

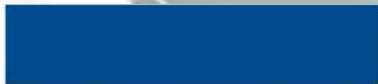


# The FUTURE OF AEROSPACE

## Current Trends and Implications

**Frank DiBello**  
*President & CEO*

**2017 Engineering Deans Institute**  
**April 4, 2017**



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# Aerospace Industry ... .. Status / Trends



- **Modest Defense Force Build-up**
  - Leveling in Commercial Aviation Marketplace, except China
- **Modest Defense Budget Increase ... 3-5%**
  - Sequestration Provisions under - 2011 Budget Control Act likely modified
- **Continued Industry Consolidation / Space M&A Activity**
- **Continued Transitioning of Defense Technologies**
  - Some New Program Starts ... .. Upgrade and Replenishment of Forces
  - Increased emphasis on adaption of commercially developed technologies
  - Space Systems to play an increasingly important role ... Next-Gen Warfare



# Next-Gen Technologies ... Key Trends/Implications



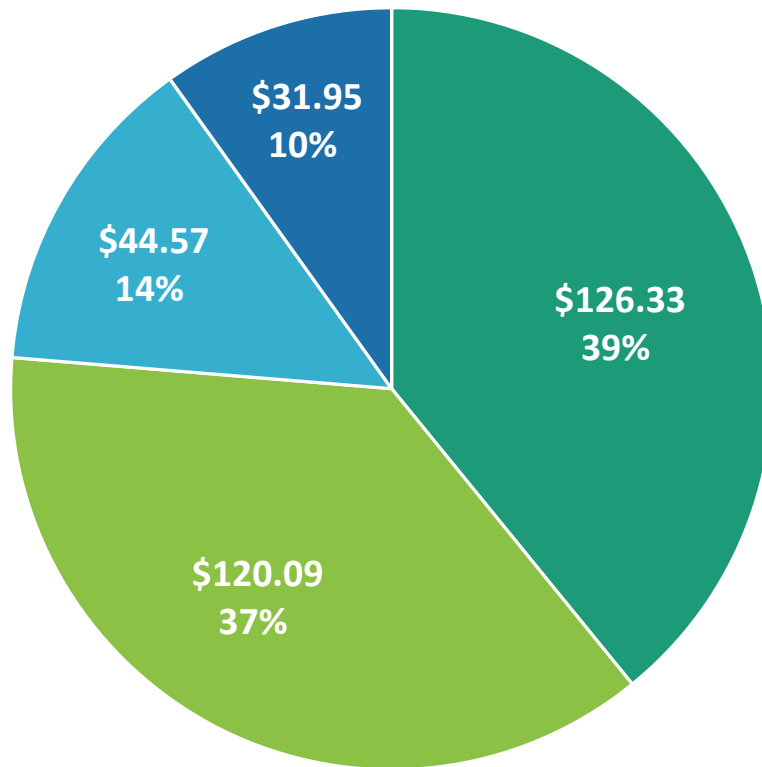
- **Increased Pace of New Technology Adaption in Systems**
  - Swarms in Networked Platforms, Hypersonics, Highly Cyber-Secure Systems, Advanced Sensors in Heuristic Software, GPS-free Precision Systems, Increasingly Autonomous Robotics, Electronic/Beam Weapon Systems, Laser Communications
- **Revolutionized Manufacturing Processes/Facilities**
  - New materials/Composites, 3-D Design/Rapid Prototyping/ 3-D Printing-Manufacturing, Nano-materials with Integrated Sensors, Highly Robotic Assembly and Integrated Test, Fully Integrated Software in Design through Shop Floor



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# 2016 Global Space Economy



- In 2016, the Global Space Economy was estimated to be approximately \$330 Billion!
- Commercial space activities made up 76% of the Global Space Economy.

- Commercial Space Products & Services
- Commercial Infrastructure & Support Industries
- U.S. Government Space Budgets
- Non-U.S. Government Budgets

Source: The Space Report 2016



# Space Industry Drivers / Trends



- **Video/Data ... .. Driving Demand for Bandwidth**
- **Global Interconnectivity ... Driving New Systems**
  - New Satellite Constellations ... .. Nanosats / CubeSat's / Micros
  - New Earth Imaging / Laser-Com / LEO On-orbit Services
- **Robotics → Learning Machines → Autonomy**
- **New Value-Add Service / Product Companies**
- **Major Impact on launch Demand / New Entrants**



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# Private Sector Competition is driving space technology development



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# Future Civil / Commercial Space Activity



**Leveraging of State, Federal & Private Sector Capabilities**  
**Rocket and Spacecraft Reusability - Gamechangers**

**Commercial Industry ... Poised to Significantly Expand:**  
**Sub-Orbital / Low-Earth Orbital Space Commerce**  
**Deeper Space Exploitation / Exploration (SLS/Orion)**  
**Increased Importance / Use of Space in Warfare**



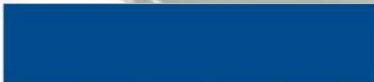


# Thank you!

*Questions*

Frank DiBello

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