Center Overview and UAV Highlights at NASA Ames Research Center
Welcome to the Federal Unmanned Aircraft Systems (UAS) Workshop

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Associate Center Director
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
NASA Centers and Installations

- Armstrong Flight Research Center
- Jet Propulsion Laboratory
- White Sands Test Facility
- Glenn Research Center
- Independent Verification and Validation Facility
- Plum Brook Station
- Michoud Assembly Facility
- Stennis Space Center
- Marshall Space Flight Center
- Kennedy Space Center
- Wallops Flight Facility
- Langley Research Center
- Goddard Institute for Space Studies
- Goddard Space Flight Center
- Headquarters
- Ames Research Center
- Johnson Space Center
Ames is One of the Early NACA Laboratories

Joseph S. Ames

NACA

1915

Langley

Ames

1939

Lewis

Dryden

NASA

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
- Hypervelocity Free Flight
- Life Sciences Research
- Blunt Body Concept

1950
- Flight Research
- Blunt Body Concept
- Conical Camber
- CFD

1960
- Air Transportation System
- Apollo Re-Entry Shape
- Air Transportation System
- Tiltrotor

1970
- Pioneer Venus
- Apollo Heat Shield Tests
- Life Sciences Research

1980
- Viking
- Pioneer 10/11
- Lunar Prospector

1990
- Mars Science Lab
- Human Centered Computing

2015
- SOFIA
- Kepler
- SSERVI
- Sustainability Base

NASA
- Lunar Prospector
- X-36
- Pioneer 10/11
- Galileo
- Lunar Prospector
- Mars Science Lab
- Human Centered Computing

NASA Research Park
- ISS
- NASA Research Park
- Pleiades
- IRIS
- LADEE
- IRIS
- Aero Institute
- LCROSS

Astrobiology Institute
- LADEE
- Quantum Computing
- Pleiades

CFD
Core Competency at Ames Today

- 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
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)

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)

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

Commercial

Virtual Institutes

NASA Research Park

Inter-Agency

Academia

International
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