



Making it Easier to Work with DHS: The Critical Role of Detailed Operational Requirements

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In today's dynamic homeland security environment, delivering cost-effective products and services that meet well thought-out detailed requirements is a critical objective for the U.S. Department of Homeland Security (DHS). DHS is composed of many organizational elements with an overriding goal: to enable, support and expedite the mission-critical objectives of DHS' seven operating components – Transportation Security Administration (TSA); U.S. Customs and Border Protection (CBP); U.S. Secret Service, (USSS); U.S. Citizenship and Immigration Service (USCIS); U.S. Immigration and Customs Enforcement (ICE); Federal Emergency Management Agency (FEMA); and the U.S. Coast Guard (USCG). These seven operating components work closely with, support and are supported by a large network of first responders at the state, local and tribal levels. DHS must coordinate, drive and prioritize the detailed needs of this diverse group of operating components and supporting elements, whose missions address a wide variety of terrorist and natural threats to our homeland, in order to maximize the effective use of DHS' resources. Ever changing threat dynamics often require new, innovative-technology based solutions in order to prevent or mitigate the potential effects of current and future dangers. The DHS Science and Technology Directorate (DHS-S&T), works diligently to understand, document and offer solutions to current and anticipated threats faced by our "customers" (DHS operating components and field agents) and our "customers' customers" (first responders and the eighteen infrastructure industrial sectors such as banking, chemicals and communications, etc.).

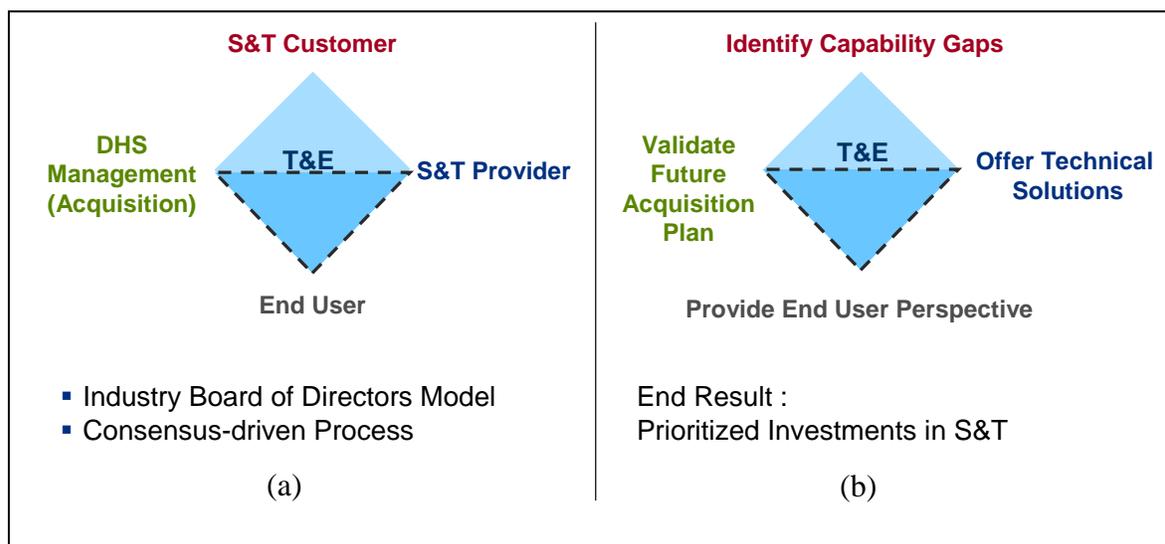
Capstone IPTs and Capability Gaps

DHS-S&T, through the Capstone Integrated Product Team (IPT) process¹, ensures that quality, efficacious products are developed in close alignment with customer needs. The Capstone IPT process is the framework that determines that developed capabilities meet operational needs, analyzes gaps in strategic needs and capabilities, determines operational requirements, and develops programs and projects to close capability gaps and expand mission competencies. This process is a DHS customer-led forum through which the identification of functional capability gaps and the prioritization of these gaps across the Department are formalized. The IPTs oversee the research and development efforts of DHS-S&T and enable the proper allocation of resources to the highest priority needs established by the DHS operating components and first responders.

Capstone IPTs bring together S&T division heads, acquisition partners and end-users (Operating Components, field agents and supporting First Responders – customers of DHS) involved in the Research, Development, Testing and Evaluation (RDT&E) and acquisition activities. Working together, the IPT identifies, evaluates and prioritizes the necessary requirements to complete missions successfully. IPTs also assess the technological and system readiness of products that will ultimately be deployed into the

field. Figure 1 shows the organization of a Capstone IPT. The formation of the IPT at an early stage allows key stakeholders to identify and address critical capability gaps. Each Capstone IPT has a DHS operating component chair or co-chairs. The chair/co-chair, representing the end-users of the delivered Enabling Homeland Capabilities (EHCs), or suite of technologies needed to close a capability gap, engage throughout the process to identify, define and prioritize current and future requirements and ensure that planned technology and/or product transitions and acquisition programs, commercialization efforts and standards development are optimally suited to their operational requirements. Operating components, field agents, first responders and other non-captive end-users with an interest in the core functional areas of an IPT are welcome to participate and contribute throughout the Capstone IPT process.

Figure 1 (a) This diagram shows the structure of the Capstone IPT model with (b) the models' output



functions carried out by each IPT member.

The Capstone IPTs are structured to focus on functional, department level requirements, articulated as capability gaps, and deal with programmatic and technology issues within the six S&T divisions. Capstone IPTs have been created across twelve major Homeland Security core functional areas: Information Sharing/Management, Cyber Security, People Screening, Border Security, Chemical/Biological Defense, Maritime Security, Counter-Improvised Explosive Devices, Transportation Security, Incident Management, Interoperability, Cargo Security and Infrastructure Protection. Each Capstone IPT is chaired by senior leadership from a DHS operating component with needs that correspond to a specific functional area. All DHS operating components with an interest in a particular Capstone IPT are invited to send a representative to participate as an IPT member. See Figure 2 for the captive members for each IPT.

DHS Requirements/Capability Capstone IPTs

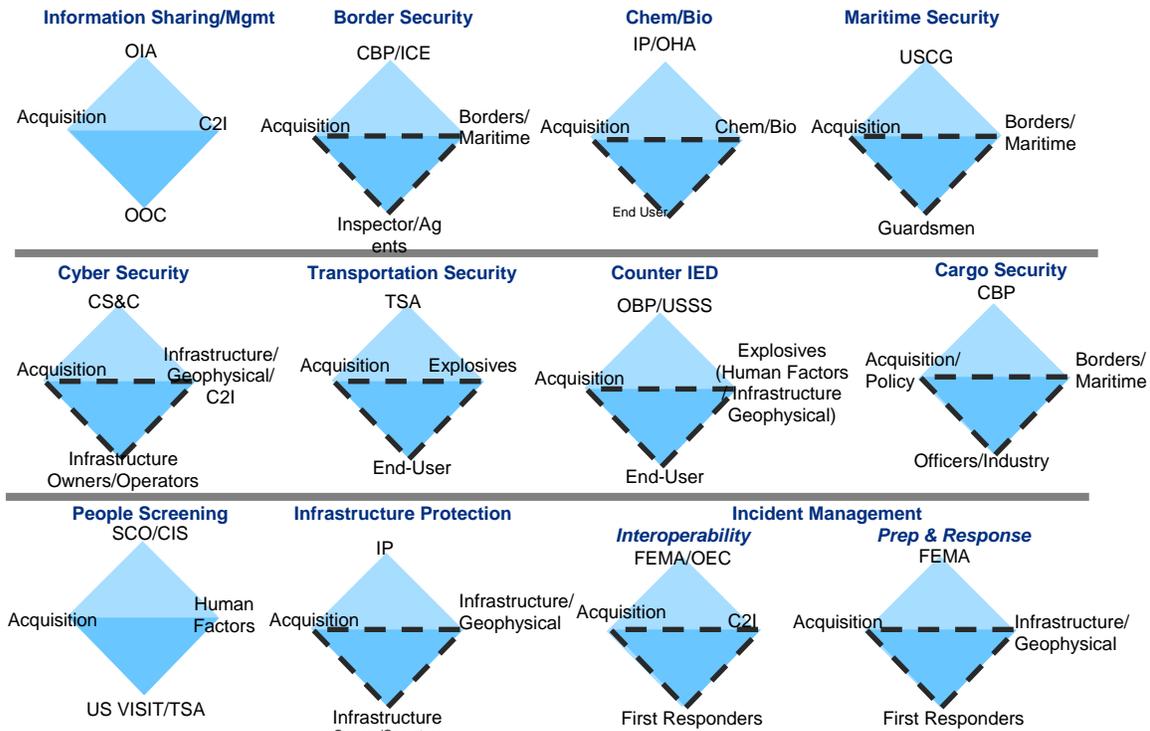


Figure 2. This diagram shows the twelve Capstone IPTs, the DHS operating component, DHS end-user(s), the S&T Division technical provider, and, when applicable, the Acquisition conducted by DHS management.

Technology development is aligned functionally, rather than by operating component “stove pipes,” to allow technologies to be used in support of multiple operating components within DHS. This broad focus aids in reducing the duplication of efforts among various operating components of DHS. In order to achieve greater insight into the facets that comprise each Capstone IPT, Project-IPTs are created to manage specific project areas within a functional area. For example, Border Officer Tools and Safety, and Container Security are Project-IPTs for the Border Security and Cargo Security Capstone IPTs, respectively. Project-IPTs consist of several subject matter experts who are responsible for clarifying the capability gaps derived from the Capstone IPTs and for developing detailed operational requirements with the operating components for the systems that will comprise the EHCs. The Project-IPTs work closely with DHS customers, through an Operational Requirements Document (ORD), to define clearly the specific requirements that must be met in order for a technological solution to address a given problem. Integration of these products into systems forms the EHCs for use by the customers. All DHS agencies are responsible for integrating and fielding the technology deliverables into operational systems scheduled for delivery to their operating component.

Beyond Capability Gaps...

Capstone IPTs generate several outputs that guide the development and fielding of products, services and systems for the operating components. The primary role of the IPTs is to conduct strategic needs analysis to determine and prioritize the capability gaps that exist within a particular functional area. Capability gaps are broad descriptions of

department level identified mission needs that are not met given current products and/or standards. Capability gaps catalog opportunities for enhanced mission effectiveness or address deficiencies in national capability.

The Capstone IPT process enables our divisions within DHS-S&T to interact regularly with their customer(s) to determine capability gaps. These capability gaps, in many ways, are just the beginning. From a product development standpoint, a capability gap is one of the initial steps in the requirements hierarchy scheme. Additional detailed requirements must be developed to enable the development of a technology or product. In our outreach efforts with the Private Sector, DHS-S&T realizes that we must work with our customers to produce a detailed set of requirements in order to communicate with other operating components and frequently to the private sector, which has the ability to develop products aligned to stated requirements.

Commercialization Model Drives the Need for Detailed Requirements

The U.S. Department of Homeland Security is forging a new paradigm with far-reaching positive consequences for DHS' customers, private sector partners, and U.S. taxpayers through the rapid, cost-effective and efficient development and deployment of products and services to protect the Homeland of the United States. As a recently formed U.S. Federal Government Department (March 6, 2003), DHS is "creating a culture" where public-private sector partnerships, beneficial to both sectors and taxpayers alike, expedite the development of products and services to protect the nation. Recently announced commercialization initiatives like the SECURE (System Efficacy through Commercialization, Utilization, Relevance and Evaluation) Program are truly groundbreaking and innovative approaches to foster a mutually beneficial relationship between the public and private sectors by creating an open and freely competitive program accessible by small, medium and large firms to provide potential solutions to DHS requirements. These efforts are a natural extension of the Capstone IPT process.

DHS possesses an "Acquisition Mindset," as do so many government agencies. While the Acquisition model has been, and continues to be, utilized effectively in developing custom, one-off products such as aircraft carriers, it is not particularly germane to a majority of the needs at DHS as well as the first responders (a DHS ancillary market). The timely design, development and deployment of lower priced, widely distributed products for both DHS operating components and the first responder communities represents a critical step in protecting our nation. Recognizing this fact, the Department recently started implementing a "Commercialization Mindset" in order to leverage the vast capabilities and resources of the private sector through an innovative "win-win" private-public partnership called the SECURE Program stressing the need for detailed requirements.

Why is there a need for a commercialization process? DHS requirements, in most instances, are characterized by the need for widely distributed COTS (Commercial-Off-The-Shelf) products. Oftentimes, the need is for thousands, if not millions, of products for DHS' seven operating components and the fragmented, yet substantial first responder market. Figure 3 shows the major differences between a "pure" Acquisition versus "pure" commercialization processes, along with the recently developed and implemented DHS "hybrid" commercialization process.

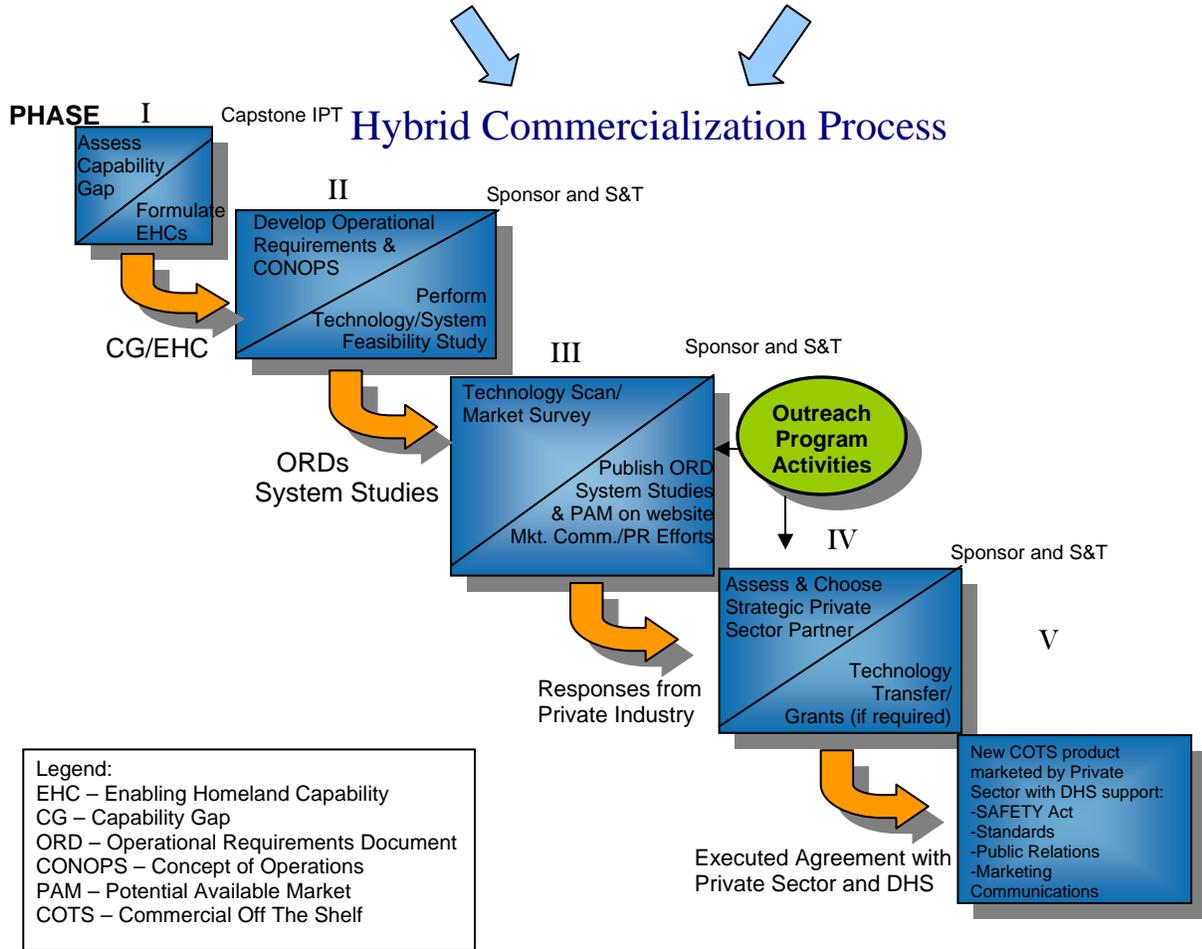
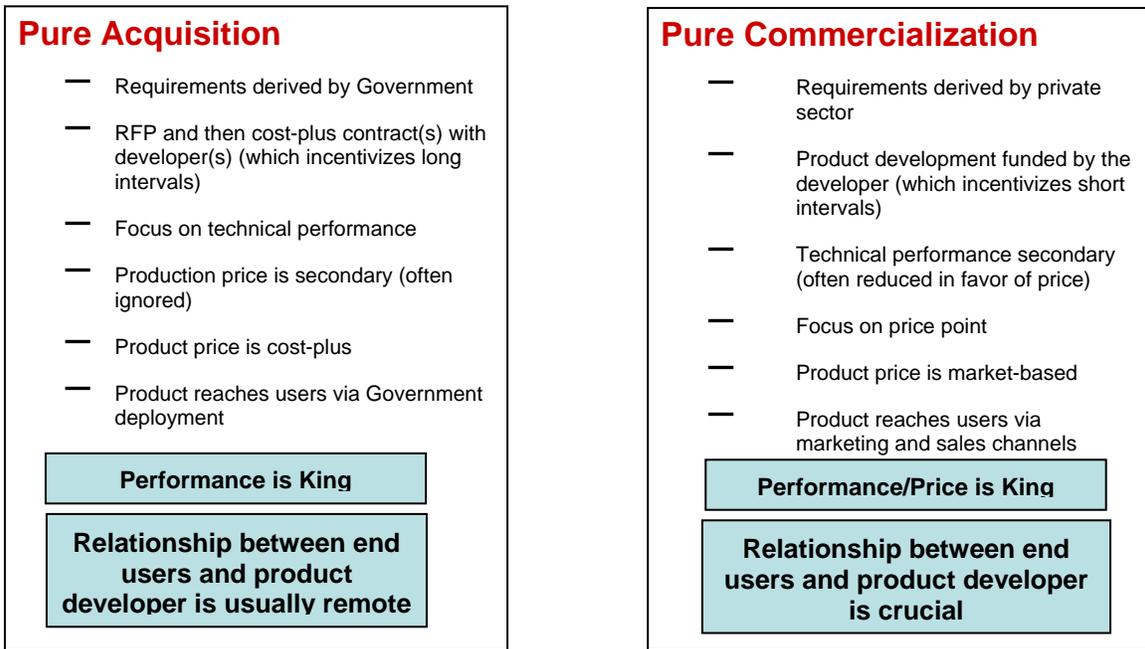


Figure 3: Comparison of “Pure Acquisition” versus “Pure Commercialization” models for product/system development and the resultant hybrid model implemented by DHS.

Figure 4 delineates the overall description of DHS’ new commercialization model and its first private sector outreach program called the SECURE Program to develop products and services in a private-public “win-win” partnership described in detail at www.dhs.gov/xres/programs/gc_1211996620526.shtm. The SECURE Program is based on the simple premise that the private sector is willing and able to use its own money, resources, expertise and experience to develop and produce fully developed products and services for DHS if significant market potential exists. The private sector has shown remarkable interest in devoting its time and resources to such activities, if and when an attractive business case can be made related to large revenue/profit opportunities, which certainly exist at DHS and its ancillary markets. The private sector requires two pieces of critical information from DHS: 1. detailed operational requirement(s), and 2. a conservative estimate of the potential available market(s). This information can then be used to generate a business case for possible private sector participation in the program.

A New Model for Commercialization...

- Develop Operational Requirements Documents (ORDs)
- Assess addressable market(s)
- Publish ORD and market assessment on public DHS web portal, solicit interest from potential partners in a way that is open to small, medium and large businesses
- Execute no-cost (CRADA-like) agreement with multiple private sector entities and transfer technology and/or IP(if necessary)
- Develop supporting grants and standards as necessary
- Assess T&E findings after product is developed to assure DHS and ancillary markets that product meet its published specifications
- New Commercial-Off-The-Shelf (COTS) product marketed by private sector with DHS support

SECURE Program



- Application – Seeking products/technologies aligned with posted DHS requirements
- Selection – Products/Technologies TRL-5 or above, scored with internal DHS metrics
- Agreement – One-page CRADA-like document that outlines milestones and exit criteria
- Publication of Results – Recognized third-party T&E conducted on TRL-9 product/service. Results verified by DHS, posted on DHS web-portal to provide confidence to potential customers at DHS and its ancillary markets that product(s) meet or exceed their published specifications in reference to their actual performance.

Figure 4: Step-by-step guide to the commercialization process developed and adopted by DHS with a brief summary of the popular SECURE Program.

To augment the commercialization process, DHS has undertaken the task of developing an easy-to-use comprehensive guide to assist in developing operational requirements. This guide now enables DHS personnel to articulate, in detail, a given system’s requirements and communicate those needs to both internal and external audiences. This effort addresses a long-standing need for DHS to fully articulate its requirements. Figure 5 clearly shows how an ORD takes a capability gap to “much higher resolution,” a

necessary required if the private sector is to aid DHS in its goal of expediting the development and deployment of cost-effective and efficient widely distributed products.

Requirements Hierarchy (TSA example)

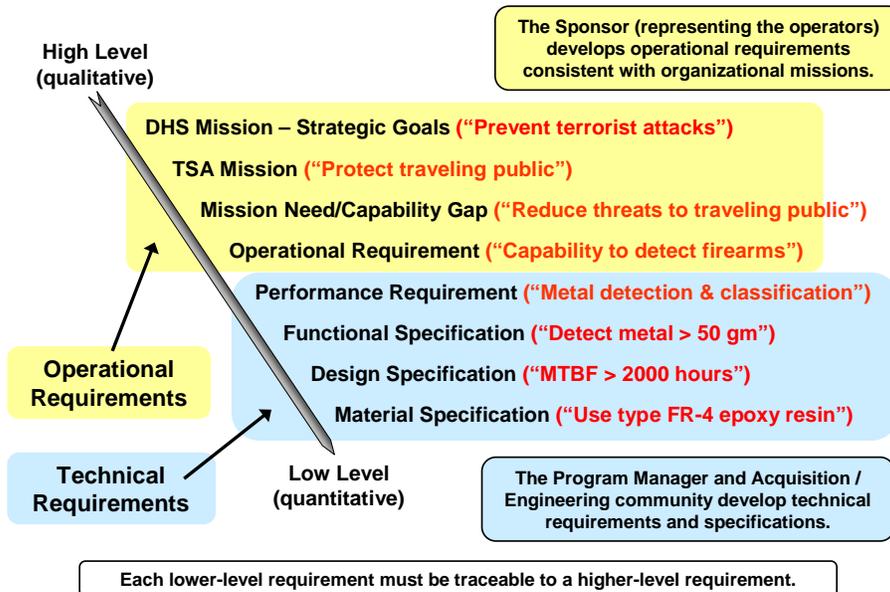


Figure 5. This requirements hierarchy shows the evolution of requirements from a high-level macro set of operational requirements to a low-level micro set of technical requirements. Note that each lower level requirement stems directly from its higher requirement so that all requirements are traceable to the overall DHS Mission.

Early response from groups within DHS, the private sector, and first responders about this guide and programs like SECURE has been very favorable². The Department plans to regularly update its website with Operational Requirements Documents (ORDs) to continually expand this innovative private-public partnership. In addition, as evidenced in Figure 6, the taxpayers, private sector and public sector view programs like this as “win-win-win.”

Benefit Analysis – “Win-Win-Win”		
Taxpayers	Public Sector	Private Sector
1. Citizens are better protected by DHS personnel using mission critical products	1. Improved understanding and communication of needs	1. Save significant time and money on market and business development activities
2. Tax savings realized through private sector investment in DHS	2. Cost-effective and rapid product development process saves resources	2. Firms can genuinely contribute to the security of the Nation
3. Positive economic growth for American economy	3. Monies can be allocated to perform greater number of essential tasks	3. Successful products share in the “imprimatur of DHS”; providing assurance that products really work.
4. Possible product “spin-offs” can aid other commercial markets	4. End users receive products aligned to specific needs	4. Significant business opportunities with sizeable DHS and DHS ancillary markets
5. Customers ultimately benefit from COTS produced within the Free Market System – more cost effective and efficient product development	5. End users can make informed purchasing decisions with tight budgets	5. Commercialization opportunities for small, medium and large business

Figure 6: The SECURE Program is viewed positively by DHS stakeholders. The success of the program lies in the fact that all participants receive significant benefits.

In conclusion, DHS’ newly created and implemented commercialization process offers long-awaited benefits to the rapid execution of cost-effective and efficient development of products and services to protect our nation and its resources.



Thomas A. Cellucci, Ph.D., MBA is the U.S. Department of Homeland Security’s first Chief Commercialization Officer. In his role, he recently published two comprehensive guides: *Requirements Development Guide* and *Developing Operational Requirements* to aid in effective requirements development and communication for the department. He possesses extensive experience as a senior executive and Board Member in high-technology firms in the private sector.

¹ Kikla, Richard V. and Cellucci, Thomas A. “Capstone IPTs: Even in Government the Customer Comes First,” April, 2008.

² Margetta, R. “S&T Official Working to Move Product Development Out of DHS, Into Private Sector,” Congressional Quarterly Homeland Security. June 27, 2008.

Doing Business with DHS S&T:

All U.S. Government business opportunities can be found at www.fedbizopps.gov.

- **HSARPA:** Register to join the HSARPA mailing list to receive various meeting and solicitation announcements. Link to the Long Range Broad Agency Announcement solicitation, where multiple awards are anticipated and will be based upon the proposal evaluation, funds availability, and other programmatic considerations. Also link to Representative High Priority Technology Areas, where DHS areas of interest can be found. <http://www.hsarpabaa.com>
- **Small Business Innovation Research(SBIR):** SBIR's goal is to increase the participation of innovative and creative small businesses in Federal Research/Research and Development (R/R&D) programs and challenge industry to bring innovative homeland security solutions to reality. <http://www.sbir.dhs.gov>
- **SAFETY Act:** The SAFETY Act enables the development and deployment of qualified anti-terrorism technologies and provides important legal liability protections for manufacturers and sellers of effective technologies. <https://www.safetyact.gov/>
- **TechSolutions:** The mission of TechSolutions is to rapidly address technology gaps identified by Federal, State, Local, and Tribal first responders by fielding prototypical solutions within 12 months at a cost less than \$1M per project. www.dhs.gov/techsolutions
- **Commercialization:** The mission of S&T's commercialization efforts is to identify, evaluate, and commercialize technologies that meet the specific operational requirements of DHS operating components and first responder communities. The commercialization efforts actively reach out to the private sector to establish mutually beneficial working relationships to facilitate cost-effective and efficient product development efforts. Please contact Chief Commercialization Officer Tom Cellucci at S&T-Commercialization@dhs.gov.



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