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

NACA
1915
Langley

Ames
1939

Lewis
1940

Dryden
1946

NASA
1958

Joseph S. Ames
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
- Lifting Body Concept
- Flight Research
- Apollo Re-Entry Shape

1960
- Transonic Flow
- Air Transportation System
- CFD
- Hypervelocity Free Flight

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

1980
- Viking
- Pioneer 10/11
- Mars Science Lab
- Human Centered Computing

1990
- X-36
- Space Biology
- NASA Research Park

2000
- ER-2
- Lunar Prospector
- SOFIA
- NASA
- Pleiades

2015
- SSERVI
- Kepler
- Sustainability Base
- Astrobiology Institute
- Quantum Computing
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
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

Academia

NASA Research Park

Inter-Agency

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