Evolutionary and Revolutionary Innovation at Lockheed Martin

2017 MIT R&D Conference

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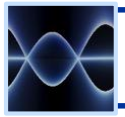
Technology Landscape & Trends

Technology Environment

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

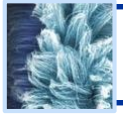
Technology Megatrends

Ubiquitous Data & Connectivity



Kinetic to Electromagnetic Shift

Acceleration of AI, Autonomy, Robotics



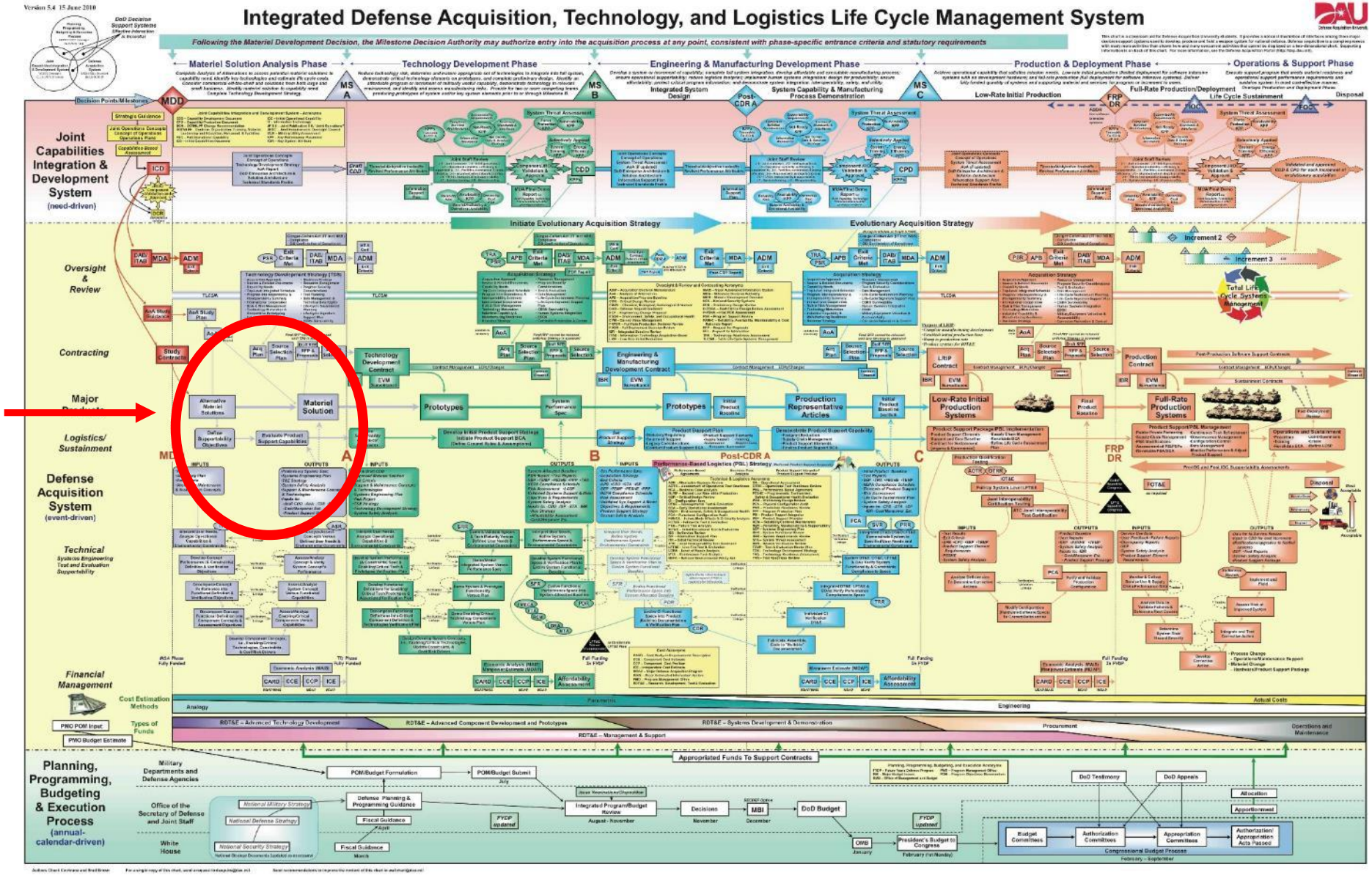
Control of Matter at Atomic Level

Moving beyond Moore's Law

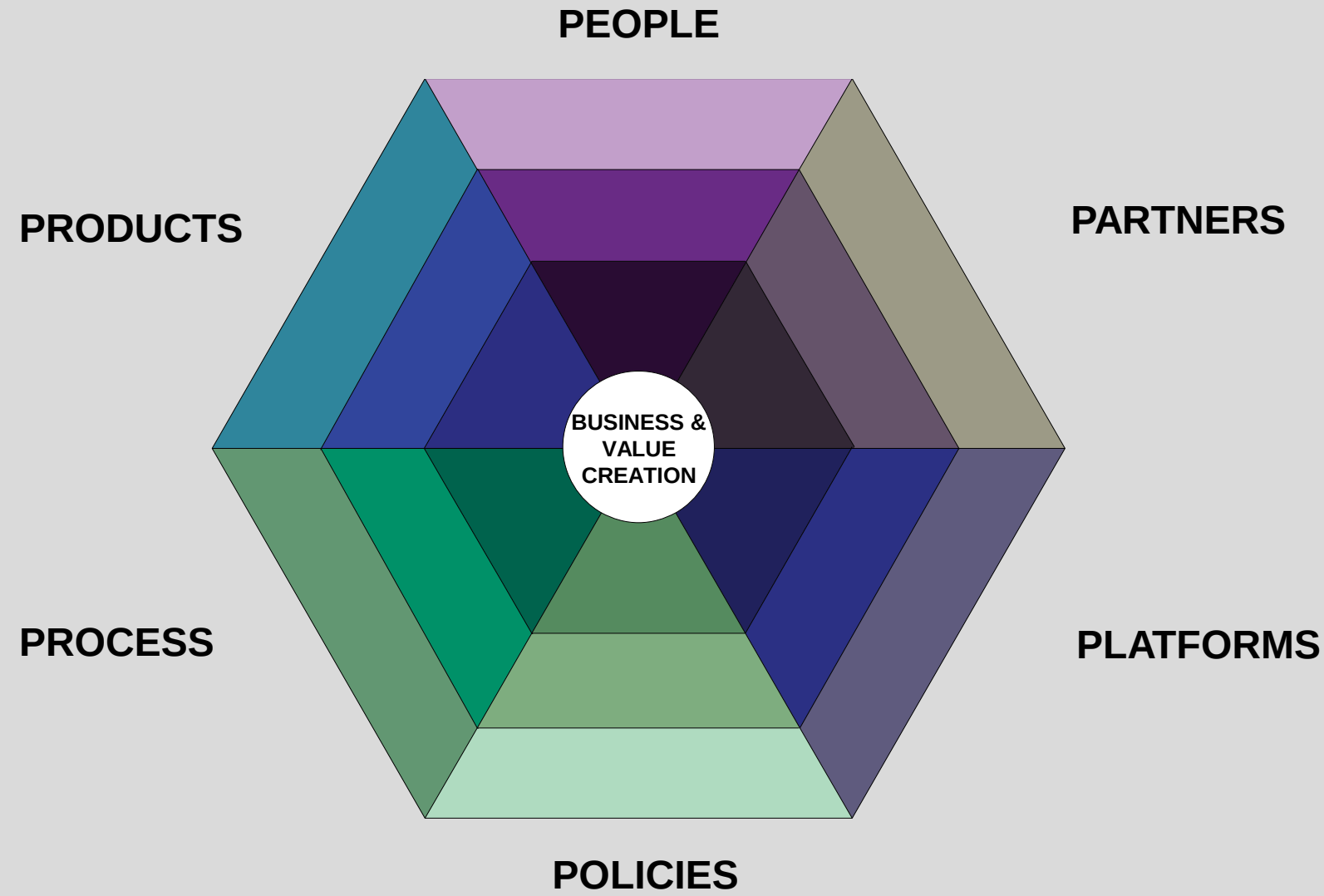
Convergence of Biology and IT

DoD's Traditional Innovation Platform

S&T Lives Here!

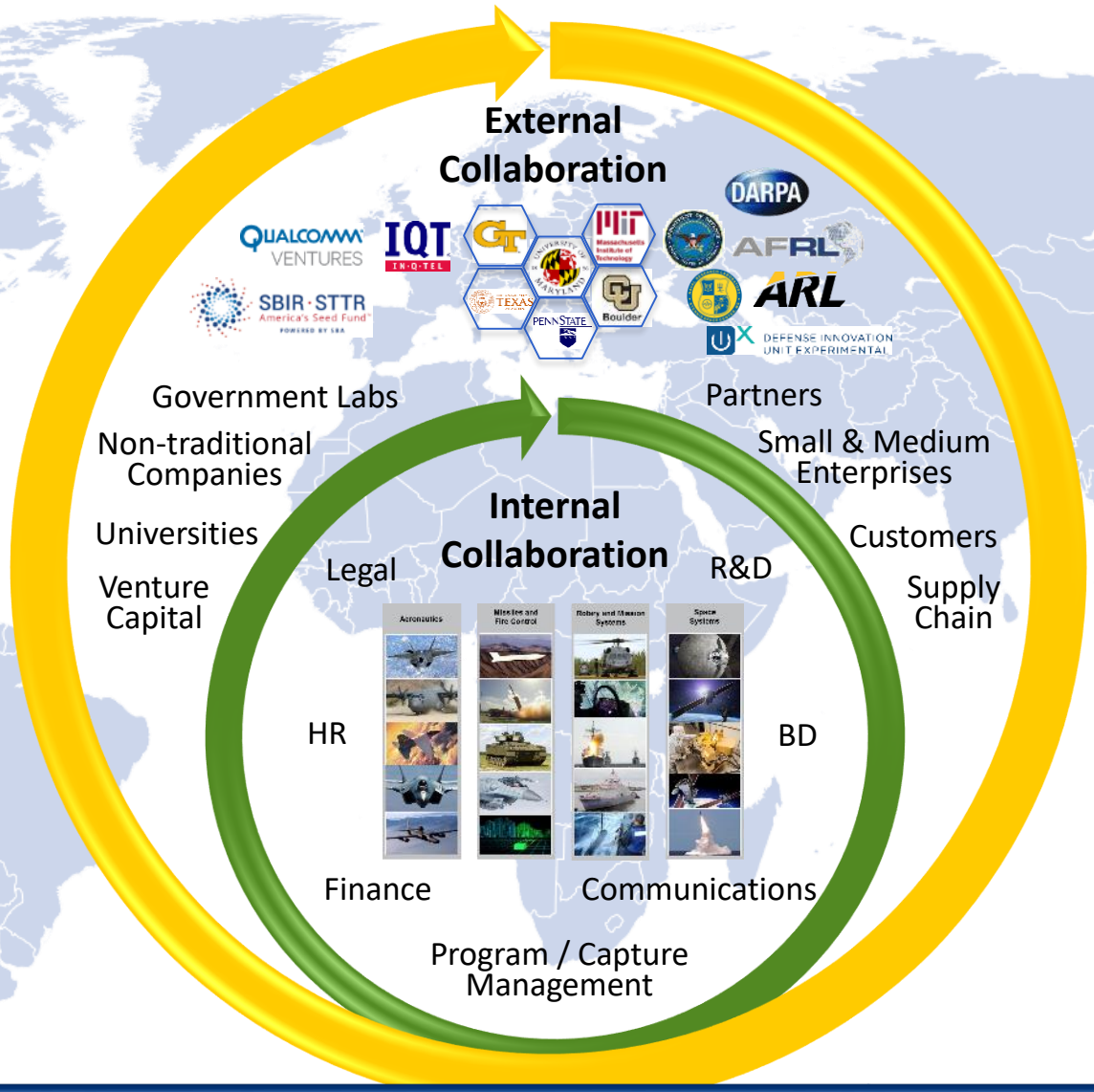


“5th Generation” Innovation Ecosystem



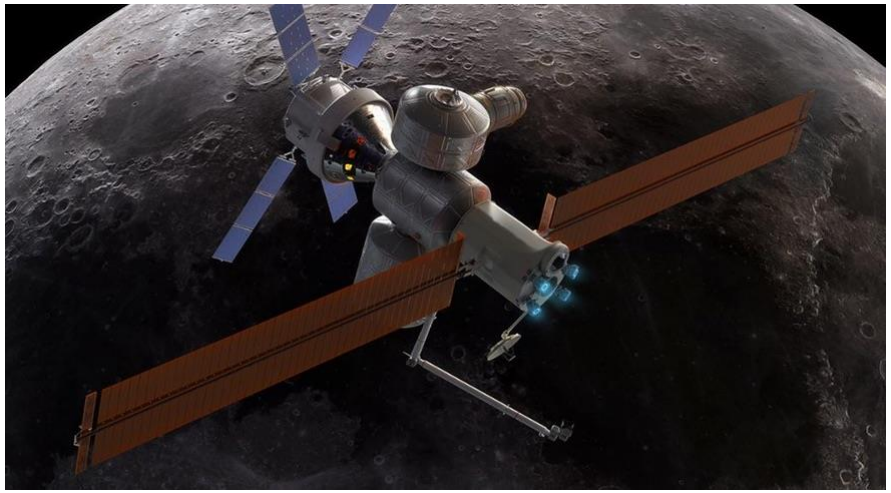
Adapted from *Signposts of Innovation*, The Conference Board, 2017

LM's Global Innovation Ecosystem



Innovation Does Not Happen in Isolation

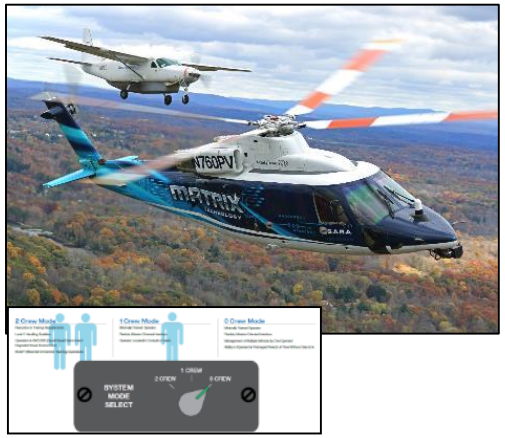
Into the Depths of Space

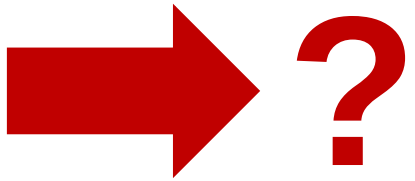


From Deep Space to ….. Urban Mobility?

Need exists for rapid transportation in global megacities

Why Urban Mobility Could Happen

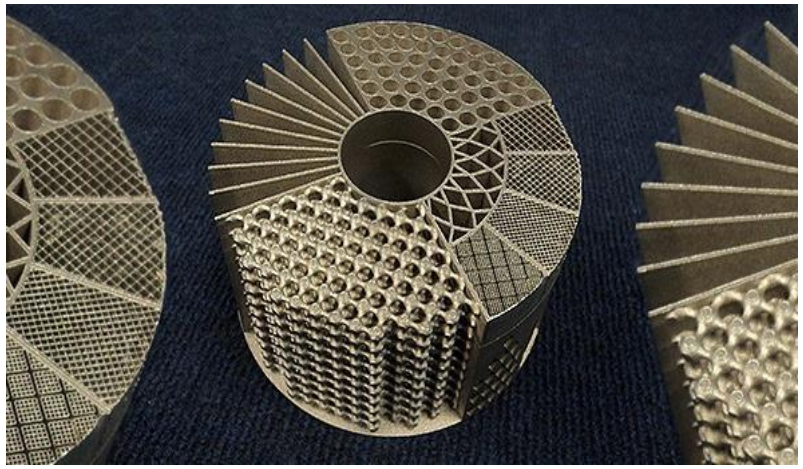
Year 2000	2005	2013	2016
			 
15 KW 900 lbs $1M	5 KW 300 lbs $400K	200W 30 lbs $60K	2X Cores



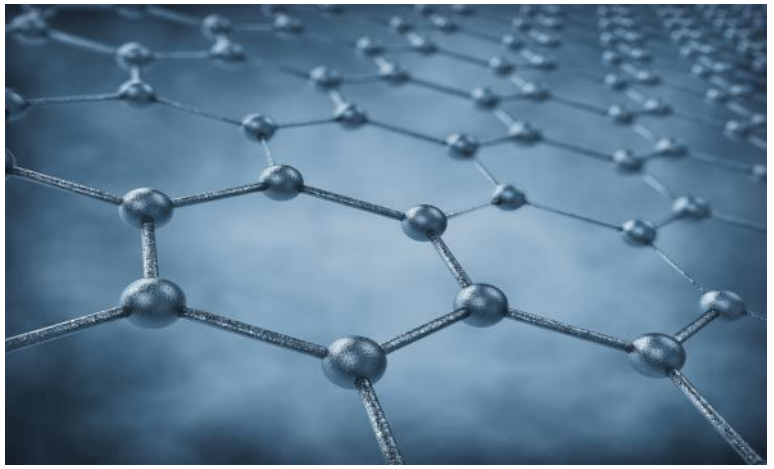
Advances in computing allowing Sikorsky to develop man-rated, certifiable, platform-agnostic MATRIX™ Autonomy systems that would be critical for urban mobility applications

AI in Aerospace & Defense

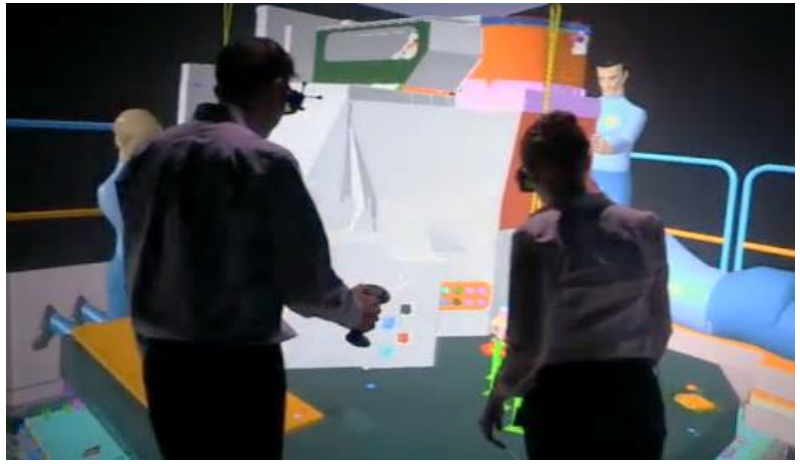
Advanced Manufacturing



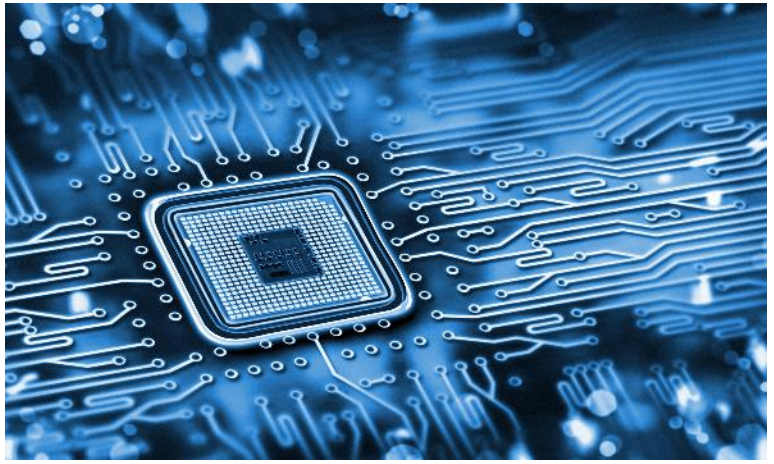
Additive Manufacturing



Advanced Materials



Digital Manufacturing



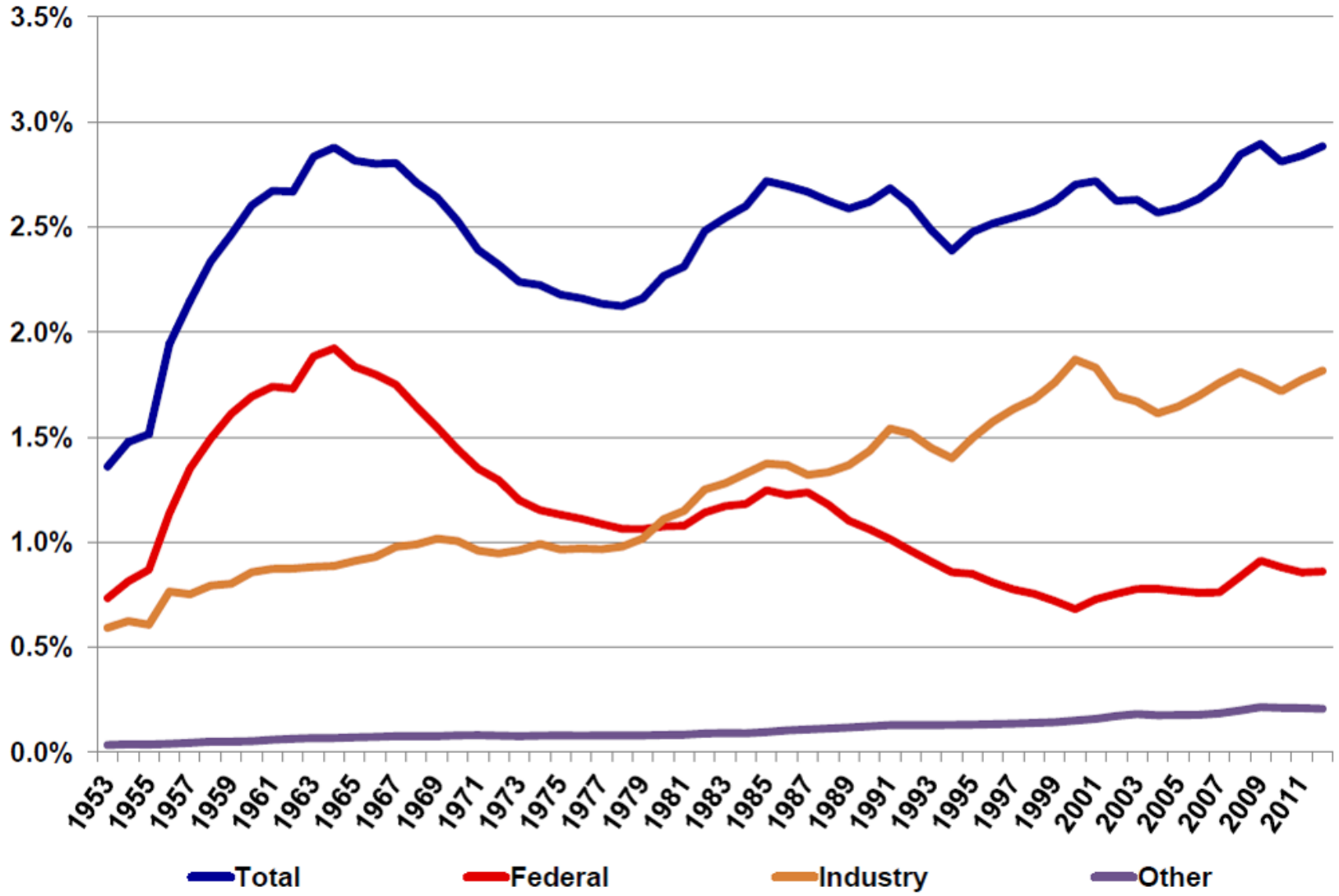
Next Generation Electronics

Accelerating Manufacturing Innovation From the Laboratory to Production

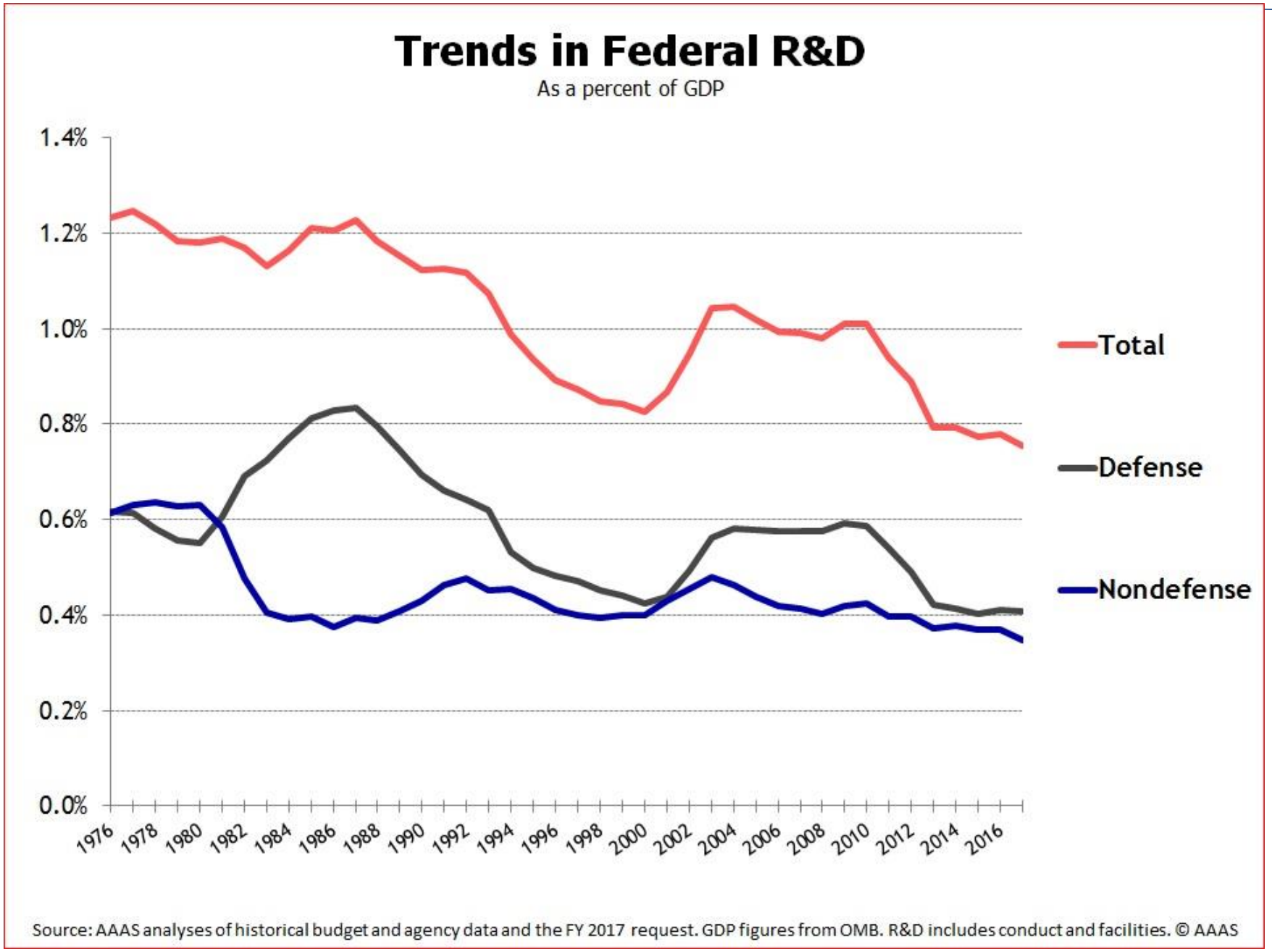
Strategic Sustainability Priorities

Sustainability Prioritizes Business Longevity and Stakeholder Needs

R&D as a Share of GDP by Funder

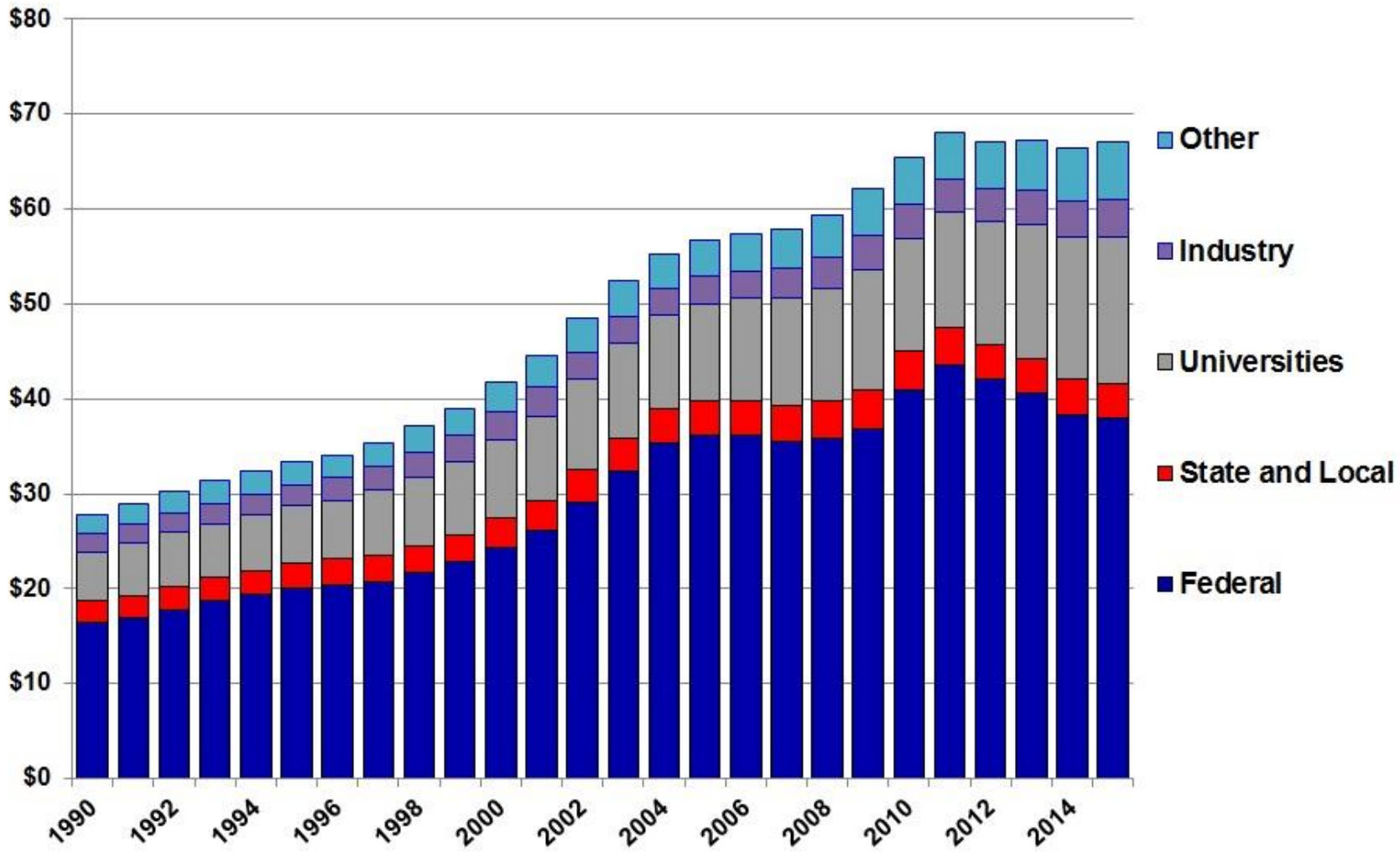


Source: National Science Foundation, *National Patterns of R&D Resources* series. © 2015 AAAS



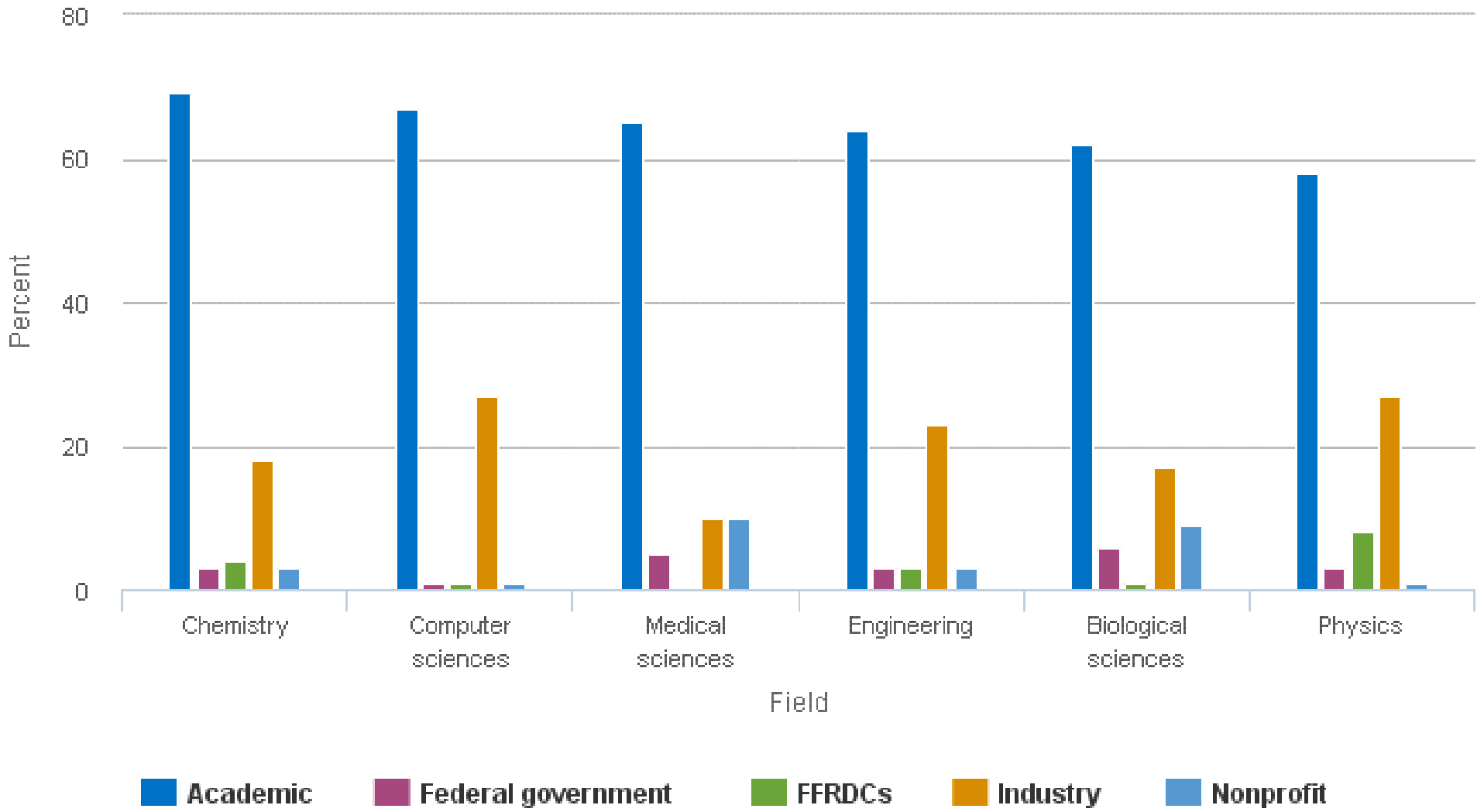
University R&D Funding by Source

expenditures in billions, FY 2017 dollars



Source: NSF, National Center for Science and Engineering Statistics, *Higher Education R&D* series, based on national survey data. Includes Recovery Act funding. © 2017 AAAS

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



Sources: NSF, National Center for Science and Engineering Statistics; SRI International; Science-Metrix; LexisNexis and U.S. Patent and Trademark Office patent data; Elsevier, Scopus abstract and citation database (www.scopus.com). See appendix table 5-65. *Science and Engineering Indicators 2016*

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