



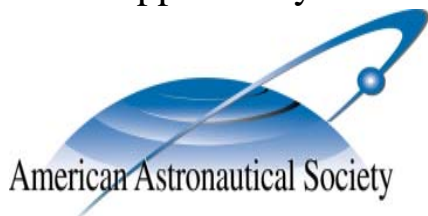
Report on The Space Economy Symposium

Sponsored by:

NASA, Cisco Systems, the Coalition for Space Exploration and Odyssey Moon Limited



And supported by:



September 15, 2009

Goals:

- Make space a central part of our national economic policy discussions
- Ensure that space is recognized as an essential component of national competitiveness in a global economy.

Key Outcome:

- Through presentations, panel discussions, and participant interaction, the Symposium promoted new perspectives and insights about the present and future impacts of space on the economy, the roles of government, industry and entrepreneurs in developing the Space Economy, and trends in commercial space that are driving economic growth

Space Economy Symposium - Agenda

AGENDA

08:00 – 08:30 a.m. 08:30 – 08:45 a.m.	Continental Breakfast (sponsored by Cisco) Welcome and Introduction, <ul style="list-style-type: none"> Robert P. Hopkins, Sr. Vice President and Managing Director, Phillips & Company Kenneth Button, Director, Center for Aerospace Policy Research, George Mason University
08:45 – 09:15 a.m.	Keynote Address: “Congressional Priorities for Space” <ul style="list-style-type: none"> Rep. Parker Griffith (D-AL), Member, Subcommittee on Space and Aeronautics
09:15 a.m. – 10:30 a.m.	Panel 1: “The State of the Space Economy” <ul style="list-style-type: none"> Moderator: Bill Bates, Vice President, Government Affairs, Council on Competitiveness Prof. Keith Hayward, Director of Research, Royal Aeronautical Society Barrie Stevens, Deputy Director, International Futures Program, Organization for Economic Cooperation and Development (OECD) Henry Hertzfeld, Research Professor of Space Policy and International Affairs, George Washington University Marty Hauser, Vice President, Washington Operations, Research and Analysis, Space Foundation
10:30 a.m. – 10:45 a.m. 10:45 a.m. – 12:00 p.m.	Break (sponsored by the Coalition for Space Exploration) Panel 2: “The Economic Benefits of the Emerging Space Infrastructure” <ul style="list-style-type: none"> Moderator: Robert P. Hopkins, Sr. Vice President and Managing Director, Phillips & Company Lt. Gen Steven Boutelle, US Army (Ret.), CEO, Cisco IRIS Robert Richards, Founder and CEO, Odyssey Moon Conrad C. Lautenbacher, Ph.D., Vice President, Polar Programs, Computer Sciences Corporation Larry Williams, Vice President, Strategic Relationships, SpaceX
12:00 – 12:15 p.m. 12:15 p.m.	Closing Remarks Adjourn

“Congressional Priorities for Space”

- **Evolving international situation in space**
 - Many countries, including Iran and North Korea, are developing space capabilities.
- **America’s Competition**
 - Smart and well-funded
 - They have the ability to challenge our dominance in space.
- **US space program taken for granted**
 - Government and industry have done so well in developing and operating the program for the last 50 years.
 - Space is critical to the provision of so many services that people depend upon, but its role is not always understood.
- **The culture of space needs to be rekindled**
 - Make fundamental research a top government priority.

“The winds of change are blowing
and space is the high ground”



Congressman Parker Griffith (D-AL)
Science and Technology Committee
Subcommittee on Space and Aeronautics

Panel I: “The State of the Space Economy”

- Moderator: Bill Bates, Vice President, Government Affairs, Council on Competitiveness
- Keith Hayward, Director of Research, Royal Aeronautical Society
- Barrie Stevens, Deputy Director, International Futures Program, Organization for Economic Cooperation and Development (OECD)
- Henry Hertzfeld, Research Professor of Space Policy and International Affairs, George Washington University
- Marty Hauser, Vice President, Washington Operations, Research and Analysis, Space Foundation

Bates – Global financial crisis could pose threat to funding the space program. “Will space be viewed as a luxury?”

Consensus:

- The state of the Space Economy is good and aerospace should be hurt less than other sectors.
- Government is the largest customer for space activity, a situation that provides stability for the industry.
- Most of the elements comprising the Space Economy are growth areas
- Innovation is key to continued growth through prizes, etc.
- ITAR restrictions hinder growth, deny access to international resources, expertise



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CO-OPERATION
AND DEVELOPMENT



Key Points

Keith Heyward – Chief contributor to Oxford Analytica report for NASA, “Understanding the Space Economy”

- Government and industry bound together in a “hybrid economy”
- Private sector provides innovation, delivers services
- Private sector primary driver of benefits to larger economy through creation of jobs, new businesses
- Aerospace sector is high-risk and cost prohibitive
- Government role is to provide investment and infrastructure to enable private sector entry to the market
- Public-private continuum moving steadily toward the private sector

Barrie Stevens – Director, Global Forum on Space Economics, 2007 report “Space Economy at a Glance”

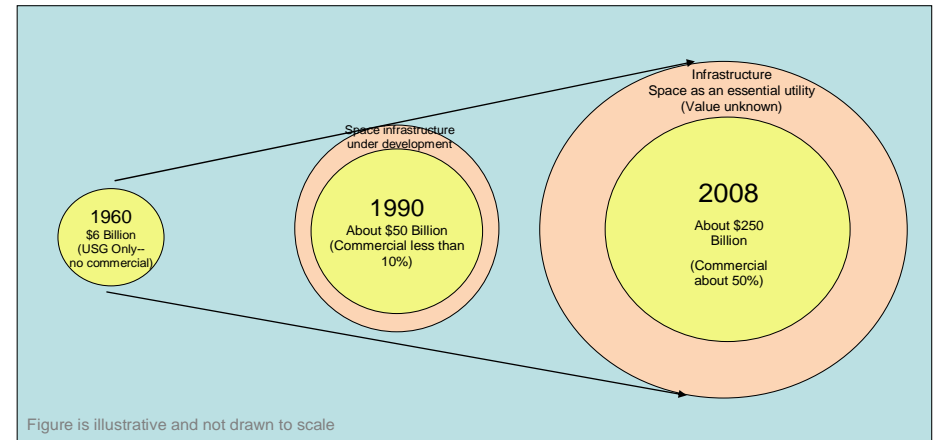
- Defines “space economy” as: all public and private actors involved in developing and providing space-enabled products and services. It comprises a long value-added chain, starting with research and development actors and manufacturers of space hardware (eg. launch vehicles, satellites, ground stations) and ending with space-enabled products (eg. Navigation equipment, satellite phones) and services (satellite-based meteorological services or direct-to-home video services) to final users.
- Space economy goes well beyond the space sector due to pervasive impact of space-derived products, knowledge and services on economy and society

Panel I: “The State of the Space Economy”

Key Points

Henry Hertzfeld

- Don't know the real size of the global space economy
- Space has become an “economic utility”
- Enabler of all forms of economic activity (security – defense, homeland, environmental), (services – telecommunications, direct-to-home TV/radio, GPS, weather forecasting, emergency response)
- Space-based infrastructure transparent to the end-user thus full extent of end uses are not well appreciated or reported
- Like land-based utilities, significant economic consequences result if infrastructure is lost or interrupted



- 1960 - \$6 billion space economy comprised of U.S. government only
- 1990 - \$50 billion space economy, 10% commercial
- 2008 - \$250 billion space economy, commercial space revenues now surpassing government spending

Panel I: “The State of the Space Economy”

Key Points

Marty Hauser

- Space Foundation’s Space Report 2008 (Space Report 2009 subsequently released), annual report on economic data related to space enterprise
- Global space activity grew to \$251.16 billion in total revenues in 2007 (\$257.22 billion in 2008)
- Commercial space revenues grew to 69% of space economy revenue, while global government budgets (civil and military) made up just 31%
- Revenues measured did not account for secondary economic benefits
- Wages for space industry jobs are more than double the national average for the private sector and continue to rise



Panel II: “The Economic Benefits of the Emerging Space Infrastructure”

- Moderator: Robert Hopkins, Sr. Vice President and Managing Director, Phillips & Company
- Steven Boutelle, CEO, Cisco IRIS
- Robert Richards, Founder and CEO, Odyssey Moon
- Conrad C. Lautenbacher, Vice President, Polar Programs, Computer Sciences Corporation
- Larry Williams, Vice President of Strategic Relationships, SpaceX

Hopkins – “Will we see a form of Moore’s Law applied to space? What technologies should the U.S. government invest in over the next ten years to stimulate the Space Economy in the future?”

Consensus:

- Improvements in avionics and manufacturing contribute to increased reliability critical to launch industry growth
- Growth in internet applications driving exponential growth in space-based technologies (modems, receivers, Ka band spectrum)
- Government investment continues to play a vital role in development of new environmental and technological applications and services that commercial enterprises can build upon
- Support commercial development through investment in R&D, tax incentives, partnerships
- Get out of the way when private sector can be more efficient and provide greater value



Key Points

Steven Boutelle

- IP traffic is growing at an exponential rate
- Interactive video communication will be the predominant mode of traffic by 2015
- Satellites offer the capability to provide a hundred-fold increase in broadband capacity with the adoption of ka-band spot beams
- Demand will increase for satellites with onboard routing to meet requirement for on-demand and interactive video

Robert Richards

- “Moon 2.0” second era of lunar exploration that should feature inspiring, innovative business models for sustainable economic activity on the Moon
- Lunar mission to extend Earth’s economic sphere and provide ongoing lunar mission products and services
- Partnering with NASA to deliver low-cost reliable access to the lunar surface

Key Points

Conrad C. Lautenbacher

- Economic and national security benefits from space systems not well understood
- Total U.S. GDP in 2007 was \$13.8 trillion, of which \$12.1 trillion resulted from private sector activity
- Virtually all subcategories of private sector activity (e.g., agriculture, mining, utilities, transportation, information, education, entertainment, etc.), over 87% of GDP, depend on access to and use of space systems
- Government investment is still needed for R&D, but commercial success relies on the private sector
- Government investment now yielding commercial benefits in Earth observations, imaging and weather services
- Greater public understanding of the benefits of space is critical to continued government funding and investment

Larry Williams

- Unique vantage point of space improves “terrestrial” applications (e.g., Earth observations, satellite communications)
- Enables new space-based services not fully realized yet (e.g., space tourism)
- High cost is holding back growth in the space economy
- U.S. is leader in space, but is not competitive in the world launch market
- Developing a low-cost, high-reliability launch solution will open up commercial applications and strengthen U.S. position in launch market

- The Space Economy, already vast and essential to economic growth, is still nascent, and not well understood
- Space has become an “economic utility” upon which our security – defense, homeland, environmental – and a wide range of essential services now depend
- A “hybrid economy” of government and commercial investment is critical to the continuing development of space infrastructure and applications that drive new products and services and contribute to overall economic growth
- Commercial interests have reached a “tipping point” in development and investment that can potentially lead to a surge in capabilities (e.g., launch services, climate observations, wireless communications, GPS, biotech R&D, clean energy technologies, etc.)
- But commercial interests alone cannot sustain the current development pace
- Government’s unique role must be to continue to invest in new capabilities and infrastructure that will serve as the foundation for future commercial investment.
- Only then will the full potential of the Space Economy be realized.



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