



By

Dr. Charles A. Smith  
[Charles.A.Smith@nasa.gov](mailto:Charles.A.Smith@nasa.gov)

Chief, Space Technology Division  
NASA Ames Research Center  
Moffett Field, CA 94035

*August 21st, 2008*

# Hawaii's Aerospace Industry: The Next Frontier Enabling the Next Frontier: The National Vision for Aerospace **NewSpace**





## What's News?

- **Virgin Galactic Rolls Out Mothership "Eve"**
- [Monday, July 28, 2008] Virgin Founder, Sir Richard Branson and SpaceShipOne designer, Burt Rutan, today pulled back the hangar doors on the new WhiteKnightTwo (WK2) carrier aircraft.





## What's News?

- **SpaceX: First 9 Engine Firing of Falcon 9 Launch Vehicle**
- [Friday, August 1, 2008] SpaceX conducted the first nine engine firing of its Falcon 9 launch vehicle at its Texas Test Facility outside McGregor on July 31st. A second firing on August 1st completed a major NASA COTS milestone almost two months early.





# What's News?

- **Bigelow Reveals Space Business Plan**
- [Friday, April 6, 2007] The Bigelow Aerospace commercial inflatable manned space module venture intends by 2015 to have three large multi-module outposts in Earth orbit to serve different user communities.





# What's News

- **Spaceport America Design Unveiled**
- Date Released: Thursday, September 6, 2007
- Source: Spaceport America
- LAS CRUCES, NM - A team of U.S. and British architects and designers, accompanied by officials from the New Mexico Spaceport Authority (NMSA) and Virgin Galactic, will unveil the design renderings of Spaceport America at a press conference Tuesday, September 4, in Las Cruces, New Mexico. Construction on the 100,000 square-foot hangar and terminal facility is scheduled to begin in 2008.





# What's News

- **Google Sponsors Lunar X PRIZE to Create a Space Race for a New Generation**
- Date Released: Thursday, September 13, 2007
- Source: X Prize Foundation
- The X PRIZE Foundation and Google Inc. today announced the Google Lunar X PRIZE, a robotic race to the Moon to win a remarkable \$30 million prize purse. Private companies from around the world will compete to land a privately funded robotic rover on the Moon that is capable of completing several mission objectives, including roaming the lunar surface for at least 500 meters and sending video, images and data back to the Earth.





# What's News

- **Space Foundation Report Pegs 2006 Global Space Economy at \$220 Billion and Growing**
- Date Released: Wednesday, October 10, 2007
- Source: British Aerospace plc
- The Space Report 2007 details 18 percent growth in one year
- OMAHA, Neb. (Oct. 10, 2007) -- Today, the Space Foundation released The Space Report 2007, revealing that in 2006 the global space industry grew to nearly \$220 billion in total revenues. The Space Report 2007 contains global space industry budgets and revenue data for calendar year 2006 and, along with the updated Space Foundation Index, demonstrates dramatic growth in the space economy that is outpacing most other markets and indices. Total space industry revenues of \$220 billion in 2006 represent a single-year increase of 18 percent from 2005.
- **Recently reported \$250 billion in 2007, ≈69% in commercial activity**





**Emerging commercial space, or NewSpace, is an important and growing segment of space industry...**

**...all indications are that it will continue to grow...**

**...soon becoming an important new sector of our aerospace industry**



# NASA's Principle NewSpace Program: Commercial-Orbital Transportation Services (COTS)

## Description

- NASA investment of \$500M over five years
- Being managed out of JSC by Alan Lindenmoyer (PM)
- Two funded partner organizations selected from national COTS competitions: SpaceX and Orbital Sciences
- Both companies working to provide demonstrations of orbital transportation capabilities to the International Space Station
- Ames directly supported JSC for the program structure and execution
- Ames currently providing SpaceX with technical support to TPS development and testing

*Providing commercial transportation demonstrations of cargo, and potentially crew, to and from the International Space Station (ISS)*



*COTS model can be used to help other programs leverage NASA funding with Non-NASA resources for achieving program goals*



# Ames Research Center *in Silicon Valley*



## 65 Years of Innovation

**2000**

NASA Research Park

**1990**

World's fastest operational supercomputer

**1980**

Nanotechnology

**1970**

Astrobiology

**1960**

Human Centered Computing

**1950**

Kuiper Observatory

X-36

Life Sciences Research

80x120 Wind Tunnel

Computational Fluid Dynamics

Arcjet Research

Conical chamber

Swept-Back/wing

Lifting body

Hypervelocity Free Flight

Pioneer Venus

Viking

Galileo

Tiltrotor

Air Transportation System

ER-2

Lunar Prospector

Pioneer

Apollo Heat Shield Tests

Blunt body concept

Transonic Flow

Apollo Guidance System

Flight Research

Flight Simulation

Human Centered Computing

Apollo Re-Entry Shape

Tektites



# Ames Research Center

in Silicon Valley



## NewSpace Partners



CISCO SYSTEMS



AIR LAUNCH



Lunar Transportation Systems Inc



Virtue Arts



TGV-Rockets





# Benefits for the Government from NewSpace

- **Flight tests of advanced technologies on NewSpace Vehicles**
  - *Rides of opportunity on test development flights*
  - *An early key benefit*
- **With time, new low cost space services**
  - *Transportation to and from orbit for cargo and crew*
  - *On-orbit and lunar services*
- **Opportunity for adoption of more cost-effective design and development approaches**
  - *The Craig Venter “Human Genome” competition effect*



# Benefits for Hawaii from NewSpace

- **Prime location for NewSpace point-to-point sub-orbital services**
  - *Hawaii could serve as a hub for sub-orbital flights from the mainland US, to Asian Pacific locations, such as Tokyo*
  - *Using existing airport infrastructure*
- **Opportunities for earth and space observation studies and activities using NewSpace flight vehicles**
  - *Corel reef and ocean monitoring*
  - *Sub-orbital astronomy*
- **Employment opportunities for UH graduates**
  - *NewSpace currently experiencing significant workforce shortage of engineering talent*



# Opportunities for Collaboration with the Ames Space Technology Division

- **Experts in Entry Physics for NASA's atmospheric entry probes**
  - Heat shields and thermal protections systems
  - Understand and calculate aero-heating environments
  - Development and testing
  - Every NASA atmospheric entry probe dating back to Apollo: Shuttle, MER, Stardust,... and now MSL and Orion
- **Opportunity for student interns**
  - *Summer 2008, 61 student interns hosted*
  - *Similar number anticipated for summer 2009*