

National Aeronautics and Space Administration



OFFICE OF THE CHIEF TECHNOLOGIST

SPACE TECHNOLOGY
INDUSTRY FORUM

A woman in a dark jacket and pants stands on the right side of a yellow-toned, futuristic industrial or technological environment. The background is filled with complex machinery, pipes, and structural elements, creating a sense of depth and scale.

Partnerships, Innovation & Commercial Space

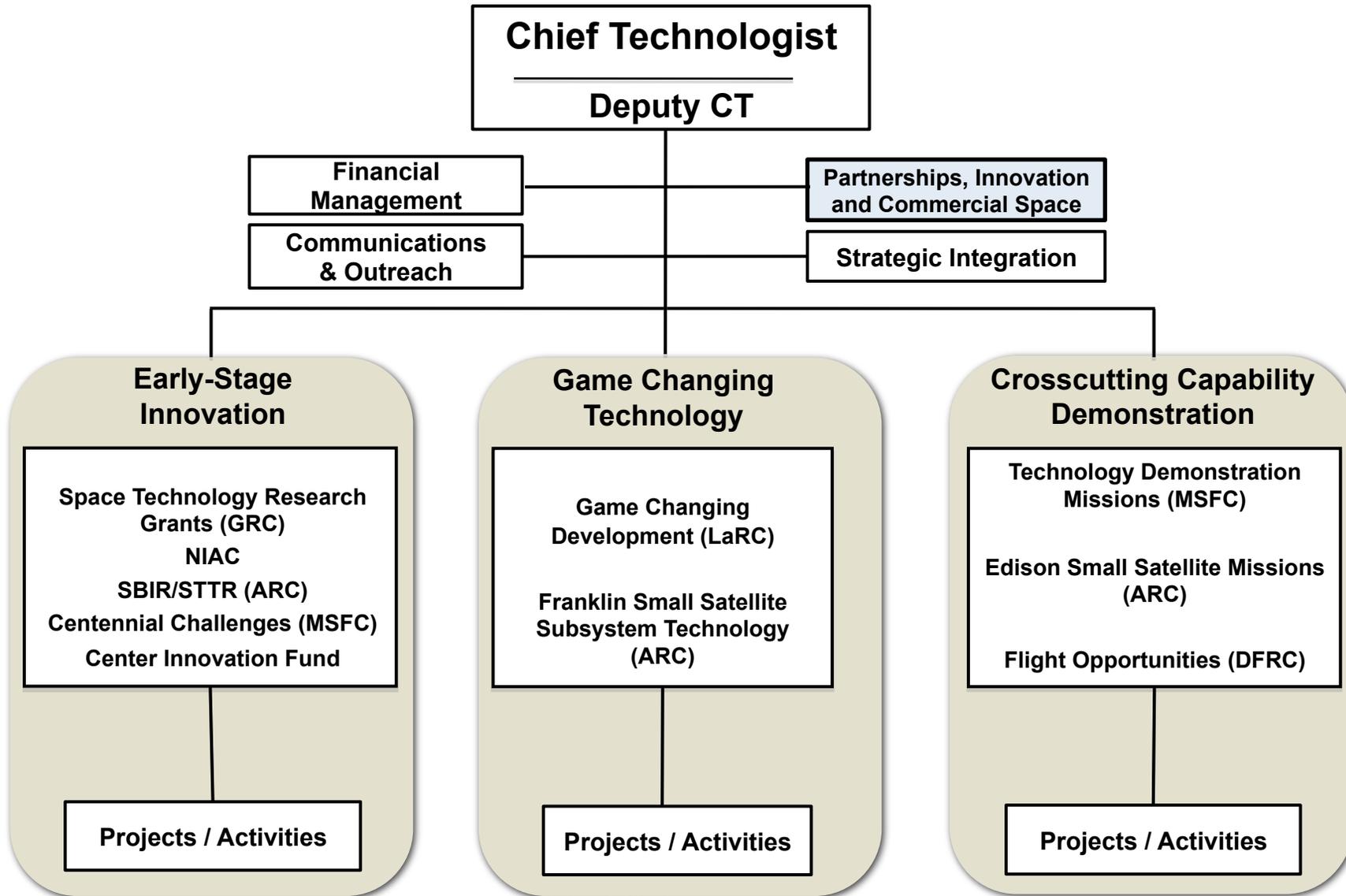
Doug Comstock

Director

July 13, 2010

www.nasa.gov

Office of the Chief Technologist Organization



Partnerships, Innovation and Commercial Space



- **Partnerships:** Partnerships are an integral part of NASA's strategy for reinvigorating technology and innovation. Partnerships will:
 - Leverage the technology investments of other government agencies.
 - Engage universities in STEM educational and career paths.
 - Connect with industry technologists to permit utilization of NASA facilities.
 - Communicate standards used by NASA facilities and assets.
- **Innovation:** Innovation activities will increase the exchange of ideas between NASA employees and the most innovative segments of the private sector and government.
 - Innovation Ambassadors: placing technical employees at external innovative organizations for up to 12 months.
 - Innovation Scouts: 1-2 day workshops to exchange information on innovation.
 - Entrepreneurs in Residence (EIR): bringing proven start-up entrepreneurs to NASA Centers, developing business cases for promising NASA technologies.
 - NASA Tech Talks – learning from leading experts in innovation.
- **Commercial Space:** OCT will work with entrepreneurs across the aerospace industry to enable new commercial space capabilities.
 - Similar to the way NACA aided the early aeronautics industry.
 - Seek opportunities to leverage other activities such as ISS as National Laboratory.
 - Efforts are coordinated with COTS/CCDEV programs.

Innovation & Partnerships

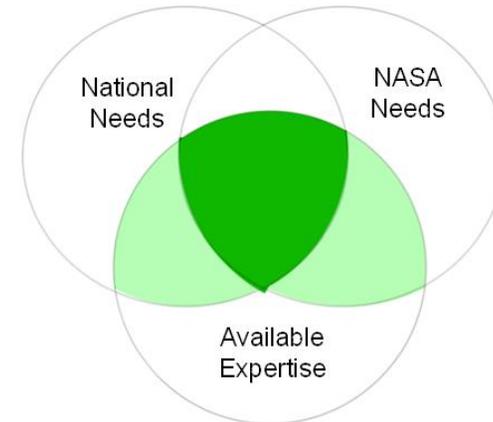


- **Innovation**

- Risk taking and failure tolerance – learning by doing.
- Building networks and making connections.
- Not just technology but new ways of applying existing technology, new processes and business models.

- **Partnerships**

- Seek out common interests and partnerships that maximize mutual benefit.
- Look for partners with skin in the game.
- Seek out adjacent markets and industries – economies of scale.
- Welcome non-traditional partners and fresh perspectives.



Innovation: Matching Technology Needs with Technology Capabilities

Entrepreneurship & Innovation



- A goal of the innovation strategy for the U.S., released by the National Economic Council and the Office of Science and Technology Policy, is to:
“Encourage high-growth and innovation-based entrepreneurship.”
- The white paper outlining the strategy states that:
“Entrepreneurship has played, and will continue to play, an essential role in generating innovation and stimulating U.S. economic growth.”
- NASA is a Critical Component of America’s Innovation Engine.
 - As a research and development agency, NASA plays a vital role in America’s innovation engine and, as such, its future economic prosperity and security.
 - An enhanced technology and innovation focus at NASA responds to the recommendations of multiple external stakeholders.
 - NASA’s new Space Technology investments will create a more vital and productive aerospace industry and address broader national needs, such as energy, health and wellness, and national security.
- NASA’s Office of the Chief Technologist offers entrepreneurs a wide variety of engagement opportunities and tools.

A Strategy for American Innovation: Driving Towards Sustainable Growth and Quality Jobs; Executive Office of the President, National Economic Council, Office of Science and Technology Policy; September 2009

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OCT Offers Numerous Benefits to Potential Partners



- Funding or Leveraged Resources through partnerships:
 - Early Stage Innovation.
 - Game-changing Technology.
 - Cross-cutting Demonstrations.
- Technology and Software.
 - Access through licensing or other partnerships.
- Test and Demonstration Facilities/Capabilities.
 - Access to NASA's facilities through partnerships.
 - Access to the space environment through flight opportunities.
- Expertise.
 - Access to NASA's technical expertise through partnerships.
- Facilitation to proactively seek and enable partnerships.



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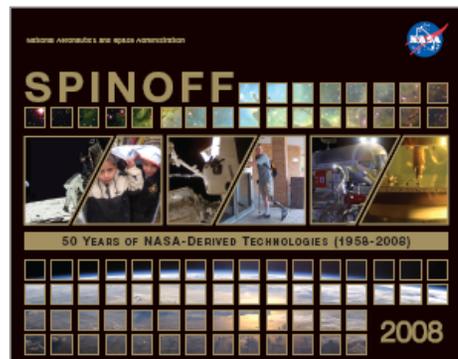
NASA Partnering for Innovation



- NASA has a long history of transferring technologies for public benefit.
- NASA's direction to do this traces to the Space Act that created NASA in 1958:
"Provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof."

Applications of NASA-Derived Technology

- Health and Medicine
- Transportation
- Public Safety
- Consumer, Home & Recreation
- Environmental and Agricultural Resources
- Computer Technology
- Industrial Productivity

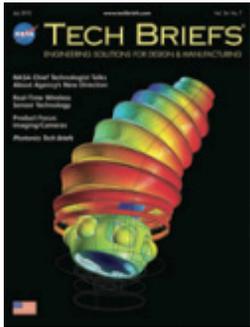


NASA @ Home & NASA City
<http://www.nasa.gov/city>

Public Benefits of NASA-Derived Technology

- Economic Growth
 - New Jobs
 - New Markets
 - Increased Efficiency
 - Improved Competitiveness
- Quality of Life
 - Improved Safety
 - New Products
 - Lives Saved or Extended
 - Green Technologies
 - Environmental Cleanup

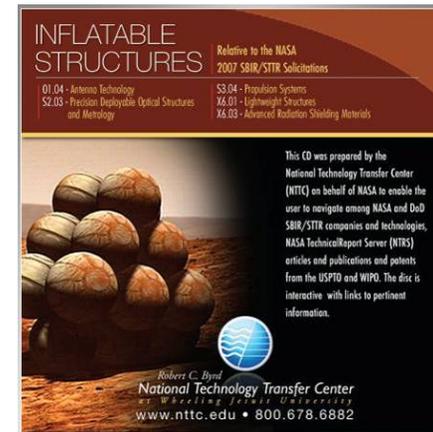
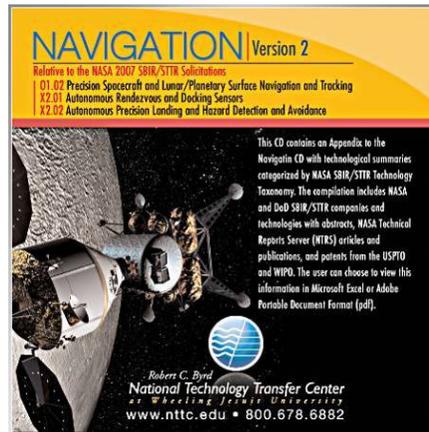
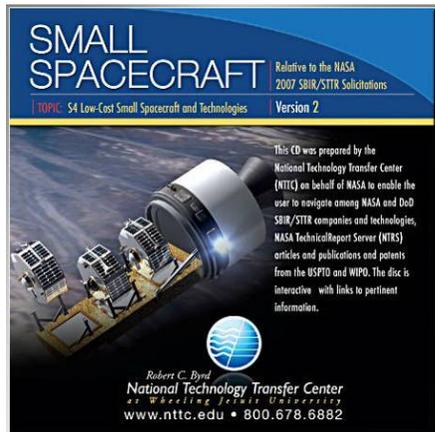
Finding Technologies



- NASA TechBriefs publishes new technologies in print and online.
- NASA technologies are searchable on many databases, including technology.nasa.gov.



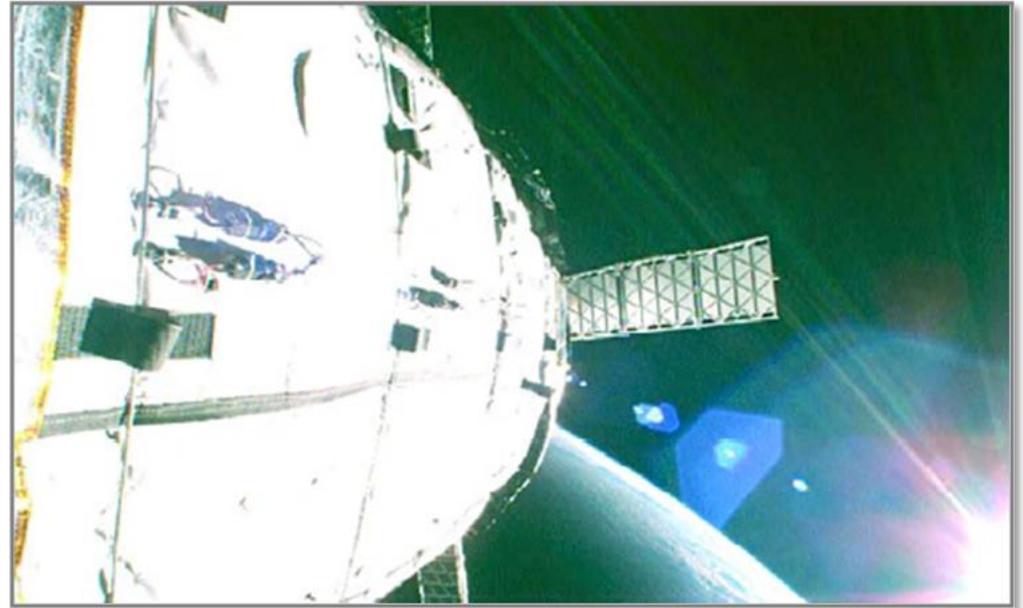
- Working with the National Technology Transfer Center (NTTC) we are generating focused technology databases.
- As part of OpenGov, NASA established an RSS feed with new technologies.



http://www.sbipp.com/technologyportfolios/technology_list.asp

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Licensing and Partnerships Enable New Capabilities



Ad Astra

- 200 kW VASIMR prototype plasma rocket engine.
 - Technology licensed from NASA.
 - First Space Act Agreement in 2005.
 - Access to and use of NASA facilities.
 - NASA technical experts on-site for extended assignments working on technical issues.

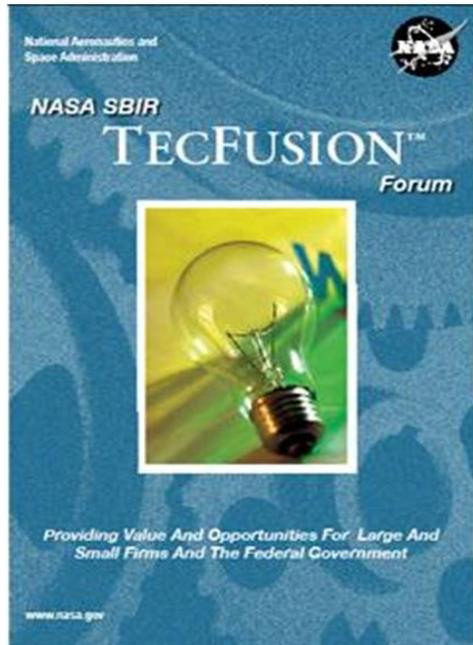
Bigelow Aerospace

- Genesis I inflatable spacecraft.
 - Technology licensed from NASA.
 - First Space Act Agreement in 2002.
 - NASA technical experts on-site for extended assignments working on technical issues.
 - NASA experiments flown on prototype spacecraft.

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TecFusion™ Forums Facilitating Partnerships for Commercial Development



- Almost 2,200 SBIR-developed innovations have been presented to large businesses in many fields.
 - Over 230 SBIR-funded firms have participated in more than 20 TecFusion™ Forums.
 - At least 70 partnerships have been formed.
 - Technologies developed by innovative small firms for NASA needs.
 - Partnering with large firms to bring these technologies to market.
-
- 21 SBIR companies have developed new products since participating, 36 plan to produce commercial products.
 - 17 large corporations have developed partnerships with NASA-funded small businesses through TecFusion Forums.



At the 2010 Consumer Electronics Show, RCA (an Audiovox subsidiary) introduced the RCA Airenergy unit.

New Methods of Open Innovation



Scientific Expert Network Matches Micro-Entrepreneurs to Needs

NASA Innovation Pavilion

Mechanical Engineer from Foxboro, MA awarded \$20,000 for novel compact and resistive exercise device design. 564 “project rooms” participated

Radio Frequency Engineer from Lempster, NH awarded \$30,000 for a mathematical model to be used for solar forecasting. 579 “project rooms” participated

NASA contracts with scientific network of 200,000+ experts from around the world to procure “frictionless” solutions

Centers Participating in the NASA Innovation Pavilion

Johnson Space Center The Johnson Space Center has been home to all U.S. human space flight programs. Our scientists and engineers are engaged in research and technology development projects encompassing human health and performance, life sciences, and aerodynamics, mechanical, electrical, industrial, propulsion, chemical, and computer engineering. We are seeking new and creative ideas to enable our success as we venture beyond low Earth orbit and further explore the universe.

PAUSE

<https://gw.innocentive.com/ar/challengePavilion/index?pavilionName=NASA>

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Response to NASA Challenges Posted at InnoCentive.com



- **JSC Challenges** - Improved Food Packaging, Compact, Effective Aerobic and Resistive Device, and Forecasting Solar Activity.
 - A Total of 1,317 Project Rooms were opened from 65 Countries, resulting in 127 Submissions from 24 Countries.
- **LaRC Challenge** – Coordination of Sensor Swarms for Extraterrestrial Research.
 - There were 423 Project Rooms opened from 49 Countries, and 37 Submissions from 11 Countries.

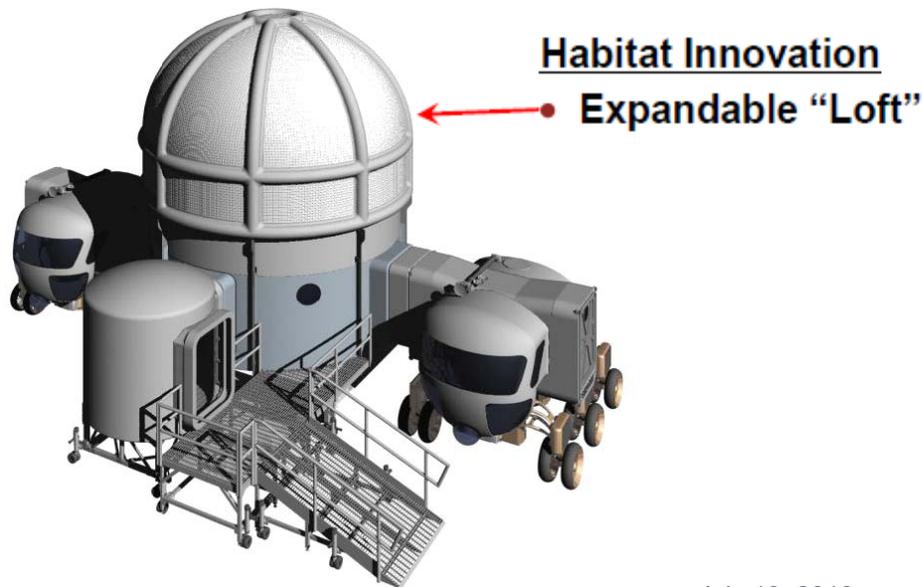
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X-Hab Academic Innovation Challenge



- OCT and ESMD have partnered with JSC and the National Space Grant Foundation to conduct a pilot innovation project.
- The exploration habitat (X-Hab) academic innovation challenge encourages academic innovation through a head-to-head competition to design and build an inflatable habitat loft.
- Solicitation released 6/23, notice of intent due 7/23, proposals due 8/20.
- The winner will participate with NASA's Habitat Demonstration Unit (HDU) Project in the Desert Research and Testing Studies in Aug-Sept 2011.



www.spacegrant.org/xhab/



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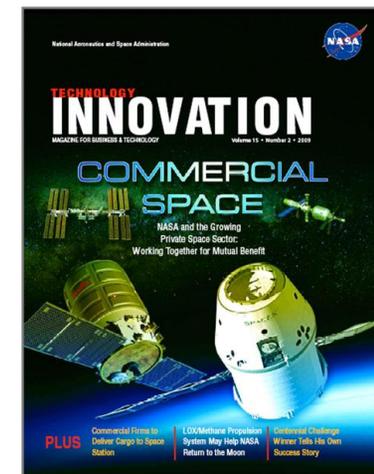
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Commercial Space and NASA



- **New National Space Policy:** A robust and competitive commercial space sector is vital to continued progress in space.
- Three key themes underscore some of the changes already underway in how NASA is engaging the commercial space community:
 - Private sector relationship as partner rather than contractor.
 - Government purchase of services rather than hardware.
 - Creating more opportunities and broader reach for innovation.
- Using a NACA approach focuses on building an industry, not a program.
- For NASA today, this implies seeking the Wright Brothers of 21st Century through open innovation and focusing on the foundational research and technology required to foster commercial space markets.

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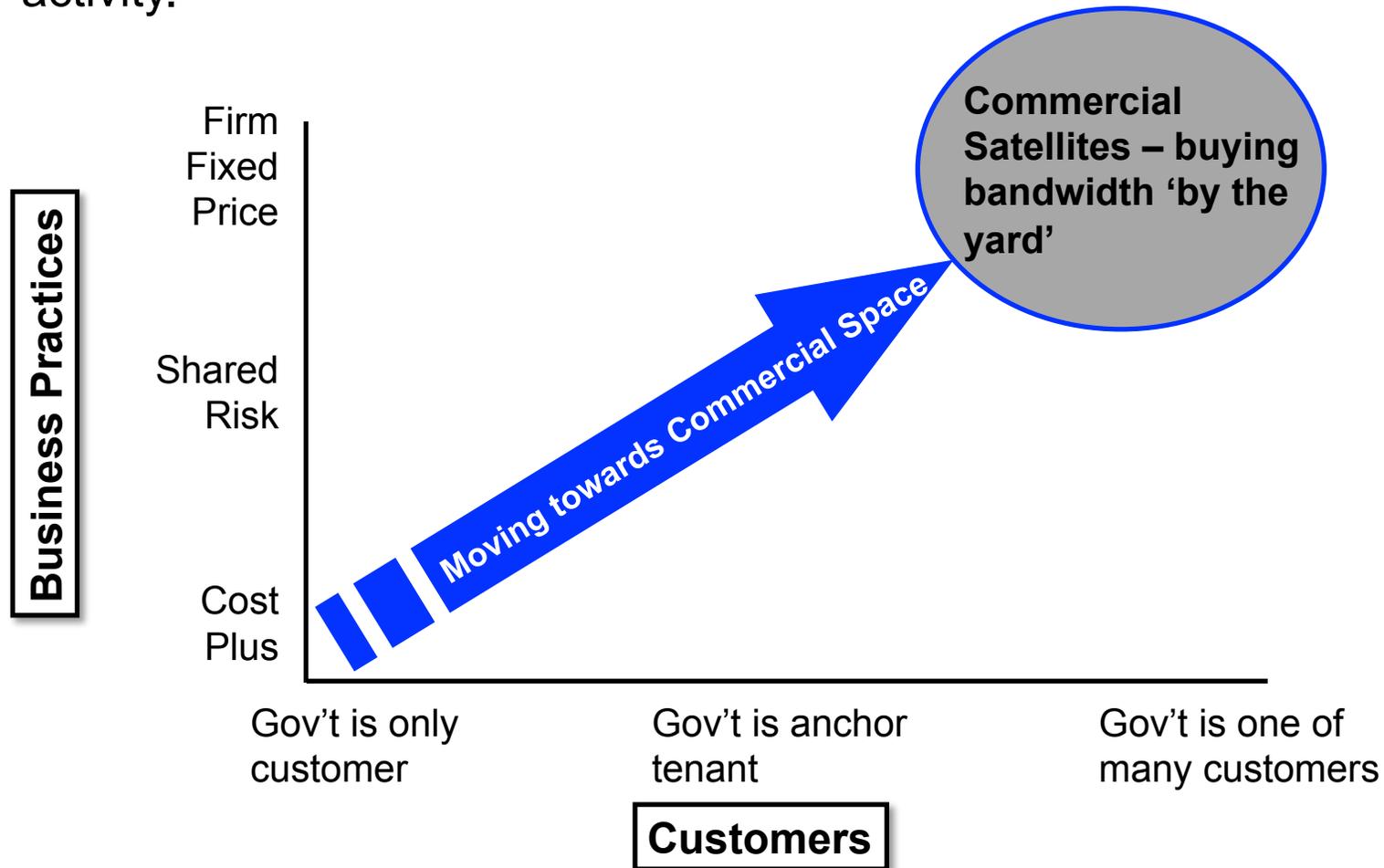


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What is Commercial Space?



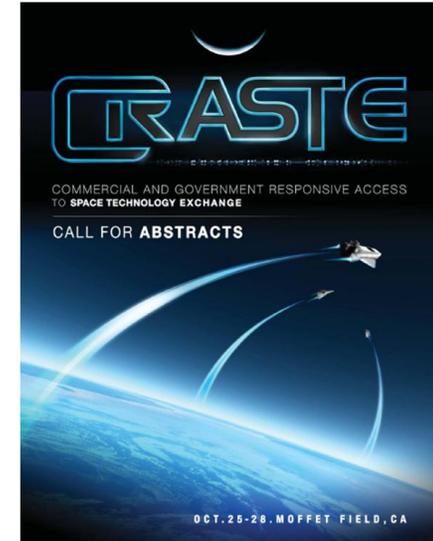
- No single discrete definition, but rather a context for understanding different aspects of what makes something a 'commercial space' activity.



Upcoming Events and Activities



- NASA-USAF Co-sponsoring Annual Technology Exchange and Industry Forum.
 - Commercial Responsive Access to Space Technology Exchange (CRASTE).
 - OCT is the NASA lead for this forum.
 - NASA and USAF alternate hosting, WPAFB in 2009.
 - 2010 event will be at NASA Ames on Oct. 25-28.
- CRASTE Purposes:
 - Facilitate technology transfer, enable partnerships with a “Marriage broker” service among firms.
 - Forum for understanding industry technology needs.
- Learn more and register at:
<http://www.usasymposium.com/craste/>
- Beginning new approach to foster commercial industries and Low-Cost and Reliable Access To Space (LCRATS) which includes:
 - Flight Opportunities using Commercial Services.
 - Commercial Responsive Access to Space Technology Exchange.
 - Commercial RLV Technology Roadmap.
 - Horizontal Launch Access to Space feasibility study



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Importance of OCT Investments



- **A Critical Component of America's Innovation Engine:** As a research and development agency, NASA plays a vital role in America's innovation engine and, as such, its future economic prosperity and security. An enhanced technology and innovation focus at NASA responds to the recommendations of multiple external stakeholders.
- **Fostering American Industry:** NASA's new Space Technology investments will create a more vital and productive aerospace industry and address broader national needs, such as energy, health and wellness, and national security.
- **An Integral Part of our National Strategy:** NASA's new Space Technology programs represent an important aspect of our overall national investment in research, technology and innovation, designed to stimulate our economy, create new inventions and capabilities, and increase our global economic competitiveness.
- **The Next Generation:** NASA's new Space Technology emphasis will create a new pipeline of young engineers, scientists, and mathematicians to serve our future National needs, inspiring wonder in a new generation, sparking passions and launching careers.
- **Partnerships, Innovation and Commercial Space:** Activities are intended to leverage expertise and resources with partners, drive new sources and methods of innovation, and maximize the benefit to the U.S. from the taxpayer investment in NASA technology.

Interested in partnering with NASA?



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