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Guiding Principles to Optimize DoD's Science and Technology Investments

Task Group Update

October 23, 2014

Overview

Impetus for Study

The Department of Defense (DoD) spends about \$12 billion annually on Science and Technology (S&T). This funding is essential for building the knowledge and technology base for future DoD capabilities and is the source for critical "leap-ahead" technologies that advance DoD's warfighting capabilities. DoD's S&T budget is projected to decrease commensurate with overall defense budget reductions. The downward trend compels DoD to seek ways to leverage S&T investments made by the larger economy. The private sector invests many times as much in R&D as DoD and in many areas has clearly superior technology.

Deliverables

Recommendations on how DoD can learn from commercial best practices to better manage S&T funds and how to attract technology companies to support DoD's emerging capabilities needs.

Task Group

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Our Tasking

- **The Terms of Reference direct the study to address:**
 - DoD is increasingly relying on commercial technology. How should it ensure its areas of critical technology are not ignored, but supported?
 - How are R&D decisions made across the following types of organizations?:
 - Global 500 corporations;
 - Venture capital and private equity firms; and
 - Technology startups
 - How can DoD learn from R&D investment best practices of commercial and non-profit organizations to better direct and leverage research funds to benefit the defense mission?
 - How can DoD find and exploit commercial technology in the many areas where it is clearly superior to DoD's in-house technology?
 - How can DoD effectively attract fledgling technology development companies that have cutting edge capabilities?

- **The Task Group views this as an opportune time to shift focus from “conducting science” to “strategic management of science”**



Progress

- Reviewed current/past DoD strategic and financial documents and reports/studies from think tanks and government agencies
- Evaluated efforts in private/public sectors and DoD experience to identify practices that resulted in both success and failure
- Conducted interviews with individuals from the private sector and government, including:
 - Current and former CEOs and Chief Technology Officers (CTOs) of Fortune 500 companies with experience in leading successful technology development
 - Current and former DoD leadership in Research, Development, Test, and Evaluation (RDT&E)
 - Other Departmental leaders past and present



Initial Assessment

- I. Commercial S&T Best Practices differ markedly from those of DoD
 - A. Commercial S&T priorities and investments are strategy driven
 - Flow from the broader corporate business strategy
 - Senior leadership is deeply involved in all major decisions related to the S&T strategy and priorities
 - B. Companies seek to control Intellectual Property (IP) critical to executing their S&T strategy and business plans
 - When the internal R&D staff lacks needed expertise, companies partner with companies that have the expertise, but maintain control over their IP
 - Small companies are often acquired to deliver needed technology and expertise
 - C. Some Non-Profits (e.g., Gates Foundation) “Crowdsource” for technology solutions
 - Now being emulated by UK Ministry of Defense and the commercial sector
 - Attract widely different ideas and proposals from many sources
 - Commercial sites, such as “Innovation Posting,” are expanding rapidly to enable “Crowdsourcing”



Initial Assessment cont'd

II. DoD faces a number of R&D challenges

- A. Work force is aging and skills are stove-piped
 - Little movement (experience) across labs and departments
 - But recent programs are attracting capable young technologists

- B. The lab structure is large, complex and uncoordinated
 - 67+ labs across 22 states and 39,000+ scientists and engineers conducting ~\$30B in work each year
 - Few are proximate to commercial technology hubs
 - Each Service has a different model
 - Lead lab for each Service (e.g., Naval Research Lab)
 - Multiple engineering labs, usually weapon/system focused
 - No overall management at the Office of the Secretary of Defense (OSD) level

- C. There is no clear S&T strategy or set of priorities at OSD or Military Department levels

- D. Independent Research and Development (IRAD) spending (\$4.5B) is not managed by the department or coordinated with key technology needs



Initial Assessment cont'd

III. DoD processes also are sub-optimized

- A. S&T spending (6-1) is uncoupled from Services' needs
 - Seen as DoD's contribution to university science and education of scientists
 - Close coupling may not be feasible

- B. Difficult to strategically source key technology from private sector
 - Limited visibility beyond DoD industrial base
 - Many private sector companies refuse to deal with DoD (e.g., robotics) due to government regulations and I.P. concerns
 - Where agility/speed are needed, acquisition process is slow and complex

Initial Findings – DoD “As Is”

- I. Lacks a departmental strategy-driven S&T process to set priorities and allocate funds
 - A. DoD has actionable priorities in only a few key areas (e.g. Cyber and Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance)
 - B. Service strategies often disconnected from their critical capabilities needs
 - C. OSD/JS do not manage service strategy-driven priorities or resource allocations that could provide unity of action

- II. Frequently fails to exploit commercial technology which is more advanced in most areas critical to military capabilities
 - A. Commercial S&T spending is a multiple of DoD spending
 - B. Potential adversaries have easy access to most commercial technology and are often agile and able to move quickly to exploit it
 - C. Defense industry does lacks in-depth access to DoD key requirements which would enable them to focus their S&T and IRAD spending

Initial Findings – DoD “As Is”

- III. R&D establishment often reproduces technology available in the private sector
 - A. Little attention or outreach to private sector technology critical to DoD future capabilities
 - B. DoD S&T does not focus on a limited set of military unique technologies, but a wider range where the private sector could be the source

- IV. Internal processes are a barrier to the exploitation of commercial technology
 - A. Slow, complex acquisition process out of phase with rapid technology change
 - B. Onerous requirements such as cost accounting standards and audits are a major deterrent
 - C. Companies are also deterred by International Trade in Arms Regulations (ITAR) and IP rules



Next Steps

- Conduct remaining interviews with current and former DoD senior leaders and private sector executives
- Test key findings with DoD and private sector leaders with responsibility for R&D in significant organizations
- Identify recommendations that can address relevant findings
- Plan to present final recommendations at the DBB quarterly meeting scheduled for January 22, 2015

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Questions?

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