



# NASA Ames Research Center An Overview

Dr. Eugene Tu, Director

# EARTH *RIGHT* NOW

Your planet is changing. We're on it.



OFF THE EARTH, FOR THE EARTH.



INTERNATIONAL Space Station

NASA'S JOURNEY TO

# MARS



TECHNOLOGY DRIVES EXPLORATION

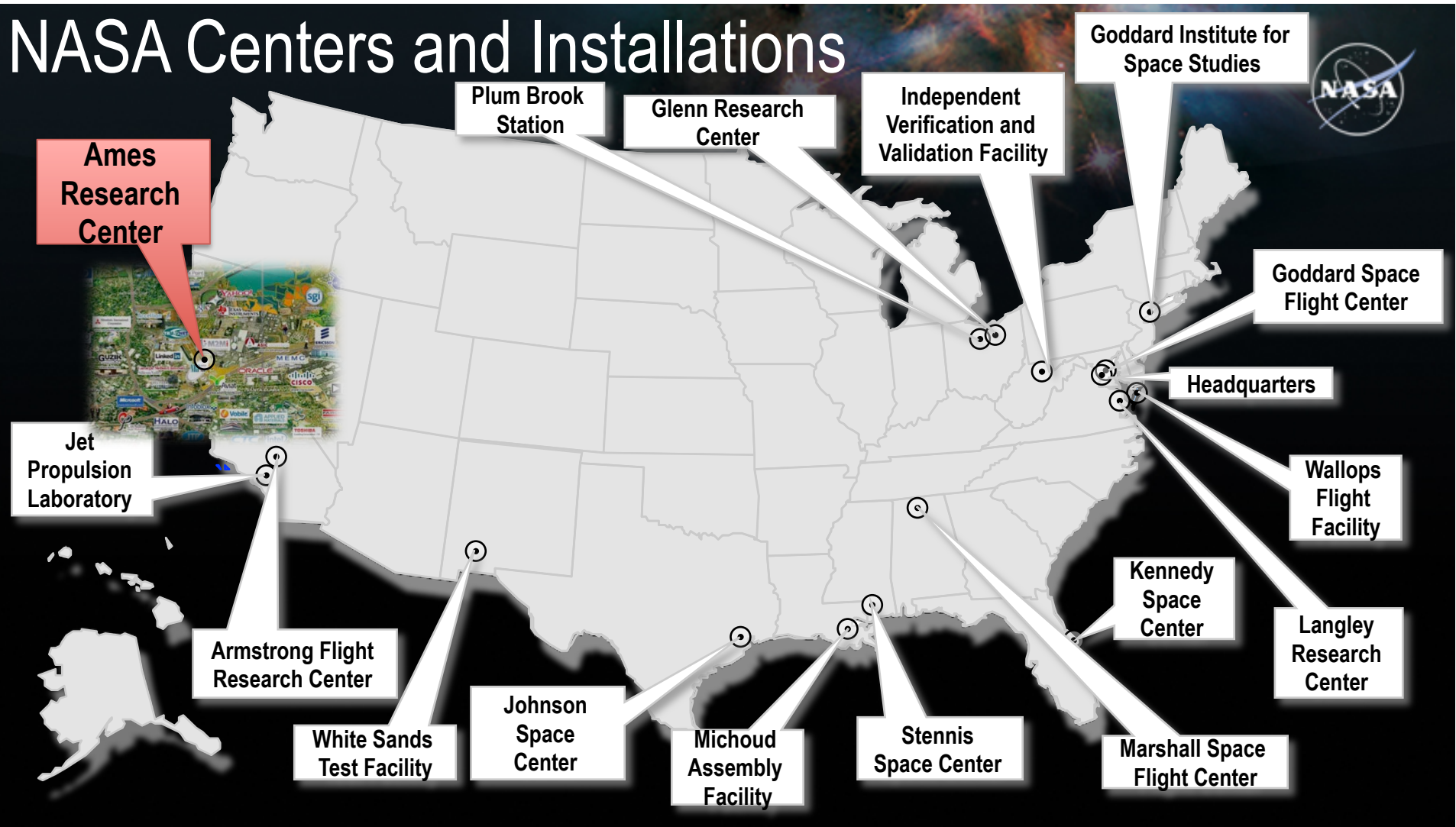


NASA

we're <sup>OUT</sup> there



# NASA Centers and Installations



**Ames  
Research  
Center**

**Plum Brook  
Station**

**Glenn Research  
Center**

**Independent  
Verification and  
Validation Facility**

**Goddard Institute for  
Space Studies**

**Goddard Space  
Flight Center**

**Headquarters**

**Jet  
Propulsion  
Laboratory**

**Wallops  
Flight  
Facility**

**Armstrong Flight  
Research Center**

**Kennedy  
Space  
Center**

**Langley  
Research  
Center**

**White Sands  
Test Facility**

**Johnson  
Space  
Center**

**Michoud  
Assembly  
Facility**

**Stennis  
Space Center**

**Marshall Space  
Flight Center**

# Ames is One of the Early NACA Laboratories



Joseph S. Ames



NACA

Langley

Ames

Lewis

Dryden

NASA

1915

1939

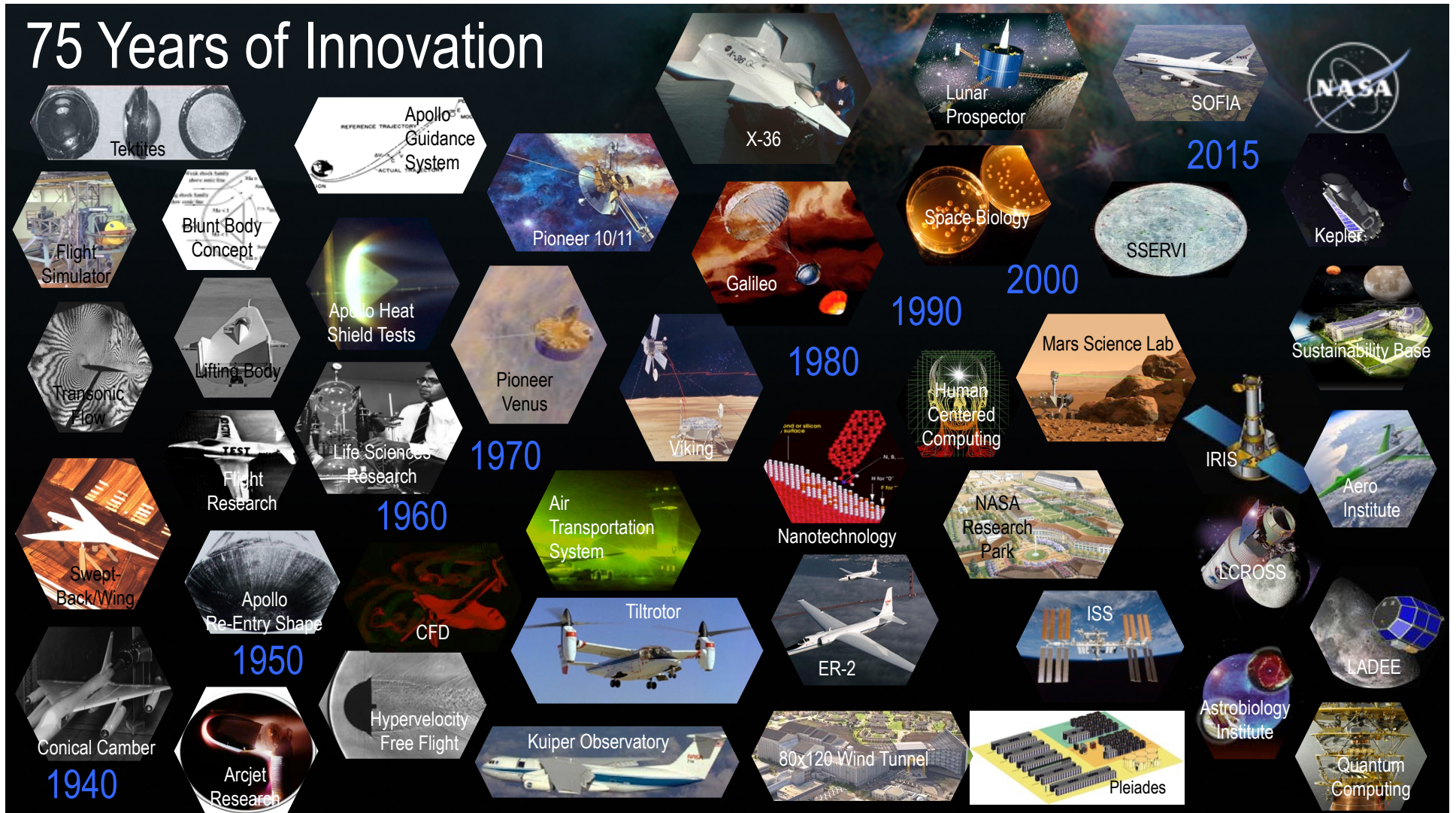
1940

1946

1958



# 75 Years of Innovation

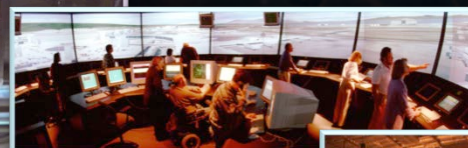
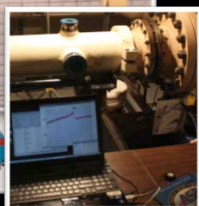
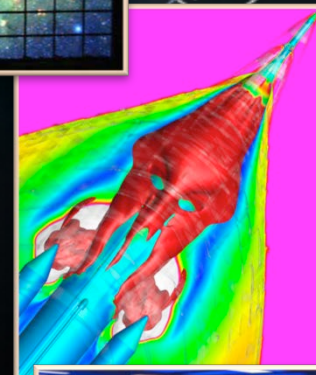
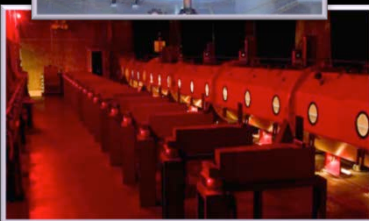
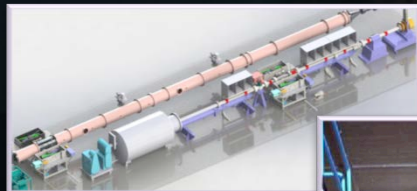
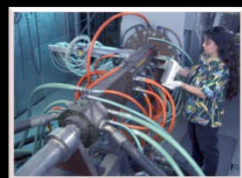
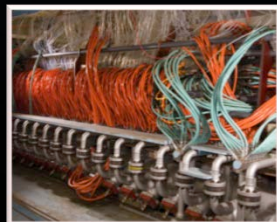


# Ames Research Center

- ~2420 employees (1130 FTE/1290 WYE)\*
- FY2016 Budget: ~\$915M (including reimbursable/EUL)  
\*in addition, 1344 summer students in 2015



# Major Research Facilities



Wind Tunnels

ARC Jet Complex

Range Complex

Simulators

Advanced  
Supercomputing

# Core Competencies at Ames Today



Air Traffic Management

Entry Systems

Advanced Computing & IT Systems

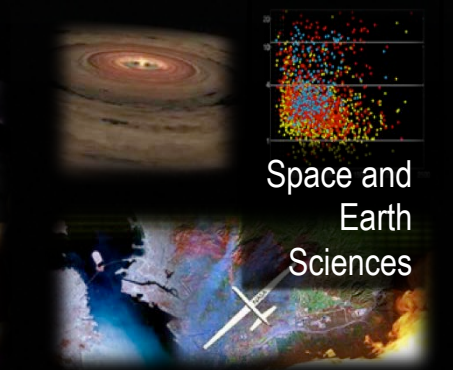
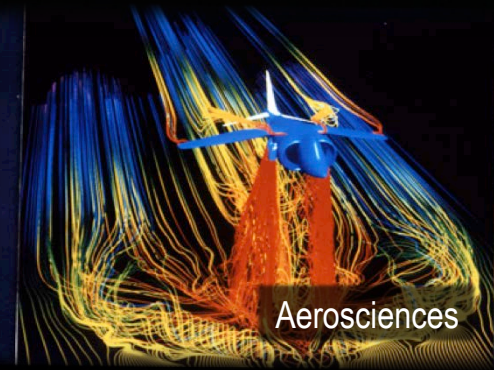
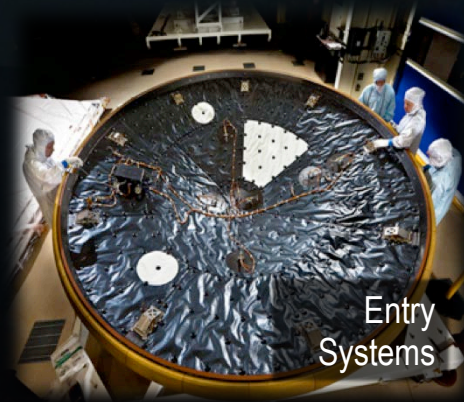
Intelligent/Adaptive Systems

Cost-Effective Space Missions

Aerosciences

Astrobiology and Life Science

Space and Earth Sciences



# Air Traffic Management



UAS Traffic Management

**FIM** Flight Deck Interval Management for Arrival Operations



**TMA-TM** Traffic Management Advisor with Terminal Metering

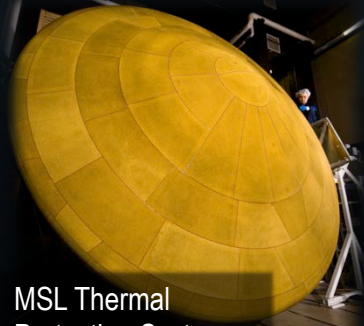
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SWD211	SWD211 03
WHE24	WHE24 03
WHE197	WHE197 03
WHE205	WHE205 03
WHE12	WHE12 03
WMA2013	WMA2013 03
WMA200	WMA200 02
WMA2	WMA2 01
WMA17	WMA17 01
WMA209	WMA209 01
WMA25	WMA25 02
WMA200	WMA200 02
WMA1	WMA1 02

**CMS** Controller-Managed Spacing in Terminal Airspace



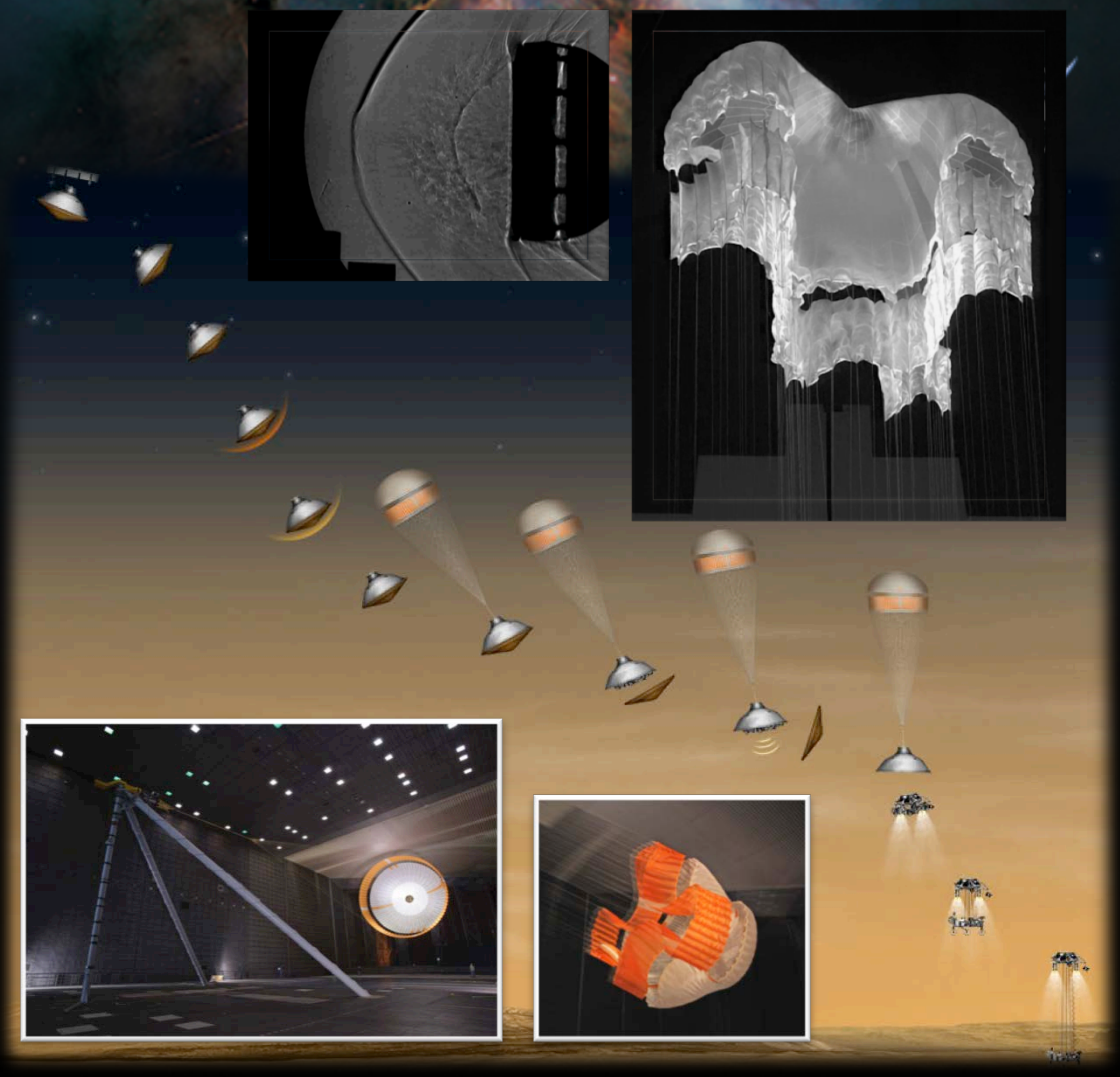
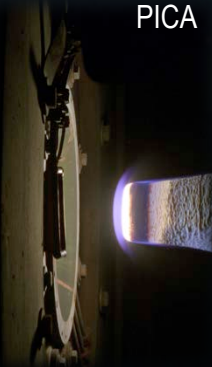
Air Traffic Demonstration – ATD-1

# Entry Systems



MSL Thermal Protection System

PICA



ADEPT



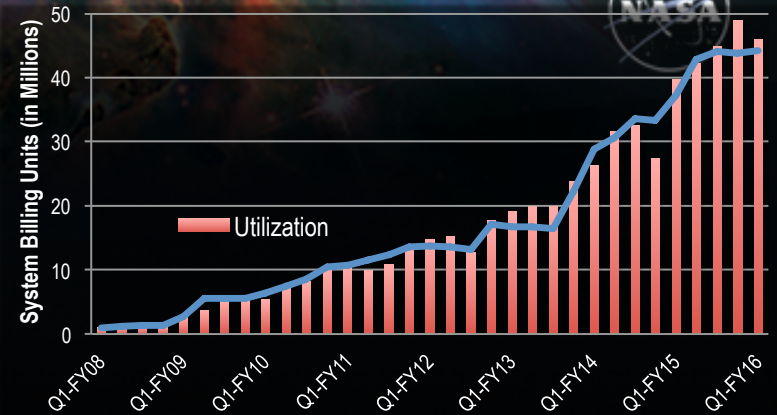
MEDLI



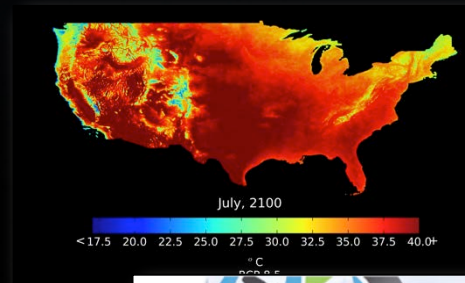
Interaction Heating Facility

# Advanced IT and Computing Systems

Supercomputing Systems



Large Scale Visualization



NEX



Big Data Analytics

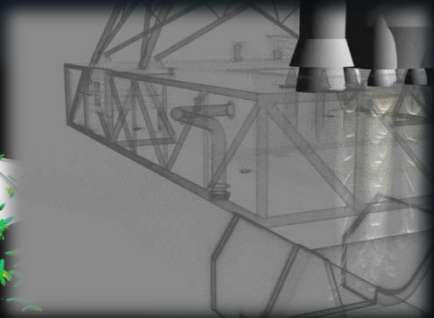
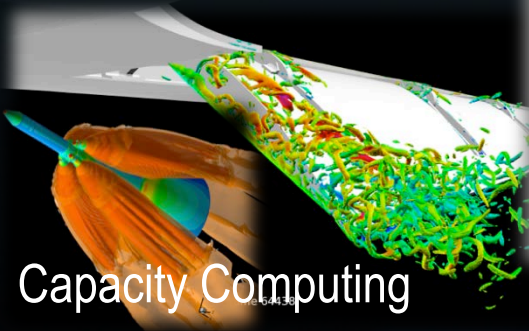
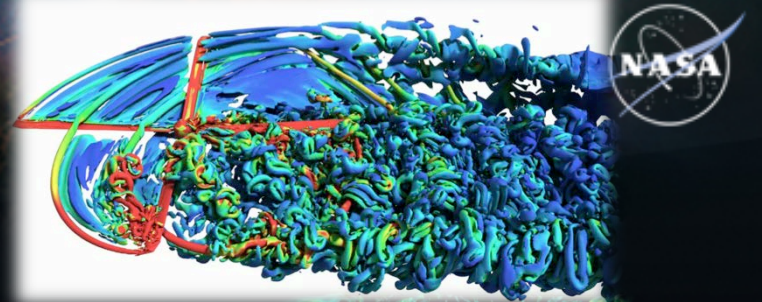


Quantum Computing



# Modeling and Simulation

Advanced IT and Computing Systems

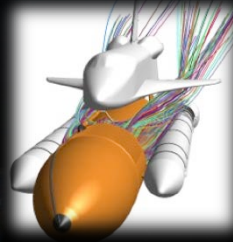
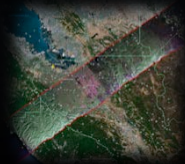


Capacity Computing

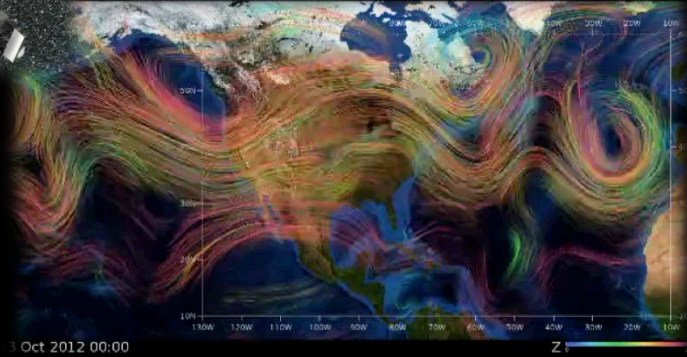
KEPLER



AVSAR

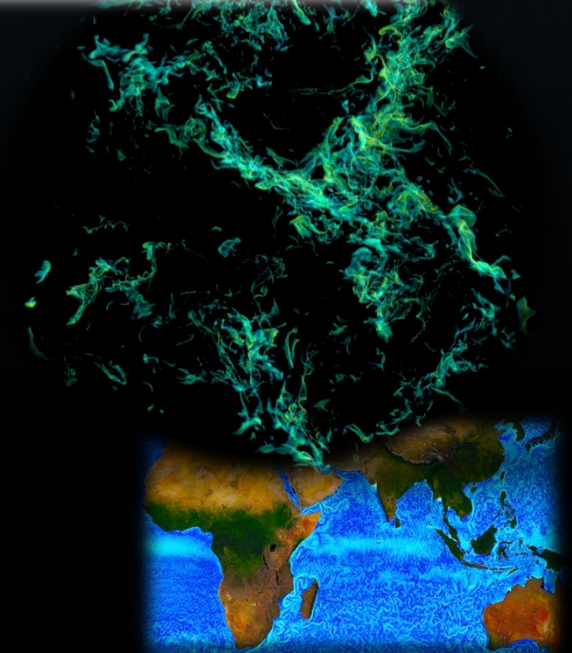


Time Critical Computing



3 Oct 2012 00:00

Z



Capability Computing

# Intelligent Adaptive Systems



Activity Mission Planning For **Mars**



Planning And Scheduling For **Human Robotic Teams** / Future



**Astronauts** Self-scheduling And Planning

Payload & Drill Subsystem



**Planetary Lake Lander**

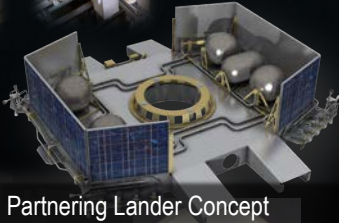
Adaptive science for dynamic phenomena in deep-space missions. Field testing in Chile.



Activity Mission Planning For **Crew On ISS**



Distributed Ops Testing



Partnering Lander Concept



**Self Driving Car**

Adapt space robotics technology to "fleet management" use.

Synchronized  
Position  
Hold,  
Engage  
Reorient,  
Experimental  
Satellites



OVEN Reactor Heater

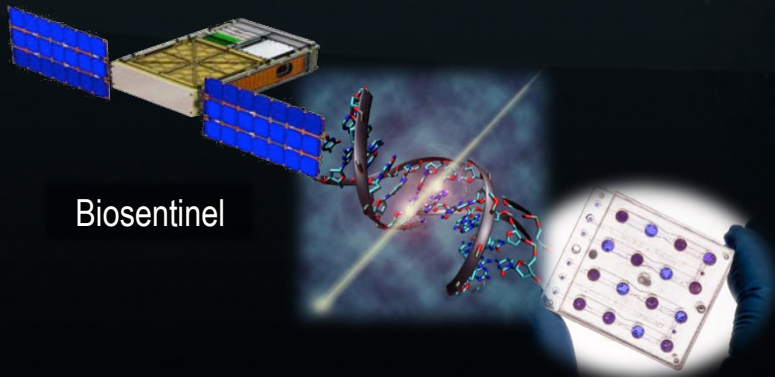


**Astrobee Free-Flyer**

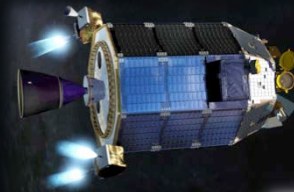
Autonomous nav, docking and recharge, and mobile sensor IVA work on the ISS.



# Cost-Effective Space Missions @ Ames



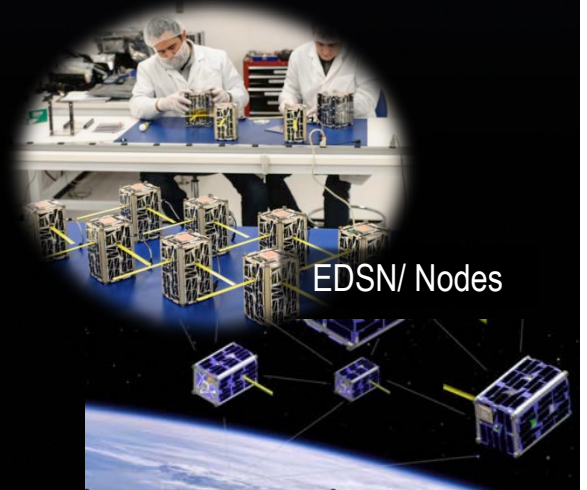
Biosentinel



LADEE (2013)



LCROSS (2009)

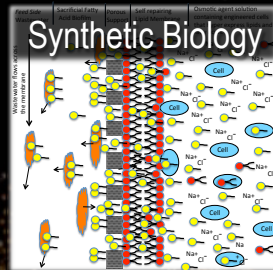
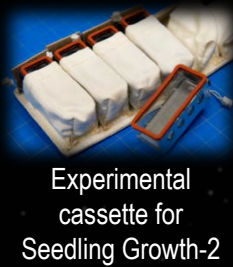
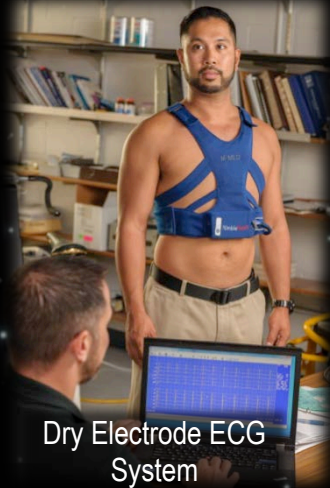


EDSN/ Nodes

# Aerosciences



# Astrobiology and Life Sciences



## Advanced Life Support Technologies



## Solar System and Beyond: *Our Journey of Discovery* Exoplanet Biosignatures



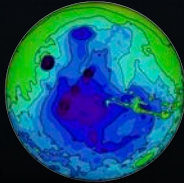
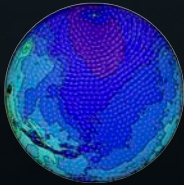
**NASA Astrobiology Institute**  
LIFE IN THE UNIVERSE

# Space and Earth Sciences

Understanding Mars Climate

With Clouds

Without Clouds



Global Circulation Model

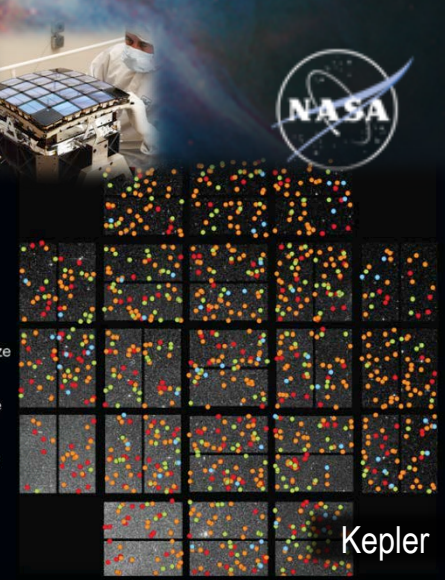


Field Studies in Antarctica



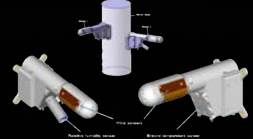
Moon Kepler-37b Mercury Mars Kepler-37c Earth Kepler-37d

- Earth-size
- Super-Earth size  
1.25 - 2.0 Earth-size
- Neptune-size  
2.0 - 6.0 Earth-size
- Giant-planet size  
6.0 - 22 Earth-size

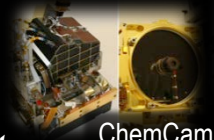


REMS

2007: CheMin installed in MSL



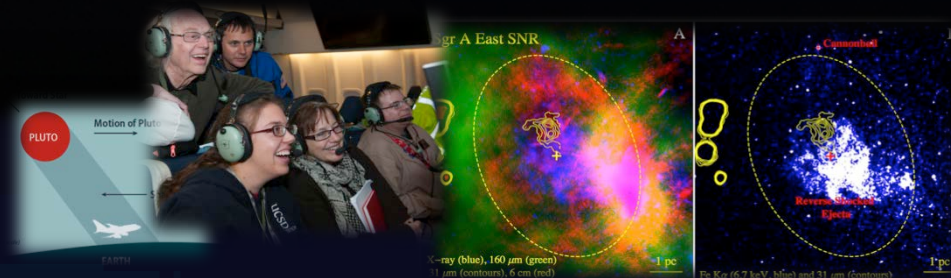
In Support of *Curiosity*



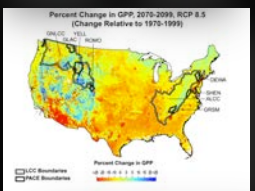
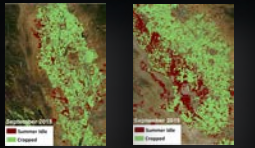
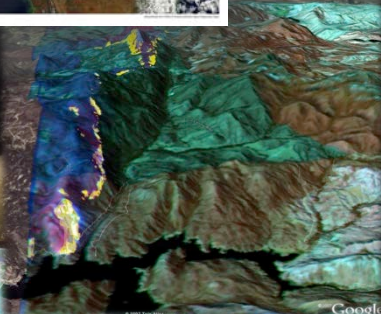
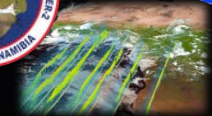
ChemCam



SAM



# Space and Earth Sciences



Earth Science Projects Office

Airborne Science Office

Airborne Sensor Facility

NASA Earth eXchange

# Partnerships at Ames



- Partnering with external organizations to access capabilities under collaborative agreements
- Entering into reimbursable agreements for partner access to NASA capabilities
- Expanding overall landscape of space activity (maximizing public and private sector growth)
- Spurring innovation

## International



## Commercial



## Virtual Institutes



## Interagency



## Military



## NASA Research Park



## Academia



## NASA Centers



# NASA Research Park

An established regional innovation cluster that facilitates commercialization by serving as a technology accelerator through vital and robust onsite collaborations.



## 70+ Partners Today

- University Associates-Ground Lease
- PV “Google” (North East Section) Ground Lease
- M2MI Corporation-Bldg.19
- Carnegie Mellon University-Bldg. 23, 19
- Kentucky Science & Technology Corporation-Bldg.19
- Bloom Energy-Bldg. 543, 154 (Fuel Cell Research)
- UAV Collaborativer-Bldg.18
- Singularity Education Group-Bldg. 20
- BAER Institute-Bldg. 19
- Chandah Space Technologies-Bldg. 19
- Deep Space Industries-Bldg. 156
- IDM Technologies-Bldg. 19
- Logyx LLC-Bldg. 19
- Made in Space-Bldg. 153
- Neurovigil Inc.-Bldg. 19
- Rhombus Power-Bldg. 19
- Scanadu Inc.-Bldg. 20
- SkyTran-Bldg. 14
- Verdigris Technology-Bldg. 19
- ZeeAero-Bldg. 210
- LatIPnet-Bldg. 19
- Wyle Laboratories-Bldg. 19



# Come Join the Ames Family

## Upcoming openings:

- Computer Scientist
- Engineers: Aerospace, Software, Electrical, Materials, Systems
- Physical Scientists: Astrobiology, Biosciences, Space, and Earth Sciences
- Business Operations (HR, Public Affairs, Procurement, IT)

## Pathway Programs: Intern Employment, Recent Graduates, Presidential Management Fellows

- Engineering
- Physical Scientist
- Human Resources
- Finance
- Business Administration



[nasajobs.nasa.gov](http://nasajobs.nasa.gov)

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# Questions?

MARS

