Dryden Flight Research Center
The World's Premiere Installation for Atmospheric Flight Research
Our Namesake

The NASA Dryden Flight Research Center was named after Dr. Hugh L. Dryden, the first Deputy Administrator of NASA. The following is his explanation as to why there is a need for flight research,

“. . . to separate the real from the imagined and to make known the overlooked and the unexpected. . .”.
To Fly What Others Only Imagine
Edwards Air Force Base
• Remote Location
• Varied Topography
• 350 Testable Days Per Year
• Extensive Range Airspace
• 29,000 Ft Concrete Runways
• 68 Miles of Lakebed Runways
• 301,000 Acres
• Supersonic Corridor

NASA Dryden Flight Research Center
Dryden’s Mission:
Advancing Technology and Science Through Flight

**Mission Elements:**
- Perform flight research and technology integration to revolutionize aviation and pioneer aerospace technology,
- Validate space exploration concepts,
- Conduct airborne remote sensing and science observations,
- Support operations of the Space Shuttle and the ISS

... for NASA and the Nation.
Dryden’s Role in NASA

The Public

Resource Provider

National Aeronautics and Space Administration (NASA)

Decision Makers

Administration and Congress

Customers

- Policy Makers
- Science/Education
- Technologists
- Commercial sectors
- Aerospace Industry
- Government Agencies

Agency Structure

Mission Directorates

- Exploration Systems
- Space Operations
- Science
- Aeronautics Research
- Education

Dryden Role

- Space Exploration
- Support Space Shuttle and ISS Programs
- Develop and Operate Platform Aircraft for Science Missions
- Aeronautical Flight Research
- Education and Outreach

Ultimate Beneficiary

The Public
Summary of Capabilities
NASA Dryden Flight Research Center

- Core Competencies
  - Atmospheric Flight Research and Test
    - Flight Safety and Risk Management
    - Flight Project and Mission Management
    - Flight Research Technology
    - Flight Test Operations
    - Experimental Aircraft - piloted and unpiloted

- Facility Capability
  - Flight Operations & Engineering Staff
  - Experimental and Testbed Aircraft
  - Unmanned Aircraft Systems
    - Extensive experience in securing Certificates of Authorization (COA) for UAS flights
  - Airborne Science Platforms
  - Range and Aircraft Test Facilities
    - Western Aeronautical Test Range
    - Research Aircraft Integration Facility
    - Flight Loads Laboratory

- On-Going Partnerships
  - Other NASA Centers: ARC, GRC, LaRC, JSC, KSC, MSFC
  - DoD Partnerships: AFFTC Alliance, USN, AFRL, DARPA
  - Other Government Agencies: DOT, NOAA, DHS, …

FY07 Vital Statistics:
- Civil Servant Staff: 530
- On-site Contractors: ~500
- Budget: ~$220M
Summary of Facilities
NASA Dryden Flight Research Center

- Research Aircraft Integration Facility (RAIF)
- Flight Loads Laboratory
- Flow Visualization Facility
- Flight Simulation Laboratory ("Sim Alley")
- Meteorological Sensing and Prediction
- Experimental Fabrication and Repair
- Shuttle Support
- 2x Mission Control Rooms + TRAPS
- Western Aeronautical Test Range
Testbed Aircraft

Testbed aircraft augmenting Dryden’s one-of-a-kind research aircraft are available to support a wide variety of research missions. Predator, Global Hawk, F/A-18, F-15, T-38, T-34, King Air, and G-3 provide platforms for sensor validation, aerodynamic, system, and propulsion research and test.
New Emphasis Areas

Program Collaboration
- X-37, UCAV, C-17, AAR

Sharing Staffing Resources
- Technicians and Shops
- Engineering
- Administrative

Test & Evaluation Mission

NASA/AFFTC/AFRL Alliance
- Co-chaired council meets quarterly
- 8 integrated product teams
- 33 active Memorandum of Agreements
- Over $86M in cost avoidance/savings to date

Preserves Unique Missions

Research & Technology Mission

Common Infrastructure
- Airfield Operations
- Range & Flight Safety
- Shared Aircraft & Equipment
- Frequency Management
- Health & Welfare
- Emergency Response
- Security

Fully integrated infrastructure with EAFB exists today

1st 5 yrs

New Emphasis Areas
- Program Collaboration
  - X-37, UCAV, C-17, AAR
- Sharing Staffing Resources
  - Technicians and Shops
  - Engineering
  - Administrative

Air Force/Dryden Alliance Activities
Current Research: Altair / Ikhana (new)

- Modified Predator-B UAV
- Environmental Research and Sensor Technology (ERAST) program
- Long-endurance/high-altitude: 32 hours @ 52,000 ft
- Over-the-horizon control, AI collision-avoidance demonstrator
- Observation, climate monitoring, search and rescue, wildfire support
- 700 lbf instruments long endurance or 3,000 lbf science payload short endurance

Partner: General Atomics Aeronautical Systems
Current Research: X-48B BWB

- 8.5% scale remotely piloted technology demonstrator
- Advanced nacelle placement
- Supercritical airfoil shape
- Currently in flight test for validation and verification

Partner: Boeing Phantom Works
Current Research: ER-2

• High altitude civil U2 derivative, 410 kt at 75,000 ft.
• Can reach 65,000 ft in 20 min, range 6,000+ nm, endurance 10 hrs.
• Earth resources, celestial observations, atmospheric chemistry and dynamics, oceanic processes, electronic sensor R/D, satellite calibration / data validation, hurricane prediction, cloud formation, etc, etc, ...
• Numerous spectral and atmospheric measurement partnerships with other NASA centers, USAF, NOAA, EPA, private industry, and universities
Current Research: F-15B Quiet Spike

- Sonic boom mitigation for civilian supersonic business jet application
- Softens boom by passing incoming flow through a series of oblique shocks instead of a single bow shock
- 3-sections, extendable to achieve desired multi-ramp configuration for flight condition

Partner: Gulfstream
Current Research: F-15 IFCS

- Artificially intelligent direct-adaptive neural network controller
- Aviation safety, damaged airframe recovery, pilot augmentation, AI systems research
- Modified pre-production F-15B, canards + thrust vectoring
- Digital failure logic via ARTS-II research controller

Partners: NASA ARC / ISR / Boeing
Current Research: SOFIA

- Stratospheric Observatory for Infrared Astronomy
- 100” (2.5m) telescope mounted to B747-SP
- Visible light through sub-millimeter far-infrared spectrum
- Mobile: anywhere in the world at any 747 operational altitude
- Advanced: loaded with scientific instruments and optical / spectrometric technology

Partners: L-3 Communications
Deutsches Zentrum für Luft und Raumfahrt
Atmospheric Flight Research and Test
A Competency for Now and the Future

Aeronautics Research

Exploration Systems

Space Operations

Science