US Naval Test Pilot School

Rotary Wing Program Update

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WHY HAVE A TEST PILOT?

- Capable of safely operating aircraft before they are “mature”
- Need to find problems early in the program
- The “bridge” between developers and users

- “Never take a test pilot to a meeting. When under pressure, they have the annoying habit of blurting out the truth.”

Major Test Pilot Schools

- The end of WW-2 and the dawn of the "Jet Age" spurred the formation of four test pilot schools

- Empire (UK) Test Pilot School
  - Established 1943 at Boscombe Down, England
- USAF Test Pilot School
  - Established 1944 at Wright-Patterson AFB, Ohio
  - Moved to Edwards AFB, California
- USN Test Pilot School
  - Established 1945 at NAS Patuxent River, Maryland
- French Test Pilot School (EPNER)
  - Established 1946, moved to Istres 1962

USNTPS History

Established 1945

- Milestone Events
  - Rotary Wing Syllabus 1961
  - 11 Month Syllabus 1973
  - Airborne Systems Syllabus 1975
  - Short Course Department 1997

New Academic/Office Building – 1993

- Staff Spaces
- 120 Seat Auditorium
- 5 Classrooms
- Simulation Labs / IT Support
- Locker rooms
- Exercise Center
- Break Areas with Vending Machines

International Partners

- Royal Air Force
- Royal Swedish Air Force
- Royal Australian Air Force
- Royal Norwegian Air Force
- Royal Netherlands Air Force
- Singapore Air Force
- Finnish Air Force
- Spanish Air Force
- Italian Air Force
- Israeli Air Force
- Swiss Air Force
- German Air Force
- Indian Navy/Air Force
- French Navy/Air Force
- Royal Navy
- Royal Australian Navy
- Canadian Forces
- Japanese Forces

Command Profile

- Academic Instructors – 12
- Flight Instructors – 27
  - 21 Military (multi-service)
  - 3 Civil Service
  - 3 Contractor
- Administrative Staff – 22
  - Operations
  - Budget
  - Facilities
- Maintenance – 187
  - Dyncorp
  - Sikorsky
  - L-3
  - Active Duty
- *~320 Staff/Student/Contractor*

- Aircraft
  - 41 aircraft
  - 12 different models

USNTPS People

- Front Office
  - Commander, LTC Greg Fortier, USA
  - Executive Officer, LtCol Tim Davis, USMC
- The Chiefs
  - CAI, John O'Connor, CDR USN (ret)
  - CFI, CDR Anthony Fortescue, USN
- Typical Student
  - Senior O-3
  - 1000 Flight Hours
  - Combat Veteran
  - Engineering Degree
  - They are wonderful

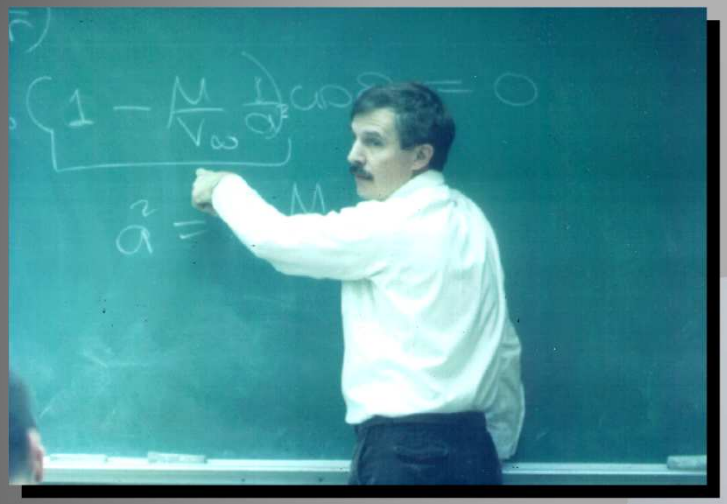
USNTPS Annual Execution

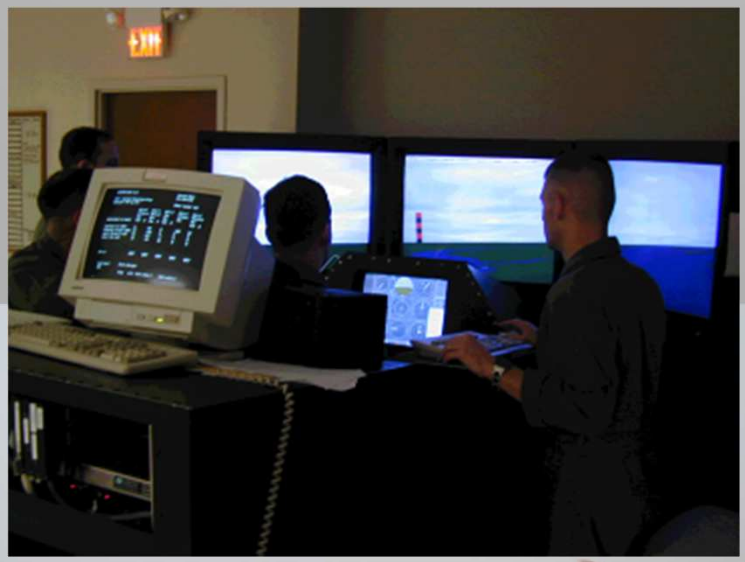
- $45 Million
- 4500 Sorties Flown
- 6500 Flight Hours
- 1100 Academic Hours
- 300 Simulation Periods
- 72 Long Course Students
- 200 Short Course Students

Long Course

- Two Classes Annually
- Three syllabi
  - Fixed Wing (pilot/engineer)
  - Rotary Wing (pilot/engineer)
  - Airborne Systems (NFO/engineer)
- 11 Months in duration
  - Pre-arrival training
    - T-6 NAS Pensacola
    - T-38C Randolph AFB
    - H-72 Grand Prairie, TX
    - H-60 Indian Town Gap, PA
  - ~ 530 Academic hours
  - ~ 100 Sorties/120 flight hours
  - ~ 25 Technical reports

Instructional Flow – Theory to Practice





- Classroom
- Lab and Simulation
- Exercise Briefing
- Flight Demonstration
- Data Flights
- Technical Report
- Review/Debrief/Critique

Rotary Wing Syllabus

- Classes 145 & 146

UH-72A (5)

- **Navy Owned (FAA COTS)**
- **Rotary Wing Syllabus**
  - Flying Qualities and Performance
  - Integrated Systems
  - AFCS Eval
  - Fully Instrumented

UH-60L (5)

- **Army Owned / Funded Aircraft**
- **Rotary Wing Syllabus**
  - Flying Qualities and Performance
  - Fully Instrumented

OH-58C (4)

- **Army Owned / Funded Aircraft**
- **Rotary Wing Syllabus**
  - Flying Qualities and Performance
  - Autorotational Landing Evaluation
  - ADS-33

C-12C (4)

- **Army Owned / Funded Aircraft**
- **Fixed/Rotary Wing Syllabus**
  - Multi-Engine Familiarization
  - Asymmetric Power Effects
  - Navigation Systems Evaluation
  - Handling Qualities and Performance

SAAB-340 (1) ASTARS II

- **Primary Systems Aircraft**
  - CALSPAN Owned/Flown
  - Cockpit Mockup
  - HUD
  - 2 Moving maps
  - Instructor Station
  - APG-66(V)2 RADAR
  - MX-15 Electro Optical System

X-26A GLIDER (2)

- **Fixed/Rotary Wing Syllabus**
  - High Lift to Drag Evaluation
  - Un-powered Flying Qualities
  - Aerobatics

Qualitative Evaluations

Rotary Wing Curriculum

- There are still three halves to each day
  - Flying
  - Academics
  - Report Writing
- 530 Academic Hours
- 120 Flight Hours
- 70 Events
- 18 Test Plans (Data Cards > Huge)
- 25 Reports (Oral & Written)
- 15 Different Aircraft

Rotary Wing Performance

- Airspeed Calibration
  - OH-58 with chase aircraft
  - Trailing Bomb
- UH-60 or UH-72 Perf Model Development
  - Engine Performance and Operation
  - Hover IGE & OGE
  - Vertical Climb
  - Level Flight
  - Forward Flight Climb & Descent
- Performance Exam & Checkride

Rotary Wing Handling Qualities

- Introduction to Handling Qualities (UH-72)
- Forward Flight (UH-60)
  - Statics
  - Dynamics
  - Control Response
- Low Airspeed (OH-58)
  - Pace Truck
  - Statics
  - Control Response
  - ADS-33 Course
- HQ Exam & Checkride

Rotary Wing AFCS

- Automatic Flight Controls (UH-72)
  - Flight Control Description
  - System Integration & Displays
  - Control Response Types
  - Normal Operating Modes
    - Attitude Hold (pitch, roll, yaw)
    - Altitude Hold
    - Airspeed Hold
    - Turn Coordination
    - Navigation Modes
  - Degraded Operating Modes
  - Mission Assessment

Autorotations

- Our “Critical Test” Event (OH-58)
- Test Plan
- Initial Familiarization Flight
- Autorotational “Refresher” Flight
- Autorotational Landing Assessment
- Height-Velocity Curve Demonstration
- Class Presentation

Fixed Wing Events

- Familiarization Flights in T-6 & C-12
- Jet Aircraft Orientation Flight (T-38)
- Performance and Stalls (C-12)
- Longitudinal Stability (C-12 / T-6)
- Lateral-Directional Stability (C-12 / U-6)
- Asymmetric Power (C-12)
- High Lift to Drag (X-26)

Variable Stability Exercises

- RW VSS-1 [Sensitivity & Damping] (TPS SIM)
- RW VSS-2 [Advanced Topics] (NRC B-412)
- CALSPAN VSS Lear Jet
  - Longitudinal
  - Lateral-Directional
  - S&C Review/Overview
  - Advanced Flight Controls
    - Develop Control Laws in TPS Simulator
    - Fly and Fix in CALSPAN Lear
- COMING SOON! USNTPS VSS Helo (UH-72)

RW Airborne Systems

- Cockpit Evaluation
- Integrated Systems Demonstration (ASTARS)
- FLIR Lab
- FLIR Evaluation (ASTARS)
- RADAR Systems Familiarization (TPS Sim)
- RADAR Systems Evaluation (MH-60R Sim)
- Over 100 hours of Academics

The Final Exam

- Developmental Test – IIA (DT-2)
  - Team of two
  - International or DoD partners
  - Mini-program from planning to reporting
  - Test Plan (50 pages in five days)
  - Executive Review Board
  - Four flights – six hours
  - Final Report (150 pages in nine days)

Flight Testing Challenges

- Verification and validation of complex integrated systems
- UAS “Autonomy”
- Obtaining and retaining highly qualified testers in the face of a DoD draw-down.

Questions