The Role of Small Business in the Future U.S. Defense Industrial Base

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Miss Suzanne Patrick
DUSD (Industrial Policy)

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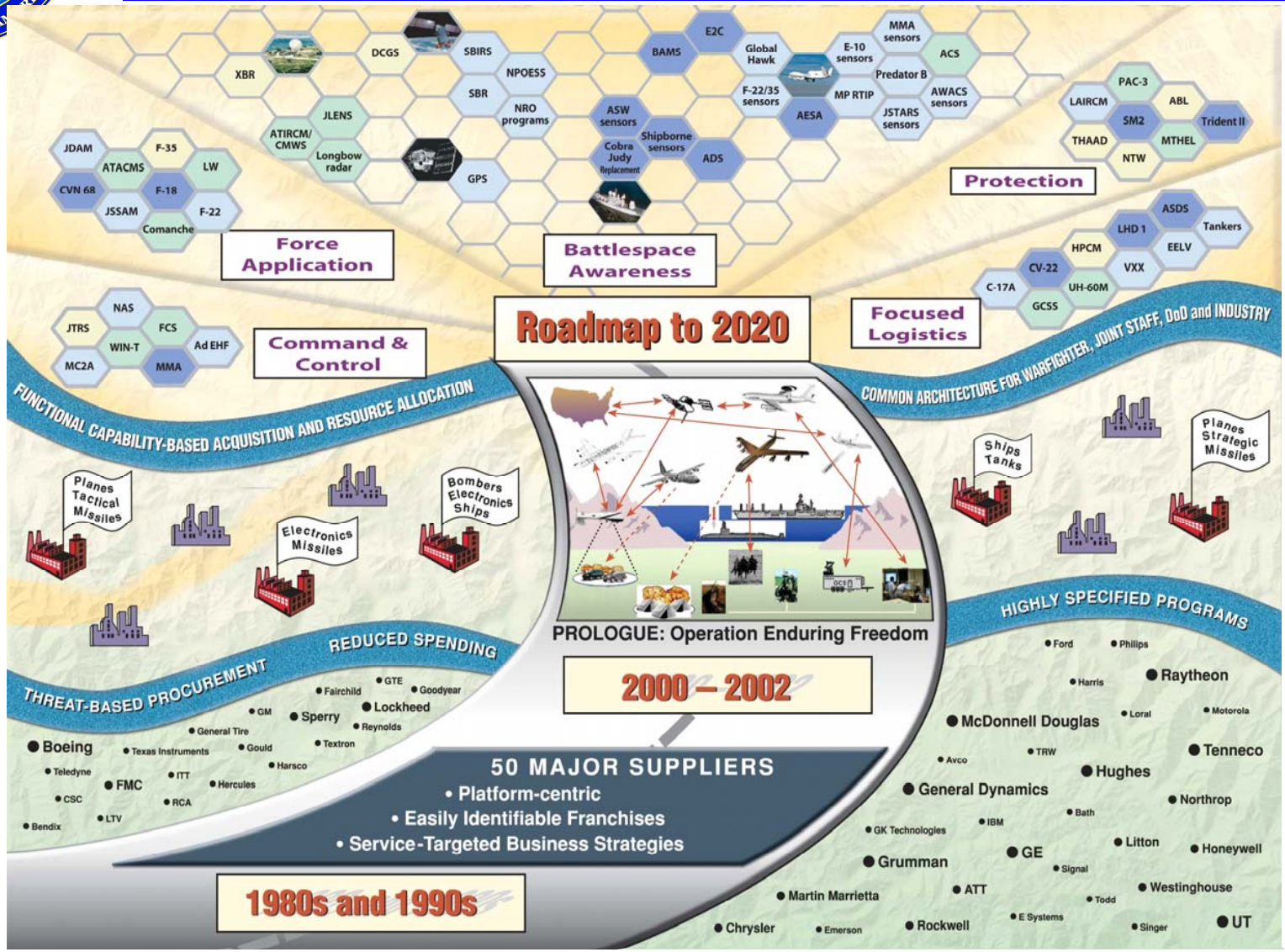
"The energy and vitality that we see in smaller niche segments in our society, in technology, tends not to deal with government because … dealing with government is just a put-off. Who in the world wants to do it if he can avoid it? It's burdensome. It's ugly. It takes forever to get anything done. Delay helps the big companies, because they've got all the lawyers and all the lobbyists and all the people in Washington. Smaller companies don't have the time to do all of that. That means that government tends not to have the kind of interaction with the creativity and innovation that exists in our society."

– Secretary of Defense Donald H. Rumsfeld
November 18, 2002

Source: Fortune, "Don Rumsfeld Talks Guns and Butter," interview by Anne Plummer

Roadmap to the Future



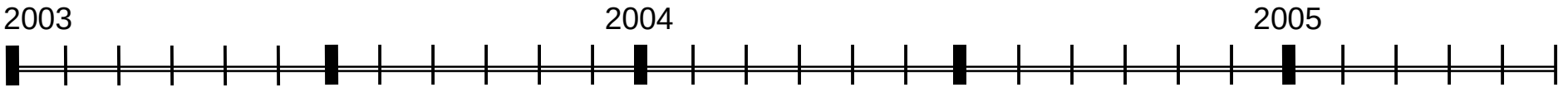
Source: Adapted from *Transforming the Defense Industrial Base: A Roadmap*, ODUSD(IP), February 2003 (www.acq.osd/ip)

Joint Staff Functional Concepts

Battlespace Awareness Global Hawk, MP-RTIP, NAS, Predator UAV (MQ-9), NPOESS, SBIRS-High, Cobra Judy Replacement, E-2 Advanced Hawkeye	Capabilities of commanders and all force elements to understand the environment in which they operate and the adversaries they face. Uses a variety of surveillance capabilities to gather information, a harmonized secure netcentric environment to manage this information, and a collection of capabilities to analyze, understand and predict.
Command and Control GBS, AEHF, FBCB2, JTRS, SMART-T, WIN-T, MCS, NESP	Capabilities that exercise a commander's authority and direction over forces to accomplish a mission. Involves planning, directing, coordinating, and controlling forces and operations. Provides the means for a commander to recognize what is needed and ensure that appropriate actions are taken.
Force Application AMRAAM, DDG 51, GMLRS, JDAM, JSOW, CVN 21, MM III, SSGN	Capabilities to engage adversaries with lethal and non-lethal methods across the entire spectrum of conflict. Includes all battlefield movement and dual-role offensive and defensive combat capabilities in land, sea, air, space, and information domains.
Protection ATIRCM/CMWS, PAC-3, Chem Demil	Capabilities that defend forces and U.S. territory from harm. Includes missile defense and infrastructure protection and other capabilities to thwart force application by an adversary.
Focused Logistics LPD-17, C-130, CH-47, H-1 Upgrades, GCSS, T-AKE, T-45 Training System, C-17, C-5 RERP, FMTV, V-22, MH-60	Capabilities to deploy, redeploy, and sustain forces anywhere in or above the world for sustained, in-theater operations. Includes traditional mobility functions of airlift, sealift, and spacelift as well as short-haul (intra-theater and battlefield) transportation. Also includes logistics C2, training, equipping, feeding, supplying, maintaining and medical capabilities.

Source: Joint Staff Functional Concepts and ODUSD(IP)

Defense Industrial Base Capability Study Series in Context



Transforming the Defense Industrial Base (02/03)

FINDINGS

- The Department should view industrial base as composed of operational effects-based sectors
- From program justification through budgeting and acquisition, the Department should organize its decision-making processes to optimize operational effects
- The Department should analyze the results of a systematic assessment of critical technology requirement in each of these sectors.

SECDEF Initiates Joint Capabilities Development Process (10/03)

CJCS Instruction 3170.01C Published (06/03)

Joint Defense Capabilities Study (Aldridge) (12/03)

PURPOSE

- Established procedures to identify, assess, and prioritize joint military capability need
- Provided a construct for the Department's efforts to re-engineer corporate processes and unify focus on delivering warfighting capabilities
- Serves as the cornerstone in realigning the Department's planning and budgeting processes

Defense Industrial Base Capability Study Series

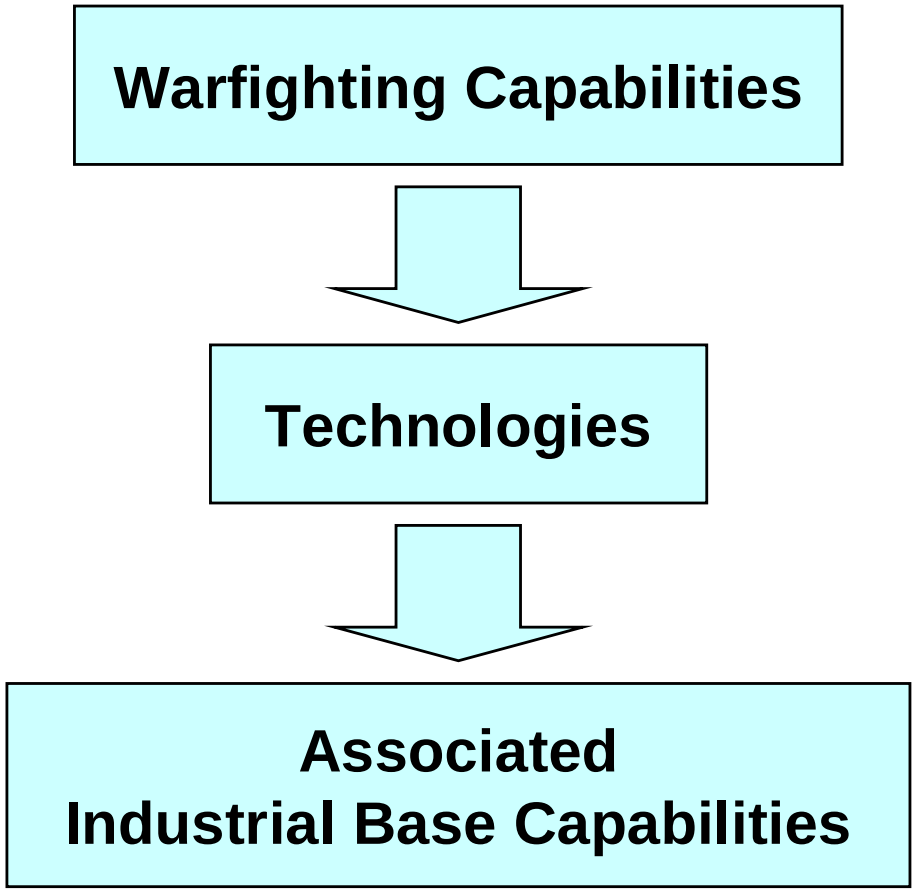
- **Battlespace Awareness** (01/04)
- **Command & Control** (06/04)
- **Force Application** (10/04)
- **Protection** (12/04)
- **Focused Logistics** (05/05)

DEFENSE INDUSTRIAL BASE CAPABILITY STUDY (DIBCS) SERIES STUDY OBJECTIVES

Develop a capabilities-based industrial framework and analytical methodology as a foundation for programmatic and investment decision-making.
Identify technology critical to enabling the new Joint Staff functional warfighter capabilities. Establish a reference database of these key critical industrial base capabilities mapped to warfighting functional capabilities.
Conduct industrial base capability assessments on priority critical technologies to identify deficiencies.
Develop a systematic method to craft industrial base strategies to remedy industrial base deficiencies identified and encourage proactive, innovative management of the industrial base.

Source: ODUSD(IP)

DIBCS Translation Process



Source: Booz Allen Hamilton and ODUSD(IP)

DIBCS Report Schedule

DIBCS Report	Publication Date
Battlespace Awareness	January 2004
Command & Control	June 2004
Force Application	October 2004
Protection	December 2004
Focused Logistics	May 2005

Source: ODUSD(IP)

The Defense Industrial Base Capability Study Series as a Lexicon: From Warfighting to Technology and Industrial Base Capabilities

The Translation Process

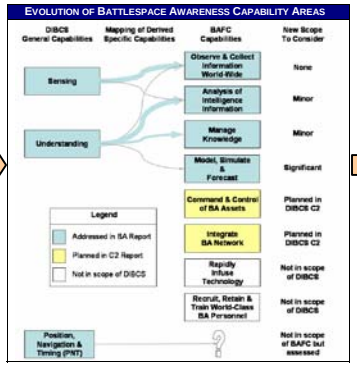
Report Data

Operational Capability Framework

Battlespace Awareness Functional Concept Capabilities

Operational	• Observe and Collect Information World-Wide • Analysis of Intelligence Information • Model, Simulate & Forecast • Manage Knowledge • Command and Control of Battlespace Awareness Assets
Enabling	• Integrate Battlespace Awareness Network • Rapidly Infuse Technology • Recruit, Retain, & Train World-Class Battlespace Awareness Personnel

Evolution of Battlespace Awareness Capability Areas



Broad Industrial Areas for Battlespace Awareness

- Acoustic Sensing
- Chemical, Biological, Radiological and Nuclear Event Sensing
- Combination Sensing
- Environmental Sensing
- Electro-Optical Sensing
- Hyperspectral Sensing
- Information Technology
- Infrared Sensing
- Laser Sensors
- Magnetic Sensing
- Microwave Sensing
- Other Imaging
- Radar
- Radio Frequency Sensing
- Sonar
- Tagging
- Timing and Geopositioning Devices

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Technologies & Industrial Base Capabilities

Battlespace Awareness Industrial Base Issues

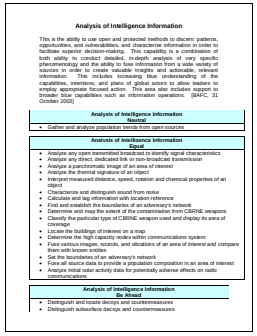
Technology	Industrial Base Sufficiency Analysis: Domestic Sources	Foreign Sources
Active Hyperspectral Imager	4	3
Active Electronically Scanned Array (AESA) Radar	2 major	5
Maser Clocks	2	3

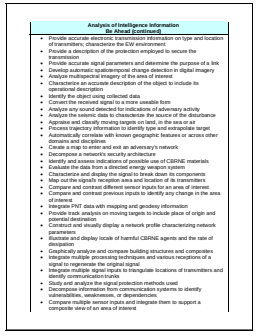
21 Battlespace Awareness Technologies with Sufficient Industrial Base Capabilities

- Passive Acoustic, Seismic, and Electromagnetic (PASEM) and Effluent Sensing Techniques
- Laser Induced Breakdown Spectroscopy
- Polymerase Chain Reaction
- Hyperspectral Imager
- Long Wave Infrared Imaging
- Near Infrared Imaging
- Staring Dual Band Infrared Arrays
- Laser Interferometry
- LIDAR seekers with Autonomous Target Acquisition
- RF Emitter-related Sensors
- Inertial Navigation System with Micro Electromechanical Systems (MEMS)
- Interferometric Fiber Optic Gyroscope
- Foliage Penetrating Synthetic Aperture Radar
- Ground Penetrating Radar
- Lightweight, Broadband, Variable-Depth Sonar
- Synthetic Aperture Sonar
- Atomic Clocks
- Laser Cooled Atomic Clocks
- Miniature Atomic Clocks
- Ultrasonic Imaging
- Ultraviolet Imaging

Appendix A

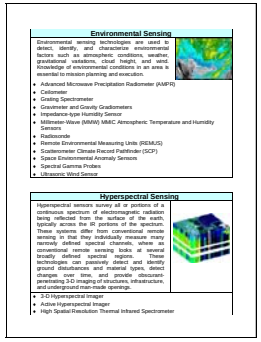
DIBCS Battlespace Awareness Capability Framework





Appendix B

Critical Technologies for Battlespace Awareness Organized by Broad Industrial Areas



Appendix C

A Compendium of Representative Defense Technology Suppliers with Transformational Capabilities

Broad Industrial Areas

Battlespace Awareness	• Acoustic Sensing • Chemical, Biological, Radiological, and Nuclear Event Sensing • Combination Sensing • Environmental Sensing • Electro-Optical Sensing • Hyperspectral Sensing • Information Technology • Infrared Sensing • Laser Sensors	• Magnetic Sensing • Microwave Sensing • Other Imaging • Radar • Radio Frequency Sensing • Sonar • Tagging • Timing and Geopositioning Devices
Command & Control	• Collaboration Management • Communication Components • Computers • Data Management • Decision Support • Displays	• Information Management • Location and Identification • Modeling and Simulation • Power Generation and Storage • Software Encryption and Tasking • Unmanned Vehicle Control

Source: Booz Allen Hamilton

Industrial Base Issues

	Technology	Industrial Base Sufficiency Analysis			Rationale
		Domestic Sources	Foreign Sources		
Battlespace Awareness	Active Hyperspectral Imager	4	3		U.S. capability trails potential adversaries' capabilities due to foreign technology advancements in civil applications.
	Active Electronically Scanned Array (AESA) Radar	2 major	5		Number of major domestic suppliers of AESA radars is probably still sufficient. However, degree of U.S. leadership is threatened by significant overseas competition.
	Maser Clocks	2	3		Maser clocks provide better precision and reliability than cesium atomic clocks and are standard in foreign GPS-like systems. U.S. capability is at best equal, and small market demand limits supplier base.
Command & Control	Helmet Mounted Display	5	4		Traditionally used for pilot applications, use of HMDs is now expanding into land warfare and U.S. leadership may be insufficient given new applications and essentiality to future warfighting concepts.
	Swarming Control Tools	Many[1]	Many[1]		U.S. research efforts are even with foreign institutions, with many foreign developers performing research in this technology area essential for remote vehicle control.
	Optical (Laser) Intersatellite Links	2	3		Competition with European and Japanese developers has been growing. Market is still small and presently two suppliers are adequate.

[1] Swarming Control Tools are still in R&D, not production.

Source: Booz Allen Hamilton and ODUSD(IP)

Crafting Defense Business Strategies by Functional Capability

Actor	Objective	Process
Emerging Defense Suppliers **Global Defense Suppliers**	Better access to U.S. Defense Industrial Base	• Map technologies by functional capabilities; overlay with U.S. functional capabilities. • Assess which technology is/are gap fillers, innovate, or revolutionize existing capabilities. • Develop business strategy targeting associated senior JCS/Department leadership, program managers, and companies.

Source: ODUSD(IP)

Backup

DIBCS Methodology: Battlespace Awareness Example

1 Identify U.S. Leadership Goals for Capabilities

Capability	Degree of Leadership			
	Neutral	Equal	Be Ahead	Be Way Ahead
Observe & Collect Info World-Wide		Detect airborne EM transmissions	Detect and locate underground, man-made structures	Characterize conventional explosions
Analysis of Intelligence Info	Gather and analyze population trends	Set the boundaries of an adversary's network	Generate combatant position based on sensor data	Integrate various sensor inputs to depict the EM battlespace
Manage Knowledge	Display raw imagery data	Manage operationally significant information	Recover signal from a noise environment	Display analysis based on all source inputs
Model, Simulate & Forecast				Develop a model for predictive battlespace awareness

Decompose capabilities and identify functions to determine enabling technologies

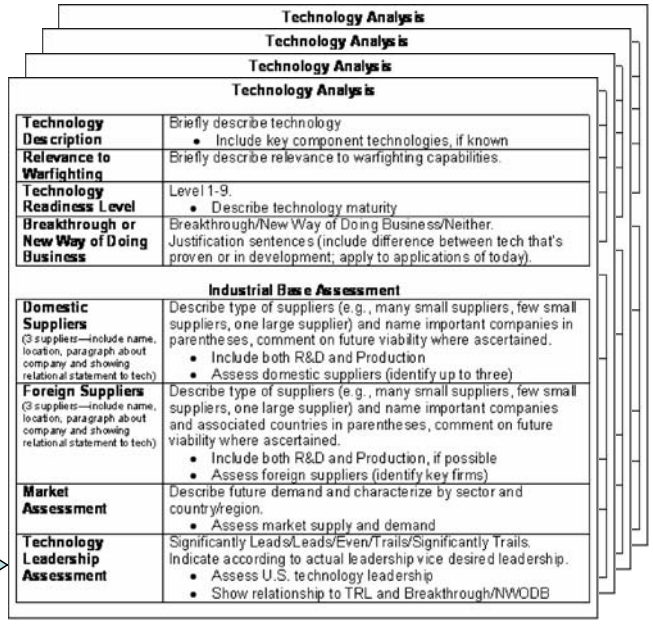
2 Determine Enabling Technologies for Be Ahead/Be Way Ahead Capabilities

Critical Technology/ Industry List (270)

- Long Wave Infrared Imaging
- Active Hyperspectral Imager
- Laser Interferometry
- Active Electronically Scanned Array Radar
- Maser Clocks
- Ground Penetrating Radar
- Lightweight, Broadband, Variable-Depth Sonar
- Ultrasonic Imaging
- Near Infrared Imaging
- Miniature Atomic Clocks
- Laser Induced Breakdown Spectroscopy
- Polymerase Chain Reaction
- ...

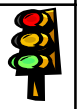
Prioritize technologies to focus and scope assessments

3 Assess Industrial Base Capabilities for Each Critical Technology



Source: Booz Allen Hamilton and ODUSD(IP)

Industrial Base Issues

	Technology	Industrial Base Sufficiency Analysis			Rationale	Remedy
		Domestic Sources	Foreign Sources			
Battlespace Awareness	Active Hyperspectral Imager	4	3		U.S. capability trails potential adversaries' capabilities due to foreign technology advancements in civil applications.	More U.S. investment. Department should consider strong program to develop the chemical signature and surveillance capabilities.
	Active Electronically Scanned Array (AESA) Radar	2 major	5		Number of major domestic suppliers of AESA radars is probably still sufficient. However, degree of U.S. leadership is threatened by significant overseas competition.	Continued R&D investment by industry and the Department focused on performance improvements, better manufacturing techniques, and broader applications. Department should carefully manage future competitions and block teaming impediments.
	Maser Clocks	2	3		Maser clocks provide better precision and reliability than cesium atomic clocks and are standard in foreign GPS-like systems. U.S. capability is at best equal, and small market demand limits supplier base.	Department should invest in R&D and structure future systems to allow for competition among innovative timing technologies thus incentivizing industrial investment and attention.
Command & Control	Helmet Mounted Display	5	4		Traditionally used for pilot applications, use of HMDs is now expanding into land warfare and U.S. leadership may be insufficient given new applications and essentiality to future warfighting concepts.	Department should fund innovative non-aviation applications and structure acquisition strategies and leverage weapon system designs to promote competition and innovation among suppliers.
	Swarming Control Tools	Many[1]	Many[1]		U.S. research efforts are even with foreign institutions, with many foreign developers performing research in this technology area essential for remote vehicle control.	Department must appropriately control intellectual property rights so that they are available to multiple potential manufacturers and be ready to stage competitions to develop sufficient sources.
	Optical (Laser) Intersatellite Links	2	3		Competition with European and Japanese developers has been growing. Market is still small and presently two suppliers are adequate.	Department should require competition of components during design of optical intersatellite links to encourage multiple satellite communication suppliers and new industry participants.

[1] Swarming Control Tools are still in R&D, not production.

Source: Booz Allen Hamilton and ODUSD(IP)

Functional Capabilities Applications in Defense Enterprise Strategies

Corporate Entity	Application	Utility
Government/Industry Program Managers	Decompose programs by functional capabilities/subsystems to assess applications for other platforms/ functions.	Facilitates cross-platform functional applications
Corporate Operating Groups and Military Services	Map operations by functional capabilities to better address customer needs and synergize corporate portfolio.	Provides benefits of functional view at corporate operating level and “common operating picture” across enterprise.
Corporations, the Defense Industrial Base, Defense Establishments, and supranational organizations	Assess business strategies based on consolidated view of existing capabilities relative to required capabilities.	Ensures common language among senior decision makers throughout the defense enterprise, better anticipatory capabilities, and more seamless access to markets/ technology opportunities.

Source: ODUSD(IP)