April 1, 1943
NAS PAX Commissioned

1945
Naval Air Test Center established

1958
U.S. Navy Test Pilot School established

1992
Reorganized as the Naval Air Warfare Center Aircraft Division (implemented BRAC 1991 decision)
- Consolidated research and development facilities (Warminster PA & Trenton NJ) with existing test and evaluation mission
- Relocated Naval Air Systems Command HQ and acquisition offices from Northern Virginia (1997)

2003
Regionalization: Naval District Washington (NDW) Commander Navy Installations Command (CNIC)
Naval Air Station (NAS) Patuxent River

- Naval Air Systems Command
- Naval Air Warfare Center Aircraft Division
- Naval Test Wing Atlantic
  - Air Test And Evaluation Squadron Two Zero (VX-20)
  - Air Test And Evaluation Squadron Two One (HX-21)
  - Air Test And Evaluation Squadron Two Three (VX-23)
  - U.S. Naval Test Pilot School (USNTPS)
- Naval Health Clinic
- NAVFAC Washington
- Marine Aviation Detachment

- Advanced Maritime Technology Center
- Naval Criminal Investigative Service Regional Office
- Navy Munitions Command Detachment
- Defense Commissary Agency
- Fleet Weather Center – Norfolk, Forecast Component Pax River
- Defense Logistics Agency Document Printing Service Pax River
- Naval Aerospace and Operational Medical Institute
- Fifth Coast Guard District
- Maryland Army National Guard

- Air Test & Evaluation Squadron One (VX-1)
- Scientific Development Squadron One (VXS-1)
- Fleet Air Reconnaissance Squadron Four (VQ-4)
**Operations**
- Air Operations – 143,492
- NAWCAD Flight Hours – 17,490
- NAWCAD Aircraft – 170
- Airspace (square miles)
  - 2,700 restricted (surface to 85,000 ft)
  - 50,000 controlled (unlimited altitude)

**People**
- 25,000+ workforce
- St. Mary’s largest employer
- 300,000 visitors annually
- Also support dependents and retired military

**Facilities**
- $3.6 billion current plant value
- 8.2M sq ft of facilities
- 104K sq ft of off-base leasing
- 890 buildings (12 hangars)
- 5 runways (longest is 11,800 ft)

**Geography**
- 14,553 acres
- 78.6 miles of roads
- 18.7 miles of shoreline
- 65 miles south of Washington DC
- 90 miles north of Norfolk

Flight hours provided by FIST (Flight Info Scheduling & Tracking) Air Ops’ info from Air Traffic Control Log Oct 15.
Other stats current as of Feb 16.
Facilities data includes Pax, Webster OLF and NRC Solomons
Naval Air Systems Command (NAVAIR)

Full Life-cycle Management

- Req’ts / Risks from Fleet / OPNAV
- Materiel Solution Analysis
- Technology Maturation & Risk Reduction
- Engineering And Manufacturing Development
- Production & Deployment
- Operations & Support

Products

- Tactical Aircraft
- Air ASW, Assault & Special Mission
- Unmanned Aircraft & Strike Weapons
- Common Systems / Mission Systems / Training / ALRE

NAWCWD
WEST COAST HUB

- NAVAIR HQ
- Depot / Industrial Site (Fleet Readiness Centers)
- Naval Air Warfare Center
- Logistic Support Activity

NAWCAD
EAST COAST HUB

- Lakehurst
- NAWC Aircraft Div
- Patuxent River
- NAVAIR HQ, PEOs, NAWC Aircraft Div
- Cherry Point
- Fleet Readiness Center East
- Jacksonville
- Fleet Readiness Center Southeast
- Orlando
- NAWC Aircraft Div

COMFRC
FLEET READINESS CENTERS

- Atsugi, Japan
- Fleet Readiness Center

26,221
Civilians

1,657
Military

9,050*
Contractors

* The CSS number reflects that of FY14, other numbers reflect FY15

NAVAIR Public Release SPR 2017-579; Distribution Statement A - Approved for public release; distribution is unlimited.
Mission

Naval Air Warfare Center Aircraft Division (NAWCAD)

To conduct research, development, acquisition, test and evaluation of Naval air-platforms; air platform systems; training systems; aviation support equipment; aircraft launch and recovery systems; air traffic control systems; and ship, shore, and air special mission equipment; and conduct air-platform systems integration; mission and cost analysis; and provide air platform life-cycle services in support of the operating forces, Department of Defense, and as directed.*

*NAVAIR INSTRUCTION 5451.65B, 4 January 2016

“Why we come to work every morning”
NAWCAD Mission

Complete lifecycle support for manned and unmanned Naval aircraft
NAWCAD Major Sites

Value Proposition

- **Workforce**: 13,000 engineers, flight testers, scientists, RDATE professionals. Naval Aviation’s intellectual capital works here.

- **National Ranges and Labs**: Integrated, unique, MRTFB invested, joint facilities, and not duplicated by industry.

- **Customer**: PEO/PMA, but strong history in Joint, Inter-Service, Inter-Agency, FMS and Industry collaboration.

- **Business Model**: Navy Working Capital Fund (NWCF) supply and demand model incentivizes cost consciousness.

- **Flag Officer with Command responsibilities (NAWCAD) and Technical Authority (Air 4.0).**

**NAWCAD Pax: The Busiest Test Center in the World**

- Horizontally integrated with other Warfare Centers and National Labs

- Warfare Centers shaped by BRAC (Indianapolis, Trenton, Warminster closed & consolidated at Pax)

- The only combined Air/Ship/Shore C4I and Interoperability DT&E activity
Capabilities, Laboratories & Facilities

Systems Engineering
Air Vehicle RDT&E
Propulsion and Power RDT&E
Ship/Shore Air Operations and Communications
Rapid Capability Engineering & Integration
Avionics RDT&E
Human Systems RDT&E
Training Systems Division (TSD)
Mission Engineering & Analysis
Flight Test Engineering (FTE)
Naval Test Wing Atlantic (NTWL)
Atlantic Test Range (ATR)
Atlantic Targets and Marine Operations (ATMO)
Integrated Battlespace Simulation and Test (IBST)
Advanced Prototyping
Joint Simulation Environment (JSE)
National Cyber Range (NCR)
Aviation Logistics
Air Vehicle RDT&E
Carrier Suitability

Test Catapult (TC-7)
Steam Catapult
Shipboard Compatibility
In Flight Refueling
Application of an Experimental, Environmentally-Friendly Surface Treatment for In-Service Testing

Scanning Electron Microscope for Failure Analysis

Autoclave for Composite Materials RDT&E

Exposure Chamber to Simulate Operational Environment

Non-Destructive Inspection for Cracks Using Eddy Current Technique
Electromagnetic Pulse Facility

Air Force E-4B fit-check at EMP

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Lab Services

- Tie-down analysis
- Air Transportability Assessments with V-22 and CH-53K Mockups
- External Cargo Mockup
- Aerial Port Services

Certification

- Tactical Vehicles
- Infiltration
- Exfiltration
- Aerial Delivery
- Unique Cargo Systems

Training

- Special Operations
- Cargo Loading
- Vehicle Loading
- Rescue Operations

NAV AIR Public Release SPR 2017-579; Distribution Statement A - Approved for public release; distribution is unlimited.
Propulsion & Power
RDT&E
Safety and performance of engine operations throughout the engine life cycle.

Fuels and Lubricants Testing

Altitude Environmental Chamber

Critical Facility supporting SECNAV’s Energy Conservation and Sustainment Strategy

Expanding Requirement and longer missions require more robust systems
Aircraft T&E Facility

Environmental Testing

Uninstalled Engine Testing

NAVAIR Public Release SPR 2017-579; Distribution Statement A - Approved for public release; distribution is unlimited.
Ship/Shore Air Operations & Communication
Surface/Aviation Interoperability Lab (SAIL)
Rapid Capability Engineering & Integration
PERSONNEL AND FACILITIES
- 499 CIVIL SERVICE EMPLOYEES
- 8 MILITARY
- 2,482 CSS/NON-CSS
- 51 BUILDINGS
- 31 LABS
TOTAL FOOTPRINT: 614,808 SQFT

LEAD SYSTEMS INTEGRATION DELIVERIES (FY15-PRESENT)
LARGE SCALE – system of systems integrations involving upwards of 20 systems: 16
MEDIUM SCALE – system of systems integrations involving less than 20 systems: 2,292
SMALL SCALE – integrations of a single system: 596
TOTAL: 2,904 (as of 20 May 2017)

LEAD SYSTEMS INTEGRATION
ENGINEERING DEVELOPMENT
FABRICATION AND INTEGRATION
SYSTEMS TESTING
SYSTEM INSTALLATION & VERIFICATION
OPERATIONAL SUPPORT

CORE FUNCTIONAL CAPABILITIES
- Combat Integration and Identification Systems
- Ship and Air Integrated Warfare
- Special Communications Mission Solutions
- Advanced Technology Transition
- Air Traffic Control and Landing Systems

RAPID DEVELOPMENT SYSTEMS ENGINEERING
- Manned and Unmanned Airborne ISR
- Emerging Technology Integration
- Cyber Warfare Solutions
- Mobile/Deployable C5ISR
- Shipboard Integration
- Engineering Prototyping
Facilities for Antenna and Radar Cross Section Measurements (FARM)

Three Outdoor Ranges
- Two capable of supporting full size aircraft shells
- Wide operating frequency range from 20 MHz to 18 GHz

Three Indoor Anechoic Chambers
- Wide operating frequency range from 100 MHz to 40 GHz
- Indoor and Outdoor GPS Anti-Jam Testing
- Rain Erosion/Impact
  - Test 1” samples at velocities of up to Mach 2 in a controlled rain field

Critical for RCS measurements, receiver performance, and antenna-to-antenna isolation

Radar and Computational Electromagnetics Modeling (RACEMM)

- Radar Design and Modeling analysis
- On-platform antenna performance and placement studies/analysis

Lab provides Low Cost risk mitigation for:
- Radar Modeling (Any band)
- Antenna and/or structural changes.
- Full platform spatial area analysis

Critical modeling and analysis to understand a platform’s electromagnetic profile
Avionics, Sensors and E*Warfare RDT&E

Acoustic/Optical Tank Facility

37,000 gallon water tank supporting research, development, and testing of novel in-situ underwater phenomena

Airborne Antisubmarine Warfare (ASW) Intelligence (AAI) Lab

Provide Intelligence Data that feeds ASW Modeling

Collect and analyze essential acoustic and non-acoustic threat data

Acoustic Modeling and Simulation Lab

Concept studies, for active and passive ASW missions
Tactics development for optimal performance and prototype sensor development
System/Platform performance assessments for engagement level and campaign level models

Critical to modeling and simulation in support of air ASW mission planning and mission optimization
Avionics, Sensors and E*Warfare RDT&E

Airborne Multi-Intelligence Special Missions (AMISM) Lab

- Provides research, development and testing of new airborne multi-INT and special mission capabilities

Information Fusion and Visualization (IFV) Lab

- Data Fusion Performance and Standard Metrics
- Predictive Analysis
- Sensor Resource Management

Critical modeling and analysis for data fusion development and integration

Fused tracker products

Operator Confusion

Prediction Distributions (Grn=Msmt, Black=Kal, Blu=Tru)

2.46
2.48
2.5
2.52
2.54
2.56
2.58
2 x 10^5
4.95
4.96
4.97
4.98
4.99
5
5.01
5.02
5.03
5.04
5 x 10^5
Human Systems RDT&E
Human Systems RDT&E

Human Integration and Performance

Protection and Sustainment Systems

Escape, Parachutes, & Crashworthy Systems
Crew Station Technology Lab

Coast Guard’s HC-130H Mock-Up
Training Systems Division (NAWCTSD)
NAWCTSD Mission

NAWCTSD is the principal Navy center for research, development, test and evaluation, acquisition and product support of training systems; We provide Interservice coordination and training systems support for the Army and Air Force, and we perform such other functions and tasks as directed by higher authority.
Mission Engineering & Analysis
Mission Engineering & Analysis

Warfare Modeling Simulation & Analysis at All Levels

- Threat Assessments, Mission Architectures, and Concepts of Employment
- Advanced Aircraft Design
- Assessing Warfighting Effectiveness in a Realistic Operational Context

Software-Based Decision Support Tools

NAVAIR Public Release SPR 2017-579; Distribution Statement A - Approved for public release; distribution is unlimited.
Flight Test Engineering
Naval Test Wing Atlantic
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**Naval Test Wing Atlantic**

<table>
<thead>
<tr>
<th>VX-20</th>
<th>HX-21</th>
<th>USNTPS</th>
<th>VX-23</th>
<th>UASTD</th>
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<tr>
<td>● C-2A</td>
<td>● AH-1W</td>
<td>● C-12C</td>
<td>● EA-6B</td>
<td>● MQ-8B</td>
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<td>● AH-1Z</td>
<td>● C-26C</td>
<td>● EA-18G</td>
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<td>● UH-1Y</td>
<td>● F/A-18F</td>
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<td>● NF/A-18C</td>
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<td>● MH-60S</td>
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<td>● NSH-60F</td>
<td>● OH-58C</td>
<td>● NF/A-18D</td>
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<td>● KC-130R SUP</td>
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<td>● UH-60A</td>
<td>● F/A-18E</td>
<td>● XUV</td>
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<td>● F-35B</td>
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<td>● X-26A</td>
<td>● F-35C</td>
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</tbody>
</table>

**Total Manned Aircraft - 125**

**Total UAV – 31**

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Atlantic Test Range
Atlantic Test Range
Patuxent River Complex

NAS PAX River Assets
- Chesapeake Test Range
- Supersonic Corridor
- UAV Routes
- Helicopter Operating Areas
- Military Training Routes also used by
  - Andrews AFB
  - Dover AFB
  - Delaware ANG
  - DC ANG
  - Other military

Expanded Air Space

Atlantic Test Ranges
- Chesapeake Test Range
  - Restricted Airspace
- Offshore Ranges
  - Warning Areas
Atlantic Targets and Marine Operations
Atlantic Targets & Marine Ops

BQM-74 Launch

SA-6 Gainful

Coyote Launch

Hellfire SEPTAR
Integrated Battlespace Simulation and Test
Air Combat Environment Test & Evaluation Facility
Installed Systems Test Facility

- Large Anechoic Chamber
- Manned Flight Simulator
- Shielded Hangar
- Electronic Warfare Integrated Systems Test Lab
- Warfare Simulation
- Distributed Test
- Communication, Navigation, IFF Lab
- High Performance Computing
- Threat Air Defense Lab
Anechoic Chamber
Electronic Warfare Testing

EA-18G

EA-6B

H-60

F-35
Advanced Prototyping
Aircraft Prototype Facility

APF Phase I Secure Facility
- 28,309 sq ft. (< P-3 sized aircraft)
- 5 ton capacity overhead crane
- $2.5M of tooling and infrastructure equipment
- Internal and external secure comms

APF Phase II Secure Facility
- 72,800 sq ft. (747-class sized aircraft)
- Capable of 4 independently compartmentalized hangars

APF Phase III (2020 Funding)
- 33,928 sq ft.
- Secure capable modification hangar
  - Composite materials laboratory
  - Composite materials preparation room
  - 3 secure room capable office spaces
Joint Simulation Environment
Joint Simulation Environment (JSE)

- Government designed and built immersive virtual simulation supporting 5th generation mission systems Research Development Test & Evaluation (RDT&E).
- Supporting F-35 Operational Testing and 4th – 5th gen integration testing as well as future testing needs of the F-35 and other platforms.
- Flexible, reusable, tailorable, and cost effective solution for developmental, operational and interoperability testing.
- JSE is considering multiple Department of Defense Enterprise Standards, including Next Generation Threat Simulation (NGTS), Architecture Management Integration Environment (AMIE), Digital Integrated Air Defense System (DIADS), Threat Modeling Analysis Program (TMAP), Weapon Server Common Environment (WSCE), and Extensible Architecture for the Analysis and Generation of Linked Simulations (EAAGLES) as common interfaces.
- Integration with Air Combat Environment Test & Evaluation Facility (ACETEF) Large Anechoic Chamber

Features:
- Integrated use of Navy and AF facilities, models, methods, & tools
- Man In The Loop (MITL)
- Hardware In The Loop (HITL)
- Ability to Link geographically distributed MITL/HITL Assets
- Leverage of Intelligence Community models
- Architectures to support the expansion of the JSE over time
- Architectures to support the extension of the JSE for other Service uses
National Cyber Range
National Cyber Range
Naval Air Warfare Center Aircraft Division (NAWCAD) Aircraft Mission Systems Support

- NAWCAD in partnership with Test Resource Management Center
- Government cyberspace test range providing mission tailored, custom-fidelity cyber environments that enable independent and/or cooperative Test and Evaluation (T&E) of advanced cyberspace capabilities.
- Provides secure facilities, innovate technologies, repeatable processes, and the skilled workforce required to support T&E in cyberspace.
- Create custom-fidelity, mission representative cyberspace environments.
- Facilitate the integration of the cyberspace T&E infrastructure through partnerships with key stakeholders across Department of Defense (DoD), Department of Homeland Security (DHS), industry, and academia.
- Provide the ability to integrate and connect platform and weapon system Hardware In The Loop (HITL) facilities, System Integration Labs (SILs), and traditional T&E facilities to a cyber range
- Provide, coordinate, and leverage platform and weapon system Subject Matter Experts (SME)s.

Features:
- Embrace a rapidly configurable architecture
- Support multiple classifications
- Provide cyber test tools
- Provide highly realistic enterprise Information Technology (IT) and Platform IT (PIT) cyber environments
- Joint Mission Environment Test Capability (JMETC) and Joint Information Operations Range (JIOR) Connectivity
- Systems of Systems (SoS) architectures
- Virtualization
- Data flow visualization

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Aviation Logistics
AIRWorks

Mission: We deliver product to the Warfighter
Economic Impact on Maryland
Workforce Demographics

Average Civilian Salary: $109,939

Civilian Professional Degrees % of Total

$7.5B Economic Impact to State of Maryland

Where We Live

St. Mary’s County 72%
Calvert County 13%
Charles County 5%
Other Maryland 2%
Other States 8%

Civilian Personnel by Occupation Level

Average Civilian Salary: $109,939


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Regional Community Connections

- Southern Maryland Higher Education Center
  - Autonomy Research Facility (3rd Building - USM)
  - Enables Federal, Local Business, and Academic collaboration

- University of Maryland (UMD) Unmanned Aerial Systems Test Site (Clark School of Engineering)
  - Alternatives to support burgeoning commercial and DoD Unmanned Aerial Systems (UAS) demand
  - Furthering the application of unmanned technologies

- Innovation Incubator
  - Accelerator for start-up companies
  - Commercialize technologies leveraged from federal labs
University Partnerships

- Title 10 U.S. Code 2194 authorizes partnerships between DoD labs and educational institutions
- NAWCAD’s Four Maryland College/University Education Partnership Agreements (EPAs):
  - University of Maryland
    - UMD and NAWCAD cooperate to provide BS ME and EE programs at Southern Maryland Higher Ed Center
      - Summer internships available to enrolled students
    - UMD students/professors perform research in support of lab missions
  - St. Mary’s College of Maryland (SMCM)
    - SMCM students obtain capstone project credit by interning in labs
    - Collaborate on other local STEM outreach programs (i.e. STEM-ING)
  - College of Southern Maryland
    - Supports UMD BS ME and EE programs by providing 2-year Associate of Science in Engineering degree pathway
  - Morgan State University
    - Targeted Baltimore City/County students for summer internship
    - MSU added to recurring recruiting schedule
    - Working to identify collaborative research opportunities
Summary

- Provides full spectrum aircraft research, development, test and evaluation and logistics support services
- Increasing focus on Rapid Prototyping and Irregular Warfare
- Demand continues for our unique intellectual capital/capabilities

Busiest Flight Test Center in the world!