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September 14, 2018

The Office of Management and Budget
via email: performance@omb.eop.gov

RFI No.: **SPE-RFI-18-0001**

Reference: **Response to SPE-RFI-18-0001 Establishing a Government Effectiveness Advanced Research (GEAR) Center**

To Whom It May Concern:

Booz Allen Hamilton (Booz Allen) is pleased to submit this response to the Office of Management and Budget (OMB) for Request for Information (RFI) SPE-RFI-18-0001 Establishing a Government Effectiveness Advanced Research (GEAR) Center.

Booz Allen has a long history of partnership on some of the Government's toughest challenges, including supporting a variety of Public-Private Partnerships and advanced research organizations, and our expertise will offer vital lessons-learned and best practices to inform the GEAR Center. With our strategic and implementation experience, partnerships across industry and academia, and extensive knowledge of the landscape of government challenges, we believe our recommendations in this response will be an asset to furthering the Government's thinking on all aspects of the GEAR Center.

If you have any technical questions regarding this response, please contact Matt Erskine at (202) 346-9067 or erskine_matthew@bah.com. For any contractual issues please contact Cecilia Gerstner at (703) 984-0556 or gerstner_cecilia@bah.com. She is authorized to negotiate on behalf of the firm for this response and any resulting contract.

Sincerely,

Richard J. Goffi
Vice President

BOOZ ALLEN HAMILTON INC.

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In Response to Solicitation No: SPE-RFI-18-0001

Office of Management and Budget and General Services Administration Performance.gov

Establishing a government effectiveness advanced research (GEAR) Center

SEPTEMBER 14, 2018

SUBMITTED TO

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In accordance with FAR Part 15.201, this submission is provided with the intent to exchange information with the Government the contents of which are consistent with procurement integrity requirements per FAR 3.104. Further, the content is not intended to be incorporated directly into the terms of a future competitive procurement.

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1.0 Our Organization

Booz Allen has been providing transformative consulting and technology services to clients for more than 100 years, and currently more than 90 percent of our work is devoted to serving the Federal Government. Supporting this effort is at the heart and soul of what we strive for daily — helping the Government deliver on its promise of advancing its mission, delivering quality services for its citizens, and serving as an effective steward for taxpayers. We know that Government can deliver exceptional service to the nation, and we are proud of the partnerships we have already created with Government.

Booz Allen created the concept of management consulting more than a century ago. Since then, we've woven that heritage into a range of highly-skilled technological, engineering, management optimization, analytical and cyber capabilities that have had an enduring impact for our clients and the communities where we live and work. Our people bring a mix of expertise to solve problems with a different, more effective mindset, devising powerful solutions for our clients' toughest challenges.

In addition to our extensive partnerships across Federal agencies, we have a wealth of senior leaders who come from state and local Government backgrounds and who understand the linkages between and across these organizations and Washington. We also partner with large universities, startups, and Fortune 100 companies. It's this breadth and diversity of expertise that enables us to bring a culture of innovation to our service offerings.

Booz Allen has considerable expertise in support of innovation hubs (iHubs), public-public partnerships (p3s), and public-private partnerships (P3s). As a result, we have partnerships with flagship academic institutions such as MIT, Harvard, University of Washington, University of Texas, Georgetown, Stanford, and Berkeley, enabling access to thought leadership programs for our clients within the iHub community. We also support or have recently supported a variety of p3 and P3 programs to include:

U.S. Army Reserve, Office of the Chief of Army Reserve – supporting the Private Public Partnership (P3) Office Support Services, Transition Program – workforce, employment, professional and trade career development, certification, training, and licensure opportunities

U.S. Air Force Civil Engineering Center (AFCEC) – supporting Air Force Civil Engineering Transformation through Enhanced Use Lease Program delivery with the private sector

U.S Army, Assistant Secretary for Installations, Energy and Environment, Office of Energy Initiatives – supporting P3 project development, industry engagement, acquisition, and oversight

U.S. Air Force, Assistant Secretary for Installations, Environment and Energy, Office of Energy Assurance – supporting P3 project development, industry engagement, acquisition, and Air Force Community Partnership Program oversight of construction and operations

U.S. Navy Renewable Energy Program Office – supporting the development of P3 renewable energy projects for energy resilience

U.S. Air Force Community Partnership Program – supporting the development of more than 1,000 P3 agreements at more than 60 Air Force installations across the nation

U.S. Department of Transportation (USDOT) Federal Highway Administration Office of Innovative Projects/ Volpe Center – delivering P3 Model Contracts, Best Practices, Risk Assessment, Value for Money, and Revenue Sharing Policy Guides

U.S. Department of Transportation (USDOT), Federal Highway Administration (FHWA), Office of Operations – performing financial analyses for the Project Finance Center

Our point of contact for any questions or other follow-up regarding our response is Mr. Matt S. Erskine. Erskine_Matthew@bah.com. 202-346-9067. 901 15th St NW, Washington, DC 20005.

2.0 Executive Summary

Booz Allen is excited to help the Government further its thinking on the GEAR Center. What we read in the RFI, and what we heard at the conference on August 23, mirrors the evolution of our own thinking as a firm over the past few years. Furthermore, it aligns to how we believe industry and Government can best partner for exceptional mission delivery for U.S. citizens and stakeholders — and to how we are already applying the concepts in our support of our Government clients. We believe an initiative like the GEAR Center will be a powerful engine for needed evolutions in how the government delivers its mission. Here is the summary of how we recommend the Government think about establishing and sustaining such an initiative.

STRATEGIC APPROACH

- Be ambitious and bold, and willing to stand on previous efforts
- Be broad in its thinking
- Be a catalyst for innovation
- Put citizens at the center
- Advance innovation program priorities as laid out in the President's Management Agenda, and in Delivering Government Solutions for the 21st Century: Reform Plan and Reorganization – mission, service, and stewardship

OPERATING OBJECTIVES

- Identify and engage multi-disciplinary expertise in physical and virtual spaces
- Engage nontraditional stakeholders by giving them greater access to Government problems
- Carefully identify and select key partners for capability, capacity, and impact
- Engage state and local government in the innovation and solutions development
- Develop aligned incentives for "sticky" partner engagement
- Experiment with different models for delivery of services
- Seek and acquire funding from a variety of sources to move the GEAR Center towards a sustainable funding enterprise

OPERATING MODELS & EXAMPLES

Booz Allen has worked extensively with several organizations that serve a similar purpose to that envisioned for the GEAR Center, including our experience with advanced research organizations and other robust P3 arrangements. We provide several essential best practices and components that can be replicated and/or leveraged.

ESTABLISHING THE GEAR CENTER

We recommend the Government consider establishing the GEAR Center as a Single-Purpose Entity (SPE) accountable to OMB and/or GSA, and competitively awarded cooperative agreement to a single, third-party manager.

The GEAR Center should also enlist a network of academic and research institutions, industry partners, and a variety of stakeholders as dictated by the Center's evolving focus areas.

OPERATIONALIZING THE CENTER

The GEAR Center should combine physical and virtual spaces and form a Consortium of targeted partners from industry leaders, academic institutions, and nonprofits. The GEAR Center should also perform outreach to the greater innovation community, including citizen stakeholders.

Center management can operationalize these three assets (Physical GEAR Center(s), GEAR Consortium, and Smart Crowds) through seven components that tie directly into the operational objectives listed above: three types of spaces and four capabilities.

- Prototyping Labs
- Co-Creation Spaces
- Community Event Spaces
- Technology Scouting
- Future Scenario Visioning
- Incubation Program
- Challenge Development

GOVERNANCE STRUCTURE

We recommend that the Government develop a clearly defined charter for the GEAR Center that outlines oversight and operational responsibilities. The Government should consider a small oversight board comprised of executives from the Office of Management and Budget, the President's Management Council, and the General Services Administration. The Government should also consider establishing a GEAR Center Inter-Agency Advisory Council that would provide ideas for operational and strategic challenges for the GEAR Center to explore as part of its portfolio.

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FUNDING

The Center should tap into a variety of funding streams for long-term self-sustainability.

- A fee-for-service for projects executed
- Lease government lab space to develop solutions in exchange for in-kind services provided by the private sector
- Work-share agreements and Cooperative Research and Development Agreements (CRADAs) with public-private collaboration
- Service-directed funds and through management fees on executed P3s
- Develop a commercialization brokerage, which can sell licenses to Government-developed solutions, data, and technology to private industry
- Create "data products" (e.g., dashboards, analytical reports, data services) that could be sold to a variety of customers in industry and academia.
- Collect membership fee from industry and research institution partners

STATE AND LOCAL GOVERNMENT ENGAGEMENT

Establishing a formal mechanism to engage with state and local governments, via

- National Governors Association
- Council of Mayors
- League of Cities
- National Association of Counties
- National Association of Regional Councils
- State Science and Technology Institute

SPECIFIC AREAS OF INNOVATION AND PRACTICE TO PRIORITIZE

In addition to upskilling the Federal workforce and leveraging federally-owned data, we also provide our thinking for four additional areas of focus, as well as methodologies for ongoing portfolio management:

- Areas that align with technology trends impacting how services are delivered
- Areas that help citizen-entrepreneurs and businesses leverage Government data for their needs
- Areas that have high levels of negative public feedback
- Areas for improving Government services through innovative acquisition approaches

RESKILLING AND UPSKILLING THE FEDERAL WORKFORCE

Best practice research indicates that the GEAR Center should pursue a multi-pronged approach to reskilling, anchored by five components. We explain each of these in detail in the sections below.

- Mentorships
- Microlearning
- Educational Institution Partnerships
- Gamification
- Communities of Practice

LEVERAGING FEDERALLY-OWNED DATA

The Government should partner with the private sector to create an architecture that creates a Federal taxonomy consistent across the agencies and validated by authoritative sources, ensuring high data quality. The Government is already working with the private sector to create lasting data standards, architecture, and taxonomy that link data elements together. And there are many opportunities that would improve data use for public good, and where the GEAR Center could initially focus:

- Enhance Standards
- Curate Data with Feedbacks and Ratings
- Encourage Quality/Timeliness of Data Sets
- Continue to Encourage Sharing
- Enhance Topics, Highlights, and Updates with Communities
- Encourage Publishing of Granular Data Sets
- Visualize Connectivity of Data Sets
- Streamline Analytics Capability
- Leverage Cloud

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3.0 Strategic Approach and Objectives

OUR UNDERSTANDING

Booz Allen understands the Government intends to establish a Government Effectiveness Advanced Research (GEAR) Center to harness the resources and expertise outside of the Federal Government in a more effective way to address pressing strategic and operational challenges facing the Government in the 21st Century. The Government recognizes the existing barriers to innovative solutions development inside of Government including: outdated technology and processes, slow adaptation, funding and capital allocation constraints, limited risk tolerance, and control considerations. Therefore, to help get beyond these barriers, the Government is seeking cross-cutting and multi-disciplinary applied research and solutions development performed *outside* of the Government by industry, research institutions, and non-profits – with a fast-track on-ramp back to the Government for implementation and execution. This approach will enable solutions development, live testing, test-and-learn, and solutions piloting through a lower-risk yet ultimately higher-return model.

STRATEGIC FOCUS

The strategic approach to the GEAR Center needs to reflect the realities of an environment that is rapidly changing. The explosion of technology and Big Data—and the rapid availability of data—the demographics of the workforce, and sheer complexity of change facing our Government requires an on-demand, highly modular, task-oriented, and flexible center of innovation. Using this structure, the Center can bring together diverse stakeholders with multi-disciplinary knowledge, resulting in creative partnerships and a motivated work environment where business, academia, not-for-profits, and the Government can learn from each other, address requirements and solve problems to promote modernized, more effectively delivery models.

Based on our extensive work and collaboration with similar efforts across the Federal Government, innovation hubs across the country, and leading research institutions, there are several fundamental practices we recommend for a strategic approach for the GEAR Center and its affiliated networks:

- ***Be ambitious and bold, and willing to stand on previous efforts.*** From its inception, the process for conceiving the Center, and its affiliated networks, should be inspirational and inherently different in space and operations. At the same time, the GEAR Center should enact lessons learned from alliances, iHubs and other partnership arrangements that have innovated the best practices for successful collaboration, cooperation, diversity, and information sharing, as well as use of specific tools and mechanisms to allow these elements to occur.
- ***Be broad in its thinking.*** The GEAR Center should serve as the nexus and intersection of multiple organizations that bring broad and interdisciplinary thinking to the priority focus areas of the Center. This will allow the Center to understand and address a variety of specific problems, while at the same time ensure that the governance and strategic focus remains high-level, cross-cutting, and forward-looking.
- ***Be a catalyst for innovation.*** The GEAR Center's design, foundational mechanisms, and incentive structures should not mandate innovation, but should set the conditions for innovation to occur. The GEAR Center should be designed to enable a diverse set of relationships, engaged stakeholders, and flow of ideas, creating and enabling innovation through connecting disparate thinkers.
- ***Put citizens at the center.*** The GEAR Center should have as its "North Star" how to provide better services to Americans. With the rise of the digitally-empowered citizen, we understand that the way in which the Government delivers its missions and leverages private-sector partnerships must also advance. Heightened citizen service expectations come with constantly-connected mobile technologies and the continued rapid pace of technological advancements—advancements that are reaching even the most remote and rural areas of our country and across all demographics. We know that the common benchmarks for service are the experiences furnished by the likes of Google, Amazon, Apple, and Netflix. And we know that the mission of government must be delivered with the common refrain to "do more with less." These competing dynamics are going to compel a sea change in how the government does its business throughout the 21st Century.
- ***Advance innovation program priorities*** as laid out in the President's Management Agenda, and in Delivering Government Solutions for the 21st Century: Reform Plan and Reorganization – mission, service, and stewardship - by creating innovation solutions, spaces, and programs to build a culture of innovation across the Government to provide more effective, agile, and efficient services.

OPERATING OBJECTIVES

The GEAR Center's operating objectives should provide a cohesive framework that encourages the flow of ideas, technologies, and multi-disciplinary talent across a network to ensure that the right connections can be made when needed. These objectives should include

Identify and engage multi-disciplinary expertise through partnerships and convene this expertise via physical and virtual spaces to inform future states where the Government operations and services can be in the near-term (1-5 years), mid-term (5-10 years), and long-term (10 years and beyond).

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Engage nontraditional stakeholders by giving them greater access to Government problems and providing opportunities to create solutions through activities such as crowd-sourcing challenges, workshops, innovation labs, and hackathons.

Carefully identify and select key partners for capability, capacity, and impact. The GEAR Center should develop criteria that provide for the selection of partner organizations from industry, higher education, and nonprofit sectors—partners that bring the requisite expertise and capacity that are aligned with the Center's innovation objectives. In addition, partners should be selected for their track record of delivering results-oriented impact.

Engage state and local government in the innovation and solutions development. Often referred to as the true "labs of innovation" as they are closer to citizens, state and local governments have been advancing innovative approaches in citizen services and therefore have much to contribute to solutions development.

Develop aligned incentives for "sticky" partner engagement. Effective partnerships are built on the right incentives to ensure full and sustainable partner engagement. Effective partnerships are also based on trust, which takes effort and time envisioning the future, identifying common objectives, and working together to deliver solutions.

Experiment with different models for delivery of services (e.g., fee for service, use of in-kind considerations, performance-based) to "test and learn" with prototypes and pilots in a low-risk environment.

Seek and acquire funding from a variety of sources to move the GEAR Center towards a sustainable funding enterprise. There are a variety models that the GEAR Center might consider to develop a path to sustainability. We discuss this in greater depth below.

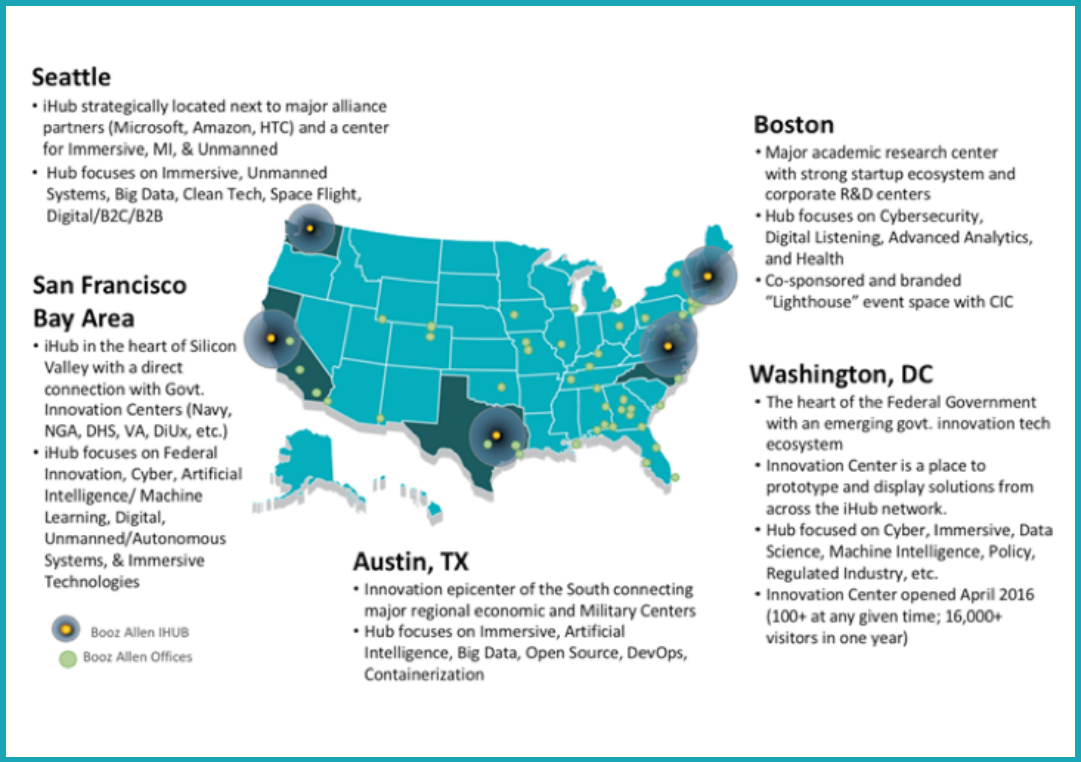
PROMISING PRACTICES FOR THE GEAR CENTER

BOOZ ALLEN'S NETWORK OF IHUBS & INNOVATION INFRASTRUCTURE

At Booz Allen, we are very familiar with the importance of using physical and virtual spaces to increase external engagement to map future trends, accelerate co-creation, and harness the power of local innovation ecosystems. We have established ourselves as a leader in workplace design and understand the importance of designing spaces and curating cultures that enable creativity and productivity. We can take the lessons from building our own innovation infrastructure six years ago—building innovation centers, innovation blueprints, incubation programs, and commercialization strategies from our clients across the public and private sectors—to inform the GEAR Center strategy.

As we built out our innovation infrastructure, Booz Allen selected five industry-wide iHubs based on careful analysis of local ecosystems, including number of patents, venture capital spending, the density and maturity of startups and incubators, future growth projection, and connection to Government R&D. Each iHub location contributes a unique set of focus areas and industries to the broader network. Each has a physical and virtual set of spaces for partner and stakeholder collaboration.

Our partnerships with flagship academic institutions such as MIT, Harvard, University of Washington, University of Texas, and Georgetown, enable access to thought leadership programs for our clients within the iHub community. For example, we worked with Stanford University on their Hacking4Defense program to bring student ingenuity to the Government. These networks of relationships and talent extend well beyond our traditional corporate footprint, allowing us to explore edge, emerging, and transformational technologies as well as recruiting/retaining top-notch talent. Our iHub network investment included sponsorship of Hub Week and South by Southwest (SXSW), relationships with hundreds of influencer organizations, and a physical presence in many leading incubators and accelerators.



4.0 Operating Models & Examples

Booz Allen has worked extensively with several organizations that serve a similar purpose to that envisioned for the GEAR Center, including our experience with advanced research organizations and other robust P3 arrangements with shared access to people, infrastructure and resources (e.g., Cooperative Research and Development Agreements, Intergovernmental Support Agreements, Workshare Agreements, leasing and direct sales arrangements).

Above all, a successful P3 program leverages public investment with private financial support and action to achieve results that is greater than either the public agency or private enterprise alone could achieve.

Based on our experience, we have identified several essential best practices and components that can be replicated and/or leveraged by the Government in informing and establishing the GEAR Center.

- Focus on high-impact, high-return research & development.
- Build in institutional autonomy, freeing the organization from the bureaucracy and preserving the GEAR Center's discretion.
- Permit Special Hiring Authority and other flexibilities to recruit and pay industry-competitive salaries for technical and professional personnel for limited terms. This would enable the recruitment of the best and the brightest.
- Have teams co-located organizationally and physically to promote collaboration and limit bureaucratic red tape.
- Identify senior leadership, including a Program Champion, that will build a culture of empowerment and maintain a streamlined organization.
- Establish an independent third-party manager and implementation partner with a Project Management Office that is staffed with both knowledgeable internal staff and expert consultants to create a business-to-business environment.
- Develop a strong strategic communications effort with a communications team that will engage stakeholders and keep them appraised about opportunities and processes for participation in the Center.
- Implement a standardized process for analyzing P3 opportunities, which will enable the organization to determine value and establish a valuation process for P3s. It also signals to the private sector there is an established P3 process.
- Implement a standardized process for transacting P3 opportunities. A transactional bridge to the private sector for limiting surprises and increasing efficiency will build confidence in industry partners that their time and financial resources will not be wasted.
- Build, maintain, and implement a pipeline of projects for delivery of services. A pipeline of projects (not one-offs) enables the private sector to plan to engage, pursue, and invest in projects over the long-term. Success in a P3 program can best be measured by the number of deals closed and projects completed without significant delays or overruns. A P3 program that can identify and keep a pipeline of projects moving toward closure in a timely manner builds momentum and confidence with all stakeholders.

In addition to and supporting our direct experience, research points to four critical organizational elements promote innovation. The GEAR Center should make a strong effort to ensure all four critical elements remain an integral part of the organization's culture.

1. Tolerance for failure
2. The ability to deal with uncertainty and risk
3. Strong communication channels
4. Nurturing leadership.[1]

Below we describe two specific operating models and organizational examples with components the Government should consider leveraging.

COMMERCIAL TECHNOLOGIES FOR MAINTENANCE ACTIVITIES AND THE NATIONAL CENTER FOR MANUFACTURING SCIENCES

The Commercial Technologies for Maintenance Activities (CTMA) is a cooperative agreement between the National Center for Manufacturing Sciences (NCMS) and the Office of the Secretary of Defense (OSD), Maintenance. Booz Allen has worked with NCMS and CTMA for the past two years.

The scope of this work includes demonstrations of technology, processes, tools, software, and requirements development, with emphasis on maintenance improvements that show:

- Benefit to Industry
- Benefit to DoD
- Industry performer cost share

CTMA represents a good model, with best practice components:

- **Cooperative Agreement –** which can be leveraged to provide a third-party-managed research and development program to solicit industry input to program objectives.

[1] Amabile et al., 1996; Holmstom, 1989; Hurley and Hult, 1998; Jaworski and Kohli, 1993; Kanter, 1983; Lyons et al., 2007; Nelson, 1962; Rosenberg, 1996; Szczepanska-Woszczyna, 2015; Utterback, 1974).

- **Self-sustained funding –** The third-party manager is funded through a program management fee, on a project-by-project basis that is scalable to the projects awarded within the program.
- **Expandable to add Industry Partners –** NCMS can increase its membership base at any time; thereby expanding the Government's access to industry expertise.
- **Consistent Project Management –** NCMS provides value in being a third party, project overseer to ensure projects performed by industry partners create their deliverables while maintaining budget and schedule.
- **Flexible Scope –** The CTMA is sponsored by OSD and projects can cover a wide array of tasks given they show DOD and community benefits.
- **Cost Share Requirement –** Every industry performer must demonstrate some level of cost-share to show increased benefit to the Government
- **Flexible on funding streams –** CTMA accepts any color of money from the Government; research and development, operations and maintenance, etc.
- **Expedited Procurement –** Compliant with the FAR, a Collaboration Agreement follows an expedited pathway for project execution. NCMS advertises as quick as 30 days between concept paper and award.

The GEAR Center should explore how to improve upon and/or refine some CTMA components:

- **Scope is broad, without targets –** The CTMA does not have dedicated targets at the program level that would accelerate program goals.
- **Not Well Advertised –** The CTMA, operated by NCMS, is socialized through local channels and does not have broad advocacy and outreach to solicit project ideas. A critical limitation of the CTMA is the limited outreach through maintenance communities. If the GEAR Center is operated as a cooperative agreement, it should emphasize strategic outreach as a core competency of the private entity managing the program.
- **Not exclusively a P3 –** CTMA connects an industry performer with a Government entity for a short-term demonstration. If the cooperative agreement can follow the same rules as an "Other Transaction Authority" (OTA), then the Government can sole-source procure the demonstration technology or initiative.
- **Demonstration Management Loosely Performed –** NCMS is a hands-off project manager. This is symptom of not having program goals to align with individual project goals.

The Government can learn more about the CTMA by contacting the OSD program manager directly.

Greg Kilchenstein, GS 15, gregory.j.kilchenstein.civ@mail.mil

PROMISING PRACTICES FOR THE GEAR CENTER

ENGAGING THE GREATER ECOSYSTEM

We understand the importance of creating virtual networks and cultivating smart crowds to find solutions. Booz Allen is a leader in launching crowdsourcing challenges for clients across the public and private sector including NASA, the DoD, the Intelligence Community, the State Department, the US Census Bureau, the CDC and more. We have also launched multiple high-profile, multi-location hackathons, where individuals from a variety of disciplines come together to focus on a specific client challenge. In addition, our staff are involved as leaders in multi-organizational alliances and partnerships across the country as part of our firm's emphasis on community engagement for social good. Examples include:

The co-creation and ongoing support of the Community, Military and Federal Facility Partnership of Northern Virginia, focused on growing and protecting military activities in the region and removing impediments to operations; improving operational efficiencies with installations; addressing the capacity and capability for new missions; enhancing the quality of life for all members of the military and community; and helping create defense related jobs

Support to the development of Northeast Maryland/ Aberdeen Proving Ground Innovation Hub, a collection of regional innovation hubs that target several technology areas including cyber, autonomous vehicles/systems, and advanced/additive manufacturing. This Innovation Hub includes that Army Research Laboratory's Open Campus Initiative, the Advanced Manufacturing, Materials & Processes (AMMP) Consortium and Material Sciences Collaborative Space, the Regional Advanced Manufacturing Partnership Maryland, and DefTech Maryland technology commercial center. This Innovation Hub is comprised of partners from Army, Industry and Academia who engage in research with shared access to people, infrastructure and resources.

It should be noted that even classified or proprietary questions can be asked to a "crowd" if it is properly obfuscated. Booz Allen has extensive experience in obfuscating crowdsourced challenges for clients in the Intelligence Community.

THE JOHN A. VOLPE NATIONAL TRANSPORTATION SYSTEMS CENTER

A model that shares objectives like those envisioned for the GEAR Center is the John A. Volpe National Transportation Systems Center (Volpe Center), a Federal fee-for-service organization within the Research and Innovative Technology Administration (RITA) of the United States Department of Transportation (US DOT). Booz Allen has worked with the Volpe Center for more than 25 years.

The Volpe Center's mission is to improve the nation's transportation systems. In partnership with sponsoring agencies, the Volpe Center provides technical research and analysis services to the US DOT, other federal agencies, state agencies, and other organizations with their transportation missions.

The Volpe Center utilizes a combination of Federal and contractor personnel to marshal a broad range of skills needed to perform sponsoring agencies' projects. By establishing a pool of professional technical/scientific resources, the Volpe Center can respond to the sometimes vague and long-term requirements of its technical program in a timely and effective manner. The contractor constitutes an important part of Volpe Center's resources and provides high-tech capabilities and skills targeted to the Volpe Center's programmatic requirements in the areas of transportation and logistics Operations Research and Analysis (ORA) Services.

The best practices to leverage from the Volpe Center model include:

- **More focused on delivering results –** As a fee-for-service organization, the Volpe Center is dependent on funding from sponsor agencies, and therefore it must deliver strong results to ensure continued funding. This more "customer centric model" results in higher performance across cost, schedule, and quality metrics, and is a principal reason that agencies outsource work to the Volpe Center despite a price premium.
- **Efficient Acquisition –** Due to the incentives above (dependent on showing customers results) the Volpe Center has developed a best-in-class acquisition process. They identify support needs early, craft solicitations that attract high-quality vendors (large and small), and most importantly they meet targets (schedule, scope, etc.). As a result, sponsors and vendors have greater confidence in their investments (time, funds, research). In contrast, delays, large changes in direction, and cancelations are too common across federal agencies and result in significant waste and mission impact.
- **Concentrating Specialized Talent –** Many Federal agencies do not require deep staff resources in specialized technical areas because their mission focus is on operation and execution. The Volpe Center enables the department of transportation to develop shared services for transportation research that can be delivered across all the DOT modal agencies.

Components of the Volpe Center model that the GEAR Center should consider improving upon:

- **Limited competition –** In many respects the Volpe Centers operates like a private sector advisory company (i.e., a consultant/contractor). It markets its services to customers in order to win work so that it can grow and sustain its funding steam. While the process the Center uses to purchase contractor support services can be highly competitive, the Government sole-sources contracts to the Center itself. There is no competitive bidding process. As a result, sponsor agencies have no opportunity to evaluate alternative solutions on the open market, and there is less transparency to the public. This can result in costlier and less innovative solutions and services.
- **Not a true P3 –** The Volpe center is a federal agency, and while it uses private sector entities and academia to perform its work, these organizations have no role in the direction or operations of the Volpe Center. This enables the Volpe center to perform work that is inherently governmental but it limits its ability to be as flexible, dynamic, or performance-oriented as a private entry.

The Government can learn more about the Volpe Center through focus groups/interviews (in person, by phone or written survey) with key stakeholders. It is essential that the Government gather balanced feedback, include the sponsor agencies (who fund the Volpe center), contractors (who perform work on behalf of the Volpe Center) and the Volpe center itself. It is also essential that feedback be provided anonymously, so that the Government is informed by unbiased input.

Several Government agencies have organizations like the Volpe Center, i.e., a federal entity that is a shared resource across agencies to perform special activities (research, analysis, etc.). These include Centers of Excellence and Service Centers that provide services using reimbursement arrangements. The GEAR Center should pick what to replicate and scale, and connect these efforts so that it can serve a broader network of stakeholders, enable and encourage them to work more closely with private institutions, and ensure they are focused on the best outcomes.

Additional organization models and examples from which to draw promising practices for the GEAR Center are provided in the Appendix.

5.0 Establishing the GEAR Center

CREATING THE CENTER

Considering the various models, we recommend the Government consider establishing the GEAR Center as a Single-Purpose Entity (SPE) accountable to OMB and/or GSA as the Government sponsor. The Government would provide "eyes-on, hands-off" oversight.

The Government should consider establishing the GEAR Center through a competitively awarded cooperative agreement to a single, third-party manager (which may also be referred to as implementation partner) to provide portfolio management, contracts managements, finance and accounting, communications and outreach, consortium management, facility space and subject matter experts to execute the mission of the GEAR Center.

The consortium should be a network of academic and research institutions, industry partners, and a variety of stakeholders as dictated by the Center's evolving focus areas. The academic partners and research institutions would provide a network of connectivity to the study of policy, leadership, and technology challenges.

The ideal third party manager would have the capacity, experience, and business relationships to ensure the GEAR Center has the breadth and depth of expertise from which to draw. In addition, the third party manager would have the necessary infrastructure to work effectively with the government, including the tools and processes to execute government work within the necessary requirements, e.g., Federal Risk and Authorization Management Program (FEDRAMP).

OPERATIONALIZING THE CENTER

Operationally, we recommend the Government consider standing-up the GEAR Center as a combination of physical and virtual spaces to tap into the expertise of a diverse network of partners and stakeholders to help the Government better meet existing and future mission requirements.

At Booz Allen, we are very familiar with the importance of using physical and virtual spaces to increase external engagement to map future trends, accelerate co-creation, and harness the power of innovation ecosystems. We have established ourselves as a leader in workplace design and understand the importance of designing spaces and curating cultures that enable creativity and productivity.

We can take the lessons from building our own innovation infrastructure six years ago—building innovation centers, innovation blueprints, incubation programs, and commercialization strategies from our clients across the public and private sectors—to inform the GEAR Center strategy and operations. Based on our experience, we recommend a three-tiered asset approach that ties together the network and ecosystem of partners and stakeholders in an interconnected and multi-dimensional way.

1. **Physical GEAR Center:** At the center of the network is one or more physical locations where the innovation community can come together to share ideas, increase exposure to new technologies, and co-create solutions.

2. **GEAR Consortium:** The creation of the Center and its activities could be informed by the GEAR Consortium, a community of targeted partners who will be the main users of the GEAR infrastructure. This would include top industry leaders, academic institutions, and non-profits that all have a vested interest in and would be incentivized for coming together to solve the Government's challenges.

3. **Smart GEAR Crowd:** The third group is comprised of the greater innovation community, including citizen stakeholders who wish to engage with the Network less formally through physical events such as hackathons and ideation jams, as well as crowdsourcing prize competitions as authorized by the America COMPETES Act. Participants can be incentivized through monetary or non-monetary rewards.

Center management can operationalize these three assets (Physical GEAR Center(s), GEAR Consortium, and Smart Crowds) through seven components that tie directly into the operational objectives listed above: three types of spaces and four capabilities.

- The creation of a physical GEAR Center should include three types of spaces:

Prototyping Labs: Dedicated space(s) within the GEAR Center(s) focused on solutions exposure and rapid prototyping. This can include demo spaces where users can interact with emerging technologies and test Government solutions as well as a maker space with tools necessary to build prototypes and Minimum Viable Products (MVPs). Items to include in these spaces may include user-experience testing tools; specific developer networks (some solutions require on-premises servers or specialized cloud infrastructure); virtual reality kits; and relevant engineering tools such as 3D printers tailored to the needs of those working in the space.

Co-Creation Spaces: Physical spaces in the GEAR Center(s) that are specifically dedicated to collaboration and co-creation with stakeholders outside of the Government. These may include a combination of conference-room-style

PROMISING PRACTICES FOR THE GEAR CENTER

INTELLIGENT WORKSPACE DESIGN: BOOZ ALLEN'S DC INNOVATION CENTER

Booz Allen opened its 88,800 square foot Innovation Center in 2015 as the next step in our innovation advancement. The facility houses the latest technologies and specialized teams that work to solve some of the toughest technological challenges facing our public and private clients. To help conceive this center, we visited 18 other innovative spaces and labs at Capital One, Intel, Marriott, Ford, Comcast, IDEO, Microsoft, Verizon and others.

Learning from these examples, we developed a flexible space where we work, host events, showcase solutions, and engage clients in fundamentally new ways. The Innovation Center is sponsored by partners like Intel, Microsoft, and HP Inc., and is a place for client and partner co-location and co-creation. To date, the Center has incubated 94 project teams—groups of Booz Allen consultants that come together in the Innovation Center to tackle our clients' stickiest problems with access to advanced technologies like Virtual Reality, Robotic Process Automation, and an open workspace with a host of virtual collaboration tools and technologies. To date, the teams in the Innovation Center have yielded more than 60 new products and processes. Since opening, the center has also hosted more than 30,000 visitors participating in 2,000 meetings and events. It convenes diverse stakeholders from the larger innovation community through hackathons, panels, workshops and startup weekends.

Booz Allen has codified the lessons learned from creating this Innovation Center, opening a cyber-focused Center in Central Maryland and investing across Booz Allen to create physical spaces catered to external engagement. Booz Allen's network also includes over 60 technical labs, and 6 digital hubs connecting over 5,000 digital developers across the country.

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spaces with white boards and virtual collaboration tools for short-term meetings, larger collaboration spaces for project incubation, and stakeholder "drop ins," as well as dedicated "war rooms" to house long-term incubation projects.

Community Event Spaces: A larger space to host knowledge-sharing events and to engage partners, citizens, and Government stakeholders with the latest innovations emerging from the GEAR Center. These events can include startup showcases, customer workshops, learning events on topics relevant to the GEAR community, and hackathons or design jams for rapid solutioning or ideation.

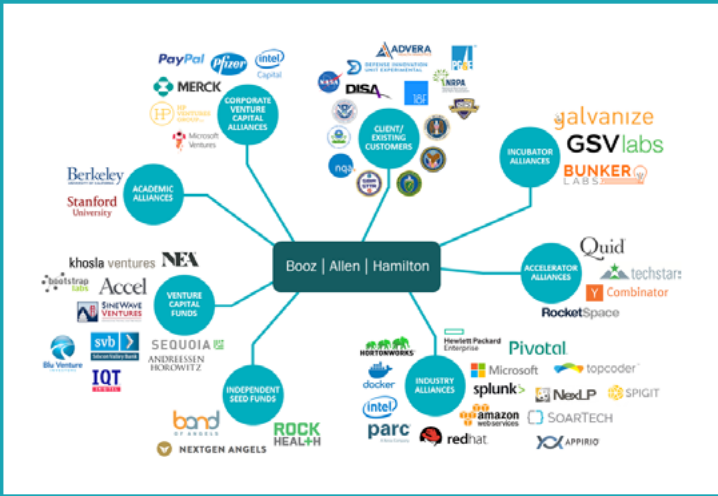
- Additionally, there are four capabilities that cut across virtual and physical boundaries that will be necessary to achieve the GEAR Center's goals:
  - **Technology Scouting:** Establish a process for the sourcing, evaluation, and deployment of new technologies to solve identified challenges. Utilize the network's virtual and physical platforms to provide the private sector with public sector pain-points to co-create solutions and to give the Government early access to emerging tech in a low-risk environment.
  - **Future Scenario Visioning:** Facilitated vision and road mapping sessions with futurists, subject matter experts, industry partners, citizen clients, and Government stakeholders to tackle current challenges, envision future challenges, and make strategic plans to mitigate future risk and inform future investment decisions using established design thinking techniques that help to question assumptions and identify obstacles.
  - **Incubation Program:** A program to help turn ideas into working prototypes, MVPs, and adopted solutions, with support at every part of the process. The GEAR Center can leverage its Consortium relationships to help nascent solutions get the right expertise, resources, testing, and stakeholder exposure. The program will also help to facilitate knowledge sharing across the network and help to create realistic metrics for new solutions.
  - **Challenge Development:** Resources to help run in-person events or online crowdsourcing challenges to solicit creative ideas, technical solutions, and to get feedback on Government technologies and services. This includes a pre-launch strategy and topic development; the selection of the right platform; the cultivation and engagement of specific segments of our Smart Crowd; challenge facilitation and execution (gamification, coaching, site moderation, idea evaluation, and critical messaging), and challenge closeout.

PROMISING PRACTICES FOR THE GEAR CENTER

TECHNOLOGY SCOUTING

Our innovation infrastructure has enabled us to understand how to find solutions for next-generation problems. We have a robust tech scouting practice, partnering with the academic and startup communities to bring innovative solutions to our clients for more than 10 years, executing many high-profile engagements with the startup community on behalf of our clients.

Booz Allen brings unsurpassed expertise in tech scouting due to our extensive already established Innovation Ecosystem: The success of integrating a new technology begins with selecting the right one from the myriad of potential options that are available at any given point in time. Our ability to help our clients identify and select both the right technology AND the right startup is unrivaled due to the extensive network we rely on to be current on the state of technological evolution. And because expertise and understanding in this field cannot be developed remotely, we have an extensive, already established network in critical geographies across the nation—in San Francisco, Austin, New York, Boston, and Seattle—to provide proximity and access to hotbeds of innovation. This gives Booz Allen the earliest access to evolving technologies across the startup communities and we have leveraged this to successfully bring multiple startups to our clients.



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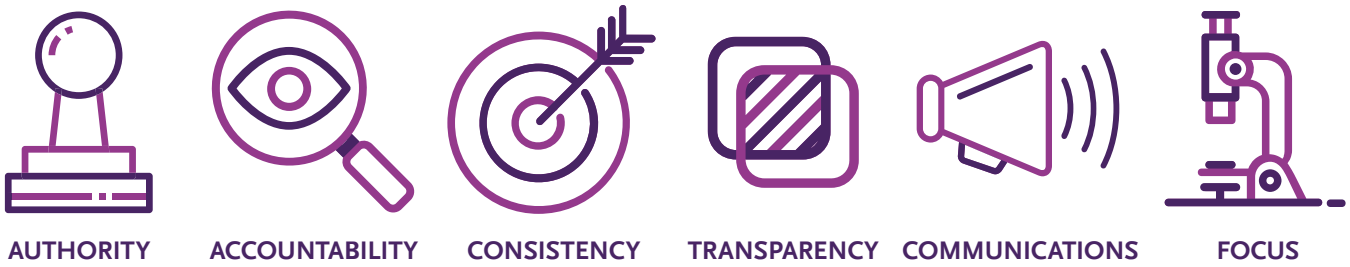

Booz Allen's essential principles for successful governance

GOVERNANCE STRUCTURE

Based on our understanding of the RFI, the Government envisions the GEAR Center as an organization independent of the Government, but also formally connected and accountable to the Government. We recommend that the Government develop a clearly defined charter for the GEAR Center that outlines oversight and operational responsibilities and expectations, as well as reporting requirements. As indicated above, we recommend the Government consider an "eyes-on, hands-off" oversight approach.

The Government should consider a small oversight board comprised of Office of Management and Budget (Deputy Director for Management), President's Management Council, and the General Services Administration (Administrator or senior designee). With this approach, OMB provides guidance and direction on strategic management policy and budgetary considerations; GSA provides strategic, Government-wide administrative direction and input; and PMC provides a direct link to the strategic management and operational issues at the forefront of agency COOs. Together, the oversight board provides the "eyes-on" accountability that is required given the envisioned first few years of Government funding. For the on-going basis under the envisioned long-term self-sustaining funding strategy, the oversight board allows for "eyes-on" accountability for effective operations and results delivered.

In addition, we would recommend the Government consider establishing a GEAR Center Inter-Agency Advisory Council that would meet two to four times per year and provide ideas for operational and strategic challenges for the GEAR Center to explore as part of its portfolio. The Council should also include representatives from the National Economic Council, Office of Science and Technology Policy, Domestic Policy Council, and National Security Council to ensure that the broad perspective and expertise of these various policy operations are part of the input to the GEAR Center, as well as the most pressing strategic challenges under their consideration.

Booz Allen's experience supporting and researching programs with similar missions to that envisioned for the GEAR Center reveals the following common set of principles essential for successful governance:

1. **Authority:** Provide sound supporting and enabling policy to maintain the Center's autonomy and flexibility.
2. **Accountability:** Provide clear lines of decision making accountability for both people and processes.
3. **Consistency:** Maintain consistent processes that all stakeholders can understand throughout all phases, and on all projects.
4. **Transparency:** Be as transparent as possible throughout the process while respecting intellectual capital and the needs of procurement decision-making.
5. **Communications:** Develop and implement a sound communication plan and never stop improving it.
6. **Focus:** Establish a dedicated PMO with strong leadership and supporting capability that becomes the focal point for the establishment and operation of a partnership program.

FUNDING

As indicated in the RFI and in the August 23rd conference, the Government anticipates providing nominal seed funding for the GEAR Center. The Government is interested in a long-term funding strategy for the GEAR Center that should not depend on dedicated Federal funding.

As indicated above, Booz Allen recommends that the GEAR Center should be established through a competitively-awarded cooperative agreement, funded by the initial seed funding, to a single, third-party manager to provide portfolio management, contracts managements, finance and accounting, communications and outreach, consortium management, facility space and subject matter experts to execute the mission of the GEAR Center.

Under the recommended model, once the seed funding put up by the Government wanes, the GEAR Center should operate in a renewed cooperative agreement with the ability to extract a fee-for-service for projects executed, as well as collect membership fees from industry and research institution partners. The third-party manager should have the ability to enter into collaboration agreements with additional industry partners or facilitate the formation and execution of a P3 or Single-Purpose Joint Ventures to meet the GEAR Center's focus areas. Project challenges could be developed through ARPA-E's 5E portfolio management approach, detailed in the Appendix of this response, and tailored to the mission of the GEAR Center.

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As the GEAR Center becomes self-sustaining, it should then develop true P3 arrangements to deliver specific services. For instance, the GEAR Center could arrange to lease government lab space to develop solutions in exchange for in-kind services provided by the private sector, similar to enhanced-use lease arrangements used by the Department of Defense and NASA. The GEAR Center could also develop solutions through work-share agreements and Cooperative Research and Development Agreements (CRADAs) that foster public-private collaboration, complementary expertise, and innovative processes.

The GEAR Center may also be able to establish itself as a sort of commercialization brokerage, which can sell licenses to Government-developed solutions, data, and technology to private industry—thus injecting greater liquidity into the technology transfer market, and capitalizing on its Consortium networks across public, private, and academic stakeholders.

The GEAR Center should consider this as part of its charter, using its resources to identify new areas that industry could commercialize and capitalize on Government assets, and market those opportunities to the relevant companies. Similarly, assuming the GEAR Center will have access to Government data repositories, there may also be an opportunity to create "data products" (e.g., dashboards, analytical reports, data services) that could be sold to a variety of customers in industry and academia.

As indicated previously, the NCMS/CTMA model provides several elements for the Government to consider in establishing the GEAR Center, and these include the funding approach used by NCMS/CTMA.

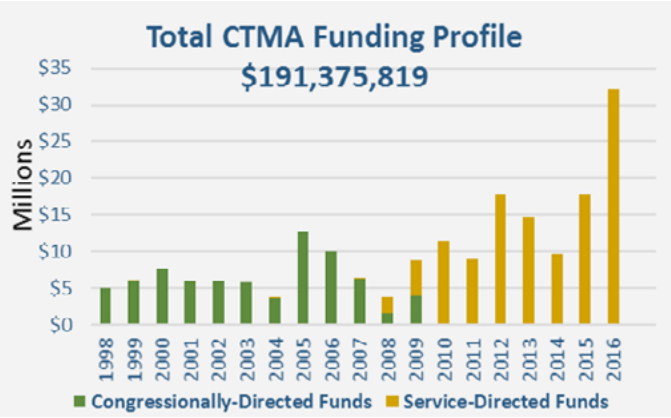
Similar to the approach envisioned for the GEAR Center, NCMS/CTMA evolved from a Congressionally-funded initiative to a self-sustaining operation supported entirely through service-directed funds, as shown below.

Other considerations from the NCMS/CTMA model include the ability to add industry performers on a rolling basis and through-funding, proportional to the number of projects and their corresponding level of effort. This could broaden the organization's reach to industry performers, and minimize their direct costs to support their third-party manager.

One of the challenges with NCMS/CTMA model is that it requires direct funding for demonstrations for Time and Materials awards. The GEAR Center could operate with the ability to leverage service-directed funds or pursue additional P3 opportunities with performance-based funding structures, where the GEAR Center could receive a management fee for the life of the P3 effort.

It is interesting to note that it took more than ten years for NCMS/CTMA to fully transition to sustainable service-directed funding versus Congressional appropriations. As shown below.

We understand that the Government expects the GEAR Center to move more quickly to a model that is not dependent on dedicated Federal funding. The GEAR Center should expedite its pathway from being directly funded, and quickly mature to a self-sustaining organization through service-directed funds and through management fees on executed P3s. In contrast to CTMA, with its decade of congressionally-directed funds, the GEAR Center's limited up-front seed funding and mandate to become self-sustaining will help the Center to adapt more quickly.



STATE AND LOCAL GOVERNMENT ENGAGEMENT

Based on the experience of several of our Booz Allen professionals who have served in senior roles at the Federal, State, and Local levels, we recommend that the Government consider establishing a formal mechanism for the GEAR Center to engage with state and local governments, especially through representatives of the following organizations: National Governors Association, Council of Mayors, League of Cities, National Association of Counties, the National Association of Regional Councils, and the State Science and Technology Institute (SSTI).

6.0 Specific Areas of Innovation and Practice to Prioritize

The RFI indicates that the Government is especially interested in two early focus areas: reskilling and upskilling Federal employees and more effectively leveraging Government data.

We provide extensive detail of our thinking and insight on those two specific areas in the following section.

First, we will lay out our thinking and recommended methodologies for prioritizing early areas of focus, as well as for identifying and prioritizing focus areas on an ongoing basis. Booz Allen recommends that prioritization should align with the three main themes of the President's Management Agenda (PMA) and *Delivering Government Solution for the 21st Century: Reform Plan and Reorganization:* **Mission, Service, Stewardship.** A robust plan for identifying and prioritizing areas of innovation and practice is essential to the success of the GEAR Center.

A Center with these themes as foundations should be able to flex to a broad array of topics, depending on market demand. This flexibility needs to be an expectation, and built-in to the operation of the GEAR Center from the beginning. From the outset, there are several areas of demand that can inform specific innovation and practice priorities:

Areas that align with technology trends impacting how services are delivered. These include robotic process automation, artificial intelligence, machine intelligence, data science, wireless communications, cybersecurity, and digital advancements such as mixed reality and 5G mobile network technologies. The GEAR Center should provide access to training and education resources in these areas to strengthen the knowledge, skills, and abilities of the Federal workforce.

Areas that help citizen-entrepreneurs and businesses leverage Government data for their needs. There are many Federal agencies that collect and manage data assets that can be commercialized in partnerships with the private sector and academia. Agencies such as the U.S. Geological Survey, National Oceanic and Atmospheric Administration, National Institutes of Health, Center for Disease Control, Department of Energy laboratories, and the Department of Transportation are but a few of the many Government entities that have high-value data that can be shared through public-public and public-private partnerships orchestrated by the GEAR Center.

Areas that have high levels of negative public feedback provide opportunities for the GEAR Center focus and priority. Examples include an array of customer experience challenges in agencies that have broad interfaces with the public and vital Government functions—improving response times for Government decision-making under the National Environmental Policy Act, regulatory process and permitting streamlining for infrastructure projects, addressing the backlog of applications for disaster assistance, and accelerating the approval of new medicines for disease control and prevention. This area is especially relevant given the recent issuance of new mandates for streamlining Government and regulatory reform—all of which underscore the need to develop and institute more efficient and leaner approaches to Government services delivery.

Areas for improving Government services through innovative acquisition approaches outside the Federal Acquisition Regulation framework. We believe that modernizing the government procurement process will be crucial, and a major component of the Gear Center's value. Examples include performance-based agreements where the private sector designs, builds, operates, maintains and finances projects and is paid via savings generated and/or reasonable user fees (e.g., expanded use of energy savings performance contracts, P3 arrangement for infrastructure projects). These arrangements are becoming more common and are changing the way the Government buys. In most federal procurements the government assumes most of the risk, with costs dictated by vendor multiples but divorced from short- and mid-term performance benchmarks, while the vendor is locked into fixed revenue streams and low profit margins, with little incentive to innovate or deliver truly differentiated performance, especially with long periods-of-performance between contract re-competes. If the government were to more aggressively move to outcome-based service provider models, tying performance to company revenue, it would allow industry and government to share risk, lowering costs for the government, and allowing the vendor to access scalable revenue based on outcome. It would inject private-sector market efficiency and improve delivery of the mission for taxpayers. Vendors would be highly incentivized to deliver continuously improving service as it ties directly to their bottom line. Please see the exhibit on the following page for a tangible example.

PORTFOLIO MANAGEMENT METHODOLOGY TO IDENTIFY AND PRIORITIZE FUTURE AREAS OF FOCUS

It is critical that the GEAR Center's program objectives remain relevant, responsive, agile, forward-looking, and based on assessment of needs. To effectively identify and prioritize additional new areas for innovation, we suggest that OMB consider a needs-identification and prioritization process that is similar to that used by the Department of Energy's Advanced Research Projects Agency-Energy's (ARPA-E) program, which Booz Allen helped develop. The 5-E process can enable the GEAR Center to be mission focused with the

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ability to evolve to new focus areas. (A more detailed description of the 5-E process is provided in the Appendix.)

The 5 "E's" stand for Envision, Engage, Evaluate, Establish, Execute, and the process has valuable benefits:

- Robust initial engagement with all relevant stakeholders during the Envision stage.
- Rapid execution during the Envision to Execution stages.

PROMISING PRACTICES FOR THE GEAR CENTER

THE NEW RECREATION.GOV: MODERNIZING HOW INDUSTRY WORKS WITH GOVERNMENT

Over the past year Booz Allen has been developing a new recreation management platform for America's National Parks system. But instead of working on a labor-hour contract in the traditional Federal acquisition construct, we've formed a true public-private partnership with Government. We are investing our own capital to develop the platform, in a no-risk and no-cost-to-Government structure.

We pay to develop it and we continue to own the IP as it's deployed, receiving a processing fee on each transaction that goes through the system. While shifting risk onto private industry, we are incentivized to move fast on upgrades and keep the platform on the cutting edge of technology as this system competes in the open market, and continued investment in an owned-asset becomes part of a long-term business strategy. We're unlocking both scalable revenue and scalable performance.

This innovation in Federal procurement fixes an endemic problem in the market's customer-vendor dynamic. Generally, the way in which Government buys services from industry is largely divorced from performance. Despite rigorous procurement standards, "good enough for Government work" is still shorthand for the fact that the bar in the Federal market is below that of the private sector. That shouldn't be, and elevating the experience for both citizens and Government users to private-sector standards is the new driver of Government transformation. Changing the traditional professional services business model (hour-based labor) to one tied to quality and outcomes will drive increased value for taxpayers and improve mission delivery for citizens.

The new Recreation.gov is on par with leading e-Commerce websites and stands as a new benchmark in how Government can interact with citizens in a digital age. Using modern software platforms and collaborative development methodology, this program combines the best of what industry can offer with the unique needs of Government missions to redefine the relationship with the user community. Please see Appendix 9.0 for full details.

INCENTIVIZING PERFORMANCE & OUTCOMES

PROVIDING AGILITY AND MARKET RESPONSIVENESS

LIMITING RISK TO GOVERNMENT AND TAXPAYERS

The 5-E model's first phase, Envision, has four steps. Below we outline how the GEAR Center can effectively utilize each step.

Step 1 - Establish Strategic Goals: The GEAR Center establishes macro-level program goals that align to the mission and vision of the GEAR Center. These should be strategic in nature and span 5 to 10 years.

Step 2 - Define Technical Objectives: Within the program goals, the GEAR Center should define measurable performance-based objectives it wants to accomplish in the short-term (1-2) years.

Step 3 - Baseline Current and Recent Initiatives: The GEAR Center should strive to be unique and practical by keeping an active inventory of industry and Government demonstrations to avoid duplication.

Step 4 - Develop Annual Program Roadmap: The GEAR Center should author and distribute and annual roadmap covering its program goals, technical objectives, and preferred funding arrangements with emphasis on innovative public-private partnerships with industry and academia. This will serve as the annual report and allows the GEAR Center to modify and enhance their goals and objectives over time.

In the Envision phase, the focus in on baselining agency needs for modernization and innovation. The GEAR Center should keep an active inventory of Government agency needs through interviews with senior leadership, staff surveys, GAO findings, internet research and industry association dialogue.

The next phase is **Engage**. In this phase, ARPA-E engages stakeholders through conferences and industry days, reports, publications, and procurement channels (such as requests for information). ARPA-E then organizes detailed technical workshops and other external engagements to gather community input and techno-economic analysis to contribute to the program. This phase of development is critical to ensure that the concept and program pitch not only align to strategic goals but also aligns to the current state of technology or research within industry. Programs are only successful if industry and Federal stakeholders actively participate to develop projects within the program itself. Once the workshop has been completed and the agency is satisfied that they have received sufficient external engagement, the program concept is matured and pitched internally for cross-agency feedback (across multiple industrial and scientific/engineering disciplines).

The objective of pitching a program is to demonstrate that the proposed program has the potential impact and merit to move forward. This can be an iterative process as feedback is received from across private and Federal stakeholders. In the case of ARPA-E, once the pitch has been approved, the FOA outline and targets are then developed to shape the technical portion of the FOA, which will detail the technical justification for the development of the program.

To maximize the utility of the Engage phase, the GEAR Center could publish an annual call for white papers through its Envision findings and participate and host industry events to socialize the intent and value of the GEAR Center. Based on this collection and integration of findings, the GEAR Center should author and distribute a roadmap covering its identified needs, recommended new priorities, associated technical objectives, and preferred partnering arrangements with emphasis on innovative public-private partnerships with industry and academia. This will serve as a baseline and allow the GEAR Center to modify and enhance its priorities and objectives over time.

For additional detail on the ARPA-E 5-E Methodology, please see the appendix in section 7.0.

RESKILLING AND UPSKILLING THE FEDERAL WORKFORCE

LEADING PRACTICES

The world of work faces an epochal transition. By 2030, as many as 375 million workers—or roughly 14 percent of the global workforce—may need to switch occupational categories as digitization, automation, and advances in artificial intelligence disrupt the world of work. It's akin to coping with the large-scale shift from agricultural work to manufacturing that occurred in the early 20th century in North America and Europe, and more recently in China. Yet earlier workforce transformations took place over many decades, allowing older workers to retire and new entrants to the workforce to transition to growing industries. The speed of change today is faster. The imperative confronting every advanced economy is to retrain and redeploy tens of millions of midcareer, middle-age workers.

Malcolm Knowles, an American educator and expert in methods and practices of teaching adult learners, has outlined four principles specific to adult learning. He emphasizes that:

1. Adults need to be involved in the planning and evaluation of their instruction
2. Experiential learning is the basis for learning
3. Learning is problem-focused
4. Learning should have a direct application in the adult learner's job or personal life

Reskilling programs need to be high-tech and high-touch—they should include both technology and in-person components to be successful while also accommodating multiple learning styles. Reskilling integration should also include a

focus on career development. Without including these components in reskilling efforts, there will likely not be enough buy-in or engagement, and employees will move out of the organization.

The Office of Personnel Management and the Chief Human Capital Officers Council have identified Government-wide skill gaps in four critical areas: STEM, cybersecurity, acquisition, and human resources. To fill those gaps, agencies should first focus on upskilling current employees, and relocating those displaced by reorganization efforts. For functions like cybersecurity, where skill requirements change at a rapid pace, this upskilling and development should happen regularly. Where possible, to get the best results from your training, put employees in a live environment where they can navigate a set of real scenarios.

There are four types of skill gaps in today's workforce, often acting in tandem:

- A lack of individuals with fundamental skills, such as the ability to use basic math, communicate effectively, read technical manuals, work successfully in teams and participate in complex problem-solving.
- A lack of workers who have the specialized skills needed to fill many trade positions.
- A lack of applicants with the science, technology, engineering and math (STEM) skills needed for many of today's jobs.
- A lack of individuals who can design and implement streamlined and lean business processes that integrate new technologies and skills to guide user-centered, more efficient Government mission functions.

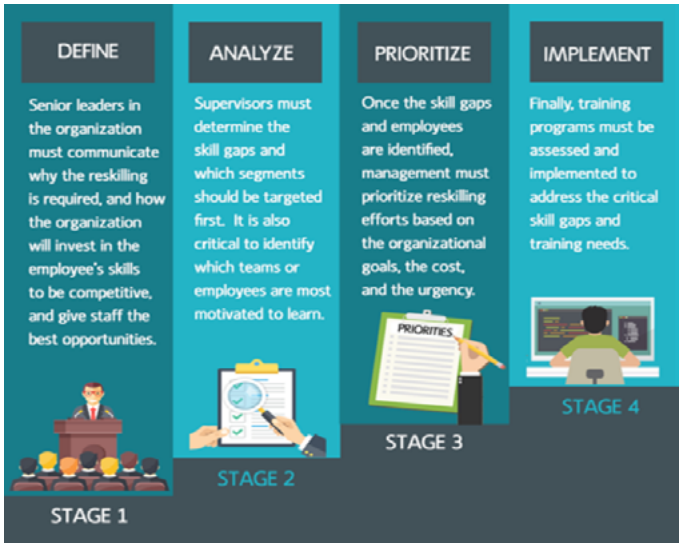
Like all large organizations, the Federal Government must continue to position itself to keep up with major technology trends, both to protect its assets and to ensure its long term sustainability.

RESKILLING PROCESS

Reskilling of the workforce can be done in a four-step process as illustrated below.

Best practice research indicates that the GEAR Center should pursue a multi-pronged approach to reskilling, anchored by five components.

- **Mentorships:** A significant share of adult learning is acquired through practical hands-on experience, on-the-job training and, especially, interaction with colleagues. Organizations can use job rotation programs to bolster adult skills. In addition, organizations can provide mentorship opportunities and adult apprenticeship opportunities, and benefit from experienced labor at reduced costs.
- **Microlearning:** The practice of "microlearning" is accelerates the process of reskilling workers. Rather than hosting day-long in-person courses or lengthy virtual seminars, a company's learning function can develop and share short, modular videos that are granular in what they teach. This will make reskilling more digestible and efficient.
- **Educational Institution Partnerships:** Sector-specific upskilling and reskilling can be provided through coalitions in partnership with local educational institutions, combining theoretical and applied training.
- **Gamification:** Building motivation for adult learning through gamification and peer support groups have also shown positive impact. It allows for simulation of diverse circumstances, interactive learning with other participants, and practicing decision-making in a risk-free setting.



- **Communities of Practice (CoP):** CoPs are significantly different from many other training approaches because CoPs are scalable across various learning domains and can be tied to a platform for evaluating skills as well as for acquiring new skills. An operational CoP network can be supported with a diverse set of activities to engage members, such as facilitating networking events and regular community updates, as well as unique special events to focus on specific areas of training and interest. Organizational and external social network services facilitate spontaneous, real-time discussions, and inform members quickly on the latest projects, priorities, and developments. These networks enable ongoing relationship building by facilitating frequent exchanges among employees. All these tools create personal connections that increase information flow.

Regardless of the method used, employees should have time away from their work to absorb what they learn. There should be dedicated time to learn a skill, and an updated role ready after completion of the training. This forces definition of the new roles and development of a clear career path for employees. It also signals to employees that the organization is fully investing in their new abilities.

Booz Allen has considerable experience in helping internal and external clients with their reskilling efforts. Cited here are

successes in the five categories defined earlier, namely; mentorships, microlearning, educational institution partnerships, gamification, and communities of practice.

Mentorships

With a rapid growth of the Information System Security Officer (ISSO) community, the Department of Veterans Affairs (VA) Field Security Service (FSS) was faced with the challenge of integrating newly appointed ISOs into the larger FSS team. FSS needed to build a high performing, highly motivated workforce consisting of skilled personnel who were able to achieve VA's mission and facilitate the transition of new ISSOs into the VA environment, ensuring their immediate productivity. To address these challenges, Booz Allen, in partnership with VA Office of Information and Technology (OIT) Information Technology Workforce Development (ITWD), developed the ISSO Mentoring Program in March 2010, with four main objectives:

- Better integrate newly appointed ISSOs into the larger FSS team
- Provide a solid support system for career development
- Prepare mentors for leadership roles and supervisory responsibilities
- Improve the interpersonal and communication skills of both mentors and mentees

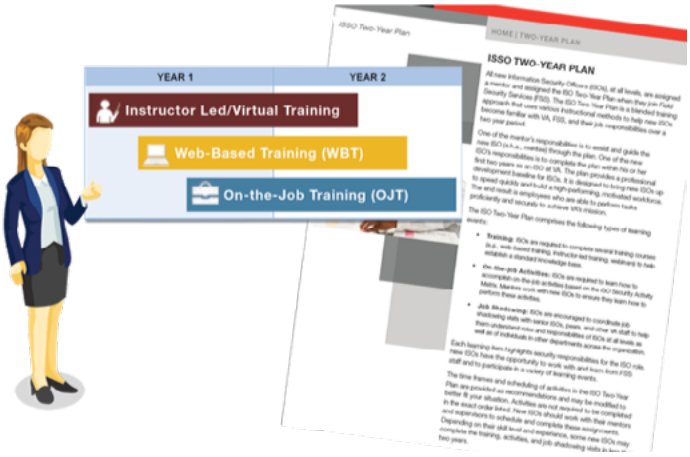
The program is comprised of components to help support the mentor and mentee, including professional development, mentor and mentee training, quarterly mentor and mentee forums, and the Mentoring Program Reference Guide.

The program currently consists of 80 mentor/mentee pairs who have committed to work together for at least 60 minutes each week for a two-year time period. The mentees are assigned a ISSO two-year learning plan in VA's Talent Management System (TMS). TMS allows mentors to track their mentee's progress against completion of items in the plan and assign additional training/activities based on the mentee's development needs.

Microlearning

IT Workforce Development (ITWD) at VA has invested in a professional development process grounded in a competency model framework. Working with Booz Allen over a period of 10 years, ITWD developed Technical and VA Core and Leadership competencies that provide a framework for all OIT employees to identify the key knowledge, skills, abilities, and behaviors that they need to succeed at VA.

With the framework in place, Booz Allen has been helping ITWD develop just-in-time, micro-learning courses that are offered via the VA IT Campus, an on-line academy that allows



for video learning at the convenience of the end-user. These courses cover the gamut of technical skill gaps to soft skills training. Post training assessments have revealed high employee satisfaction in closing skills gaps, addressing immediate training needs, and accessibility.

Educational Institution Partnerships

Booz Allen Hamilton is committed to professional excellence in the services it performs for its clients. To achieve this goal, the firm provides training and educational opportunities to help staff members enhance professional and technical knowledge and skills in areas directly related to their roles in the organization. Booz Allen has partnered successfully with several educational institutions to provide training in emerging fields.

Once such successful program is the Change Management Advanced Practitioner (CMAP) offered in partnership with Georgetown University's McDonough School of Business. Advanced change management skills are in high demand as the Federal Government continues to evolve and seeks to maximize resources amid budgetary constraints. This flagship advanced change management training, enhances Booz Allen's change management capabilities and aids Government clients by helping them implement major transformations, mitigate risk, and protect their investments.

The graduate-level CMAP Certification uses industry standards, establishes a formal training curriculum, and requires skills demonstration, testing, independent evaluation, and continuing education. Taught by some of the country's leading business professors and Booz Allen change management experts, the program couples academic theory with real-world experience in delivering successful change to organizations.

The intensive CMAP program is five months in its entirety, with two full-day sessions at Georgetown University's main campus each month, plus significant reading, writing, and team activities outside the classroom. The program has been highly successful with its graduates implementing change management processes in a number of Federal agencies.

Gamification

CyberSim™ is Booz Allen's proprietary, cloud-based assessment and training platform that uses realistic work samples, known as challenges, to evaluate participants' demonstration of job-relevant cybersecurity skills. In October 2016, the Army's Program Executive Office Ground Combat Systems (PEO GCS) organization selected Booz Allen Hamilton (Booz Allen) to pilot a CyberSim™ assessment to inform their training and development practices for their Information System Security Managers (ISSMs). For this engagement, Booz Allen conducted an abbreviated job task analysis on the work performed by PEO GCS ISSMs, developed a customized CyberSim™ training assessment for these employees, and delivered customized and actionable performance reports to each participant identifying strengths, developmental areas, and specific cyber training linked to the technical areas covered by the assessment.

Upon completion of the 30-item assessment, each participant received an individualized report with an overall assessment score, performance scores for each job role and related technical areas, and targeted training recommendations based on the content of each challenge. Booz Allen also provided PEO GCS leadership a technical report that included both individual- and cadre-level results and supporting, actionable recommendations. The effort allowed PEO GCS to gain a clearer understanding of the individual and shared training needs of their ISSM staff. Assessment results identified patterns of strengths and developmental areas both for individual employees and for the broader ISSM workforce. These findings led Booz Allen to make several recommendations, such as developing individual development plans for each participant based on their results, identifying and creating additional technical training where necessary, and using assessment results to inform workforce planning.

As technological advances continue to expand adult learning opportunities, new frontiers are emerging in technology-enhanced hands-on learning. Booz Allen has a team that is dedicated to exploring and implementing these new technologies as well. For instance, virtual reality may be a useful educational medium for professionals who use physical skills to solve problems, such as surgeons, nurses, electricians, and firefighters. Virtual reality removes mediating factors from the educational experience, creating new opportunities for new types of on-the-job cyber training activities. We are collaborating with our nation's academic and Government leaders to recast our educational programs according to today's and tomorrow's needs.

Communities of Practice (CoPs)

Booz Allen has an established record of building and managing CoPs for numerous clients, like the US Department of Veterans Affairs, and our own staff. We customize techniques, applications, and solutions to address the unique challenges organizations face every day. Booz Allen's Barrier-Free Human Performance Improvement™ model targets multiple audiences so networks can be strong and available to an organization when needed. Our approach supplements existing communities, integrating leadership, community participation, knowledge transfer, and technology. Booz Allen's ability to develop and customize CoP networking systems enables organizations to share critical knowledge and information through various communications, empowering employees to learn new skills and to make rapid decisions effectively and efficiently.

METRICS

It is possible to evaluate the effectiveness of reskilling and upskilling programs using measures like those used to produce the Department of Labor Employment and Training Administration's Workforce System Results (published on a quarterly and an annual basis). Programs are evaluated based on jobs found by trainees (the entered employment rate), the length of time they keep the jobs (the employment retention rate), and the salaries (six months' average earnings). Specific measurements include:

- **Employment Retention Rate:** The number of participants employed in target area nine months after program completion divided by the number of participants registered in the first quarter of the fiscal year.
- **Earnings Gain:** The difference between the average of the current wage of the total number of participants still employed nine months later and the average of the starting wage of the total number of participants registered in the first quarter of the fiscal year.
- **Average Cost Per Registered Participant:** Program budget allocation divided by total active participants (e.g., apprentices).
- **Retention with the same employer:** The rate of participants that are with the same employers but in a job area of targeted skills/abilities.
- **Recognized credentials:** The percentage of program participants who, during a program year, are in an education or training program that leads to or have completed a recognized postsecondary credential and who are achieving measurable skill gains, defined as documented academic, technical, or occupational forms of progress towards such a credential.

Booz Allen is experienced in training evaluation and has worked with Kirkpatrick Partners to produce the OPM Training Evaluation Field Guide, which shows how to produce an objective summary of quantitative and qualitative data about the effectiveness of training/reskilling. The primary purpose of evaluation is to make good decisions about use of organizational resources. Training evaluation data helps the organization to determine whether training and subsequent reinforcement is accomplishing its goals and contributing to the agency mission. It also helps agencies decide how to

adjust the training and other interventions for greater effectiveness. The Training Evaluation Field Guide contains a comprehensive evaluation methodology with the goal of cost effective training initiatives that maximize mission accomplishments.

LEVERAGING FEDERALLY-OWNED DATA

The 330 million citizens of the United States expect their Government to leverage data as a strategic asset, and provide data to its citizens that facilitate oversight, increase overall effectiveness, and promote transparency. These citizens also thrive on a digital culture where they can provide feedback and see actions to that feedback, so they feel heard. Cross-Agency Priority (CAP) Goal 2 of the President's Management Agenda aims to change the landscape of Federal data and specifically focuses the Government on "leveraging data as a strategic asset," charging the Government to create a set of practices that are integrated, logical, and coordinated across agencies, and that also engage citizens.

While the Government owns and exposes large and expansive data sets, they are not always well connected, and the citizen may not understand them in their current form. Citizens, residents, and visitors are hungry for data presented in easy to understand ways, yet many Government agencies have not provided citizens with the data they crave or a modern digital experience with citizen services.

The Government can, and should, partner with the private sector to create an architecture that creates a Federal taxonomy consistent across the agencies and validated by authoritative sources, ensuring high data quality. The Government is already working with the private sector to create lasting data standards, architecture, and taxonomy that link data elements together:

- **DATA Act Information Model Schema (DAIMS):** Created in a partnership between Booz Allen Hamilton, Kearney & Company, and the Treasury in response to the requirements of the Digital Accountability and Transparency Act (DATA Act) of 2014, a data-centric approach was needed to break the system and database silo paradigm that led to inconsistencies and challenges with data portability and comparability in financial data stored by every agency in the Government.

  To address this challenge, the DATA Act Information Model Schema (DAIMS) was created to standardize the reporting of spending data across the Government, connected throughout its lifecycle in a way that was independent of disparate agency systems. The DAIMS was designed to be comprehensive and flexible, while still providing the ability to draw data for validation directly from source and authoritative systems, including the Federal Procurement Data System (FPDS), Central Accounting Reporting System (CARS), Governmentwide Treasury Account Symbol Adjusted Trial Balance System (GTAS), among others.

- **National Information Exchange Model (NIEM):** NIEM is a standard library of information that enables information exchange across public and private organizations. NIEM helps agencies save time and money by providing consistent, reusable data terms and definitions, and repeatable processes. NIEM is used extensively across the justice community where background and law enforcement checks are performed when attempting to validate criminal records nation/worldwide.

While there are examples of existing public/private partnerships, there are many opportunities that would improve data use for public good, and where the GEAR Center could initially focus:

- **Centralized Data Platform:** Currently, the Government lacks a Government-wide data governance strategy that defines policies, roles, security, and responsibilities for ownership and dissemination of the data to the public. Data is housed separately across each agency in closed systems, sometimes only available for internal use, and is often presenting it in ways that are not meaningful. A centralized data store would provide a mechanism for agencies to share like data in a single data source, bound by a single data schema, that would allow for standardized reporting to agency leadership and the public.
- **The Grant Reporting Efficiency and Agreements Transparency (GREAT) Act:** Numerous agencies across the Government handle grant reporting in vastly different ways, while the information they collect is relatively similar. As the DATA Act provided a mechanism to standardize agency financial reporting, the GREAT Act would provide a standard way for agencies to report, store, and display data around agency grant spending and recipient information.

Data quality continues to be a problem across the Government for multiple reasons, including agency data being stored across multiple platforms, and is not shared externally due to perceived privacy/security restrictions. Even with currently-deployed data consolidation systems, such as Data.gov, which provide Government data sources to the public, most of the data provided in the system is contained in PDF- and text-based reports that are hard to consume by automated analysis systems without manual intervention and cleaning.

Potential solutions to improve data quality include:

- **Eliminate Intermediary Systems:** Intermediary systems are supposed to provide a single source of data to be ingested into other systems and provide consistency in the data that is ingested. Unfortunately, once the data is consumed into systems outside of the intermediary systems, changes to that data are likely not pushed back to the intermediary system and the data is now mismatched.
- **Create Government-Wide Data Standards:** As mentioned before, the DAIMS was deployed to ensure that the data consumed for DATA Act reporting was consistent across the 90+ agencies required to report their information.

Continued investment in creating data standards is imperative to ensuring data stored across the Government is standardized. Additionally, the appointment of a "Government Data Czar" would create a position of authority in the Government to ensure standards are created and maintained.

Hackathons are an example of where the private sector can provide a significant resource for solving these data challenges. Hackathons are normally timeboxed events where participants convert ideas into reality. With Government data provided to participants, a hackathon can provide a platform where new and cutting-edge ideas can be surfaced. For example, Booz Allen has created the Data Science Bowl in partnership with Kaggle – which brings together communities of data scientists to solve problems for social good, as well as grow data science capacity and capabilities. Booz Allen worked in partnership with NIH to cleanse a normally "private" data set for use in the bowl to help NIH find new ways to interpret the data.

Public APIs surfacing Government data are another way that can highlight the value of Government data encourage private investment to use the data. Recreation.gov is the system where the public can go to find out about the National Park Service, the national parks, and make reservations for park services. Currently, users can only access the information in Recreation.gov through the existing web portal. As we explain in the earlier case study, Booz Allen is working to deploy the new recreation.gov, which will have a public API to allow private companies to access the data in the reservation system. Users will have the ability to make reservations themselves through the web portal, but companies like Orbitz and Expedia will also be able to access the reservation system and let travelers book and pay for time in the parks alongside their plane and hotel reservations.

As the home of the U.S. Government's open data, Data.gov should continue to transform to make Government data as accessible and usable as possible. OMB issued the Open Data Policy in May 2013, with the seven principles that open data must be: public, accessible, described, reusable, complete, timely, and managed post release.

- Data.gov serves as the home of Federal Government data for the open data community to spur innovation, opportunity, and economic growth
- Data.gov was re-launched in January 2014, improving searchability of Federal datasets
- Led the implementation for the Project Open Data Metadata standard with Federal agencies, enabling common metadata and data discoverability
- Published quarterly metrics on how agencies are performing on the Open Data Policy through the Project Open Data Dashboard
- Introduced Topics, Highlights, and Updates, organized by domains to tell the important stories associated with the data sets
- Catalogued software applications that help people make informed decisions on the open Government data
- Facilitated other cross-Government data federation efforts with the U.S. Data Federation

Data.gov is a huge step forward in providing access to public data and there are opportunities to do more. Our future vision for Data.gov 2.0 would provide a mechanism for expanded use of Government data, and could provide a framework for the GEAR Center's data focus:

- **Enhance Standards:** Promote, foster, and facilitate the development of common data definitions, formats, and metadata. In the absence of uniform standards, develop an additional standardized "data layer" to enhance interoperability.
- **Curate Data with Feedbacks and Ratings:** Develop user feedback systems to flag quality problems for agencies. Use challenges, competitions, and crowdsourcing to improve data quality.
- **Encourage Quality/Timeliness of Data Sets:** Release both raw data and improved data with transparency about accuracy, quality and provenance. Publish measures to encourage reduction in HTML/PDF datasets and focus on machine-readable datasets.
- **Continue to Encourage Sharing:** Develop common tools, platforms, and catalogs for managing, sharing, and improving data.
- **Enhance Topics, Highlights, and Updates with Communities:** Build communities similar to live open-source communities on GitHub.
- **Encourage Publishing of Granular Data Sets:** Provide tools to publish data at different levels while protecting privacy.
- **Visualize Connectivity of Data Sets:** Deploy algorithms to make the connection between data sets transparent.
- **Streamline Analytics Capability:** Provide analytics cloud platform for data exploration, for Federal agencies and the public.
- **Leverage Cloud:** Provide data platform for agencies as a shared service for efficiency in opening up new data sets and better data governance.

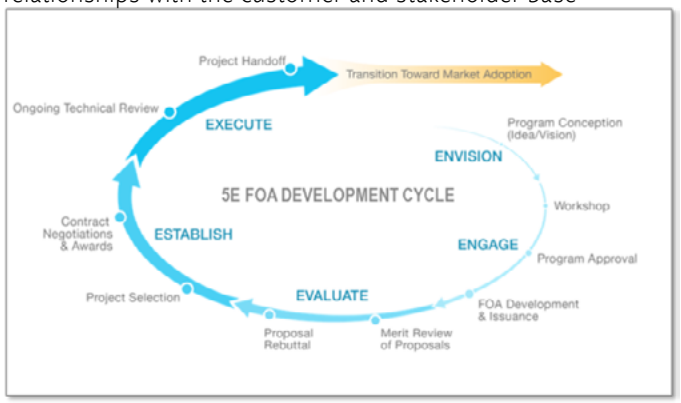
APPENDICES

7.0 Appendix: ARPA-E 5-E Portfolio Management Methodology

Booz Allen supported the development of the Department of Energy's Advanced Research Projects Agency-Energy's (ARPA-E) "5-E" portfolio management methodology. The 5 "E's" stand for Envision, Engage, Evaluate, Establish, Execute, and the process has unique and valuable attributes:

- Robust initial engagement with all relevant stakeholders during the Envision stage.
- Rapid execution during the Envision to Execution stages that is three to six months faster than any other DOE FOA process without compromising due diligence.
- The 5-E model further differentiates ARPA-E from other Government R&D offices by promoting greater transparency and by ensuring funding is only awarded to a highly selective group of innovative applicants.

The first phase of the 5-E construct is Envision. In our work with ARPA-E, the agency brainstorms program concepts that merit further research and external engagement. Once a program concept has been proposed for further exploration, the idea will be measured against the agency's strategic goals, ensuring that programs result in meaningful contributions. The success of the Envision phase depends on strong relationships with the customer and stakeholder base



throughout the Government to identify capability gaps and potential project champions. These capability gaps set the foundation for research program technical objectives to be disseminated across all potential demonstration performers (industry, academia, other Federal agencies, etc.).

Envision is fundamentally conducted in four steps. We outline below how the GEAR Center can effectively utilize each step.

Step 1: Establish Strategic Goals: The GEAR Center establishes macro-level program goals that align to the mission and vision of the GEAR Center. These should be strategic in nature and span 5 to 10 years.

Step 2: Define Technical Objectives: Within the program goals, the GEAR center should define measurable performance-based objectives it wants to accomplish in the short-term (1-2) years.

Step 3: Baseline Current and Recent Initiatives: The GEAR Center should strive to be unique and practical by keeping an active inventory of industry and Government demonstrations to avoid duplication.

Step 4: Develop Annual Program Roadmap: The GEAR Center should author and distribute and annual roadmap covering its program goals, technical objectives, and preferred funding arrangements with emphasis on innovative public-private partnerships with industry and academia. This will serve as the annual report and allows the GEAR Center to modify and enhance their goals and objectives over time.

In the Engage phase, we help ARPA-E engage stakeholders through conferences and industry days, reports, publications, and procurement channels (such as requests for information). ARPA-E then organizes detailed technical workshops and other external engagements to gather community input and techno-economic analysis to contribute to the program. Once the workshop has been completed and the agency is satisfied that they have received sufficient external engagement, the program concept is matured and pitched internally for cross-agency feedback (multiple industrial and scientific/engineering disciplines). The objective of pitching a program is to demonstrate that the proposed program has the potential impact and merit to move forward. are

To effectively utilize the Engage phase, the GEAR Center could publish an annual call for white papers through its Envision findings and participate and host industry events to socialize the intent and value of the GEAR Center, and identify specific ideas, partners and mechanisms for supporting new priority focus areas. A key component of the Engage activity is to ensure that GEAR Center's efforts are unique, practical and based on validated market demand.

Once the FOA is released, the process moves forward to the Evaluate stage. There are two phases to the typical ARPA-E FOA, the first phase is the Concept Paper phase and the second is the Full Application phase. During the Concept Paper phase, short applications are submitted, evaluated by qualified reviewers as well as the Merit Review Board

members, and a down-select is made based on multiple criteria that encourages risk-taking (not just a strict numerical ranking score). Any Concept Paper applicant may choose to submit a Full Application but the agency encourages or discourages such a submission to save the community time in preparing applications that are unlikely to merit funding. Full Applications are evaluated against the Merit Review Criteria by peer external reviewers, each of whom are required to attend a Merit Review Panel to discuss their reviews. Applicants are provided comments from the reviewers and are given an opportunity to respond to those comments before decisions are made.

The performers' feedback, responses and project ideas are evaluated by technical subject matter experts and coordinated with the customer base to assess technology readiness level (TRL), value to mission, impact to technical objective, and likelihood for transition. The GEAR Center, for example, could leverage a third-party manager to review and make recommendations to a GEAR Center selection committee for project selection.

In the Establish phase, award negotiations are initiated upon selection. Under the 5-E construct, ARPA-E has established aggressive deadlines for the completion of award negotiations, typically 60-90 days after selection. During the award negotiations, selectees are expected to make updates, clarifications, and changes to the documentation submitted as part of their Full Application. Aggressive Technical Milestones and Deliverables are agreed to, along with critical contractual details, and the awards are issued. Furthermore, a prioritized list of investment activities is established to guide them through appropriate processes; critical when working with small businesses, non-traditional Government contractors, or academia. The GEAR Center could create a prioritized list of efforts and align them to best-fit funding tools with emphasis on innovative P3s. The Gear Center could have the ability to authorize P3 arrangements on behalf of other Government agency contingent on a signed memorandum of agreement allowing the authority. Industry partners, like Booz Allen, can provide additional capability for engineering and design reach-back to work with each performer to validate or tailor a niche technology to meet their needs and provide quality control oversight.

Once projects have been negotiated and awarded, project execution begins (the Execute phase) and continues throughout until the project is closed. Once a product is ready for demonstration, Booz Allen has worked with ARPA-E to provide a standardized approach to "Execute" demonstrations. This approach begins with establishing a demonstration management plan with scope, project champion and stakeholders, timeline and critical path, and demonstration objectives that will qualify the technology to elevate to the next technical review or to a program of record. This replicable, structured approach will carry a project through the entire demonstration; assessment, evaluation, demonstration, and transition.

In the Execute phase, ARPA-E is heavily involved in oversight responsibilities throughout the execution of projects and maintains the right to accelerate the project with additional funding, defund the project, or redirect the project entirely. ARPA-E visits each project at least twice per year, often each quarter to track progress and assist in solving technical issues. A critical component of this active engagement is preparing technologies for an eventual transfer from lab to market. ARPA-E's goal is to help research teams develop the knowledge and skills they need to prepare for and expedite private-sector deployment of their technologies, once successful. Finally, the execution stage ends with project closeout.

For the Execute phase, the GEAR Center could provide standardized reporting templates and take an active role in the P3 management and measurement and verification through the life of the project. In addition, the GEAR Center could develop and publicize annual program targets to its membership through an annual call for white papers and participation and sponsorship of industry events.

The Gear Center program management office should have the ability to establish relationships with universities for collaborative activities. Once an effort is awarded, the Gear Center should provide active project management to ensure that the task-specific goals are met and continue to align with the program targets.

8.0 Appendix: Additional Organizational Models and Examples

ROCK ISLAND ARSENAL JOINT MANUFACTURING & TECHNOLOGY CENTER

The manufacturing, assembly, and laboratory facilities of the Army's Rock Island (IL) Arsenal were being used at less than 50% of their capacity when a consortium of public and private agencies approached the Garrison Commander with a partnership. Today the facilities operate in excess of 90% of capacity, the Army has 1.5 million square feet of fully modernized state-of-the-art manufacturing and laboratory facilities producing a variety of products critical to national defense, and private corporations and investors are reaping profits and creating jobs. In addition, public partners are using the facilities as a training ground, developing local talent and workforce to fill those jobs. Partners include Rock Island Arsenal, Quad City Manufacturing Lab, BAE Systems, Sylver Steel, Blackhawk Community College, Mandus Group, and Supply Core.

The Army Retooling and Manufacturing Systems (ARMS) Program created similar success stories at the Volunteer Army Ammunition Plan in Chattanooga, TN, and the Indiana Army Ammunition Plant, yet the ARMS Program has been allowed to languish in recent years. The GEAR Center can examine the ARMS Program and consider ways to revitalize it, possibly including extending its P3 capabilities to Federal manufacturing and laboratory facilities nationwide

MONTREAL UNIVERSITY HOSPITAL RESEARCH CENTER, MONTREAL, CANADA

The Montreal University Hospital Research Centre (CRCHUM) is home to more than 360 researchers (35% basic researchers, 55% clinical research and 24% population health researchers) and around 450 students. The Centre's facilities were aging and costs to operate and maintain were rising annually. Construction of an ultra-modern, state-of-the-art integrated research center that is focused on innovation, non-invasive human exploration and knowledge transfer applied to health care services, populations and teaching began in 2010.

The private partner, Accès Recherche Montréal s.e.c, took on all responsibilities and risks to design, construct (or redevelop some reusable old facilities), finance and maintain the Centre for 30 years. These responsibilities also included management of power consumption and promotion of energy conservation. In return they are receiving monthly service payments sufficient to service and retire their debt, pay all costs and fees, and produce a profit. Partners include Infrastructure Québec, Montreal University Hospital, Accès Recherche Montréal s.e.c (a consortium led by Fiera Axium Research and Meridiam Infrastructure Canada Finance).

Benefits to the public include the redevelopment of an aging facility into a state-of-the-art medical research center, transfer of project financing risks to the private sector, avoiding requirement to appropriate C$400 million up front to fund a major construction project, transportation improvements, and avoidance of C$8 million in construction and O&M costs over 30 years. Accès Recherche Montréal s.e.c receives 30 year monthly service payments subject to a performance and energy-use benchmarks and profits from the financing structure.

GERMAN FEDERATION OF INDUSTRIAL RESEARCH ASSOCIATIONS

The AiF Research · Technology · Communication GmbH (AiF F · T · K) sees itself as a service company for small and medium-sized companies, founders and scientific institutions that supports entrepreneurs and thought leaders in the realization of innovation projects.

AiF acts as the management and governance organization for CORNET. CORNET is a self-sustained network of ministries and funding agencies that combine their existing funding schemes to increase the competitiveness of small to medium enterprises. In this way, CORNET supports funding organizations worldwide to introduce pilot actions and schemes for pre-competitive Collective Research. Partners include 8 European nations, Japan, Peru, Quebec Province, 100+ industry associations, 1200+ research centers, and 50,000+ businesses.

INNOVATE UK, CATAPULT NETWORK

The Catapult network was established by Innovate UK (a British Government agency) and is one of the ways Government supports innovation by UK business. Each Catapult Centre does this by providing access to expert technical capabilities, equipment, and other resources required to take innovative ideas from concept to reality.

Catapults are not-for-profit, independent physical centers which connect businesses with the UK's research and academic communities. Each Catapult Centre specializes in a different area of technology, but all offer a space with the facilities and expertise to enable businesses and researchers to collaboratively solve key problems and develop new products and services on a commercial scale.

The Centres gain their funds from a mix of competitively-earned commercial funding and core Innovate UK investment. The funding model will vary through the life of the technology and innovation centers, and can be expressed in simplified terms as following the one-third, one-third, one-third model. Under this model, Centres are required (when fully established) to generate their funding broadly equally from three sources: competitively bid business-funded R&D contracts; collaborative applied R&D projects, funded jointly by the public and private sectors, also bid competitively;

and core public funding for long-term investment in infrastructure, expertise and skills development.

Whether a business is in need of a new manufacturing process, a fresh approach to digital rights protection, or a new way of balancing energy demands in a future city environment, Catapults can help them.

Each Catapult Centre is a company limited by guarantee (CLG), a separate legal entity from Innovate UK. They are controlled by their own Boards with an Executive Management team responsible for the day-to-day management of each Catapult.

NORTHEAST MARYLAND/ABERDEEN PROVING GROUND I-HUB

Aberdeen Proving Ground, the Home of Army's Technology, partners with several organizations to develop regional innovation hubs that target several technology areas including cyber, autonomous vehicles/systems, and advanced/additive manufacturing.

Army Research Laboratory's Open Campus Initiative: Partners from Army, Industry and Academia engage in research with shared access to people, infrastructure and resources, with $83 million of in-kind research produced, 61 Cooperative Research and Development Agreements (CRADA) with Academia and 79 CRADAs with industry.

Advanced Manufacturing, Materials & Processes (AMMP) Consortium: A collaboration between the National Center of Manufacturing Sciences (NCMS) and its partners, ARL, the State of Maryland, and Harford County, funding comes from multiple sources including Federal, state, in-kind contributions, and membership fees. AMMP focuses on next-generation manufacturing breakthroughs to meet warfighter needs, and brings together Government, academia, and industry tool makers, material scientists, and end users, utilizing both P3 and Other Transaction Agreement (OTA) models.

Regional Additive Manufacturing Partnership Maryland (RAMP MD): Established by state law to provide organizational structure and initial funding, their board includes Federal, state, and local Government, industry, academia and regional organizational representation. Partnership with APG organizations through overarching Cooperative Research and Development Agreement (CRADA) with RDECOM, RAMP MD provides access to several behind-the-gate facilities. Participants enter into a Joint Work Statement under CRADA to have access and to facilitate payment to Government for materials and labor.

DefTech Maryland: Defense Technology Commercialization Center: Funded through Maryland Department of Commerce grant with DoD Office of Economic Adjustment (OEA) and in-kind contributions, DefTech Maryland partners with with Harford and Cecil Counties and serves as a hub for commercialization of US Army technologies developed at APG by supporting the community through entrepreneurship development and expanded innovation, driving industry diversification and technology commercialization in the region, and fostering a collaborative environment between APG scientists and engineers, local companies, and entrepreneurs.

Overall the Northeast Maryland/Aberdeen Proving Ground IHub has more than 100 partners, including the Armed Forces Communications and Electronics Association, International Society of Logistics, International Test & Evaluation Association, National Contract Management Association, National Defense Industrial Association, Battelle, Susquehanna Workforce Network, Maryland Department of Commerce, Booz Allen Hamilton, and Hartford County, Maryland.

THE STRATEGIC ENVIRONMENTAL RESEARCH AND DEVELOPMENT PROGRAM AND THE ENVIRONMENTAL SECURITY TECHNOLOGY CERTIFICATION PROGRAM

SERDP and ESTCP are DoD-funded activities to pursue leading edge technology demonstrations that address critical needs of the Department in the areas of environment and energy. SERDP and ESTCP solicit input from the DoD research lab's and Headquarters offices for technology gaps. These gaps are turned into requirements and are distributed through an annual call for projects. Responses, in the form of white papers, are reviewed by a DoD/DOE committee of subject matter experts to assess the validity of the white paper against the requirement. Viable white papers are responded to with a formal request for proposal and briefing to the SERDP and ESTCP committee for evaluation and recommendation for funding.

9.0 Appendix: Recreation.gov Case Study

Booz | Allen | Hamilton

RECREATION.GOV: A MODEL FOR PUBLIC-PRIVATE PARTNERSHIPS

Modernizing how industry works with government at low- or no-cost, with shared risk and improved delivery, unlocking unparalleled taxpayer value

JULY 2018

CONSULTING | ANALYTICS | DIGITAL SOLUTIONS | ENGINEERING | CYBER

BOOZ ALLEN IS MODERNIZING HOW INDUSTRY WORKS WITH GOVERNMENT TO DELIVER BETTER VALUE FOR TAXPAYERS

SHIFTING RISK, IMPROVING DELIVERY, AND UNLOCKING BOTH SCALABLE REVENUE AND PERFORMANCE WITH TRUE PUBLIC-PRIVATE PARTNERSHIPS BETWEEN INDUSTRY AND GOVERNMENT

Currently, the way in which government buys services from industry is largely divorced from performance. Despite rigorous procurement standards, "good enough for government work" is still shorthand for the fact that the bar in the federal market is below that of the private sector. That shouldn't be, and elevating the experience for both citizens and government users to private-sector standards is the new driver of government transformation. Changing the traditional professional services business model (hour-based labor) to one tied to quality and outcomes will drive increased value for clients, improve mission delivery for citizens, and allow access to scalable revenue streams for the business.

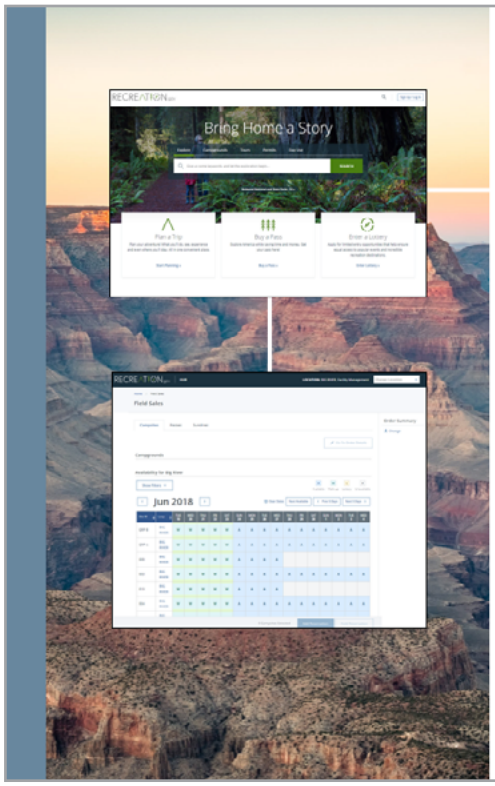
TRADITIONAL PROFESSIONAL SERVICE PROVIDER MODELS

- In most federal procurements of professional services the **government assumes the majority of the risk**, with **costs dictated by vendor multiples** but **divorced from short- and mid-term performance** benchmarks, while the **vendor is locked into fixed revenue streams** and low profit margins, with **little incentive to innovate** or deliver truly differentiated performance, especially with long periods-of-performance between contract recompetes.

OUTCOMES-BASED PROFESSIONAL SERVICE PROVIDER MODELS

- **Tying performance to revenue allows industry and government to share risk, lowering costs for the government,** and allowing the vendor to access scalable revenue based on outcome, **inject private-sector market efficiency and improve delivery** of the mission for taxpayers. **Vendors are highly incentivized to deliver continuously improving service** as it ties directly to their bottom line.

Booz Allen Hamilton 1



RECREATION.gov

CREATING A CONSUMER-GRADE DIGITAL EXPERIENCE FOR CITIZENS, AND ENHANCED WORKFLOWS FOR FEDERAL STAKEHOLDERS

TRUE PUBLIC-PRIVATE PARTNERSHIP—SHARING RISK AND REWARD

Booz Allen is investing to create the system that meets the specific needs of the Recreation.gov program. In return for accepting much of the risk, Booz Allen retains ownership rights to the platform and can use that platform to support other clients and businesses.

- Booz Allen's revenue is generated by collecting transactional fees from customers that use the system
- The contract is structured to allow Booz Allen to share in the reward for improved delivery, expanded service and transactional volume growth
- Booz Allen has an incentive to move fast on upgrades and keep the platform on the cutting edge of technology as this system competes in the market, and continued investment in an owned asset becomes part of a long-term business strategy

A MODERN VISION FOR DIGITAL FEDERAL SERVICES

The new Recreation.gov will give the U.S. Forest Service and other agency stakeholders a completely modern solution for managing citizens' interaction with our Federal lands and waters - integrating intuitive search, dynamic trip planning, mapping, financial transaction management, and open APIs for third parties into the government's online reservations system.

- The new Recreation.gov is on par with leading e-Commerce websites and stands as a new benchmark in how Government can interact with citizens in a digital age
- Using modern software platforms and collaborative development methodology, this program combines the best of what industry can offer with the unique needs of Government missions to redefine the relationship with the user community

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RECREATION.gov

PRIVATELY-OWNED TECHNOLOGY DRIVING VALUE FOR TAXPAYERS, GOVERNMENT, AND INDUSTRY

INCENTIVIZING PERFORMANCE & OUTCOMES

- Outcome success, instead of billed labor, drives vendor profit incentivizing performance beyond requirements, continuous improvement, and ongoing innovation
- Compensation is dictated by effective missions delivery, and not prices fixed ahead of time based on vendor multiples and corporate overhead
- Fewer contract mods reduces administrative burden

LIMITING RISK TO GOVERNMENT AND TAXPAYERS

- By building software or a service offering that they will own, vendor assumes greater amount of risk
- Vendor balances risk/reward in more typical market conditions – not subject to appropriations and budget fluctuations
- Cost for service is borne by those citizens who choose to use the service versus utilizing general tax revenues

PROVIDING AGILITY AND MARKET RESPONSIVENESS

- Consolidating ownership to a single contract allows for faster responsiveness to changing market conditions, without the burden of a typical acquisition cycle
- Vendor can more easily execute software license agreements, short-term or part-time arrangements, specialized services, subcontracts, and other value-added actions
- Vendor can create new services and delivery channels to improve citizen value without the constraint of separate acquisition

MANY MODELS FOR PUBLIC-PRIVATE PARTNERSHIPS

- There are many other models that enable the government to compensate vendors based on the value they provide, rather than costs determined by wrap rates and overhead
- Well thought-out timelines and an open and transparent procurement process allow for robust dialogue to collect industry ideas and articulate needs without the pressure of contract end dates

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OMB CAN HELP AGENCIES BUY SERVICES IN NEW MODELS, DRIVING PERFORMANCE, AND MAKE SURE THAT THE AMERICAN TAXPAYER GETS MORE FOR THEIR MONEY

INCREASING VALUE FOR THE GOVERNMENT, CITIZENS, AND BUSINESS

A variety of established and evolving models shift acceptable risk to the private sector and align profit to performance and outcomes, improving efficiency in the federal market, insuring value for taxpayers, and increasing both performance incentives and potential revenue for business.

FEE FOR PERFORMANCE The business receives payment based upon the satisfactory delivery of products and/or services, defined by outcome	**Cost-per-Action (CPA)** Common in advertising, CPA deals are based on the relative effectiveness of services, directly tracking effect	**Incentive-Based Pricing** In conjunction with traditional pricing methods, the vendor is awarded bonuses for achieving defined performance above the service-level agreement	**Value-Based Purchasing/Pricing** Often a JV funded by investor capital, a group of service providers are compensated by outcome, often to federal and state government programs; also used increasingly in healthcare	**Software as a Service (SaaS)** A consumption-based IT model—the vendor provides access to software or platform on a subscription or other pay-per-use basis, often with added services as part of the contract
SHARE OF SERVICED TRANSACTIONS The business receives payment as a proportion of transactions it services, be it on a digital platform or as an outsourced service provider	**Transaction Processing** A vendor receives a small percentage of a payment made to the contracting organization, examples in Visa and Mastercard as well as new FinTech companies such as Venmo	**Transaction Management Platform** Similar to Transaction Processing outside of the financial industry, a fee-for-service transaction management model may be a part of a suite of services in which the vendor owns and operates a platform on which the payer hosts its transactions, akin to a SaaS model, but not consumption-based		
SHARE OF VALUE The business receives payment based on the benchmarked value provided or cost savings	**Share-In-Savings (SIS)** A contractor's earnings are a proportion of the savings delivered to the payer based on the contractor's services, there is no upfront cost and the service provider is incentive to perform quickly and to high standards	**Gain Share Pricing** The vendor earns a premium based on its expertise and contribution to the contracting organization's mission and outcomes, such as the outsourced management and operation of payer-owned assets	**Shared Risk-Reward Pricing** The contractor and customer jointly fund new products, services, and solutions and the contractors shares in the revenue stream over a predefined period	

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THE GOVERNMENT ALREADY LEVERAGES THESE MODELS, AND IT WORKS

INCREASING VALUE FOR THE GOVERNMENT, CITIZENS, AND BUSINESS

They are few and far between, but this is already happening in insolated pockets. Agencies, given the direction, can leverage these where appropriate to transform the delivery of their missions.

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Recreation.gov allows the government to use a portion of the revenue stream transacting through the system to compensate the contractor. The contractor is incentivized to market the system to consumers and provide an exceptional user experience, with the potential to scale revenue and increase net income to the government

The IRS uses private debt collectors to pursue tax revenue that has been written off as uncollectable. The government does not have the resources to pursue it. But the private debt collectors are task-focused, and are compensated with a portion of the revenue they recover. The rest of it gets earmarked for tax enforcement in the IRS.

The Department of Energy uses private companies to take over the operations and management of government assets, outsourcing the government mission to the private sector to make cost-based decisions, rather than by allocated-and-exhausted budget appropriations. The higher they perform, the more money they save, the greater the performance incentive.

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PUBLIC-PRIVATE PARTNERSHIPS, LIKE THE NEW RECREATION.GOV, CAN AND WILL REVOLUTIONIZE MISSION DELIVERY

WE UNDERSTAND THE ADMINISTRATION'S PRIORITIES. WHEN AGENCIES ARE READY TO BUY SERVICES WITH DIFFERENTIATED BUSINESS MODELS, WE'RE READY TO DELIVER—OTHER COMPANIES WILL FOLLOW.

- ✓ When industry takes on the risk and retains an ownership stake in solutions, we can move faster, more efficiently, retain flexibility, and stay on the cutting edge of technology for the length of a contract.
- ✓ This model will keep government apace with the private sector, and ensure continuous improvement as vendors have the incentives to outperform built into the model.
- ✓ This model is replicable, low cost, and incentivizes vendor performance.
- ✓ Federal acquisition does not have to be at taxpayer expense.
- ✓ This is the value that the American Taxpayer expects for their dollar.

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