Independent Research and Development (IR&D): The Challenges Continue*

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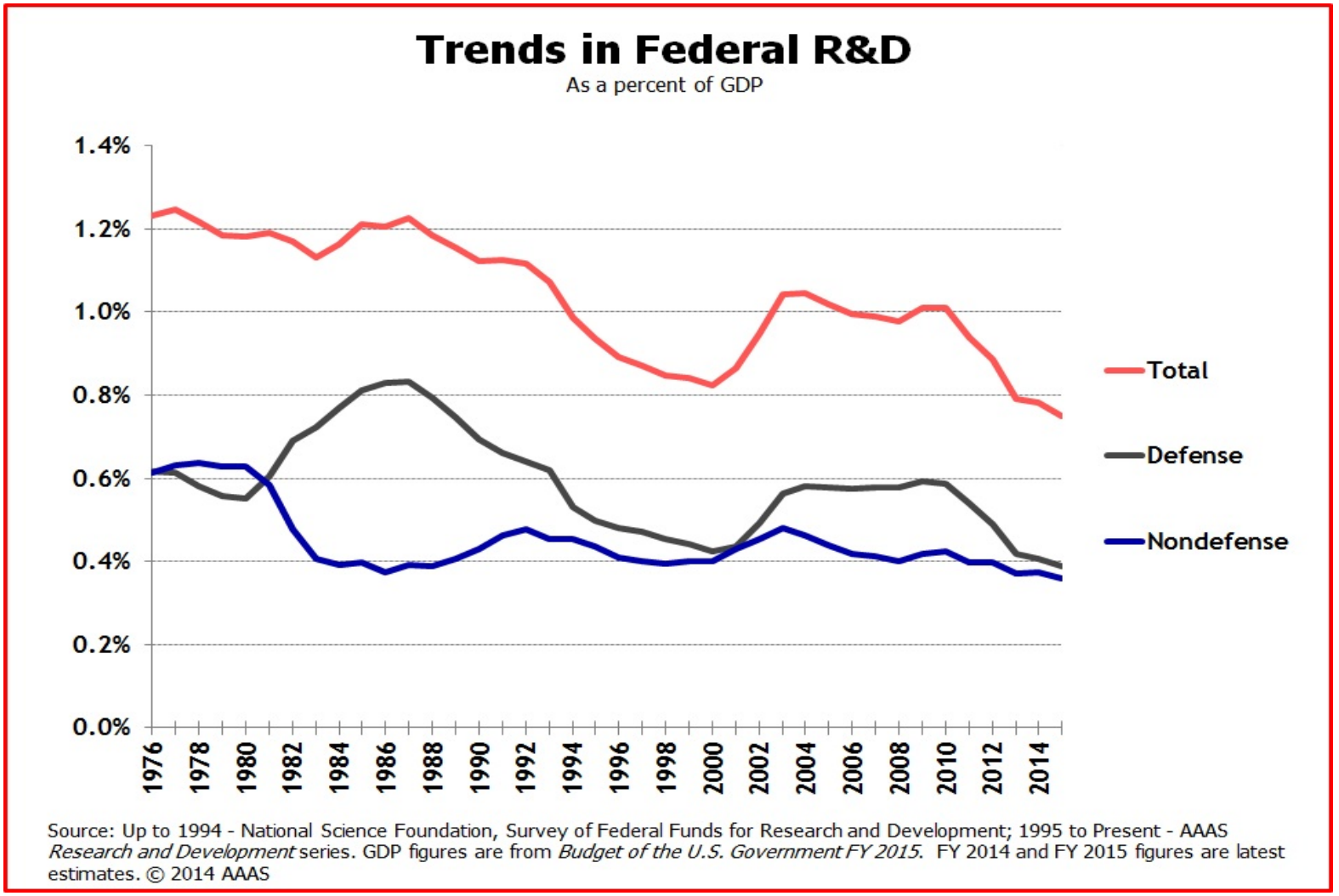
Continued Need for Technical Innovation

- A rapidly-changing world—in technology, geopolitics, and security
  - Weapon and information technology systems are more complex and sophisticated
  - Global and U.S. commercial industry are playing an increasingly important role in innovation and development, and DoD is becoming less influential
  - Unstable/insecure global environment
- Adversaries are beginning to catch up to the U.S.' capabilities, threatening the United States' military and technological superiority
- Constrained and uncertain budgets, require better decision making
- Technological superiority is a cornerstone of the nation's security strategy and defense policy
- Challenges:
  1. Investments in R&D are declining
  2. Incremental technology advancements are often more profitable than paradigmatic shifts
  3. Information needed for technological breakthroughs is not generally profitable

Independent Research and Development (IR&D) is a key source of technology innovation for DoD.

Trends in Federal R&D as a % of GDP



Background

- IR&D is different than directly funded R&D
  - It is an effort to incentivize technology-based firms to invest in R&D to ensure their capability to produce new products and processes
  - The contractor decides how to invest it
  - It is not sponsored, or required, in the performance of a contract or grant, but it is ultimately recovered through the contractor's overhead rates
  - The process was an effort to try to replicate the commercial markets ability to recover their R&D costs in the price of their products
- IR&D Projects fall into 4 categories:
  - Basic Research, Applied Research, Development, Systems and other concept formulation studies
- IR&D costs are applicable to cost reimbursement contracts as an allowable indirect cost--and along with Bid & Proposal costs

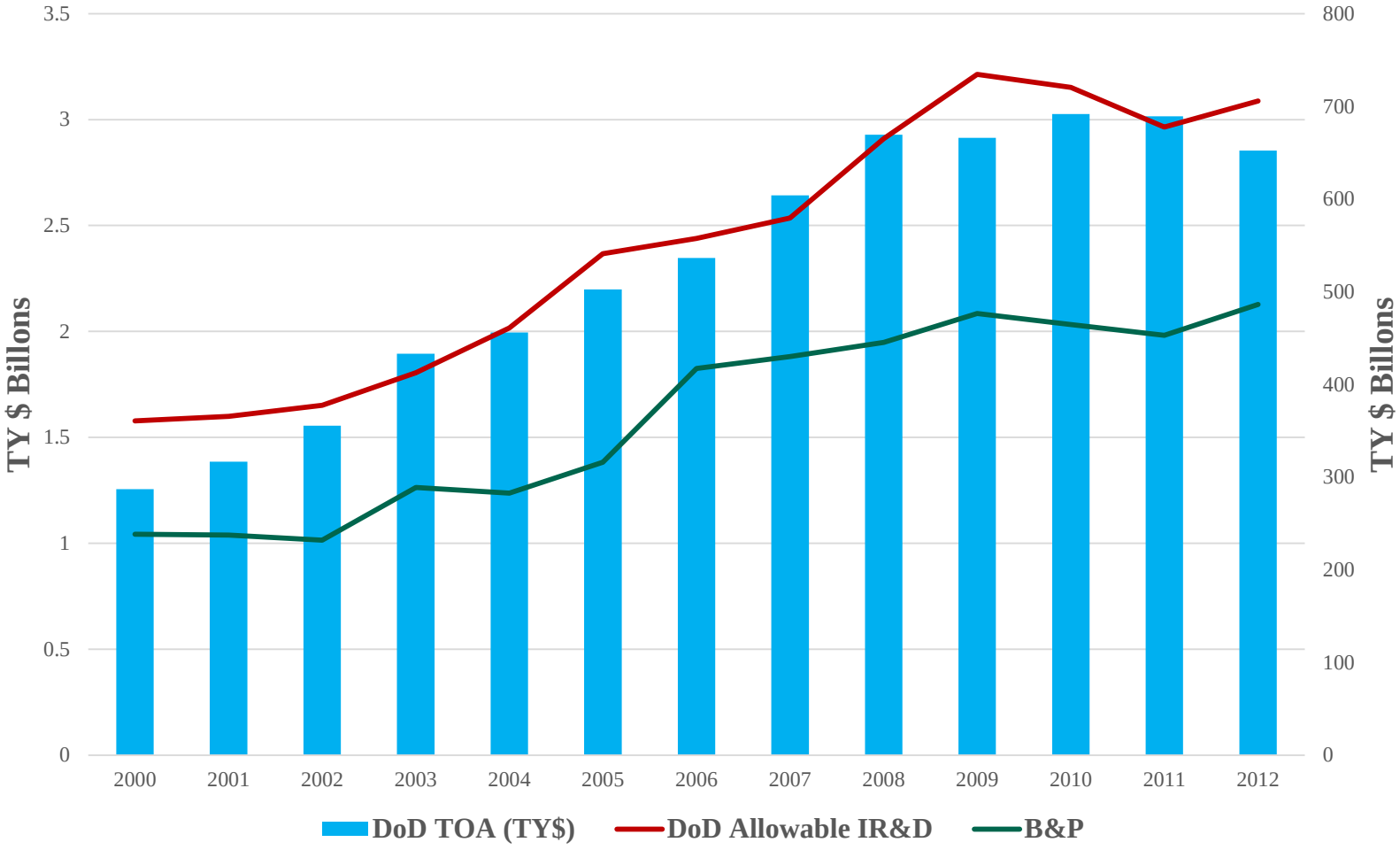
Defense Federal Acquisition Regulation Supplement (DFARS)

- **DFARS 231.205-18**
  - Defines "**Covered Contract**" -- a DoD prime contract for an amount exceeding the simplified acquisition threshold, except for a fixed-price contract without cost incentives (includes sub contracts under these contracts).
  - Defines projects of interests as projects that:
    - "**Enable superior performance** of U.S. weapon systems and components"
    - "**Reduce acquisition costs and life-cycle costs** of military systems"
    - "**Strengthen the defense industrial and technology base**"
    - "**Enhance the industrial competiveness** of the U.S."
    - "**Promote the development of technologies identified as critical** under 10 U.S.C. 2522
    - "**Increase the development and promotion of efficient and effective applications of dual-use technologies**"
  - For a contractor's IR&D costs to be allowable, the IR&D projects generating the costs must be reported to the Defense Technical Information Center (DTIC)
- **DFARS 242.771**
  - Encourages contractors to engage in IR&D/B&P activities, and outlines ACO responsibilities

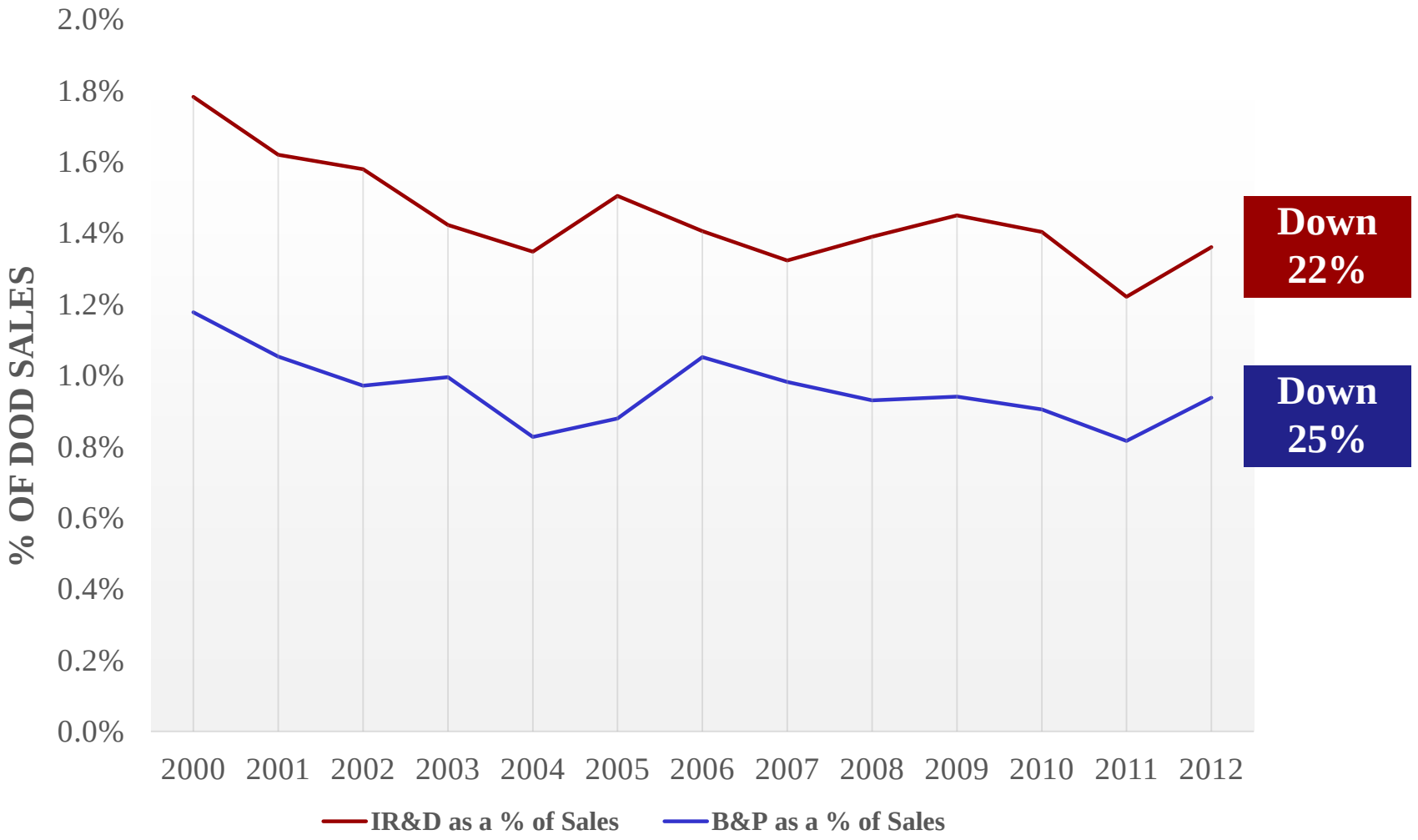
IR&D Program

- DoD's IR&D program encourages firms to pursue innovative technological solutions to the most challenging operational problems, both for near-term missions, and to prepare a vibrant tech base for an uncertain future.
- DoD reimburses approximately 1,200 firms in the industrial base for IR&D efforts
  - DoD reimburses the defense industry between $3 and $4 billion a year for IR&D costs
  - Over half of the funding goes to major prime contractors
  - The IR&D funding helps to ensure a healthy talent base in the industry and helps to maintain design team skills
- Example: ITT Defense (expertise in RF countermeasures) used IR&D funds to develop an innovative laser seeker/tracker unit for the Army's Common Infrared Countermeasure Systems competition.
  - Though they ultimately lost the competition to Northrop Grumman and Bae Systems, ITT would not have been a viable competitor without IR&D funds
  - Promoted competition and innovation among the competitors

IR&D and B&P Spending



IR&D and B&P as a % of DoD Sales



Top 20 International Corporate R&D Budgets (2010)

Rank	Company	2010 $ US Dollars	As a Percent of Sales
1	Roche Holding	$9,646	21.1
2	Pfizer	$9,413	13.9
3	Novartis	$9,070	17.9
4	Microsoft	$8,714	14.0
5	Merck	$8,591	18.7
6	Toyota	$8,546	3.9
7	Samsung	$7,873	5.9
8	Nokia	$7,778	13.8
9	General Motors	$6,962	5.1
10	Johnson & Johnson	$6,844	13.8

Rank	Company	2010 $ US Dollars	As a Percent of Sales
11	Intel	$6,576	5.1
12	Panasonic	$6,176	13.9
13	GlaxoSmithKline	$6,127	17.9
14	Volkswagen	$6,089	14.0
15	IBM	$6,026	18.7
16	Sanofi-Aventis	$5,838	3.9
17	Honda	$5,704	5.9
18	AstraZeneca	$5,318	13.8
19	Cisco Systems	$5,273	5.1
20	Siemens	$5,217	13.8

Source: Jaruzelski, Barry, et al., 2011. The Global Innovation 1000: Why Culture Is Key, Strategy and Business, October 25, 2011

Challenge: Communication Between the Government and Contractors

- Contractors need a clear line of communication with DoD, but they have a strong motivation to maintain the secrecy of their innovations (both to protect their IP, and for future competitive advantages)
- With the Better Buying Power Initiative, USD (AT&L) engaged DoD's largest IR&D performers, as well with DoD personnel, to learn how they leveraged IR&D in acquisition program planning.
- **The key challenge identified was communication**
  - Industry wanted information about DoD investment priorities
  - DoD planning had limited insight into IR&D projects
- DoD issued a final rule requiring contractors to submit IR&D project data through a secure website, in order to receive reimbursement
- Defense Technical Information Center (DTIC) established a web portal to increase communication and transparency between DoD and contractors

The Defense Innovation Marketplace (DIM)

However, contractors fear that it could put proprietary data at risk, and some firms would rather stop using government funded IR&D than expose proprietary data by using DIM

Challenge: Intellectual Property/Technical Data Rights

- IR&D are considered private expenses--allowing companies to keep the rights to their data.
- However, the law (which is constantly evolving) is not always clear on the data rights of companies and government-sponsored research.
  - For example, the FY 2011 NDAA caused confusion—stating IR&D and B&P should be treated as government funds
- IP rights from IR&D-sponsored innovations are protected for commercial application of technology, commercial rights to a technology can be blocked by DoD at any time for national security reasons.
- Furthermore, with fewer new business opportunities, the defense industry is highly competitive, leading contractors to be extremely protective of their intellectually property.
  - As a result, companies may resist sharing data with DoD.
- They also resist putting sensitive information in writing – and in some cases – resist seeking patent protection for their products.

Limited Rights

- May be reproduced or used by the USG
- May not be disclosed outside the USG or used for manufacture
- DFARS Exceptions (DFARS 252.227-7013(a)(14))
  - Emergency repair
  - To USG support contractor
  - To a foreign government if in the interest of the U.S.
  - Subject to certain restrictions and contractor notification
- Recent Change
  - Authorizes release/disclosure if necessary for the segregation from, or reintegration of the item or process (or equivalent) with other items or processes

Challenge: Budget Uncertainty

- Firms are reluctant to make investments for future DoD requirements, because of uncertainty in the forecasts of future requirements
  - DoD's current focus is divided among various strategies and technologies, making it difficult decide where to focus
  - The apparent lack of clear strategy, when it comes to the need for new technologies, adds to the risk for private sector contractors
- Declining budgets and the threat of sequestration has led some firms to reconsider their investments in military technology
  - The budget will limit the development and production of new systems
  - There is a fear that funding will be cut before the firm is able to commercialize the new technology

Challenge: IR&D and B&P Combined in the Same Cost Pool

- Bid and Proposal costs are combined with Independent Research and Development costs, resulting in a category of "B&P/IR&D" costs.
- This categorization makes sense on some level, as companies may budget for both costs through the same internal business development mechanism.
- Some believe rising B&P costs have a negative impact on IR&D investments.
  - Shrinking budgets, increased competition, along with recent trends (such as the greater use of ID/IQ contracts) increase B&P costs per unit of business.
- Although not reflected in the available data, increased spending on B&P costs may reduce the incentive to spend on IR&D; understanding this interaction requires an in-depth study.
- As Congress and DoD are responding to the reduced acquisition funds by cutting R&D, IR&D investments become even more important (to maintain U.S. technological leadership)

Challenge: Lack of Clear Metrics

- A lack of clear performance metrics have made it difficult to assess the effectiveness of IR&D investments.
- For example, without a tracking mechanism, it is difficult to say whether IR&D suffers due to changing levels of B&P costs in tighter fiscal environments.
- Uncertainty over how IR&D outcomes are being measured
  - Outcomes of IR&D spending are difficult to separate from outcomes of other innovation programs

Challenge: “Independent” vs. “Sponsored” or Required Effort

- A controversial aspect of IR&D costs is determining when an IR&D or B&P effort is ‘required under performance of a contract’, or ‘sponsored by a grant or cooperative agreement.’
- Example:
  - General Dynamics developed two prototypes for the Divisional Air Defense System (DIVAD).
  - General Dynamics was on a firm-fixed price (FFP) (best efforts) contract,
  - The Army chose not to exercise the contract’s options.
  - General Dynamics voluntarily chose to continue working on the program and charged it to IR&D.
  - The government brought a case against General Dynamics for unallowable cost overruns—treating it as a conventional FFP contract
  - However since the contract only required “best effort”, the work was no longer required under the statement of work.
- General Dynamics was awarded $25m in damages

Challenge: "Implicit Requirements" vs. "Explicit Requirements"

- Contract requirements for the development of new technology systems, can be explicitly stated in the contract, or implicit to the task.
- Although the government often interprets the implicit tasks as being required, and as a result excluded from being funded as IR&D, this is not always the case.
- Example: ATK THIOKOL, INC. v. UNITED STATES
  - Controversy as to whether upgrades could be considered IR&D costs, or whether they were "required in the performance of a contract"
  - Ruling: That R&D effort is only "required in the performance of a contract" when the effort is specifically required by a contract's terms
  - Since the development efforts were not explicitly included in the contract, the costs were deemed allowable

Recommendations

- Improve communication between DoD and contractors
  - Firms still reluctant to trust the protection of the Defense Innovation Marketplace, e.g. do all government users full understand the sensitivity of the posted material?
  - DoD should consider a threshold for the IR&D programs that must be posted to DIM, e.g. all programs where the IR&D costs exceed $100,000
- Use Intellectual Property/Technical Data Rights as an incentive
  - The greatest incentive for industry to perform IR&D is the benefit derived from the developed IP
  - The government has legitimate need for tech data for acquired systems, but must be careful not to reduce its value to the firms
- Monitor IR&D and B&P cost pool
  - Although data does not show any significant changes in the ratio IR&D and B&P to DoD sales, this may change as budgets shrink and competition increases
  - Evaluate impact of splitting the cost pool
  - Reduce “no value added” proposal preparation, e.g. duplicative ID/IQ contracts, especially those with few awards

Recommendations (cont.)

- Develop Metrics
  - IR&D provides an incentive for firms to innovate
  - Currently the available metrics focus on inputs, i.e. the level of IR&D spending
  - The more important and useful, but much more difficult to develop, metrics would include outputs to measure the programs benefits
    - e.g. does the IR&D reduce a firm's proposal costs
- To preserve the incentive value, maintain the current legal interpretations
  - IR&D investments are private funds
  - Unless requirements are explicitly included in the contract, the IR&D costs should be allowable

Concluding Thoughts

- The prosperity and national security of the United States is directly tied to its commitment to research and technological superiority
- The IR&D cost principle is one of the mechanisms supporting this commitment
- The Government should keep this long term objective in mind, and not, in the face of budgetary pressures, succumb to the temptation to save pennies on the budget's margins.

"Having the best defense industrial and technology base in the world is not a birthright."

Ashton Carter