NASA and Public-Private Partnerships

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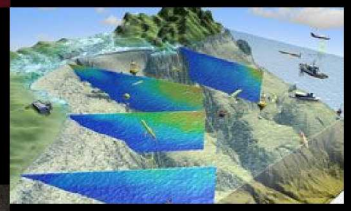
Ames Research Center

Ames Research Center *in Silicon Valley*

- **NASA Headquarters, Washington, DC [Management]**
  Management over the space flight centers, research centers, and other installations that constitute NASA

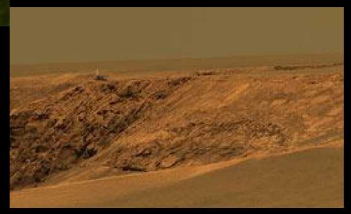


- **Ames Research Center, California [Research]**
  Research geared towards creating new knowledge and new technologies that span the spectrum of NASA interests

- **Dryden Flight Research Center, California [Research]**
  Lead for flight research

- **Glenn Research Center, Ohio [Research]**
  Develops and transfers critical technologies for aeronautics, aerospace, and space applications

- **Goddard Space Flight Center, Maryland [Mission]**
  Expand knowledge on the Earth and its environment, the solar system, and the universe through space observations



- **Jet Propulsion Laboratory [Mission]**
  Managed by the California Institute of Technology is lead center for robotic exploration of the Solar System.

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Johnson Space Center [Mission]
Leads NASA's effort in Human Space Exploration

Kennedy Space Center [Launch Operations]
Preparing and launching missions around the Earth and beyond

Langley Research Center [Research]
Aviation and space research for aerospace, atmospheric sciences, and technology commercialization to improve the way the world lives

Marshall Space Flight Center [Mission]
Access to space and use of space for research and development to benefit humanity

Stennis Space Center [Propulsion Test]
Rocket propulsion testing and for partnering with industry to develop and implement remote sensing technology

There are Many Ways to Build Public-Private Partnerships with NASA

- Space Act Agreements (Non-Reimbursable, Reimbursable, Memorandum of Understanding, Memorandum of Agreement, Interagency, and International)
- Licensing Agreements (Exclusive, Nonexclusive, and Limited Exclusive)
- Software Agreements
- Cooperative Research and Development Agreements (CRADA)

NASA Ames Research Center Today

- Science (Earth-Life-Space)
- Astrobiology
- Science Missions
- Exploration Systems
- Small Satellites
- Aviation and Aeronautics
- Innovative Collaborations

- 2400 Employees
- $700+ M Annual Budget

Current Active Facilities, 2008

National Full Scale Aerodynamic Complex, 80x120 Wind Tunnel

Vertical Motion Simulator

Small Spacecraft Development Facility

Unitary Plan Wind Tunnel

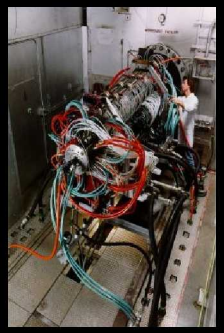
SOFIA

Machine Shops

Small Satellite Lab

Columbia Super Computer

Ballistic Range

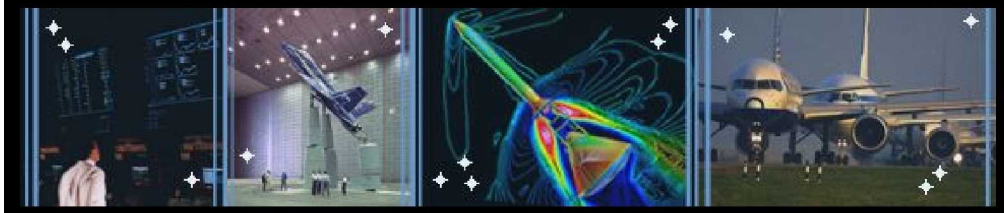


Arc Jets

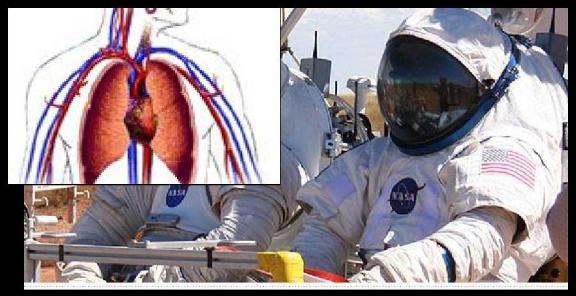
Image copyright Dariusz Jezewski

Airfield and Hangars

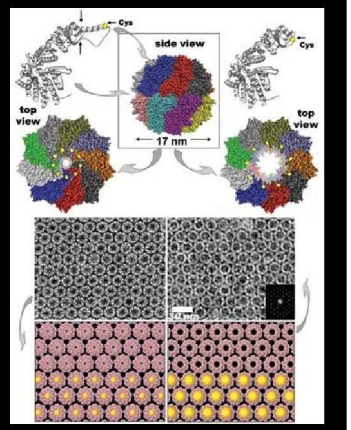
Ames Technology Areas



Aerospace and Aeronautics



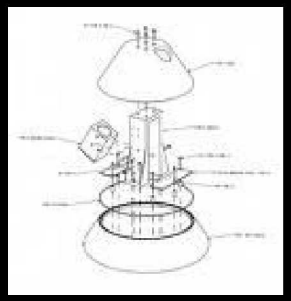
BioTech/Biomedical



Nanotechnology

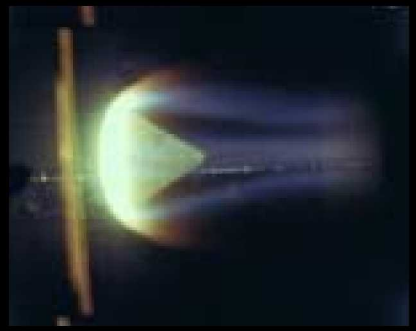
Integrated Systems Health Management (ISHM)

Small Satellite Systems



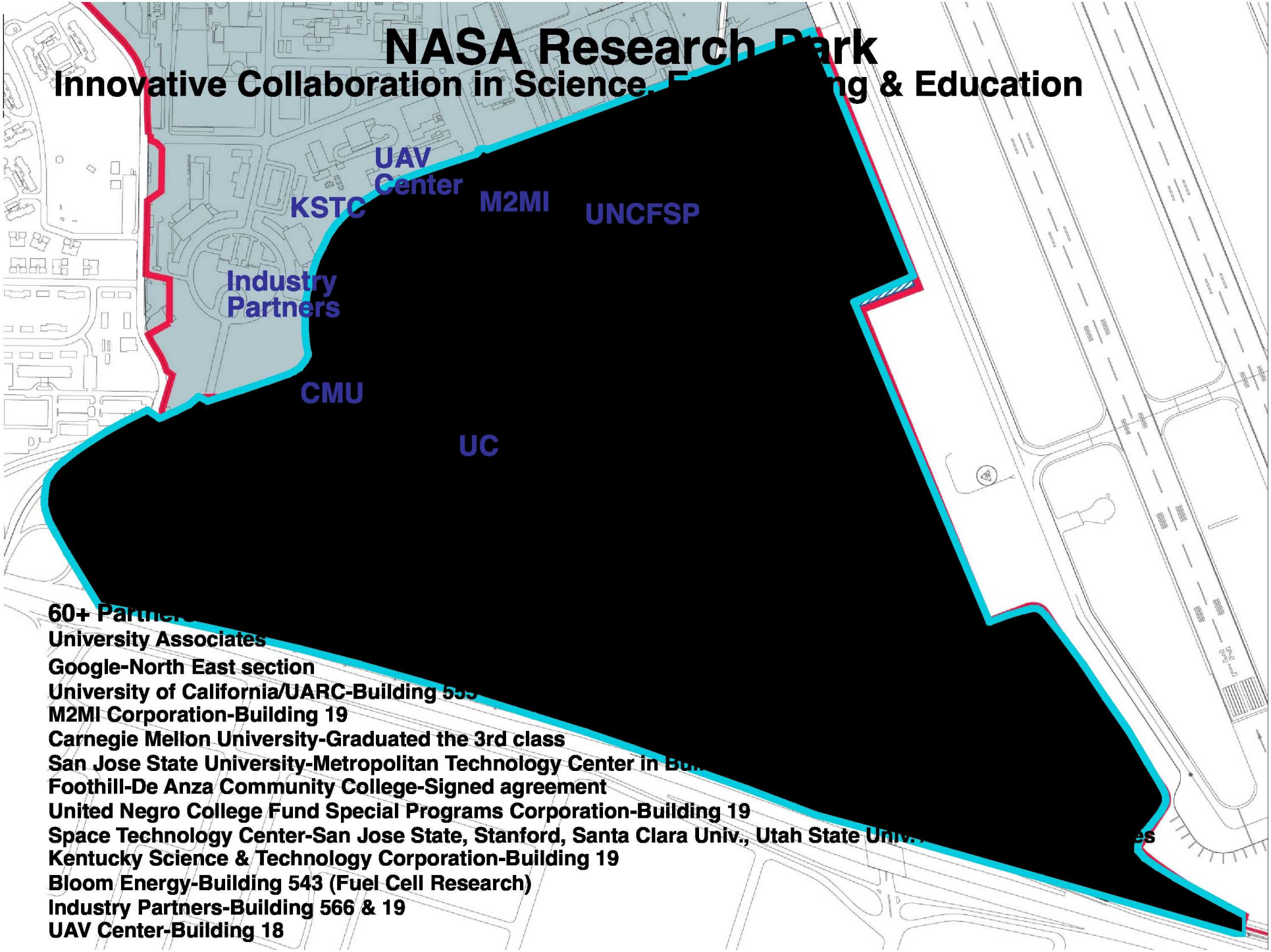
Systems Engineering and Design

Robotics and Artificial Intelligence



Materials Science and Entry Systems

Software and High-end Computing


NASA Research Park
Innovative Collaboration in Science, E ng & Education
UAV Center
KSTC
M2MI
UNCFSP
Industry Partners
CMU
UC
60+ Partne
University Associates
Google-North East section
University of California/UARC-Building 55
M2MI Corporation-Building 19
Carnegie Mellon University-Graduated the 3rd class
San Jose State University-Metropolitan Technology Center in Bu
Foothill-De Anza Community College-Signed agreement
United Negro College Fund Special Programs Corporation-Building 19
Space Technology Center-San Jose State, Stanford, Santa Clara Univ., Utah State Univ.
Kentucky Science & Technology Corporation-Building 19
Bloom Energy-Building 543 (Fuel Cell Research)
Industry Partners-Building 566 & 19
UAV Center-Building 18

Google

- 40-year agreement
- Google will lease 42.2 acres of unimproved land in the NASA Research Park to construct up to 1.2 million square feet of offices and research and development (R&D) facilities and housing in a campus-style setting
- NASA and Google are planning to work together on a variety of areas, including large-scale data management, massively distributed computing, bio-info-nano convergence, and encouragement of the entrepreneurial space industry.

University Associates

The University of California Santa Cruz (UCSC) and Foothill-De Anza Community College District will partner with NASA Ames to establish a sustainable community for education and research at the NASA Research Park (NRP).

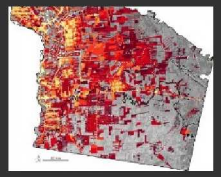
Space Portal

- **NASA partnerships to explore collaboration in space launch systems and payloads launched from aircraft**
  - NASA Ames will become a West Coast 'space portal' for affordable small satellites and other scientific and commercial payloads
  - Areas of collaboration to include mission, vehicle, and payload concept analyses; systems engineering; and payload integration, as well as use of NASA Ames' facilities, such as its wind tunnels, arc-jet facility, flight simulators, hangars and runways

- **Lunar Commercialization complements national Lunar objectives**
  - Early, small scale Lunar transportation enabled by private sector
    - Commercial delivery system -- “FedEx Lunar”
  - Near-term technology demonstrations on the Lunar surface
    - Constellation technology risk reduction
  - Early start to Lunar science campaign
  - Enable more commercial opportunities relative to the moon
    - Commercial Lunar communications, navigation

Partnerships 2009

Planetary Skin Initiative and Rainforest Skin Layer



1. **Green Initiatives**
2. **Planetary Content**
3. **Disaster Response**
4. **Global Connection**

Worldwide Telescope Project

Study of Commercial Application of Direct-To Software

Pipeline Rights-of-Way and Liquid & Gas Leak Detection

Common Spacecraft Bus Development

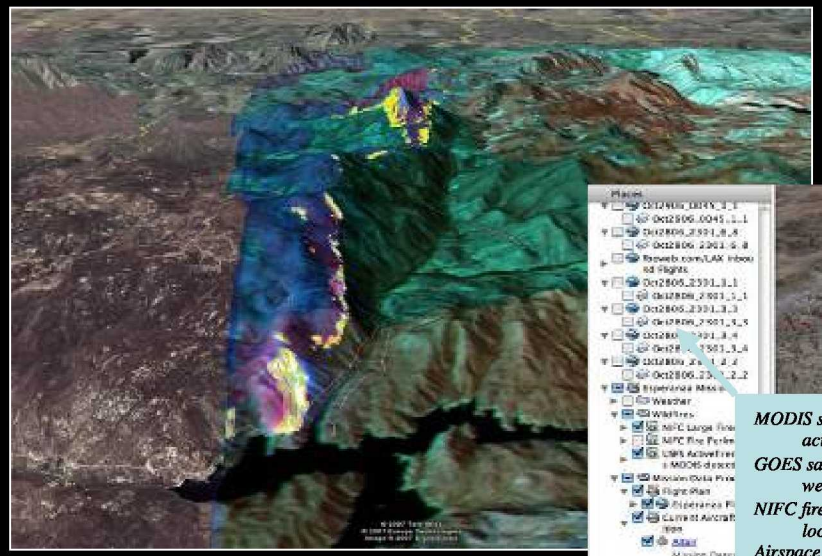
Development of High Performance Chemical Sensors

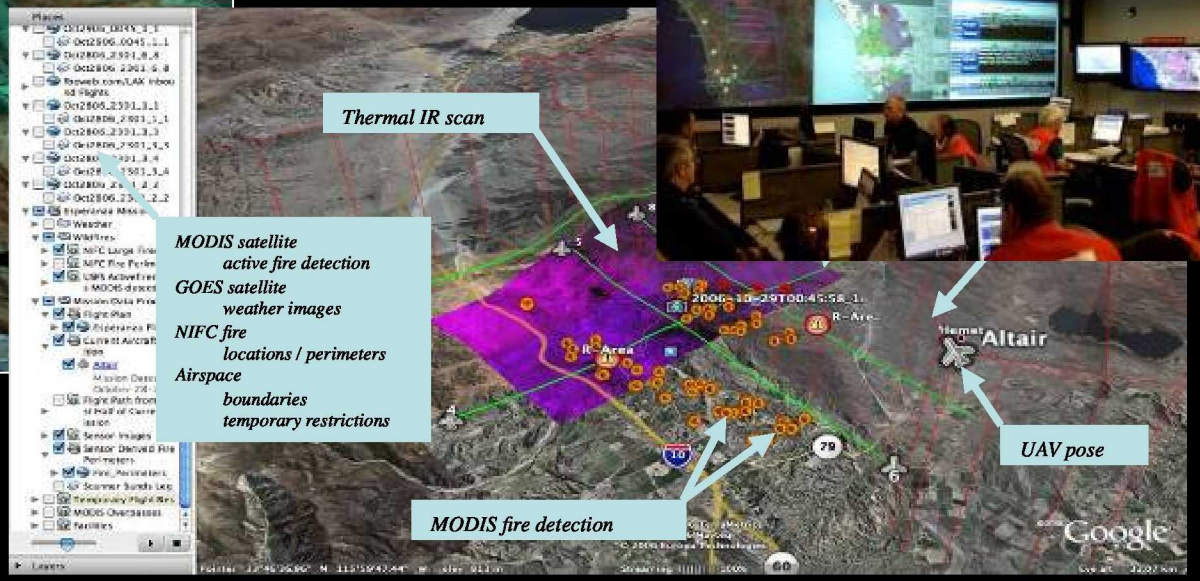
Skin Radiation and Lunar Dust Toxicity Studies

Wildfire Monitoring

Real-time monitoring of Western States Wildfires

- Remote sensing with autonomous modular sensor
- Deployment of ground, aerial (UAV's), and orbital assets
- Integration of weather data (images and maps)
- Distributed data communication





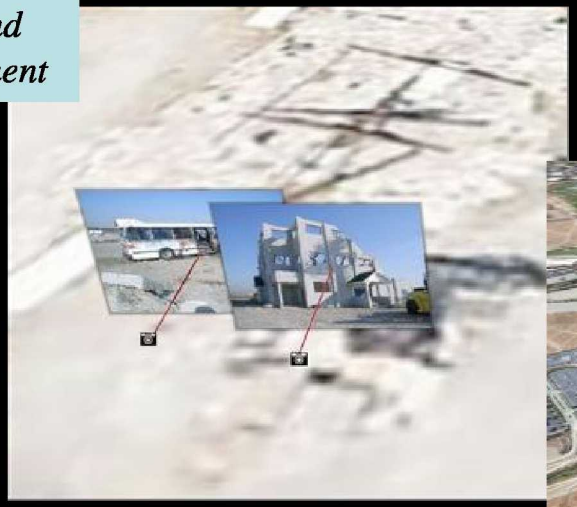
US Forest Service
NASA Dryden
State of California
Federal Aviation Administration

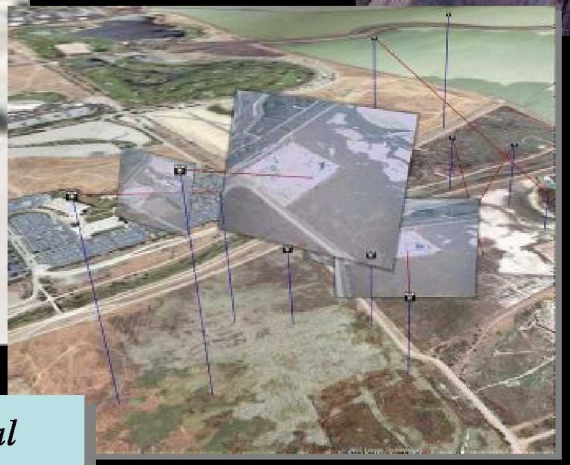
Disaster Imaging & Response

- **Improving Situational Awareness, Coordination and Speed of Response**

-Rapid image processing/overlay of satellite imagery
-Geo-positioning of aerial fly-over imagery
-Integrated view of disaster zones

Ground assessment





Aerial recon

Carnegie Mellon
Google
Urban Search & Rescue

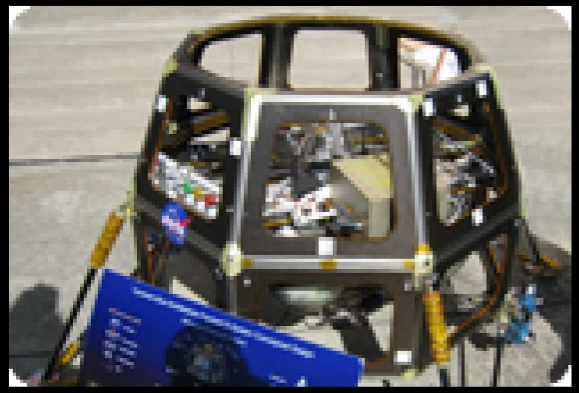
Pipeline Rights-of-Way (RoW) Surveillance

Third-party strikes to the nation's liquid and gas pipeline infrastructure are the leading cause of damage and spills, posing significant hazards to the general public and the environment

Rights-of-Way Autonomous Monitoring (RAM)

Remotely detect intrusions into liquid pipeline rights-of-way and releases from liquid/gas pipelines via sensors and imaging systems on small manned and Unmanned Aircraft Systems (UASs)

Pipeline and Hazardous Materials Safety Administration
British Petroleum
Pipeline Research Council International



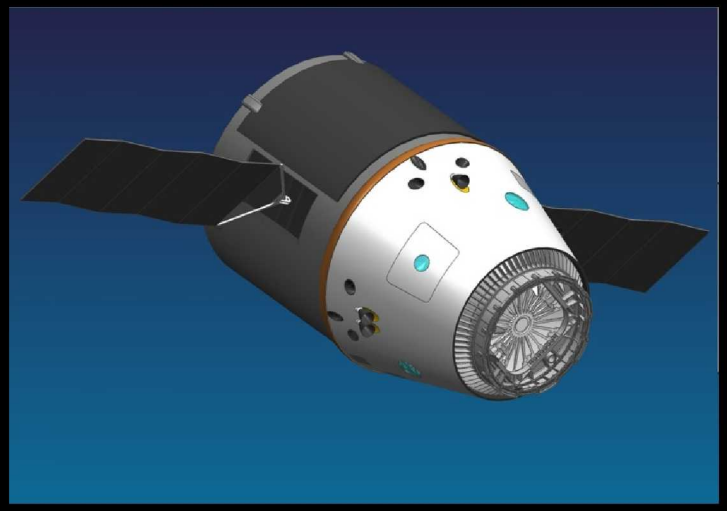
Odyssey Moon Ventures LLC

Common Spacecraft Bus Development

-Collaborate on the assessment of NASA ARC's Common Spacecraft Bus (CSB) design for use on a commercial space mission.

- OMV intends to conduct a series of robotic missions to the moon in support of science, commerce, and exploration

SpaceX Partnership

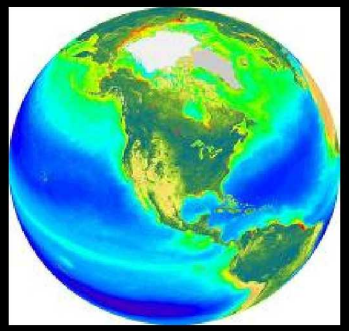


Thermal Protection System Material Design and Analysis for the Space Dragon Capsule

-The Space X Dragon Spacecraft has been selected as one of the winners of the NASA Commercial Orbital Transportation Services (COTS) program

-NASA received funding for its engineering efforts to analyze and develop the Thermal Protection System (TPS) and thermal control system

- SpaceX obtained expert engineering support services from experienced NASA personnel.



"Planetary Skin"

Capturing, collecting, analyzing and reporting data on environmental conditions around the world.