

# Dryden Flight Research Center



# To Fly What Others Only Imagine





# Dryden at Edwards Air Force Base



Rogers and  
Rosamond Dry  
Lakes as seen  
from space

You are  
here!



## 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

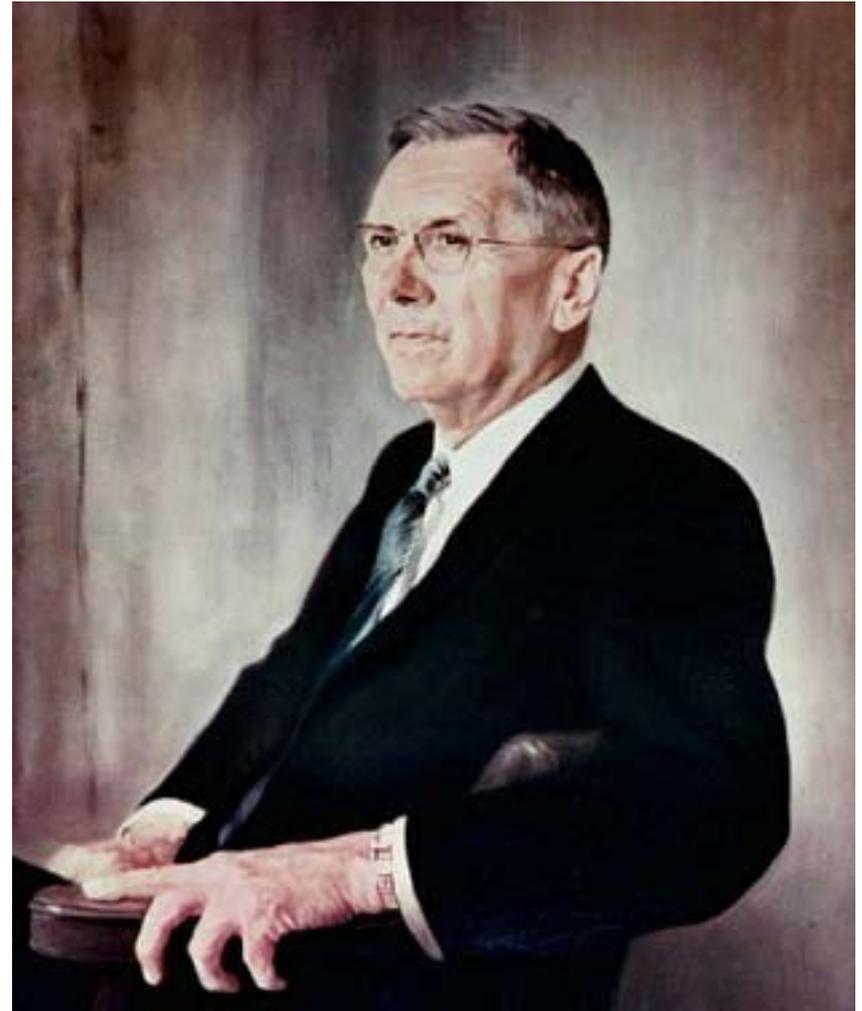
NASA Dryden Flight  
Research Center



# Our Namesake

The NASA Dryden Flight Research Center was named after Dr. Hugh L. Dryden, Director of the National Advisory Committee for Aeronautics (NACA) and 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. . . ”



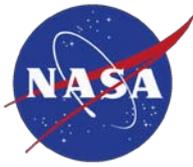


# NASA Strategic Plan

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- **NASA MISSION:** *To pioneer the future in space exploration, scientific discovery, and aeronautics research.*
  
- **NASA'S STRATEGIC GOALS: 2006 THROUGH 2016**
  - Strategic Goal 1: Fly the Shuttle as safely as possible until its retirement, not later than 2010.
  - Strategic Goal 2: Complete the International Space Station in a manner consistent with NASA's International Partner commitments and the needs of human exploration.
  - Strategic Goal 3: Develop a balanced overall program of science, exploration, and aeronautics consistent with the redirection of the human spaceflight program to focus on exploration.
  - Strategic Goal 4: Bring a new Crew Exploration Vehicle into service as soon as possible after Shuttle retirement.
  - Strategic Goal 5: Encourage the pursuit of appropriate partnerships with the emerging commercial space sector.
  - Strategic Goal 6: Establish a lunar return program having the maximum possible utility for later missions to Mars and other destinations.

# Dryden Flight Research Center



## 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 world-wide airborne science operations
- Support operations of the Space Shuttle and the ISS

... for NASA and the Nation





# Dryden's Role in NASA

Resource Provider



Decision Makers



Customers

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

National Aeronautics and Space Administration (NASA)

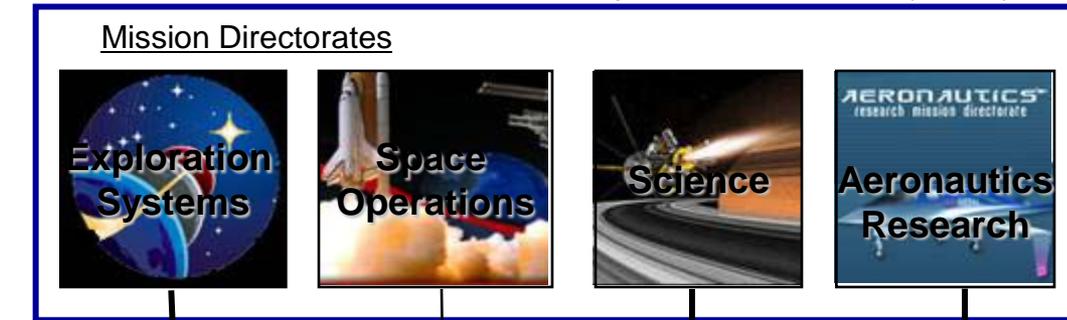
Mission Directorates



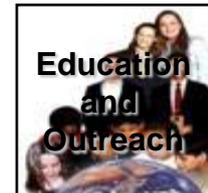
Ultimate Beneficiary



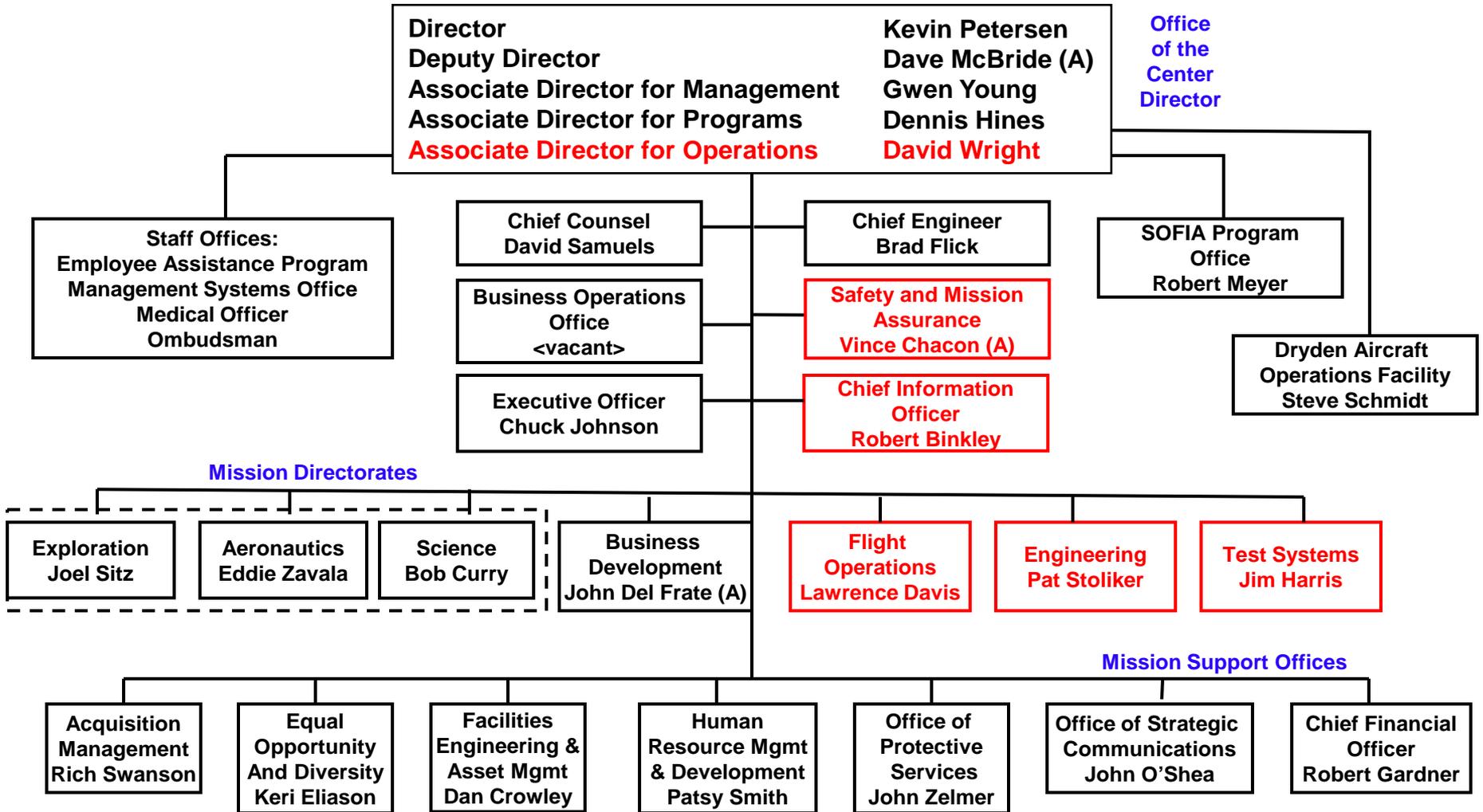
**Agency Structure**



**Dryden Role**



# Dryden Flight Research Center





# Summary of Dryden's Capabilities

## ■ 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
  - International Operations
- Range and Aircraft Test Facilities
  - Western Aeronautical Test Range
  - Research Aircraft Integration Facility
  - Flight Loads Laboratory

## ■ On-Going Partnerships

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

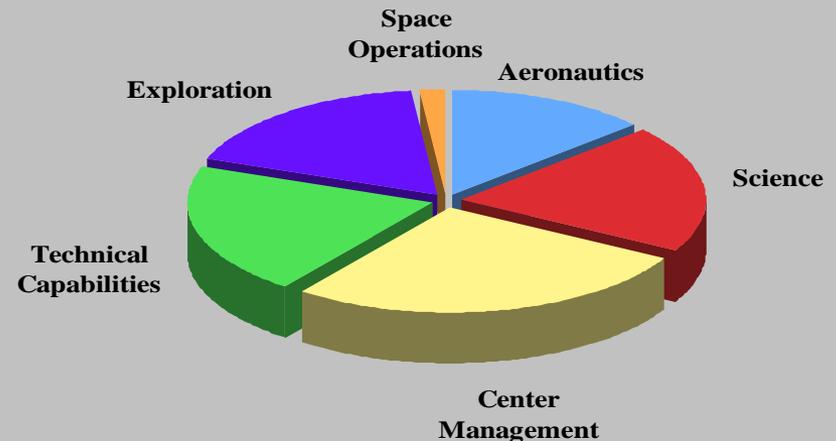


### FY08 Vital Statistics:

Civil Servant Staff  
Approximately 557

On-site Contractors  
Approximately 500

Budget  
Approximately \$228M





# 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.





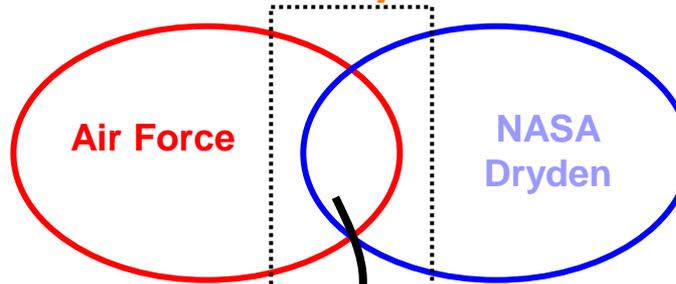
# Air Force/Dryden Alliance Activities

## 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

**Test & Evaluation Mission**



**Research & Technology Mission**

## Common Infrastructure

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

1st 5 yrs

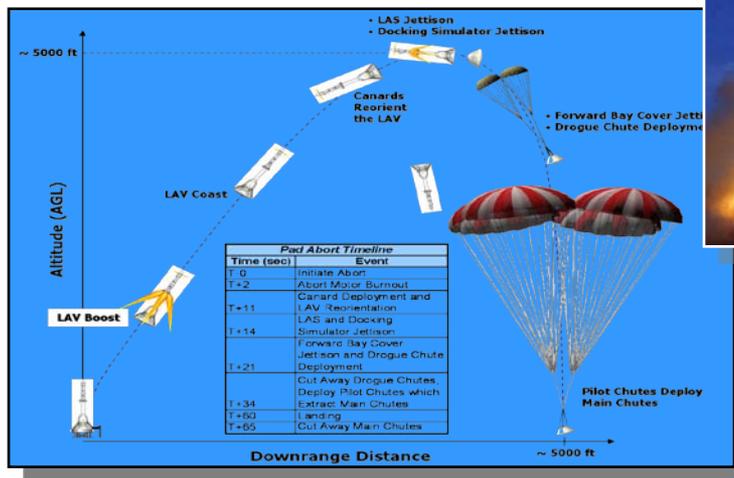
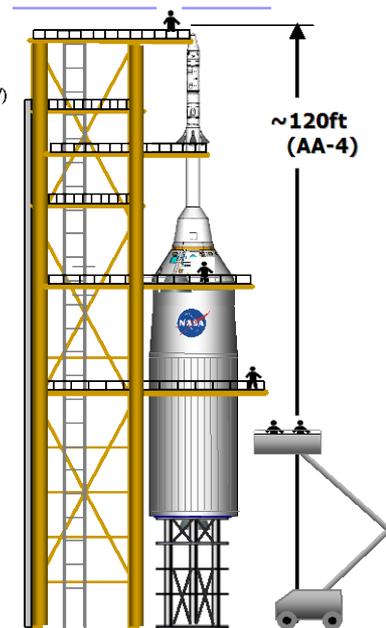
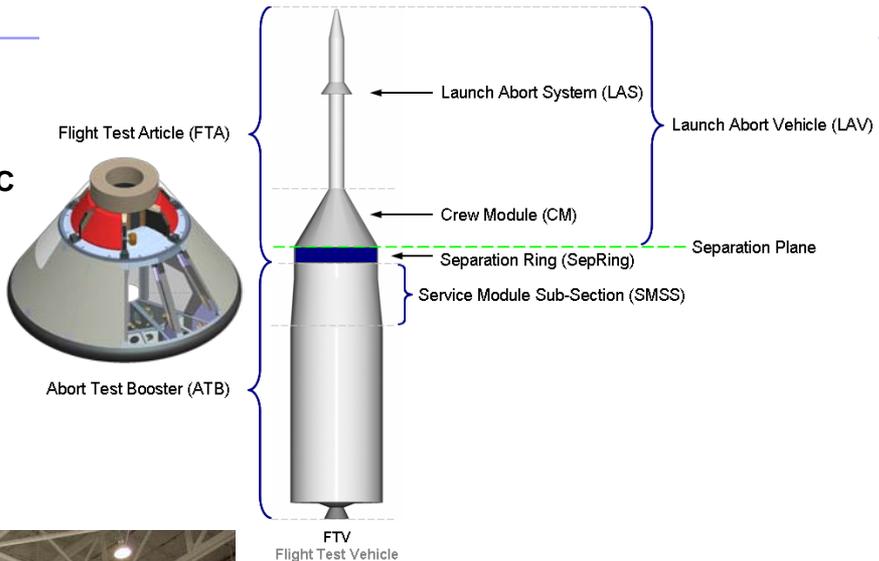
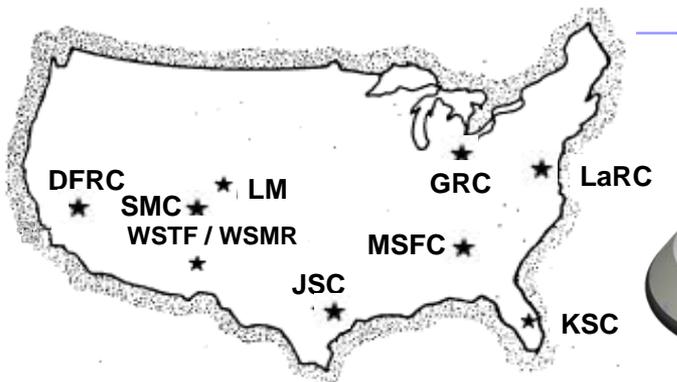
Fully integrated infrastructure with EAFB exists today

## New Emphasis Areas

- Program Collaboration
- X-51, UAS, C-17, AARD
- Sharing Staffing Resources
- Technicians and Shops
  - Engineering
  - Administrative

# NASA Exploration Systems

## Orion Launch Abort Flight Tests



# NASA Space Operations



**STS-117 - July, 2007**

# NASA Aeronautics



Autonomous Aerial Refueling  
Demonstration

# X-48B Blended Wing Body



# NF-15 Intelligent Flight Controls



F-15B Quiet Spike



NASA

**Stratospheric Observatory for  
Infrared Astronomy (SOFIA)**



# NASA Airborne Science



**ER-2 Airborne Science Platform**

**DC-8 Airborne Science Platform**



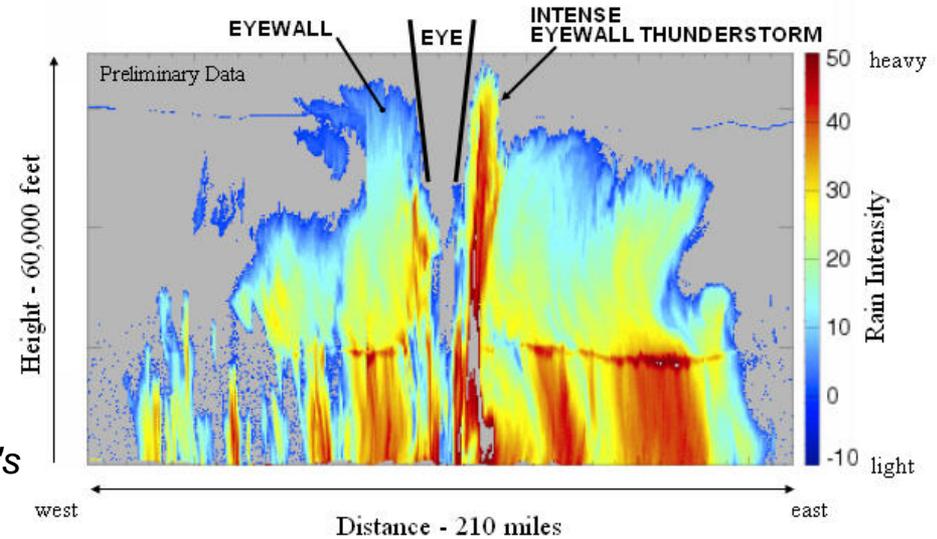
**G-3 Airborne Science Platform**

# ER2 - Hurricane Emily (TCSP)



## ER-2 Doppler Radar (EDOP) Views Detailed Super-Anatomy Of Intense Hurricane Emily During NASA's TCSP Experiment

Principal Investigator: Dr. Gerald Heymsfield, NASA GSFC



“EDOP measured *reflectivities nearly to the ER-2's level*, with very high reflectivity values in the upper troposphere (~40 dBZ to ~17 km altitude). LIP detected at least *10 flashes per minute*, likely more. AMPR and HAMSR showed strong ice scattering, with even the lowest frequency channels scattered (indicative of very *large graupel or hail*).”

“Indeed, the electric fields above Emily were *among the strongest ever measured by the aircraft's sensors over any storm*.”

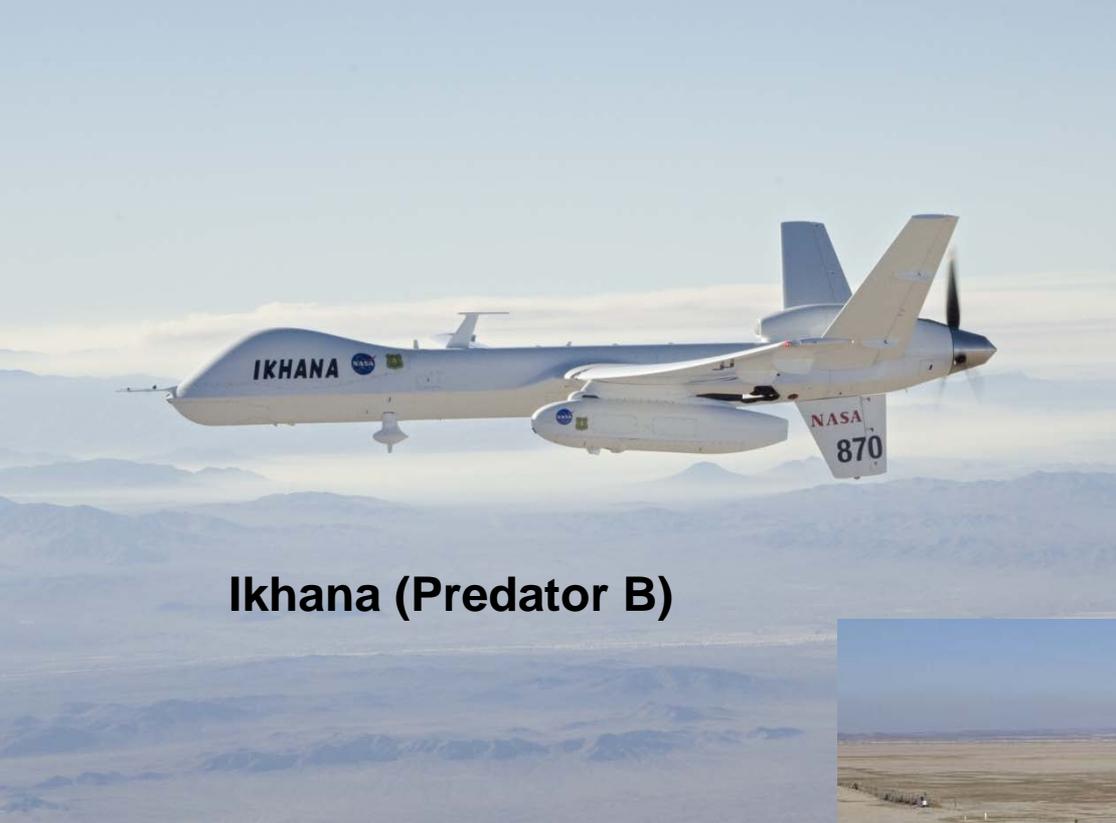
“We observed steady fields in excess of 8 kilovolts per meter,” says Blakeslee. “That is huge--comparable to the strongest fields we would expect to find over a large land-based 'mesoscale' thunderstorm.”

**Vertical slice showing rain structure across the entire storm - 1:30 - 2:00 AM CST July 17, 2005**

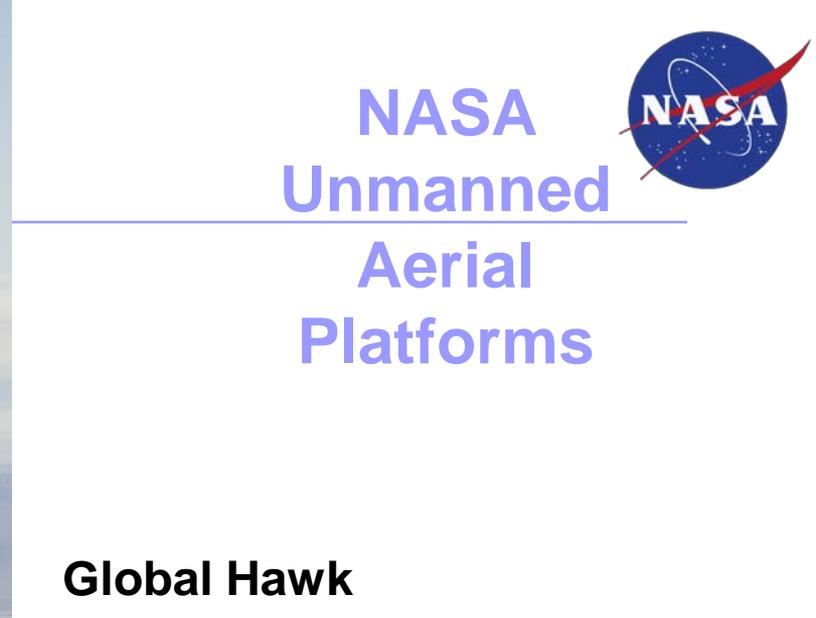




# NASA Unmanned Aerial Platforms



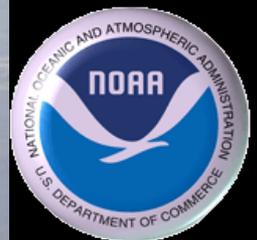
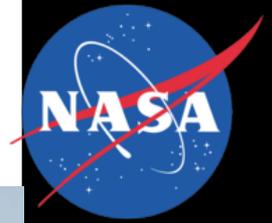
**Ikhana (Predator B)**



**Global Hawk**



# Emergency Response Fire-Imaging UAS Missions over the Southern California Wildfire Disaster



NASA Dryden Flight Research Center  
January 22, 2008



# Dryden Aircraft Operations Facility



- Ready access to USAF Plant 42 runway and facilities
- Completed negotiations with LAWA for lease agreement in Oct. 2007
- MOA with Plant 42 nearing completion
- Complete modifications and occupy during 2008

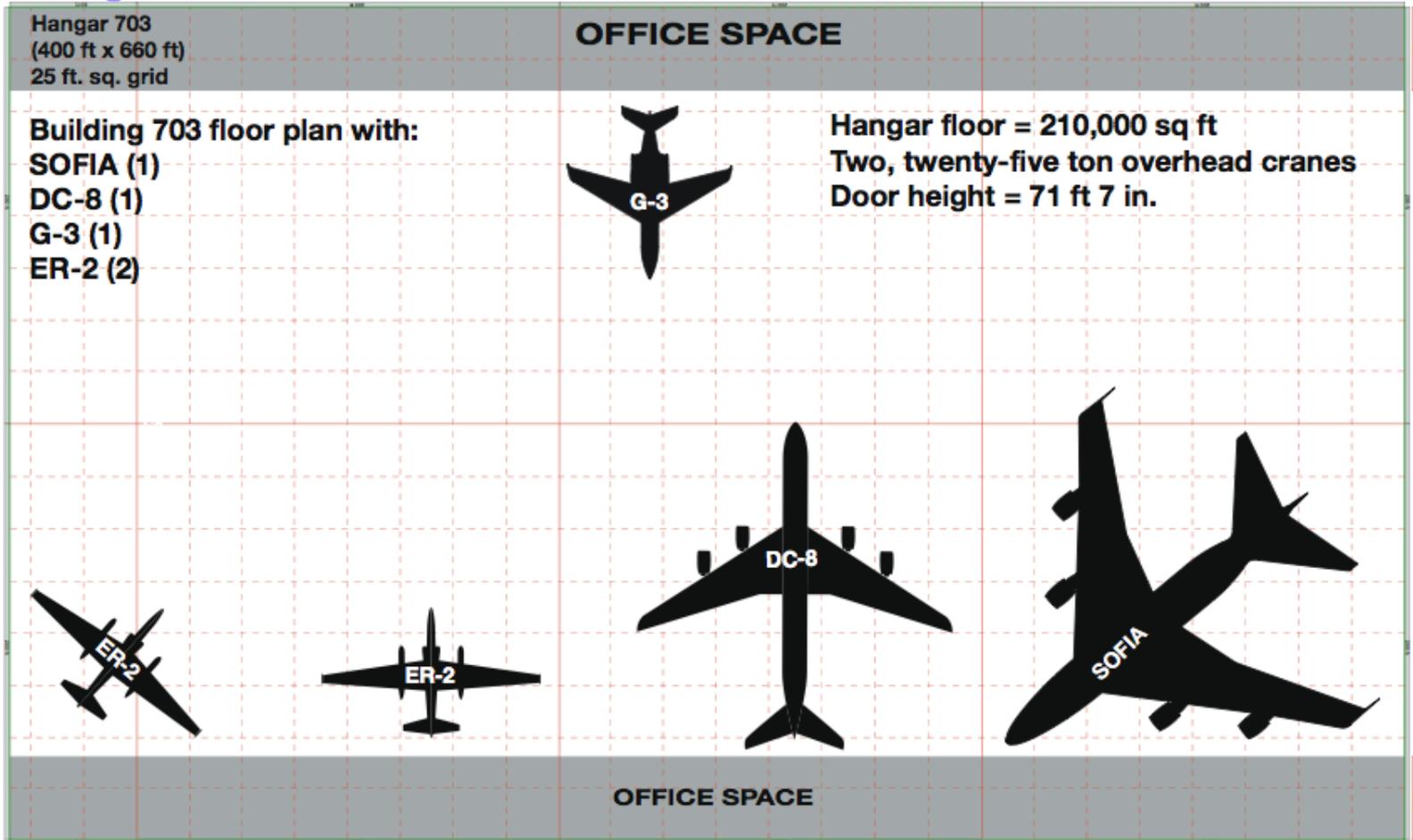
# Dryden Aircraft Operations Facility

Recent Photograph – January 2008



# Dryden Aircraft Operations Facility

Hangar 703, Site 9, Palmdale, CA



- Principal use as airborne science aircraft operations site
- Principal customer is NASA's Science Mission Directorate
- SOFIA and DC-8 have already been relocated

# Atmospheric Flight Research and Test

## A Competency for Now and the Future



### Aeronautics Research

### Exploration Systems

### Space Operations

### Science

