Continuing to use obsolete and outdated IT infrastructure is a virtual invitation for cyberattacks and security breaches of sensitive government information.
Obstacles to IT Modernization
The New National Security Imperative

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INTRODUCTION

As the December 2018-January 2019 government shutdown pressed forward into unexplored territory, no one asked what impact the continuing funding delays might have upon information technology (IT) modernization. This should be a significant concern, as IT modernization is now widely recognized as a national security imperative. The cumbersome and lengthy acquisition process stifles innovation and allows U.S. adversaries such as China to develop and deploy cutting-edge technologies far faster than the United States is able. The loser is the U.S. military, which is often saddled with obsolete capabilities. The recently released Third Volume of the Section 809 Panel report states this explicitly—we are on a “war footing”—and the government’s cumbersome acquisition policies are a primary culprit. The shutdown certainly did not help any of this. The authors can offer no solution regarding how to solve the threat of another shutdown. The issues are no longer substantive—both parties see “the wall” as emblematic to their political base. But we can talk about recent green shoots in addressing the IT acquisition.

Without mincing words or exaggeration, the government has a dismal record of successful IT modernization.¹ The U.S. Government Accountability Office (GAO), a respected government watchdog, has exhaustively documented the government’s dependence on outdated legacy IT and the billions of U.S. dollars wasted by agencies in failed modernization attempts.² The causes are numerous: a compliance-oriented acquisition workforce, perverse incentives that reward “box checking” rather than end-user outcomes, and an entrenched cultural fear of “doing things differently” caused by an overblown concern about potential bid protests and increased congressional oversight.³

Recently, however, a new awareness has arisen across the government that the old ways of IT procurements no longer serve the country. Current acquisition techniques are relics of an age before commercialized internet services even existed; they were not designed to keep pace with the rapid evolution of IT technologies.

Greg Touhill, former Federal Chief Information Security Officer, captured the scope of this challenge. “Touhill’s Law” states that, since the average human

¹ Cite

² Cite

³ Cite
lifespan is seventy-five years, and the average computer’s lifespan is three years, for every year a computer exists, it will age the equivalent of twenty-five human years.\textsuperscript{4} Given how quickly technology ages, the government cannot continue to use traditional slow-moving acquisition techniques and expect to remain up-to-date in a 21st-century digital world.

The omnipresent and increasing threat of cyberattacks provides further motivation for a more dynamic procurement system, because continuing to use obsolete and outdated IT infrastructure is a virtual invitation for cyberattacks and security breaches of sensitive government information.\textsuperscript{5} Recognizing these issues, the Department of Homeland Security’s (DHS) Procurement Innovation Lab (PIL), a forward-leaning innovation cell and test-bed for the development of cutting-edge procurement techniques, has identified several key goals that will enable the government to evolve more rapidly, including:

- Lowering entry barriers for innovative, non-traditional contractors;
- Shortening the time-to-award, thereby delivering capabilities to customers faster;
- Encouraging competition by providing interested vendors with an improved understanding of the goals and objectives for each procurement; and
- Increasing the likelihood of successful outcomes by refining evaluation techniques to identify the most qualified contractors.

Ultimately, smart risk-taking, lower proposal development burden, and clear alignment between solicitations and mission objectives help DHS yield better solutions more quickly, improve contract performance, and provide savings to the taxpayer.\textsuperscript{6}

The most important recognition, in the authors’ view, is the acknowledgement of the time value (or lost opportunity cost) associated with the interminable pace of current acquisition procedures. Metrics such as the “Procurement Acquisition Lead Time” (PALT), the amount of time it takes a contracting officer to award a contract, indicate a growing awareness of the tangible costs of delays in the form of implementation of obsolete systems “out-of-the-box,” and the resulting increased cybersecurity risks.\textsuperscript{7,8}

There is also a recognition that, in order to obtain true IT innovation, the government should, indeed must, turn to existing commercial technologies and determine how best to bring them into government.\textsuperscript{9}

**THE GROWTH OF COMMERCIAL ITEMS: FASA AND BEYOND**

The preference toward the federal government using commercial technology has already been the subject of multiple legislative initiatives, starting with the 1994
passage of the Federal Acquisition Streamlining Act (FASA). FASA was designed to streamline the acquisition by introducing simplified acquisition procedures and pushing program offices to buy commercial-off-the-shelf (COTS) items whenever possible by making them much quicker and easier to purchase than traditional acquisition methods. The Act establishes a preference for the government’s use and adoption of commercial technologies that provide the best value to the government, rather than focusing solely on the lowest offer. The reason for this transition is simple: the bulk of research and development has migrated from the government to the private sector. The federal government is now hopelessly outclassed in terms of cutting-edge technology development and needs to adapt accordingly.

Both federal chief information officers, as well as their acquisition staff, now realize that meeting the emerging requirements of the Federal IT Acquisition Reform Act (FITARA) as well as Office of Management and Budget (OMB) policies such as Cloud Smart and the recently revised OMB Data Center Consolidation Initiative require extensive reliance upon commercial systems and commercial technologies. To better address these concerns, acquisition professionals have shown, with proper leadership, a remarkable agility in embracing new procurement techniques. Groups such as DHS’s PIL have spearheaded training and dissemination of best practices and rapid procurement techniques across multiple program offices. Some of these techniques mimic the approach taken by venture capitalists and others in the private sector.

**TRANSITION FROM FIRM FAR PRACTICES TO FLEXIBLE RAPID ACQUISITION TECHNIQUES**

The Federal Acquisition Regulation (FAR) rules were drafted to ensure a uniform standard for acquisition across the entire federal government. It serves as a guidepost for contracting officers (COs) and seeks to ensure that the government receives the best technologies, goods, and services at the fairest price possible. However, the FAR has proven to be ineffective in allowing COs to keep up with the rapid advancement of technology: COs have become consumed by checking boxes, rather than satisfying the needs of the end user.

These regulations have allowed bloated and slow-moving legacy contractors to dominate most IT contracts, utilizing their vast resources to establish offices dedicated to securing government contracts almost perpetually. Meanwhile, nontraditional contractors offering new and innovative technologies are unable to compete due to their lack of experience and inability to meet the bureaucratic requirements. Further, many leading IT companies, such as the ones in Silicon Valley, are unwilling to even attempt to work with government because of its notoriously complex and unfriendly intellectual property (IP) policies attached to traditional procurements.

In response, Congress has been testing the water by implementing rapid acquisition techniques across the
federal government, including Small Business Innovation Research (SBIR) Phase III, Other Transaction Authority (OTA), and the Commercial Solutions Openings (CSO) Pilot Program. While these programs are a promising starting point, each has unique advantages and disadvantages that should be examined and refined to ensure that the government can effectively keep pace with the technological advancement of the private sector.

The SBIR Phase III program is a glowing example of the U.S. government trying to avoid the grasp of large legacy contractors and looking to smaller start-up businesses for innovation. The goal of this program is to allocate funding to small businesses and non-profit U.S. research institutions so that they can pursue new technological research and develop it in to commercially viable products without fear of sacrificing ownership, IP rights, or future profits. To limit waste of taxpayer dollars, the program utilizes a tranched phase-oriented methodology ensuring that only the most promising, commercially viable products continue to receive resources. Each phase has specific dollar values and time limits with which to comply. Successful awardees move to the next phase, receiving additional funding and the potential for follow-on contracts, while costly and ineffective ideas are scrapped with minimal investment by government.

While the SBIR Phase III technique is an effective way to streamline procurements using the FAR, the first truly rapid acquisition authority that Congress created to bypass the FAR is the OTA. OTAs are flexible agreements that often have minimal standard requirements, other than cost sharing, and are designed to encourage faster research or prototyping with less administrative intervention and overhead costs. Specifically, OTAs allow the government to work directly with the private sector to solve issues in a faster, more effective manner, without having to worry about “checking the boxes” required by the FAR.

OTAs are beginning to gain significant traction with help from programs like DHS’s PIL and the Defense Innovation Unit (DIU). However, these awards often require cost-sharing agreements and are only available for specific agencies enumerated by Congress. Despite these drawbacks, OTAs have given smaller innovative tech companies that typically avoid the government, due to FAR-based obstacles, a way to work with the government that is similar to how they conduct business commercially.

While experimenting with OTAs, DIU developed and piloted a new acquisition technique, coined the Commercial Solution Opening. CSOs allow the government to post a general solicitation to fulfill a need without outlining a specific methodology, allowing the private sector to propose unique solutions. The private sector can choose to either develop new technology to meet the need, which would be difficult considering the relatively short PALT, or meet the need with tech that is available commercially with little or even no modification to fulfill the need in the most efficient way possible. These awards are similar to Broad Agency Announcements (BAAs), but rather than being restricted to a general government purpose, CSOs allow for the acquisition of the technology for specific programs. Based on the success of the CSOs, Congress authorized the Department of Defense (DoD) and General Services Administration (GSA) to participate in an official pilot program by the same name.

CSOs are not regulated under the standard rules of the FAR, allowing the contracting officer much more discretion to base the decision on the fulfillment of the needs of the government, rather than a generic selection standard. However, with this discretion comes some significant limitations. Both the GSA and DHS have a hard cap of USD 10 million on any CSO award, while DoD must notify Congress about any award over USD 100 million. Additionally, the authority has only been delegated to the GSA, DHS, and DoD for this iteration of the CSO pilot program.

While none of these techniques are perfect, they have made Congress aware that changes need to be made. With these techniques, contracts are being awarded faster, the government has received more current technology, and contracting failures tend to be caught earlier with less investment by the government. Although these are significant improvements, the government still needs to make modifications to maximize the strength of the rapid acquisition techniques while also eliminating weaknesses indicated by past failures.

**A PROMISING FUTURE FOR INNOVATION: THE IRS PILOT PROGRAM**

One potentially disruptive approach is being piloted
by none other than the Internal Revenue Service (IRS). The IRS has one of the most notoriously antiquated legacy infrastructures of any agency across the federal government. In a recent report from June 2018, the GAO noted that the IRS spent USD 2.7 billion on its IT investments in 2016, of which USD 1.9 billion was spent on operation and maintenance of its existing systems. A large portion of these maintenance costs come from the IRS’s reliance on legacy programming languages and outdated hardware. These have increased costs from inefficiencies and a lack of qualified IT individuals who can effectively work the outdated systems.

According to the GAO, of the USD 684.2 million in hardware associated with the IRS’s Mainframes and Servers Services and Support (MSSS) program, which makes up 73 percent of the IRS’s total infrastructure, approximately USD 430.3 million (63 percent) is outdated. Beyond being inefficient, these outdated systems pose increased maintenance costs, upwards of 25 percent more per year, and significant risks to the ability of the IRS to handle its core function: taxes. IRS officials have stated that relying on current MSSS hardware “has the potential to expose IRS to equipment failures that could preclude its systems from supporting the annual tax filing season.” As one can clearly see, it is not a lack of investment or funding by the IRS that is the source of the problem; rather, it is the lack of communication and consultation with IT experts in the private sector.

Facing significant backlash from the GAO and Congress, the IRS reevaluated how it acquired IT services for its deficiencies and created the IRS Pilot Program. This program utilizes a five-phase process involving: communication and discussions with the private sector about the IRS’s needs; evaluating potential solutions submitted by the private sector; testing the prototypes on an individual scale; testing an initial deployment at the local scale; and testing a limited/pilot deployment at a regional/national scale. Each phase is tranched with specific time and monetary limits and requires significant merit to progress to the next phase.

Essentially, this process allows ineffective and inefficient ideas to be weeded out at each phase, leaving only the best ideas. From there, the IRS will use follow-on production contracts to select winning solutions to implement. Under the highly respected procurement leadership of programs like DHS’s PIL or DIU, this program approach has the possibility of transforming the IRS’s legacy IT systems into a shining example for the rest of the federal government.

A MODEST LEGISLATIVE PROPOSAL

The U.S. federal government desperately needs to accelerate these emerging techniques. Certainly, one size will not fit all circumstances. However, the pluses and minuses of these techniques outweigh the risks posed by the current status quo. Smart policy development can accelerate this process even further, and legislation
can accelerate this process. While still notional, there are several concepts that need to be adopted across the federal government.

The first concept is the incorporation of OTA and CSO language in all civilian agencies through modification to the public contracting statutes found in Title 41 of the U.S. Code. Through this implementation, the federal government could still utilize the FAR for non-time-sensitive items but have the option to use OTAs and CSOs to capitalize on the innovation of the private sector where necessary. Congress could add controls such as monetary limits, or even penalties, for the abuse of the system, but it is essential that agencies are given more leeway in their decision-making process. The best assurance of success is for Congress to mandate every agency has an acquisition center for excellence following the model of DHS’s PIL.

By requiring agencies to adopt these acquisition centers for excellence, Congress would be ensuring that there are always acquisition experts available to contracting officers, regardless of to which agency they belong. These centers would serve as a central hub where contracting officers can receive training, ask questions, learn about best practices and reevaluate what it means to achieve the best results for the government. Additionally, by having all these hubs communicate with one central “acquisition excellence leader,” information could easily be disseminated, whether it be about a new acquisition method, shining examples, or practices to avoid.

Finally, phase-based acquisition should be incorporated into all acquisitions. SBIR Phase III has shown to be an effective way to progress a solution from an idea through to production and fielding with minimal risk or investment by the government but maximum innovation and speed of implementation of the solution. By adopting a phase system where the government allows business to fail fast and fail cheaply, it effectively limits its liability while also serving as a chance for the government to gain insight into what types of solutions to avoid in the future. Additionally, phase-based acquisitions couple well with bounties and other prize-based awards, which have shown to be effective at encouraging innovative solutions from smaller universities and research institutions that often lack the ability to contract with the government. By utilizing prizes in early phases of acquisition, the government can receive solutions for very little upfront cost and utilize the solutions in future phases or solicitations.

CONCLUSION

The United States’ IT sector is one of the most advanced and prosperous in the world. Meanwhile, the government’s most critical IT infrastructures, such as those controlled by the Internal Revenue Service, are severely outdated legacy systems that have a high risk of failing or succumbing to cyberattacks that jeopardize national security. The government cannot hope to consolidate, protect, and transform its aging base of legacy IT without doing something dramatically different in terms of its acquisition procedures. If the hope and promise of a 21st-century digital government is to be fulfilled, we
need to enthusiastically embrace risk-taking and the “need for speed” in our core procurement practices. Only in this fashion can government evolve into the 21st century.

2 Ibid.
6 Department of Homeland Security, Office of the Chief Procurement Officer, 4.
8 Ibid.
10 Ibid.
11 Ibid.
16 See FAR 1.101.
17 Ibid., 1.102-1.
20 Ibid.
21 Ibid.
22 Ibid.
24 Ibid.
25 Ibid.
27 Ibid., 10-16.
30 See “Contracts & Legal: Commercial Solutions Opening.”
32 Ibid.
33 Ibid.
34 Ibid.
35 See Information Technology: IRS Needs to Take Additional Actions to Address Significant Risks in Tax Processing.
36 Ibid., 5.
37 Ibid., 19-22.
38 Ibid., 19.
39 Ibid., 20.
40 Ibid.
42 Ibid.
43 Ibid.
44 Ibid.

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