Evolutionary and Revolutionary Innovation at Lockheed Martin

2017 MIT R&D Conference

November 15, 2017
Technology Landscape & Trends

Technology Environment

• Post-Vannevar Bush R&D Model
• Commercial and Venture Capital Investment
• Global Diffusion of Technology
• Exponential Speeds
• Global Talent Wars

Technology Megatrends

Ubiquitous Data & Connectivity
Control of Matter at Atomic Level
Kinetic to Electromagnetic Shift
Moving beyond Moore’s Law
Acceleration of AI, Autonomy, Robotics
Convergence of Biology and IT
DoD’s Traditional Innovation Platform

S&T Lives Here!
“5th Generation” Innovation Ecosystem

Adapted from Signposts of Innovation, The Conference Board, 2017
LM’s Global Innovation Ecosystem

Innovation Does Not Happen in Isolation

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Into the Depths of Space
From Deep Space to ..... Urban Mobility?

Need exists for rapid transportation in global megacities
Why Urban Mobility Could Happen

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<td>15 KW</td>
<td>5 KW</td>
<td>200W</td>
<td>2X Cores</td>
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<td>900 lbs</td>
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<td>$1M</td>
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Advances in computing allowing Sikorsky to develop man-rated, certifiable, platform-agnostic MATRIX™ Autonomy systems that would be critical for urban mobility applications.
AI in Aerospace & Defense

TRUSTED  INTELLIGENT  SECURE

AUTONOMY
Advanced Manufacturing

Additive Manufacturing
Advanced Materials
Digital Manufacturing
Next Generation Electronics

Accelerating Manufacturing Innovation From the Laboratory to Production
Strategic Sustainability Priorities

- **Product Impact**: Innovating energy, security and telecommunications infrastructures
- **Business Integrity**: Advancing ethical conduct
- **Employee Wellbeing**: Fostering a high-performance, inclusive workplace
- **Information Security**: Securing data for our operations and our customers
- **Resource Efficiency**: Optimizing our energy, water and material usage

Sustainability Prioritizes Business Longevity and Stakeholder Needs
R&D as a Share of GDP by Funder

Source: National Science Foundation, *National Patterns of R&D Resources series*. © 2015 AAAS
Trends in Federal R&D
As a percent of GDP

Source: AAAS analyses of historical budget and agency data and the FY 2017 request. GDP figures from OMB. R&D includes conducting and facilities. © AAAS

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University R&D Funding by Source

expenditures in billions, FY 2017 dollars


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Citation of U.S. S&E Articles in U.S. Patents

Key Takeaways

• Global, hyper-turbulent, exponential tech landscape
• No shortage of amazing, hard problems to solve
• Importance of new non-linear innovation platforms
• Critical role of university/industry relations