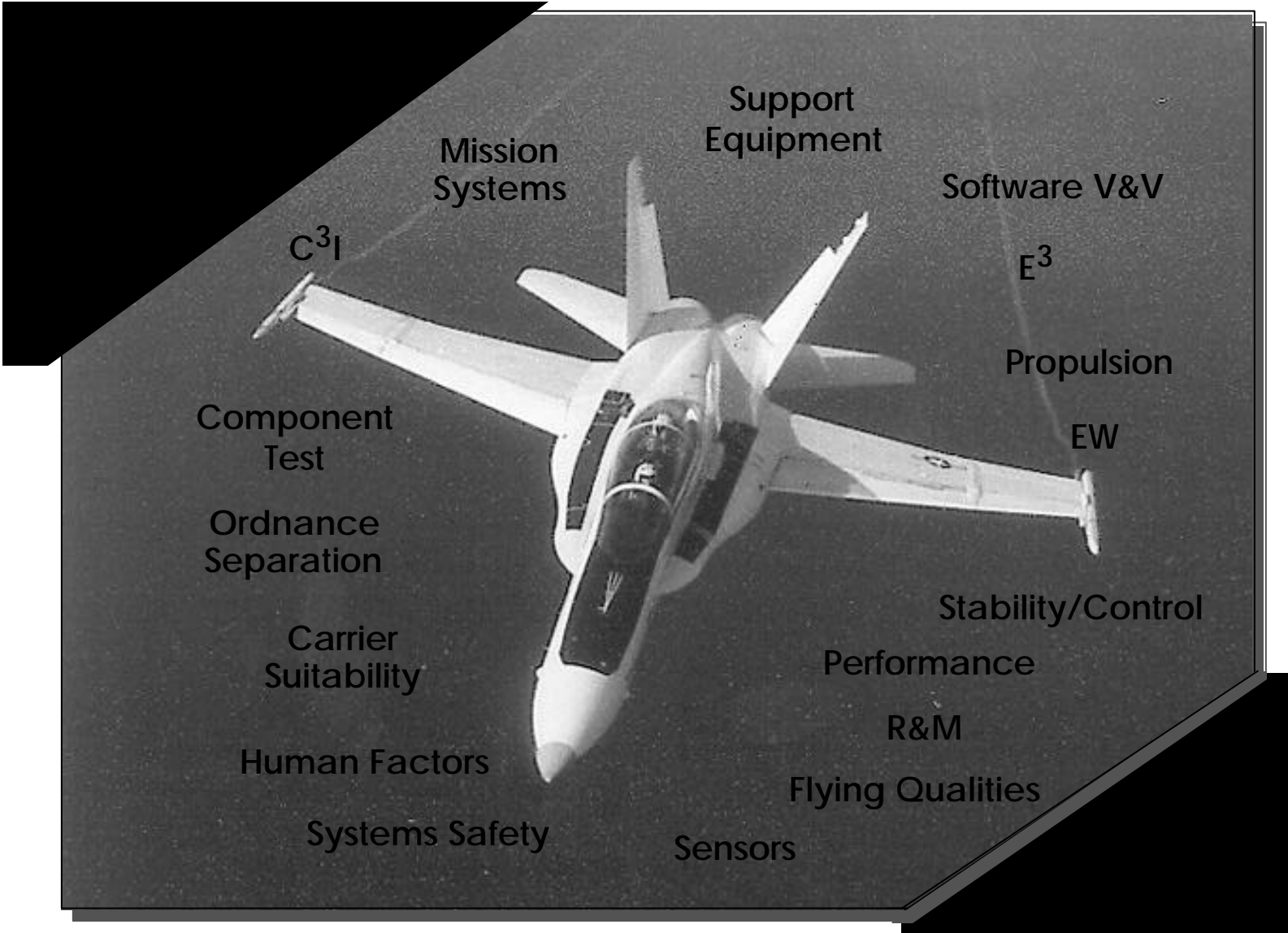


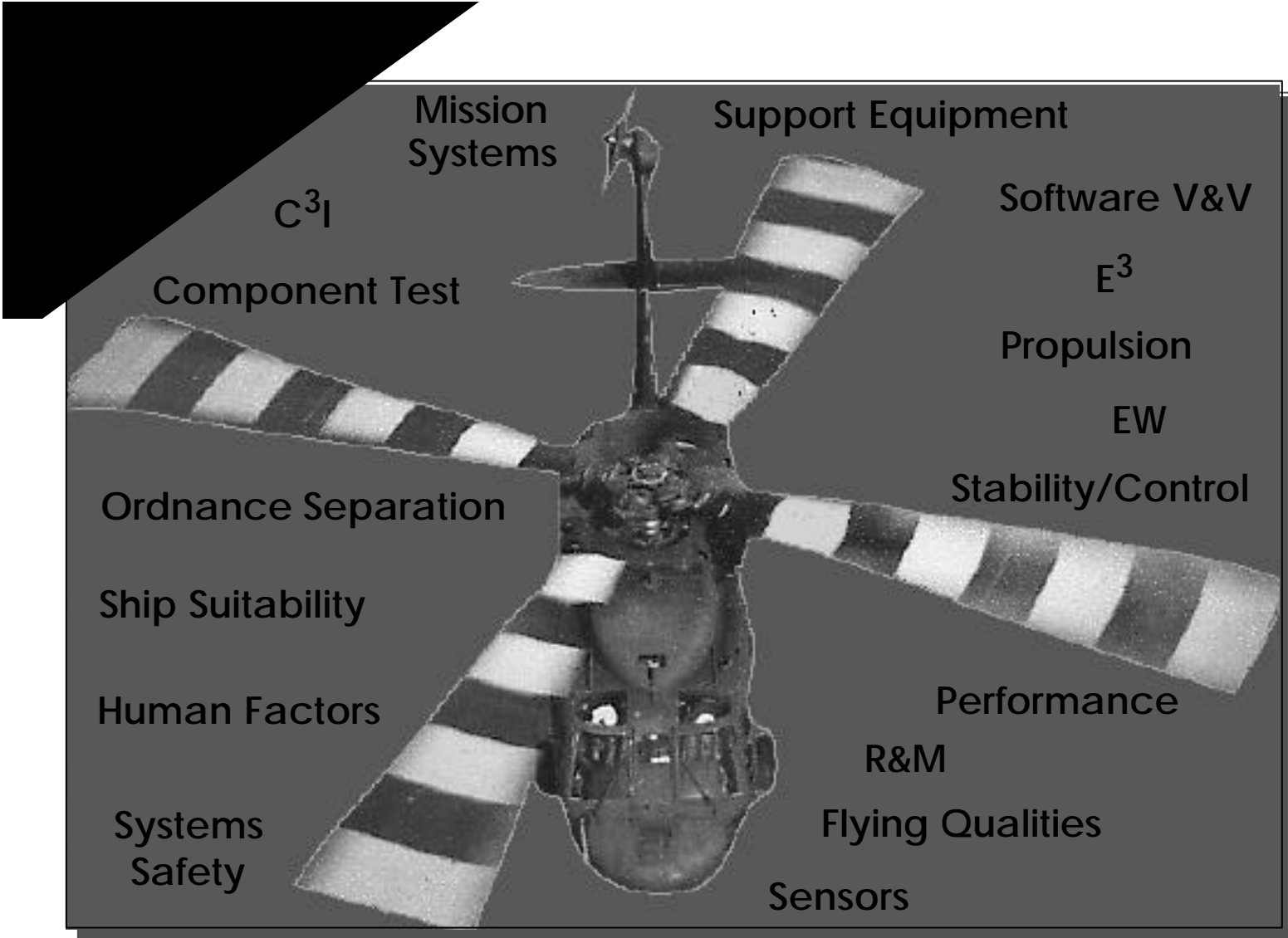
# Electro Optics Target



# Reconnaissance/Resolution Target









# Project Highlights

# Active Test Projects



## ➤ **Flight Systems**

- ↪ **Airframe**
- ↪ **Propulsion and Fuel**
- ↪ **Flight Control**
- ↪ **Environmental**

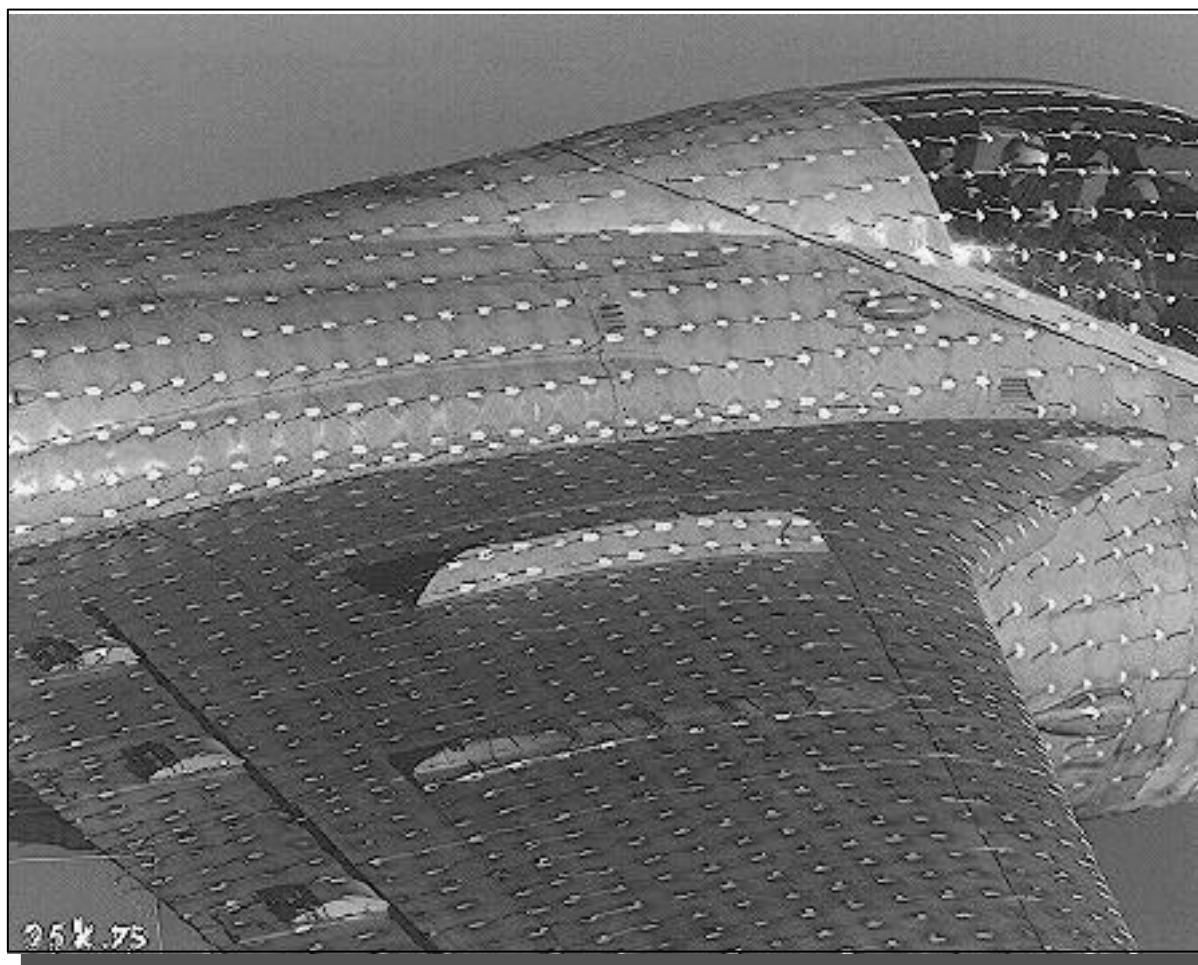
## ➤ **Mission Systems/Installed Weapons**

- ↪ **Avionics**
- ↪ **Processors and Software**
- ↪ **Remote Sensors**
- ↪ **Subsystems**

## ➤ **Component Improvements**

## ➤ **Related Support Systems**

# Flying Qualities



# Performance



# Stability and Control



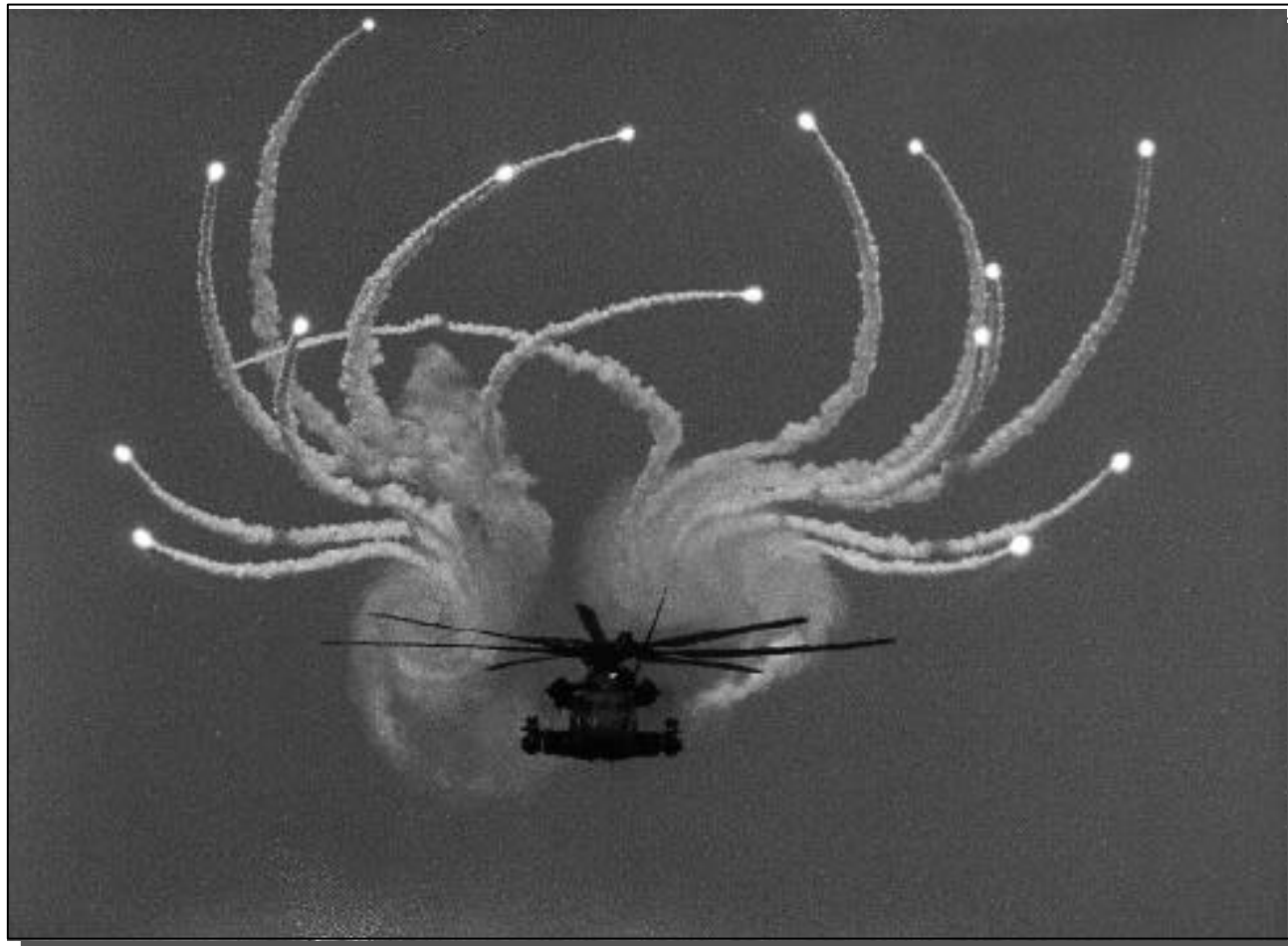
# Sensor Evaluation



# Countermeasures



# Countermeasures



# Weapon Separation



# Missile Compatibility



# Air Crew Systems

- **Chemical Biological Protective Gear**



# Shipboard Compatibility



# External Load Validation



# Unmanned Aerial Vehicle Testing



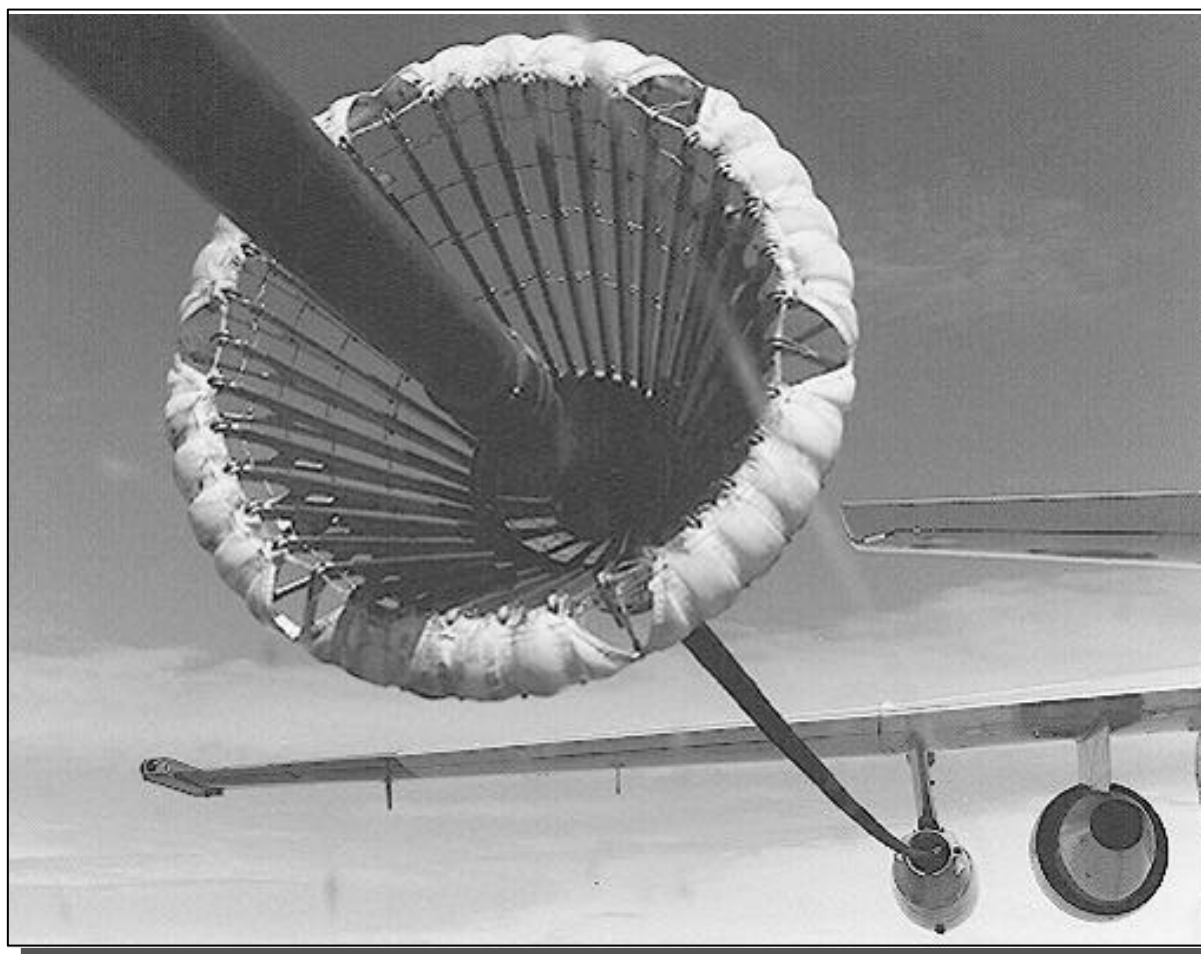
# Unmanned Aerial Vehicle Testing



V-22



# Aerial Refueling



# Support Equipment



# Targets



**Fabricated T-72 Tank**

# T-72 Tank





F/A-18



T-45



AV-8B



SH60-B

# F/A-18E



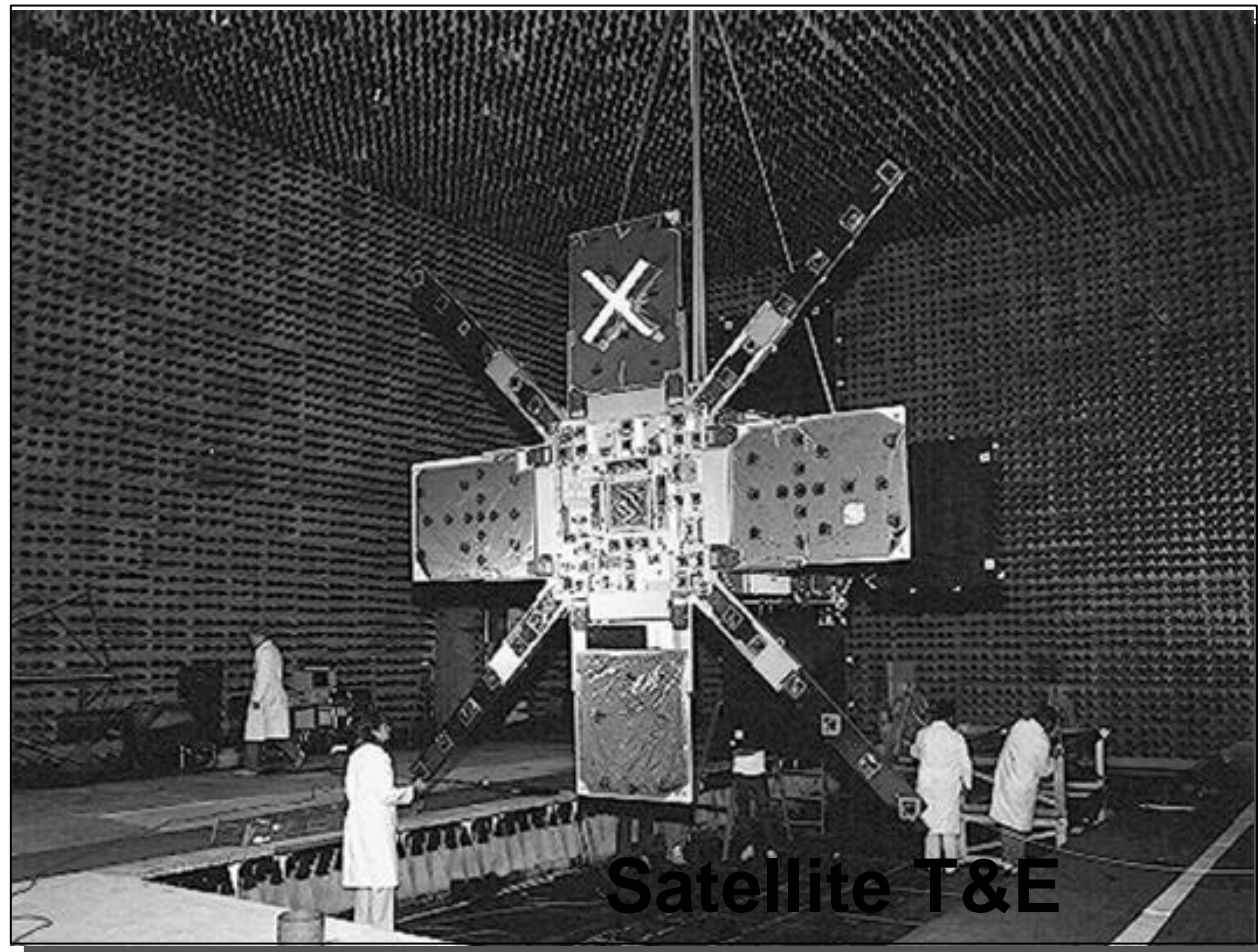
# V-22





# Non-TEAM Work

# Anechoic Chamber





CH-47D



AH-64



MH-60K



MH-47E

# Army



Patriot EMP Test



C-17



MC-130E



F-15



F-16

# Air Force



RCS Testing



Coast Guard



NTSB



NASA



FAA

# Vessel Traffic System



NASA



**T-38 Engine Testing**



Kuwait



Norway



France



Canada

# E<sup>3</sup> Testing



Royal  
Thailand  
Helo S70B

# Eurofighter 2000



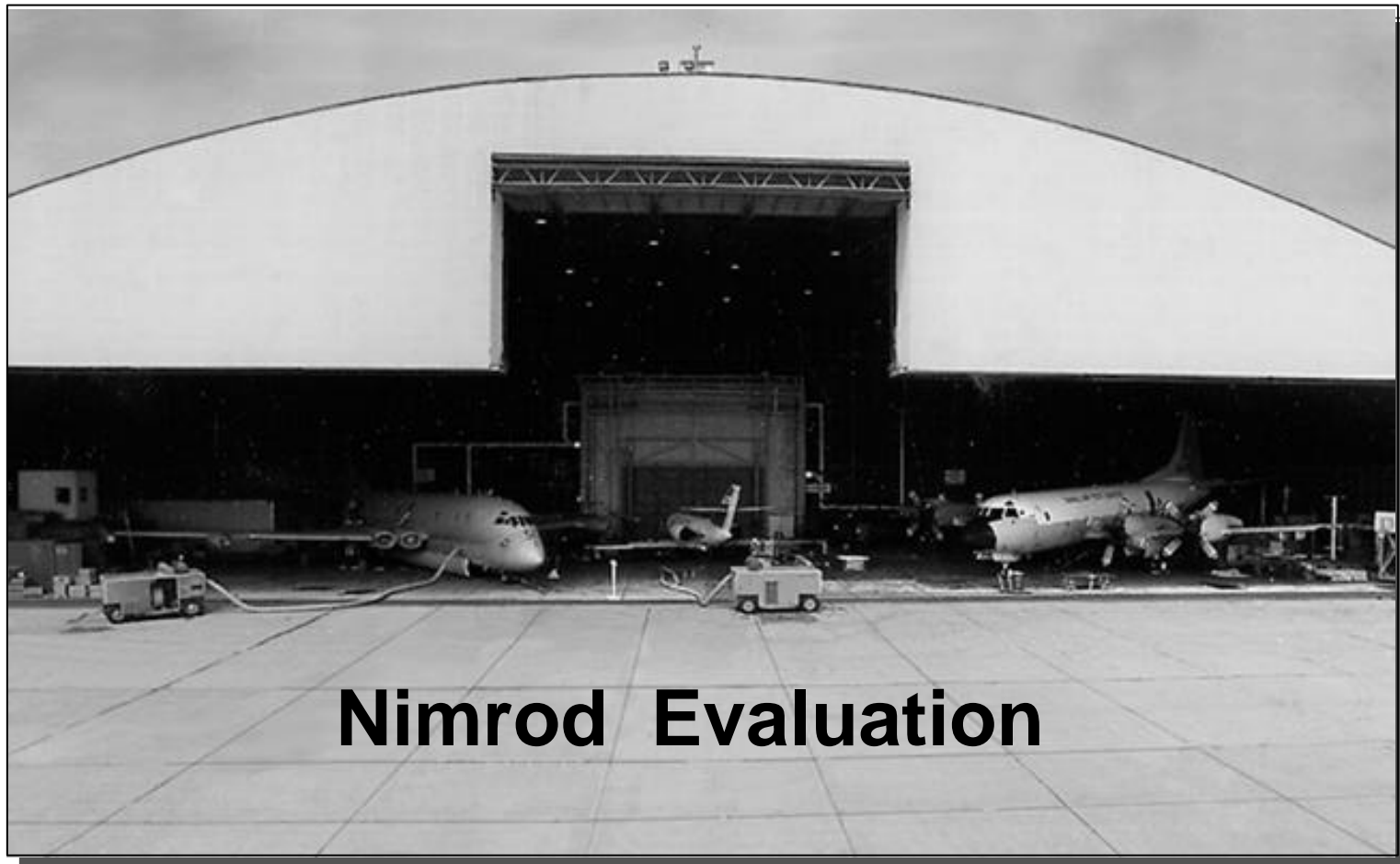
# F-14



# International



# International



# International



Hellenic Navy S-70B-6 Helicopter  
Penguin Missile Program

# FY99 International Customers

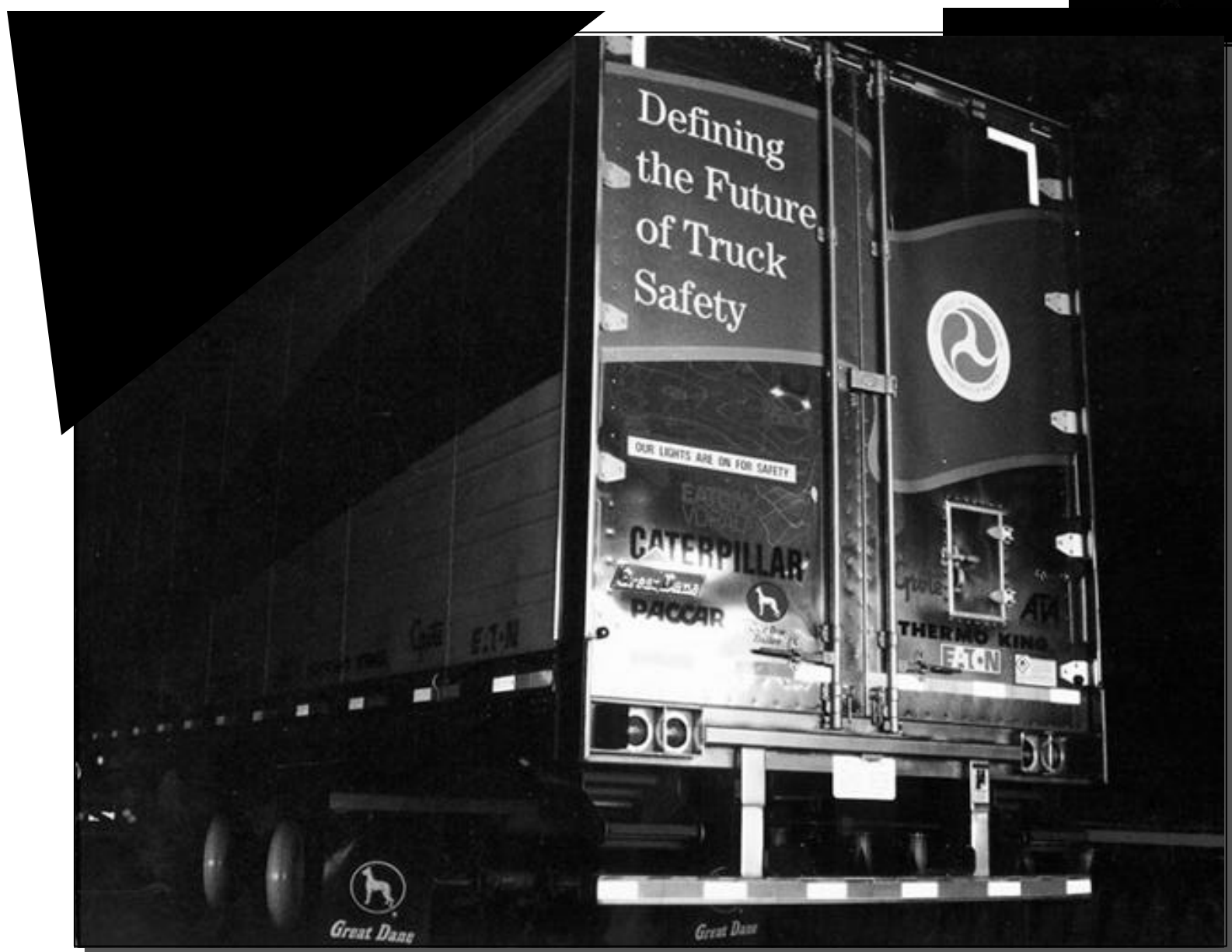


- **Argentina**
- **Australia**
- **Bahrain**
- **Canada**
- **Chile**
- **Denmark**
- **Egypt**
- **Finland**
- **France**
- **Germany**
- **Greece**
- **Hungary**
- **Israel**
- **Italy**
- **Japan**
- **Korea (Seoul)**
- **Kuwait**
- **Malaysia**
- **Netherlands**
- **New Zealand**
- **Norway**
- **Pakistan**
- **Portugal**
- **Saudi Arabi**
- **Senegal**
- **Singapore**
- **Spain**
- **Sweden**
- **Switzerland**
- **Taiwan**
- **Thailand**
- **Tunisia**
- **Turkey**
- **United Arab Emirates**
- **United Kingdom**

# Commercial



**Boeing 717**



Defining  
the Future  
of Truck  
Safety



OUR LIGHTS ARE ON FOR SAFETY

EATON  
CATERPILLAR

PACCAR

THERMO KING

EAGON



Great Dane

# Commercial



# FY99 Commercial Customers



- Advanced Lubricant Technology
- Advanced Technical Products Inc
- Allied Signal Eatontown
- Allied Signal Lexington Park
- Allied Signal Newark
- American Overseas Marine Corp
- Ameritech Fastener Mfg
- Architects Engineers Planners
- Atlantic Mutual Companies
- Bath Ion Works Corp
- Bell Atlantic Mobile Annapolis
- Bell Geospace Inc.
- BF Goodrich
- Board of Education Toms River
- Board of Education/VOCA/City Ocean
- Boeing Long Beach Division
- Castrol Industrial North America Inc
- Central District of Illinois
- CKC Laboratories
- Coleman Microwave Co Edinburg
- Cooper Industries Liberty
- County of Mercer Trenton
- CRC Industries Inc
- DACCO-SCI Columbia
- Dayton-Granger Inc Ft Lauderdale
- Dera Electronics
- DHCS Central Finance
- Electronic Systems Inc Gaithersburg
- Empire Test Pilot School
- ESCO Eng Systems
- F H Technologies Inc.
- Fastener Innovation Technology
- Federal-Mogul Corp
- First National Bank
- Fullerton Operation
- General Kinetics Inc
- General Offshore Specialized
- Gentex Corp Western Operations
- Greer Stop Nut Inc Nashville
- GTE BBN Corp Cambridge
- Harris Corp Elec Sys Sector Melbourne
- Harris Corp Rochester
- Herley Industries Inc.
- Highland Federal Bank Burbank
- Huck International Inc
- Hughes Danbury Optical Systems Inc.
- Intermarine USA Savannah
- Johns Hopkins University APL
- Lear Siegler Services Inc.
- Leland Electyrosystems Inc. Vandalia
- Level 1 Fasteners Huntington
- Llamas Plastics Inc
- Lockheed Aircraft Pax River
- Lockheed Martin Integ Systems Inc Orlando
- Lockheed Martin Lakeland
- Lockheed Martin Systems Fallon
- M Technologies Inc.
- Maritime Dynamics Inc Pax
- Massachusetts Bay Insurance Co Richmond
- McDonald's Pax River
- McDonnell Aircraft & Missile Systems St. Louis
- McDonnell Douglas Aerospace
- McDonnell Douglas Corp St. Louis
- Moddady Corp Subway Pax
- Motorola

# FY99 Commercial Customers (cont)



- National Finance Center OPAC
- National Geographic Society
- Navmar Applied Sciences Corp  
Warminster
- Norman L Cyr Milton
- Northrup Grumann
- Northern District of Georgia
- Northrup Grumann Baltimore
- Northrup Grumann El Segundo
- Northrup Grumann Electronic  
Sensors & Sys Div
- Northrup Grumman Corp ISA  
Sector
- Ocean Research Education  
Foundation Inc. Coral Gables
- Omega Air Inc
- Operational Research Consultants  
Inc Chesapeake
- Penn State, University Park
- Phillips National Inc Lakehurst
- Photographic Imaging Services  
PAX
- Planning Systems Inc McLean
- Polysi Technologies Inc
- Postmaster PAX
- PSI Bearings
- Public Works & Gov Services Canada
- Quantum Milpitas
- Random Hearts Productions Inc
- Raytheon Company
- REV-CAP Co Inc, Maple Shade
- Rheology Montreal Ltd Canada
- Rockwell Science Center
- Royal Bank of Canada
- Sarma Aerospace Equipment
- SBS Avionics Technologies
- Scandia Manufacturing Co Inc
- Sea Education Association Inc
- Shore Lines Mfg Group Inc
- Sippican Inc
- Skyhooks Technologies Inc
- Smith Aerospace Leland  
Electrosystems Vandalia
- Smith Industries Aerospace
- State of New Jersey Police
- Sunstrand Aerospace Rockford
- TCOM, L P, Columbia
- Technologies Inc Horsham
- TECOM Industries
- Teledyne Brown Engineering
- Texaco Exploration &  
Production Inc
- The Boeing Company  
Seattle
- United Air Surveys  
Lakehurst
- United States Marine Inc  
New Orleans
- United Technologies  
Research Center
- University of Maryland  
College Park
- Veridian
- Virgin Lightships Inc
- Westinghouse Electric  
Corp
- Williams International

# BOEING JSF



**USAF CTOL**



**USN CV**



**USMC STOVL**



**UK STOVL**

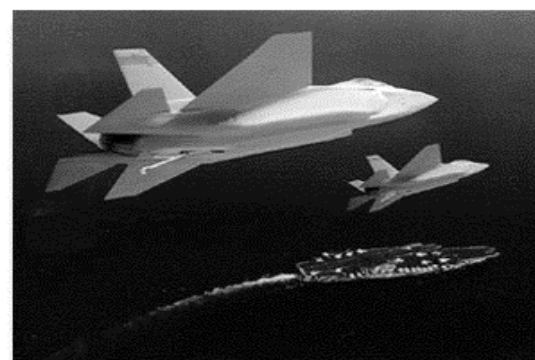
# LOCKHEED MARTIN JSF



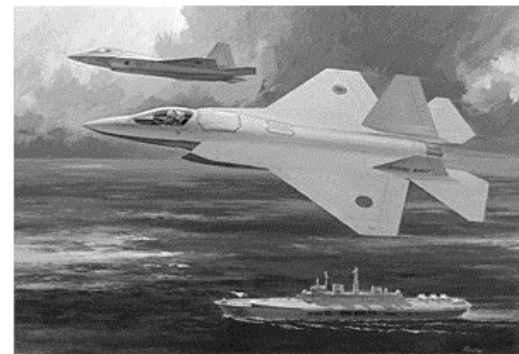
**USAF CTOL**



**USN CV**



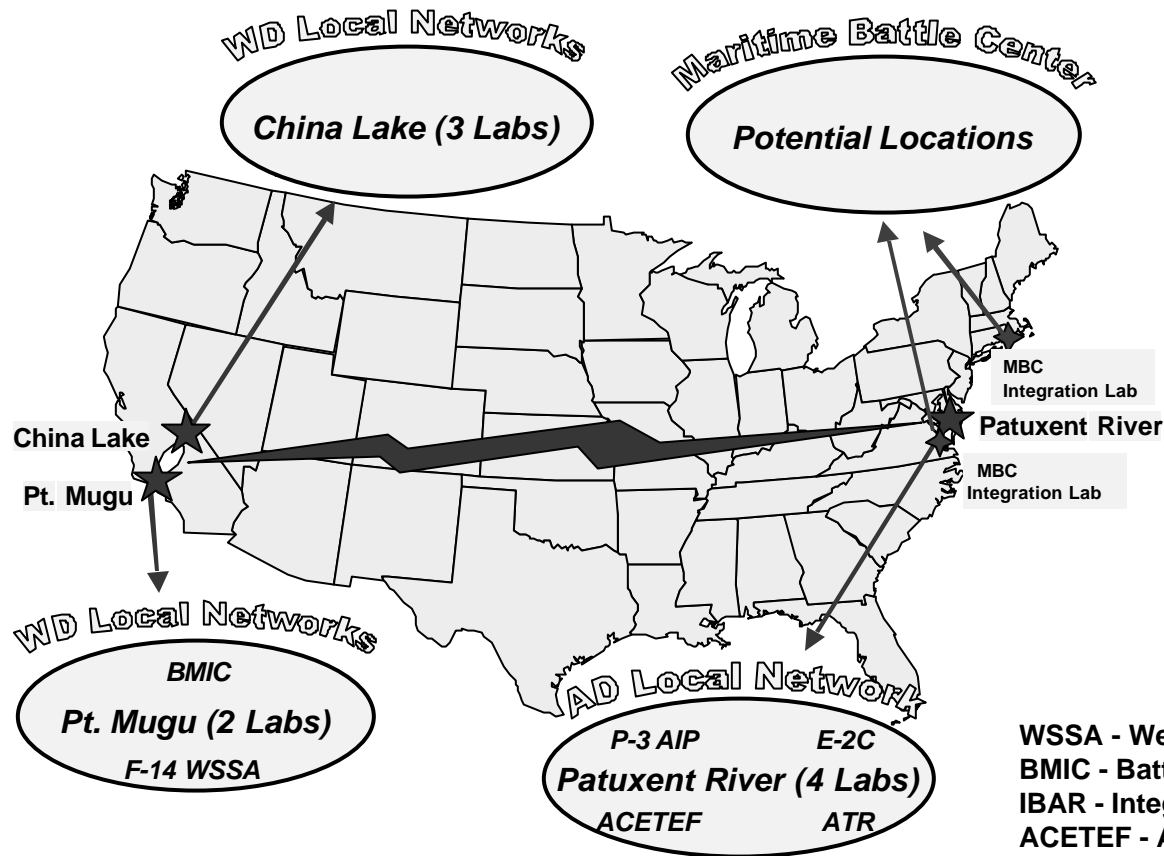
**USMC STOVL**



**UK STOVL**



# NAVAIR Business Process Re-engineering Initiatives



## OBJECTIVE

“Devise a T&E capability development strategy to optimize TEAM support for air combat systems integration into future joint warfare systems (sensor command and control, shooter) in a Network Centric Warfare (NCW) architecture”

WSSA - Weapons System Support Activity  
 BMIC - Battle Management Integration Center  
 IBAR - Integrated Battlespace Arena  
 ACETEF - Air Combat Environment Test & Evaluation Facility  
 ATR - Atlantic Test Range  
 AIP - Avionics Improvement Program

# Integrated Capabilities to Support Program Requirements



WSSA/SSA



S&T Facility



Simulation Facility



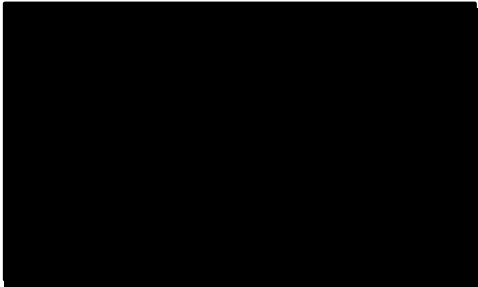
Installed System Test Facility



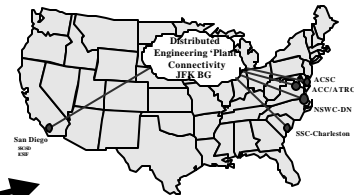
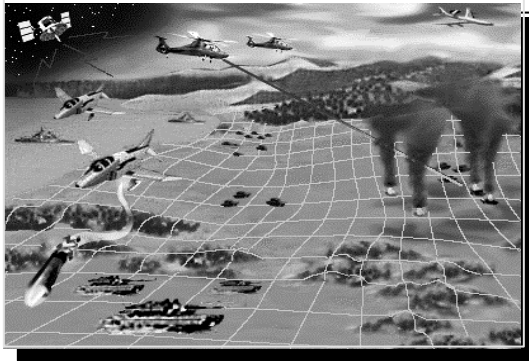
Open Air Range



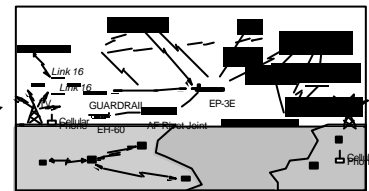
Hardware-in-the-loop



Common Simulation & Stimulation Environment



Participant in DEP



Joint Service and Fleet Battle Experiments



# Joint Advanced Distributed Simulation



# High Performance Computing



# Business Thrusts



- **Form Strategic Alliances with Joint / Allied Warfighters**
- **Deliver Innovative Products and Services**
- **Institute TEAM-wide Business Development Processes**
- **Pursue Business External to the TEAM**
- **Shape Resources (People / Facilities) to Remain Relevant to Joint Warfighter**

# Gain the Edge



- **Unique Work Force**
- **World Class Facilities**
- **Aircraft**
- **Airspace**
- **Full-Service Support**
- **\$17.7 Billion Market**

**F-35  
Integration**

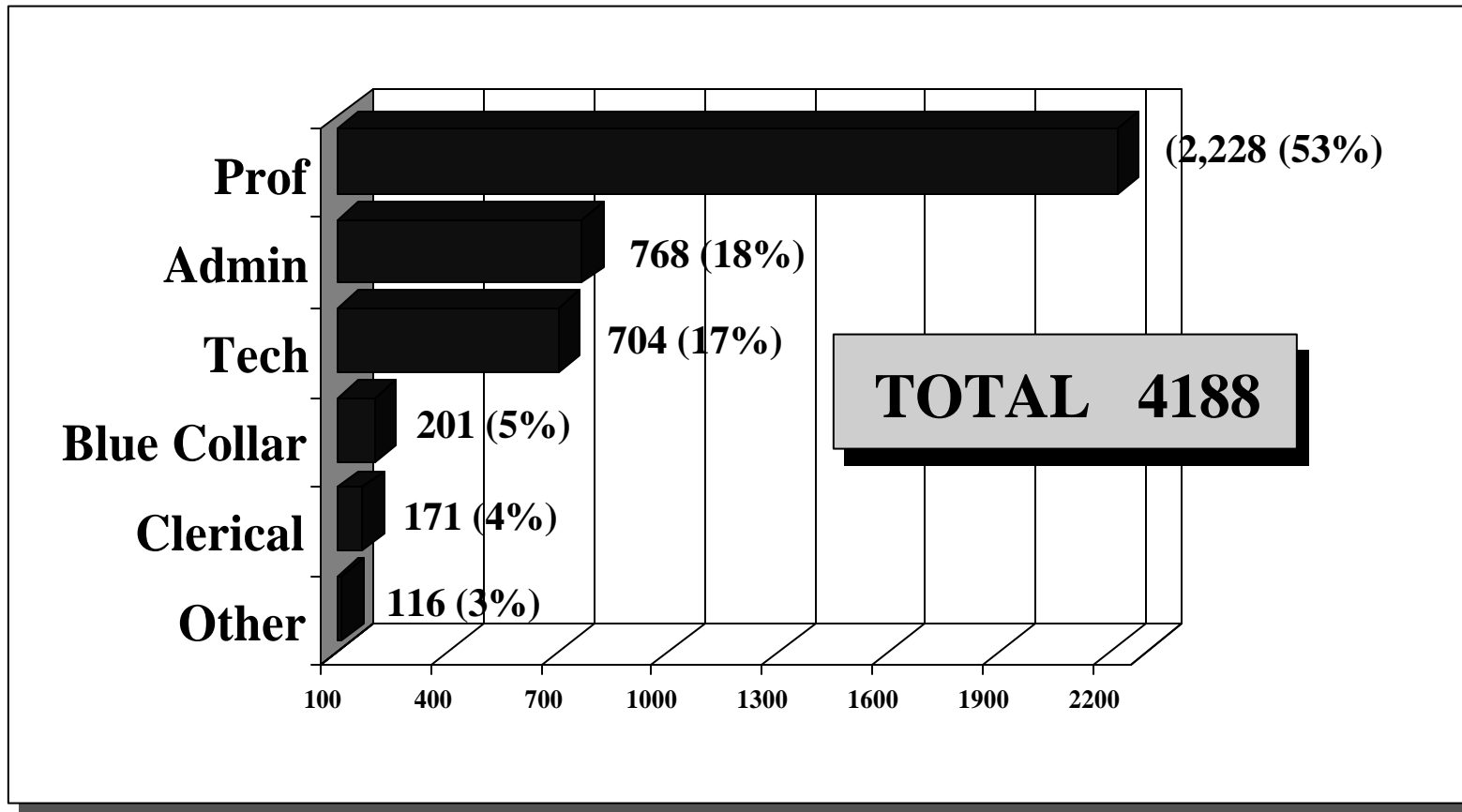


<http://www.nawcad.navy.mil>

email [busdevteam@navair.navy.mil](mailto:busdevteam@navair.navy.mil)

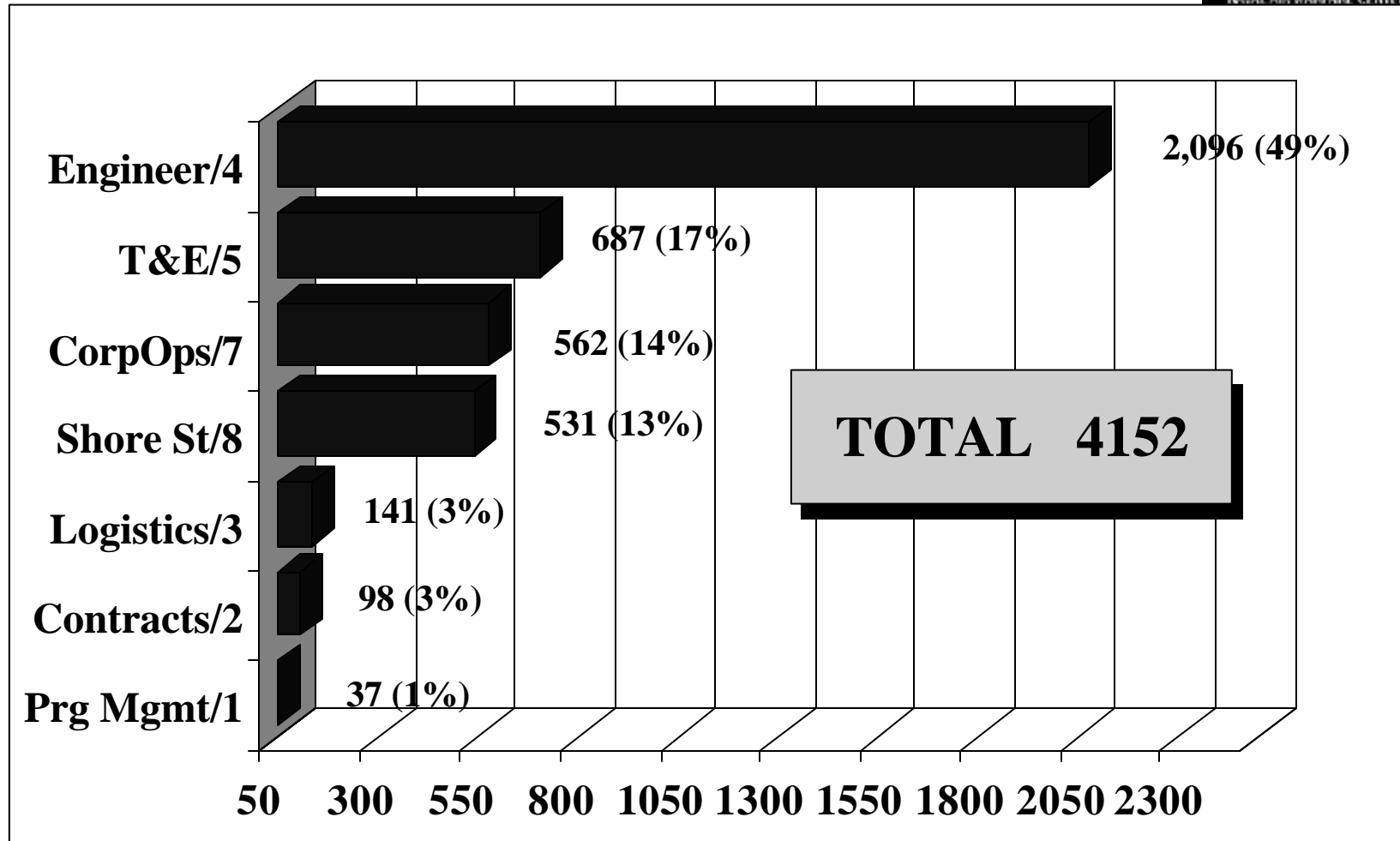
or phone 301-291-3333

# NAWCAD (PAX) Civilians by Discipline



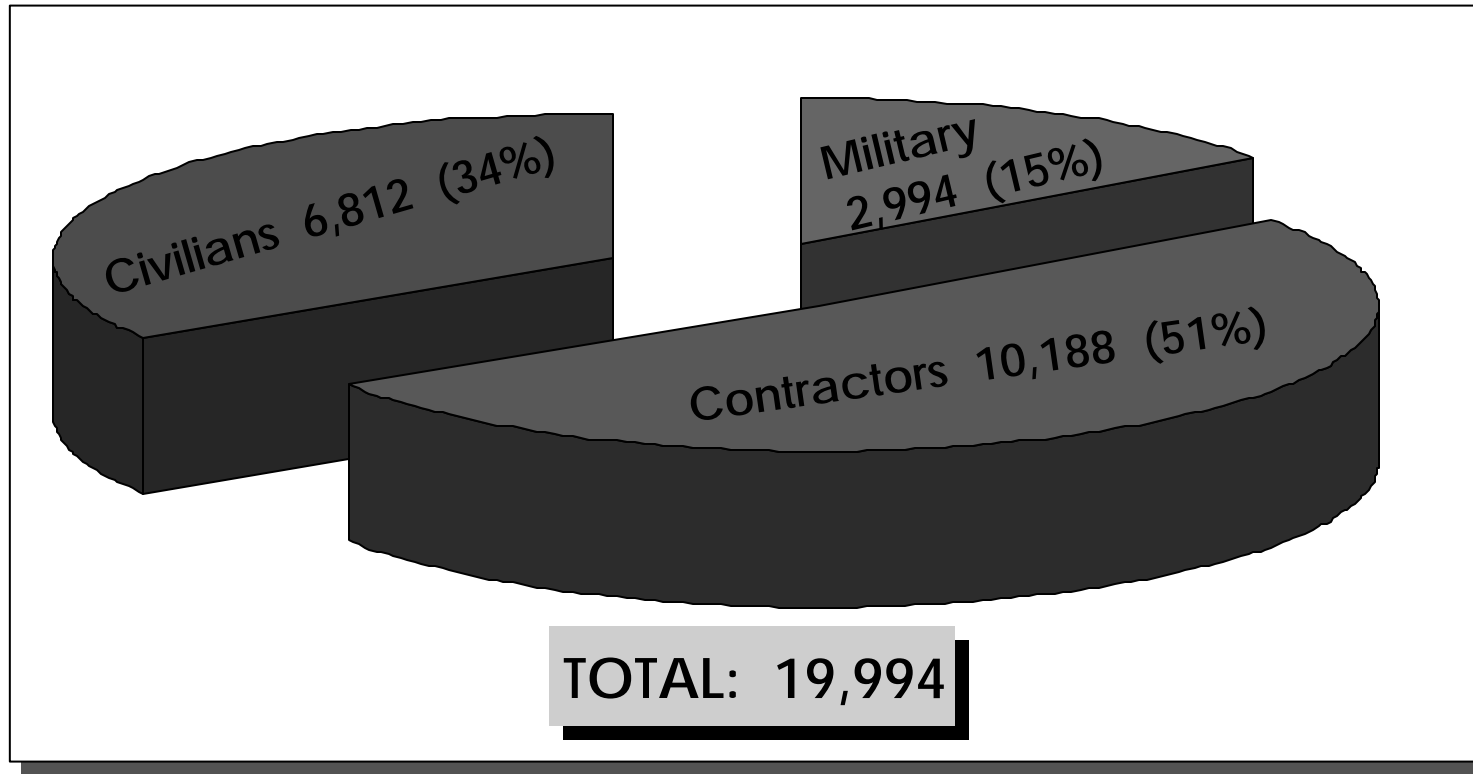
As of March 31, 1999

# NAWCAD (PAX) Civilians by Competency



As of Sept 31, 1999

# PAX Work Force



# Vision



- **One TEAM Delivering 21st Century Aviation Solutions Enabling Dominance From The Sea ...**