Center Overview and UAV Highlights at NASA Ames Research Center

Welcome to the Federal Unmanned Aircraft Systems (UAS) Workshop

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Cross-cutting Role of Unmanned Aircraft Systems

Allow NASA projects to extend measurements and test new technologies

Provide a pathway for NASA instruments from ground, to balloon, to aircraft, to space.

Play a substantial role in civilian services as NASA and FAA work to develop safe and effective means for integrating them into the National Airspace System
Ames is One of the Early NACA Laboratories

Joseph S. Ames

NACA

Langley

Ames

Lewis

Dryden

NASA

1915

1939

1940

1946

1958
Ames Research Center

- Occupants: ~1130 civil servants; ~2,100 contractors; 1,650 tenants
  855 summer students in 2016
- FY2016 Budget: ~$915M (including reimbursable/EUL)
- ~1,900 acres (400 acres security perimeter); 5M building ft²
- Airfield: ~9,000 and 8,000 ft runways
75 Years of Innovation

1940
- Conical Camber
- Arcjet Research

1950
- Blunt Body Concept
- Flight Research
- Hypervelocity Free Flight

1960
- Transonic Flow
- Apollo Re-Entry Shape
- CFD

1970
- Life Sciences Research
- Pioneer 10/11
- Viking

1980
- Air Transportation System
- Tiltrotor
- ER-2

1990
- Lunar Prospector
- ER-2
- Space Biology

2000
- Mars Science Lab
- NASA Research Park
- Human Centered Computing

2015
- SOFIA
- Kepler
- Sustainability Base

INSTITUTIONS
- NASA Research Park
- Astrobiology Institute
- Quantum Computing
- Human Centered Computing
- ISS
- LADEE
- IRIS
- Aero Institute
- LCROSS
- Pleiades
- Pleiades
- Pleiades
- Pleiades
Core Competencies at Ames Today

- Air Traffic Management
- Entry Systems
- Advanced Computing & IT Systems
- Intelligent/Adaptive Systems
- Cost-Effective Space Missions
- Aerosciences
- Astrobiology and Life Science
- Space and Earth Sciences
Air Traffic Management and Aerosciences
Advanced Computing and IT Systems

Exploring Drone Aerodynamics with Computers
Intelligent/Adaptive Systems

Search, Identify, and Track
• Optimal Search Planning
• Distant Object Detection
• Object Validation, Deep Learning
• Robust Tracking and Re-Search AI

Research and Test Facilities
• Outdoor – DART Site and Roverscape
• NUARC Indoor Flight Test Facility
• Advanced Simulation Environments
Earth Sciences

Matrice 600 hexacopter with payload to track invasive Asian carp in the Mississippi (2017 summer)

Sierra flew over the Arctic sea ice as part of the MIZOPEX mission (2013)

Dragon Eye @ Turrialba crater (Costa Rica) and Kilauea Crater (Hawaii) (2013)

Ikhana (using an autonomous modular sensor to see through smoke) as part of a Collaborative Decision Environment, relating real time information to fire responders (2007)
Partnerships at Ames

Commercial

Virtual Institutes

NASA Research Park

Inter-Agency

NASA

Academia

International

Bay View

Eastside/ Airfield

Shenandoah Historic District

NASA Ames Campus

NRP South Campus

Carnegie Mellon University Silicon Valley

Singularity University
Partnerships and UTM

**Commercial**
- Use cases and operational needs
- Readiness of technologies (e.g., sense & avoid)
- Validation of the concept of operations
- Participation in flight tests and demonstration
- Technology options for vehicle

**FAA**
- Subject matter expertise
- Concept of operations
- Information requirements
- Roles/responsibilities definition
- Integration & interoperability needs
- Engagement on potential solutions

**NASA**
- Concept of operations
- Overall UTM information architecture and data exchange definition
- UTM research platform, flight test planning and execution
- Performance requirements for operations including planning, scheduling, track/locate, sense & avoid

- 14 Partner Organizations
- 2 Simultaneous Altitude Stratified Expanded Operations
- 11 UAS Platforms