John W. (Jack) Boyd was recently brought back as the Senior Advisor to the Ames Center Director. Prior to this position he was the Ames Historian and the Ombudsman for the Center. As the official historian, Mr. Boyd captured important historical information for future publications concerning significant research accomplishments of this Center. Previous to this position, he was the Executive Assistant to the Director at NASA Ames Research Center for over 8 years. Mr. Boyd began his career at Ames in 1947, when it was still the National Advisory Committee for Aeronautics (NACA) Ames Aeronautical Laboratory, and worked as an aeronautical research engineer conducting wind tunnel studies of the supersonic and subsonic characteristics of fighter/bomber aircraft. He later pioneered early research on the design of unmanned planetary probes to explore Mars and Venus, and helped develop early configurations for the Mercury, Gemini, and Apollo capsules, as well as the space shuttle design. He is a graduate of George Washington High School in Danville, Virginia, Virginia Tech; and Stanford University.

Mr. Boyd has served as Deputy Director of Dryden Flight Research Center, Deputy and Associate Director of Ames Research Center, and Associate Administrator for Management at NASA Headquarters. Additionally, he was also chancellor for Research for The University of Texas System. He has also been an adjunct professor at The University of Texas (Austin, El Paso, and Pan American campuses) teaching courses in aerodynamics, introduction to engineering, and the history of space flight.
NASA Ames Research Center Overview

Jack Boyd, Senior Advisor to Center Director
NASA Ames Research Center in Silicon Valley
August 16, 2006 – Presentation to Next Generation Exploration Conference

First Century of Flight, 1903–2003


First Century of Flight, Ames Visitors

Charles Lindbergh  Orville Wright  Neil Armstrong  Chuck Yeager

Wernher Von Braun  John Glenn  Jimmy Doolittle  Edward Teller

NACA Research Centers

NACA  Ames  NASA

Langley  Dryden  Lewis

1915  1939  1940  1946  1958
Science (Earth-Life-Space): Astrobiology - the study of life in the universe
Science Missions
- Stratospheric Observatory For Infrared Astronomy
- Kepler Mission - Search for Habitable Planets
Exploration Systems Development
- Lunar Crater Observation and Sensing Satellite
- Thermal Protection Systems
- Mission Operations
- Integrated Systems Health Management
- Autonomy & Reliable Software
Supporting Technologies
- Information Technology (Autonomy, Human Factors, High-End Computing)
Aviation and Aeronautics
- Air Traffic Management and Control
Education
Innovative Collaborations
- NASA Research Park
- University Affiliated Research Center
2300 Employees
- (1200 Civil Service/1100 Contractor and Other)
$600+ M Annual Budget
**Astrobiology**

- Scientific study of life in the universe
- Three fundamental questions
  - How does life begin and evolve?
  - Does life exist elsewhere in the universe?
  - What is life’s future on Earth and beyond?
- NASA Astrobiology Institute at Ames
  - Dr. Rosalind Grymes, Executive Director
  - Dr. Bruce Runnegar, Science Director
  - 12 lead member institutions

![Map of Hydrothermal Systems](image1)

**SOFIA**

SOFIA will explore the infrared universe flying above interference from the Earth’s water vapor atmosphere

National Academy priority from Decadal Surveys, 1991 & 2001

![SOFIA Observatory](image2)

**Orion in the infrared**

**Orion in visible light**

Airborne observatory

2.8 m IR telescope in 747 aircraft

160 flights per year
To explore the universe and search for life: **Kepler**: The Search for Habitable Planets

Ames led Discovery Mission: PI - W. Borucki


June 2008 Launch

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**Crew Exploration Vehicle/Crew Launch Vehicle**

- **CEV Thermal Protection System Advanced Development Project Office assigned to Ames**
  - Primary roles
    - Maturing ablative material technology
    - Developing TPS ablative material response model
    - Down-selection to a single TPS solution by CEV PDR
    - Supporting aerothermal environments and verification (JSC lead)
    - Project management support, systems engineering support for CEV
  - Multi-center team: ARC, JSC, KSC, LaRC, JPL; Lead: James Reuther
  - Industry to lead detailed design, fabrication, test and verification

- **Mission Operations System for CEV/CLV**
  - ARC is part of the team that will design, develop, and implement the Launch Mission Systems, and Command and Control capability for CEV/CLV
  - Team includes JSC, GSFC, JPL, KSC

- **Integrated Systems Health Management for Exploration**
  - ARC leads the ESMD Technology Development Program's R&D effort in Integrated Systems Health Management for Exploration
  - 5 year research effort focused on CEV, CLV, and RLEP
  - Team includes MSFC, JPL, GRC, and JSC

- **Spacecraft Autonomy for Exploration**
  - ARC is leading the ESMD Technology Development Program's R&D effort in Autonomy for Exploration
  - 5 year research effort focused on CEV, CLV, and RLEP
  - Includes additional work at JSC, LaRC, and JPL
Lunar Crater Observation and Sensing Satellite (LCROSS)

_Ames – piggy back on LRO_

- Lunar Kinetic Impactor Mission employed to reveal the presence and nature of water ice on the Moon’s South Pole
  - Delivers a 2000 kg impactor to a lunar crater and measures water signatures with an _in situ_ Shepherding Spacecraft that then becomes a 700 kg secondary impactor.

- Mission Objectives
  - Advance the Vision for Space Exploration by confirming the presence or absence of water ice at the Moon’s South Pole.
  - Provide technologies and modular, reconfigurable subsystems that can be used to support future RLEP mission architectures.
  - Inspire public interest in NASA’s Exploration Vision.

Thermal Protection Materials and Arc-Jet Facility

Testing and/or materials for all US Planetary entry systems; Support for Apollo, Shuttle, and Crew Exploration Vehicle
Information Science & Technology

Intelligent Adaptive Systems
Human/machine Interface
Large Data Sets and Datamining

Project Columbia: One of the world’s fastest super computers

Integrated Systems Health Management

Super Computing

Designing the next generations

Global Climate modeling

Record Time and Budget!!
Air Traffic Management/Air Traffic Control

Impact: Surface Management System (SMS)
Estimated annual savings of $315M/year to airlines

New Tools for Air Traffic Control:
TMA—Deployed at 11 sites—Soon to be nation-wide!!

New Models-UARC

NASA’s first University Affiliated Research Center
- 10 year, $330 M contract between NASA Ames and University of California.
- UC Santa Cruz is lead UC institution-Ranked 1st in Space Science by ISI
- Beyond grants and support contracts
- Tasks that are part of NASA’s critical milestones
- Flexibility to change tasks as needs arise
- UC: 10 Campuses, 3 National Laboratories
- $18B annual budget
- 4 UC campuses rated among top 15 worldwide

UC President
Robert Dynes

3 Bay Area Campuses

University of California
It Starts Here

UC System

San Francisco
Santa Cruz

Los Angeles
Irvine

San Diego
Next 50 Years – It’s Up To You