

**Annual Industrial Capabilities Report
to
Congress**



February 2004

Report Documentation Page			Form Approved OMB No. 0704-0188		
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 00 FEB 2004		2. REPORT TYPE N/A		3. DATES COVERED -	
4. TITLE AND SUBTITLE Annual Industrial Capabilities Report to Congress				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Department of Defense Washington, DC				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release, distribution unlimited					
13. SUPPLEMENTARY NOTES The original document contains color images.					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT UU	18. NUMBER OF PAGES 39	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

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Foreword

Twice in the last century, the United States heeded the call of European and other nations to engage in major world conflicts. In both of these conflicts, the fledgling American industrial base added capacity and surged production to meet these unexpected, long-term, warfighting demands. In contrast, recent engagements (Operation Enduring Freedom and Operation Iraqi Freedom) matched state-of-the-art and legacy products of the defense industrial base with multi-dimensional, unconventional, and asymmetric tactics to produce a truly come-as-you-are war with a brand-new, transformational script. With the emergence of terrorism and asymmetrical warfighting tactics, the Department of Defense (DoD) is adopting a different lens for viewing the defense industrial base: one organized around the most essential operational effects that the U.S. warfighter must deliver to be successful.

This new paradigm has led the Joint Staff to redefine 21st century warfighting requirements based on functional capabilities, such as Battlespace Awareness, Command and Control, Protection, Force Application, and Focused Logistics. The Joint Staff is developing a sixth functional capability: Net Centric Operations. The new paradigm requires a redefinition and reassessment of the industrial base capabilities that are truly critical to the warfighter. This new evaluative process will help to focus the manufacturing base on the challenges of 21st century warfare.

Additionally, with the need to posture itself against the mobile threat of terrorism, the Department is moving toward a “global sourcing” principle for distributing its forces worldwide. Although an evolutionary process, the Department is focusing on moving from a principle of having forces assigned to a specific region and being very regionally controlled to one where forces can be readily shifted to meet threat requirements as necessary around the globe.

Consistent with this global force distribution principle is the reality that coalition warfighting operations, the resulting interoperability requirements, the benefits of cooperative defense programs, and an increasingly global industrial infrastructure require that the Department be prepared to accept the benefits offered by access to the most innovative, efficient, and competitive suppliers worldwide.

This report reflects the Department’s movement toward capabilities-based warfighting and decision-making within an evolving worldwide security and industrial environment.

Executive Summary

Section 2504 of title 10, United States Code, requires that the Secretary of Defense submit an annual report to the Committee on Armed Services of the Senate and the Committee on Armed Services of the House of Representatives, by March 1st of each year. The report is to include:

“(1) A description of the departmental guidance prepared pursuant to section 2506 of this title.

(2) A description of the methods and analyses being undertaken by the Department of Defense alone or in cooperation with other Federal agencies, to identify and address concerns regarding technological and industrial capabilities of the national technology and industrial base.

(3) A description of the assessments prepared pursuant to section 2505 of this title and other analyses used in developing the budget submission of the Department of Defense for the next fiscal year.

(4) Identification of each program designed to sustain specific essential technological and industrial capabilities and processes of the national technology and industrial base.”

This report contains the required information.

1. Introduction

Transforming the Defense Industrial Base: A Roadmap (February 2003) identified the need for a systematic evaluation of the ability of the defense industrial base to develop and provide functional, operational effects-based warfighting capabilities. This study concluded that the Secretary's transformation mandate required a different lens for viewing the defense enterprise: one organized around the most essential operational effects that the U.S. warfighter must be able to deliver to be successful on the battlefield.

The Joint Staff recently reorganized its requirements process around five initial functional concepts: Battlespace Awareness, Command and Control, Force Application, Protection, and Focused Logistics.¹ These five concepts, defined in the table below, are becoming the central basis for Department decision-making.

JOINT STAFF FUNCTIONAL CONCEPTS	
<i>Battlespace Awareness</i>	Capabilities of commanders and all force elements to understand the environment in which they operate and the adversaries they face. It uses a variety of surveillance capabilities to gather information; a harmonized, secure, network-centric environment to manage this information; and a collection of capabilities to analyze, understand and predict. ²
<i>Command and Control</i>	Capabilities that exercise a commander's authority and direction over forces to accomplish a mission. It involves planning, directing, coordinating, and controlling forces and operations. It provides the means for a commander to recognize what is needed and ensure that appropriate actions are taken.
<i>Force Application</i>	Capabilities to engage adversaries with lethal and non-lethal methods across the entire spectrum of conflict. It includes all battlefield movement and dual-role offensive and defensive combat capabilities in land, sea, air, space, and information domains.
<i>Protection</i>	Capabilities that defend forces and U.S. territory from harm. It includes missile defense and infrastructure protection and other capabilities to thwart force application by an adversary.
<i>Focused Logistics</i>	Capabilities to deploy, redeploy, and sustain forces anywhere in or around the world for sustained, in-theater operations. Includes the traditional mobility functions of airlift, sealift, and spacelift as well as short-haul (intra-theater and battlefield) transportation. It also includes logistics command and control, training, equipping, feeding, supplying, maintaining, and medical capabilities.
Source: Joint Staff Functional Concepts and ODUSD (IP)	

¹ The Joint Staff is developing a sixth functional capability: Net Centric Operations.

² Embodied in this thinking is the decomposition of platforms into their enabling capabilities and assessing technologies in the functional capability area where their capabilities are most enabling. For example, major sensor suites associated with tactical aircraft and Navy combatants are assigned to Battlespace Awareness. The associated radars, missiles, and fire control assets would be allocated to Force Application. This decomposition of platforms into capabilities is at the heart of network-centric warfare and the new functional paradigm.

1.1 Roadmap to the Future

The Department's move towards capabilities-based decision-making will fundamentally change the defense enterprise. How the Department looks at what it has and what it needs also will affect who participates in the defense industrial base. The base of defense suppliers likely will broaden as the Department accesses smaller, innovative, emerging suppliers to solve difficult defense problems. Additionally, because capabilities-based decision-making provides a common and comprehensive vernacular to operators, acquirers, and industry, this integrated vision should continue to improve the efficiency of resource and operational planning, and associated decision-making and program execution.

1.2 The Defense Industrial Base Capabilities Studies

With a new capabilities-based framework for the acquisition and requirements processes, the challenge for DoD decision-makers is to evaluate the industrial base within this new framework and with the new vernacular. It is the explicit purpose of the Defense Industrial Base Capabilities Study (DIBCS) series, launched in 2003 by the Office of the Under Secretary of Defense (Acquisition, Technology & Logistics) (USD(AT&L)), to ensure that the industrial base can produce the systems and weapons required to implement the materiel solutions that make possible the functional concepts developed by the Joint Staff.

The Department expects to complete the DIBCS series of assessments, one for each of the Joint Staff Functional Concept areas defined in the previous table, over the next year and a half. *Battlespace Awareness* was completed in January 2004. The Department expects to complete *Command and Control*, *Force Application*, and *Protection* in 2004; and *Focused Logistics* and *Net Centric Operations* in 2005.

Beginning with the recently-completed *Battlespace Awareness*, the DIBCS series will assess the sufficiency of the most critical segments of the industrial base in each functional capability area. The study uses a critical technology and industrial capability assessment methodology derived from the *Space Research and Development Industrial Base Study*.³ The methodology is consistent with the operational ethos embodied in the defense industrial base; warfighter requirements, and the warfighter as the primary constituent, should determine industrial base composition and products.

This methodology categorizes warfighter capabilities according to the relative advantage desired by the United States over its adversaries. As described in the table on the next page, analysis is primarily focused on those warfighter capabilities where the United States should lead any potential adversary.

³ Published in September 2002; summarized in the February 2003 *Annual Industrial Capabilities Report to Congress*; conducted by Booz Allen Hamilton for the National Reconnaissance Office and the Office of the Under Secretary of Defense (Acquisition, Technology and Logistics)

LEADERSHIP GOALS	
<i>Neutral</i>	Position relative to potential adversaries is immaterial.
<i>Equal</i>	Desire capability at least as good as potential adversaries; systems likely are within a common technological generation.
<i>Be Ahead</i>	Desire a significant capability difference over potential adversaries; systems likely should lead by a technology generation or offer order of magnitude better performance in key attributes.
<i>Be Way Ahead</i>	Desire a very significant capability difference over potential adversaries; systems likely should lead by multiple technology generations or orders of magnitude in performance.
Source: Booz Allen Hamilton	

[illegible]

1. Identify U.S. Leadership Goals for Capabilities. Since a detailed understanding of functional capabilities and associated architectures will continue to evolve within the Department, the specific warfighting capabilities and associated leadership goals are refined incrementally as details continue to emerge from

development of the Joint Staff's functional concepts and the associated integrated architectures.

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

The next step in the process is to identify the key enabling technologies for those warfighting capabilities with leadership goals rated *be ahead* or *be way ahead*. The priority of a technology is determined by the number of different critical warfighting capabilities to which it applies and the degree to which it enables those individual critical warfighting capabilities.

3. Assess Industrial Base Capabilities for Each Critical Technology. Finally, the study examines the industrial capabilities necessary to support the prioritized critical technologies. This generally involves identifying major domestic and foreign suppliers and examining them for sufficiency and suitability.

The policy construct in which the studies deploy potential risk mitigation actions is based on employing three policy “levers” to remedy instances in which required industrial capabilities are insufficient to meet projected defense requirements: (1) fund innovation; (2) optimize program management structures and acquisition strategies; and (3) employ external corrective measures (measures taken outside the confines of individual defense programs). These policy levers can be deployed through five major “portals” throughout the technology and weapon system life cycle—insertion opportunities where managerial decisions have the most impact on developing and sustaining critical technologies and associated industrial capabilities: (1) science and technology; (2) laboratory to manufacturing transition; (3) weapon system design; (4) make-buy decisions; and (5) life cycle innovation for fielded systems. By highlighting industrial base deficiencies for critical technologies and implementing appropriate policy initiatives and remedies, the Department is positioned to facilitate innovation that promotes joint, cross-Service warfighting.

Accordingly, when an industrial base deficiency is identified, a DoD research and analysis team examines it in-depth and recommends remedies, using the portals and levers available to the Department to correct an immediate deficiency or to avoid a future one.

1.3 A Note on International Suppliers

Part of a DIBCS assessment is to evaluate how domestic industrial capabilities compare with foreign capabilities. This is necessary because, in order to provide the best capability to the warfighter, the Department wants to promote interoperability with its allies and take full advantage of the benefits offered by access to the most innovative, efficient, and competitive suppliers—worldwide. It also wants to promote consistency and fairness in dealing with its allies and trading partners while assuring that the U.S. defense industrial base is sufficient to meet its most critical defense needs. Consequently, the Department is willing to use non-U.S. suppliers—consistent with national security requirements—when such use offers comparative advantages in performance, cost, schedule, or coalition warfighting. For this reason, the Department and many friendly governments have established reciprocal procurement agreements

that are the basis for waiving their respective “buy national” laws and put each other’s industries on par as potential suppliers.

U.S. sources for those technologies and industrial capabilities supporting warfighting capabilities for which it has established leadership goals to *be ahead* or *be way ahead* of potential adversaries could reduce certain risks associated with using non-U.S. suppliers. However, the Department must be, and is, prepared to use non-U.S. suppliers to support critical warfighting goals when necessary and appropriate, and when the supplier and the nation in which it resides have demonstrated reliability in:

- Responding to DoD technology and product development requirements.
- Meeting DoD delivery requirements during peacetime and/or periods of conflict or international tension.
- Precluding unauthorized transfer of technical information, technologies, or products within the nation or to third parties.

1.4 Just the Beginning

A capabilities-based framework will help Department decision-makers understand and address industrial base deficiencies. Completing the initial look at each functional area, however, is just the beginning. The baseline will continue to evolve as the Joint Staff implements its functional concepts and the Department continues to assess industrial base elements supplying those corresponding capabilities.

It is in the Department’s best interest to encourage the alignment of industrial strategic direction with the Department’s overall strategic direction. The DIBCS series should help companies large and small—indeed the whole of the defense industrial enterprise—gain more direct insight into the critical industrial base capabilities required for 21st century warfighting.

2. New DoD Policy

DoD 5000 Series (May 2003)

During 2003, the Department continued the efforts begun in 2002 to bring acquisition policy more in line with the focus of the Secretary of Defense on transformational warfare requirements. The Department formally published in May 2003 revised acquisition policy documents attuned to 21st century warfighting requirements: Department of Defense Directive 5000.1, “The Defense Acquisition System” and Department of Defense Instruction 5000.2, “Operation of the Defense Acquisition System.”

The new DoD 5000 series emphasizes evolutionary acquisition as the preferred strategy and spiral development as the preferred vehicle to execute that strategy. This approach will facilitate rapid delivery of a military capability to the warfighter in initial and follow-on increments (“spirals”). With this approach, the warfighter will receive an initial capability more quickly while receiving more enhanced capabilities later as technology risks are resolved.

The new DoD acquisition policy aims to give the program manager more authority and freedom to manage. By minimizing regulatory requirements and removing prescriptive practices, the Department hopes to encourage program managers to offer innovative approaches to program planning and execution with the goal of delivering affordable solutions to the warfighter more rapidly.

Joint Capabilities Integration and Development System Process (June 2003)

Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) have emphasized the necessity of integrated and interoperable joint warfighting capabilities. Accordingly, the Department validated a need for a new requirements generation process to assess existing and proposed capabilities in the aggregate and to define desired joint capabilities. The Joint Staff responded by issuing new policy guidance delineating a new capabilities requirements process that ensures new proposals meet the needs of the joint warfighters of the future. In June 2003, the Joint Staff issued an instruction, “Joint Capabilities Integration and Development System” (CJCSI 3170.01C) and a manual for implementation, “Operation of the Joint Capabilities Integration and Development System” (CJCSM 3170.01).⁴

The Joint Capabilities Integration and Development System (JCIDS) analytical process is based on the premise that in order for joint forces to meet the full range of military challenges of the future, they must be able to project and sustain joint forces; and conduct flexible, distributed, and highly-networked operations. JCIDS implements a capabilities-based approach that leverages the expertise of the entire Department, non-DOD agencies, and industry to identify improvements to existing capabilities and to

⁴ The *Defense Industrial Base Capabilities Study* (DIBCS) series (described in Section 1) uses the Joint Functional Concepts laid out in the JCIDS framework and a structured top-down analysis methodology to evaluate the adequacy of the industrial base for the most critical warfighting capabilities.

develop new warfighting capabilities. This approach requires a collaborative process that is focused on resolving prioritized capability gaps early on and identifying solutions (materiel and non-materiel) to fill those gaps.

As the Joint Staff continues to develop and refine the JCIDS strategic guidance, joint concepts, and integrated architectures, they will provide a common construct for analysis to identify capability shortfalls or redundancies and to compare alternatives for improving joint warfighting capabilities. Ensuring that the joint force is properly equipped and supported to perform across the range of military operations is the primary focus of the JCIDS process.

3. Defense Mergers and Acquisitions

3.1 Introduction

Robust, credible competition is vital to providing the Department with high quality, affordable, and innovative products. The Department has no blanket policy of discouraging further consolidation or divestiture, or encouraging a specific industry structure. The Department believes that the competitive pressure of the marketplace is the best vehicle to shape an industrial environment that supports the defense strategy. Therefore, the Department of Defense takes action to intervene in the marketplace only when necessary to maintain appropriate competition and develop and/or preserve industrial and technological capabilities essential to defense that the marketplace, left unattended, would not. The Department evaluates each proposed transaction on its particular merits in the context of the individual market and the changing dynamics of that market.

The Department must establish, maintain, and strengthen industrial relationships that ensure that the future defense industrial base is both healthy and vital. In doing so, the Department maintains focus on the need to encourage competitive forces for innovation while acknowledging the need of companies to scale up or combine with other firms to create new industrial capabilities essential for future warfare. Such flexibility is essential if the Department is to capitalize on the revolutionary technologies of tomorrow.

DoD reviews several kinds of business combinations involving defense suppliers: (1) proposed mergers or acquisitions filed under the Hart-Scott-Rodino Antitrust Improvement Act of 1976 (currently, transactions valued at more than \$50 million); (2) other collaborations among competitors that have been made public (joint ventures, mergers and acquisitions) of special interest to the Department that do not meet the Hart-Scott-Rodino Act filing threshold; and (3) proposed acquisitions of U.S. defense contractors by non-U.S. firms for which filings have been made pursuant to the Exon-Florio Amendment to the Omnibus Trade and Competitiveness Act of 1988. The Department published a Business Combinations Desk Book in September 2003. It provides procedural guidance and context for the Department's merger and Committee on Foreign Investment in the United States (CFIUS) reviews. The Desk Book can be found at <http://www.acq.osd.mil/ip/>

3.2 Merger and Acquisition Reviews

The Federal Trade Commission and the Department of Justice (the "Antitrust Agencies") have the statutory responsibility for determining the likely effects of a defense industry merger on the performance and dynamics of a particular market; and whether a proposed merger should be challenged on the grounds that it may violate antitrust laws. As the primary customer impacted by defense business combinations, DoD's views are particularly significant because of its special insight into a proposed merger's impact on innovation, competition, national security, and the defense industrial base. Accordingly, the Department actively works with the Antitrust Agencies.

DoD reviews are structured to identify impacts on national security and on defense industrial capabilities; evaluate the potential for loss of competition for current and future DoD programs, contracts and subcontracts, and for future technologies of interest to the Department; and address any other factors resulting from the proposed combination that may adversely affect the satisfactory completion of current or future DoD programs or operations.

In 2003, the Department reviewed 43 transactions, as shown in the following table, pursuant to the Hart-Scot-Rodino provisions of the Antitrust Improvement Act. Of those cleared by the Antitrust Agencies, two required consent orders (General Electric's acquisition of Agfa-Gevaert's Non-Destructive Testing and GenCorp's acquisition of Sequa's Atlantic Research Corp.) to protect continued competition. Two other transactions (Raytheon's acquisition of Solipsys and Hitachi's acquisition of Honeywell's Metglas) required letters of agreement that stipulated specific company practices that would preserve competition or ensure security of supply. Several cases involved mitigation of organizational conflicts of interest, but subsequently were cleared.

DEFENSE MERGER AND ACQUISITION REVIEWS - 2003			
Acquirer	Acquired Company	Value** (\$M)	Disposition
Alliant Techsystems	Allied Aerospace's GASL & Micro Craft	n/a*	No Objection
American Management Systems	RM Vredenburg	\$45	No Objection
AMSEC	Eagan, McAllister Associates	n/a*	No Objection
Anteon International	Information Spectrum, Inc.	\$92	No Objection
Armor Holdings	Simula	\$111	No Objection
BAE Systems PLC (North America)	Mevatec	\$82	No Objection
Behrman Capital	ILC Industries	\$303	No Objection
CACI International	Premier Technology Group, Inc.	\$49	No Objection
Cobham	Northrop Grumman's Life Support Unit	\$73	No Objection
Crane Co.	Signal Technology Corp.	\$135	No Objection
Curtiss-Wright	E/M Engineered Coatings Solutions - Selected Assets	\$17	No Objection
DRS Technologies	Integrated Defense Technologies	\$543	No Objection
EDO Corp.	Darlington Incorporated	\$29	No Objection
Engineered Support Systems, Inc.	Technical and Management Services Corporation	\$66	No Objection
FLIRSystems	Indigo	\$190	No Objection
GenCorp	Sequa's Atlantic Research Corp	\$133	Consent Decree Divestiture
General Dynamics	Creative Technology	n/a*	No Objection
General Dynamics	Digital System Resources, Inc.	n/a*	No Objection
General Dynamics	General Motors – Defense (GMD)	\$1,100	No Objection
General Dynamics	Intercontinental Manufacturing Co.	n/a*	No Objection
General Dynamics	Veridian	\$1,500	No Objection
General Electric	Agfa-Gevaert's Non-Destructive Testing	\$507	Consent Decree Divestiture

DEFENSE MERGER AND ACQUISITION REVIEWS – 2003 (CONTINUED)			
Acquirer	Acquired Company	Value** (\$M)	Disposition
Hitachi	Honeywell's Metglas Division	n/a*	Letter of Agreement
International Steel Group	US Steel's Gary Plate	n/a*	No Objection
Kohlberg Kravis Roberts	MTU Aero Engines	\$1,727	No Objection
L-3 Communications	Goodrich Avionics Systems	\$188	No Objection
L3 Communications	Klein Associates	\$30	No Objection
L3 Communications	Vertex Aerospace	\$650	No Objection
Lockheed Martin	Affiliated Computer Services' Federal Government Business	\$658	No Objection
Lockheed Martin	Orincon	n/a*	No Objection
Lockheed Martin	Titan	\$2,400	No Objection
ManTech International	Integrated Data Systems	\$40	No Objection
Moog	Northrop Grumman's Poly Scientific Div.	\$158	No Objection
Northrop Grumman	XonTech	n/a*	No Objection
Odyssey Investment Partners	DeCrane Aircraft Specialty Avionics Group	\$147	No Objection
Oracle	PeopleSoft	\$7,250	Reviewed, but not Resolved
Raytheon	Solipsys	\$170	Letter of Agreement
Rockwell Collins	NLX	\$125	No Objection
Science Applications International Corporation	Computer Systems Technology	n/a*	No Objection
The Carlyle Group (Vought)	The Carlyle Group (The Aerostructures Corp.)	n/a*	No Objection
The Carlyle Group	Fiat Avio (70%)	\$1,218	No Objection
Ultra	BAE Ocean Systems	\$10	No Objection
United Technologies	Chubb	\$1,974	No Objection
Notes: ** Value based on publicly available information. n/a* indicates transaction value is not publicly available. Source: ODUSD (IP)			

3.3 Foreign Investment in the United States

The Exon-Florio Amendment to the Omnibus Trade and Competitiveness Act of 1988 established Section 721 in the Defense Production Act. This section authorizes the President to suspend or block foreign acquisitions, mergers, or takeovers of U.S.-located firms when they pose credible threats to national security that cannot be resolved through other provisions of law.⁵ The President has delegated management of the Exon-Florio Amendment to the interagency Committee on Foreign Investment in the United States (CFIUS), chaired by the Department of the Treasury.

Under Exon-Florio, the President has 30 days from the time he is notified of a foreign acquisition to initiate an investigation of the transaction. During the first 30 days after formal notification CFIUS members conduct a preliminary review to determine whether the transaction poses credible threats to national security and, if so, whether there are means to adequately mitigate those threats under various statutes or departmental regulations. By the 30th day, the CFIUS must either approve the transaction, with or without risk mitigation measures, or initiate a Presidential Investigation. There are no other options under the law. If the CFIUS begins a Presidential Investigation, it must complete a report on the Investigation within 45 days. The President then has 15 additional days to decide what action to take. Amendments to Exon-Florio enacted in 1992 require the President to inform Congress of his decision in each case involving a Presidential Investigation.

The Department of Defense is a member of the Interagency Committee. As a CFIUS member, the Department evaluates the national security aspects of proposed foreign acquisitions of U.S. defense contractors and other U.S. firms indirectly impacting national defense. In assessing foreign acquisitions, the Department's principal objectives are to: (1) facilitate the development of an integrated defense industrial base among U.S. allies and trading partners in order to increase interoperability in coalition warfare and reduce DoD acquisition costs; and, simultaneously, (2) avoid the risks of unauthorized transfer of classified information and military and dual use technologies and protect the reliability of supply of goods and services to the Department.

To assist in achieving the latter objective, the Department determines in each case whether the firm being acquired possesses critical defense technology or is otherwise important to the defense industrial and technology base. The intelligence community also prepares for the Department a risk assessment of the acquiring firm and country which evaluates (1) their compliance with U.S. and international export control laws and other international regimes which regulate proliferation of weapons of mass destruction; (2) their potential reliability as suppliers to the defense industrial base; and (3) their support in fighting international terrorism.

Given the statutory constraints of the Exon-Florio Amendment to the Defense Production Act, the Department cannot publicly discuss specific reviews. Information submitted to the CFIUS is protected by law from disclosure to ensure that voluntarily submitted sensitive business information is not compromised.

⁵ Excepting the International Emergency Economic Powers Act.

During 2003, a review of roughly 40 foreign acquisitions of U.S. firms indicated that: 13 percent of the transactions involved U.S. firms deemed to possess critical technologies; 21 percent of the U.S. firms were determined to be otherwise important to the defense industrial base; and two percent met both criteria. In most cases, the Department, acting under its own industrial security regulations or other means, remedied its concerns by imposing measures on the acquiring firms to reduce risks of foreign ownership, control and influence on national security. In only one case has a Presidential Investigation been necessary.

4. Industrial and Technological Capabilities Assessments

Methods and Analyses

The Department periodically conducts analyses/assessments to identify and evaluate those industrial and technological capabilities needed to meet current and future defense requirements. It then uses the results of these analyses/assessments to make informed budget, acquisition, and logistics decisions.

"DoD-wide" industrial assessments evaluate and address changes in key system, subsystem, component, and/or material providers that supply many programs, and affect competition, innovation, and product availability. DoD Components conduct their own assessments when: (1) there is an indication that industrial or technological capabilities associated with an industrial sector, subsector, or commodity important to a single DoD Component could be lost; or (2) it is necessary to provide industrial capabilities information to help make specific programmatic decisions. These assessments generally are conducted, reviewed, and acted upon internally within the DoD Components. Additionally, the Defense Contract Management Agency supports DoD-wide and DoD Component industrial assessments by utilizing its broad knowledge across industrial sectors and its on-site presence in many contractor industrial facilities.

4.1 DoD-Wide

Transforming the Defense Industrial Base: A Roadmap (February 2003)

The Deputy Under Secretary of Defense for Industrial Policy conducted this study to provide an industrial base roadmap to Secretary of Defense Rumsfeld's vision of transformation.⁶ If followed, the roadmap could position the Department to transform itself and its supplier base, and deliver innovative, network-centric weapons systems to the warfighter more expeditiously.

The report notes that the concerns of emerging defense suppliers resonate strongly with concerns expressed previously by legacy defense suppliers:

- Insufficient visibility into the military enterprise.
- Inadequate funding and advocacy for new technology transition.
- Difficulty building a strong, interactive relationship with customers.
- Cumbersome system design specifications.
- Lengthy, laborious sales cycles.
- Limited access to development and investment capital.

⁶ Report available on the Internet (<http://www.acq.osd.mil/ip>).

The report recommends that the Department consider:

- Viewing the industrial base as being composed of operational effects-based sectors that support transformational warfighting.
- Organizing its decision processes to optimize operational effects – not programs, platforms, or weapon systems.
- Evaluating technological and industrial capabilities and concerns within these sectors, including the investment and competitive issues necessary for informed, effective decision-making.

The recommendations offered for consideration in the report are intended to provide emerging and legacy suppliers of interest to the Department more transparency into the programs and processes that constitute the military enterprise. The report concludes that recasting the defense industrial landscape across operational effects-based sectors and organizing the Department's decision-making processes to optimize operational effects would improve supplier visibility into the military enterprise and help to more systematically secure "invention-to-weapon" technology transition funding. If programs were arrayed this way with corresponding management structures, emerging defense suppliers would be able to ascertain opportunities that cut across individual programs and platforms; and identify DoD and prime contractor points of contact with whom to engage. Conversely, senior DoD leaders would be better positioned to identify technology "gaps" affecting both individual and multiple programs. With such visibility, DoD leaders also would be positioned to advocate sufficient transition funding to "pull" the promising new technologies that would enhance operational effects for multiple defense systems.

The first follow-on study, *Defense Industrial Base Capabilities Study: Battlespace Awareness*, implements the third recommendation with an assessment of the ability of the defense industrial base to field the integrated battlespace technologies critical to Secretary Rumsfeld's transformation mandate. This study is summarized later in this report.

Joint Strike Fighter International Industrial Participation Study (June 2003)

The Office of the Under Secretary of Defense (OUSD (AT&L)) initiated this study to provide a preliminary assessment of Joint Strike Fighter (JSF) partner country strategies and the potential financial impact of the JSF program on their respective industrial bases. The study developed comprehensive case studies of partner country governments and major industrial suppliers to characterize potential financial effects (including return on investment) of JSF-related work for the studied suppliers as well as for the country as a whole.⁷

The study included in-depth assessments of the impact of the JSF program partnerships on the United Kingdom, Italy, the Netherlands, and Canada, based on their level of partnership and/or the maturity of their industrial linkages to the program.

⁷ Report available on the Internet (<http://www.acq.osd.mil/ip>).

Australia, Denmark, Norway, and Turkey were examined on a more prospective basis to illuminate their strategic approaches to the program.

The study determined that the potential financial impact to JSF partner countries is substantial, in terms of revenue, earnings, and return on investment. It also found that countries that have been involved early and/or aggressively organized efforts to compete for JSF program work have been the most successful. The study concluded that while the JSF program with its new international acquisition strategy is a work in progress, it is on the path of success and can serve as a model for future international acquisitions.

Consideration of a Consolidated DoD Semiconductor Foundry (July 2003)

The OUSD (AT&L) initiated this study to respond to a recommendation in Conference Report 107-732 accompanying the 2003 Defense Appropriations Bill. The study examined the long-term DoD acquisition model for advanced semiconductor devices and addressed whether a consolidated U.S. semiconductor foundry could offer the U.S. Government a solution to the impending advanced technology procurement challenge. It focused on advanced semiconductors and looked at the latest technology (brought into service in the last three years) for producing semiconductors. The study concluded that:

- A consolidated semiconductor foundry for the Department would be technically feasible; however, it would come at a high cost. Industry advances occur about every three to five years requiring large capital investments to keep pace with technology. New state-of-the-art commercial fabrication facilities currently cost approximately \$2 billion and require upgrades costing hundreds of millions of dollars every year to keep abreast of technology.
- A government facility that is associated with a large commercial facility (e.g., a government-owned, commercially operated company run by an experienced team with access to high-volume production processes) could cost as little as \$300 million and satisfy the Department's needs. However, continual upgrades still would be needed (perhaps \$100 million per year), and operating costs would include a considerable non-recurring cost component plus substantial technology licensing costs to maintain product quality. Further, a government facility would introduce numerous risks including disruption to the current industrial base and the risk of substituting DoD-fabricated parts for commercially produced parts.
- Although a national foundry could not be justified on economic grounds alone, the concerns over the integrity of the implementation of DoD semiconductor designs could not be completely addressed within the status quo decentralized procurement regime. The study indicated general agreement that certain critical integrated circuits used in weapons systems, and even some integrated circuits used within the national infrastructure of communication, might be vulnerable to certain kinds of attack. At some cost and increased production risk, a national foundry could address the security issue.

- Lower cost options appear to have the advantages of a captive foundry without the risks and responsibilities. One potential arrangement involves purchasing a portion of an existing U.S. foundry's output (a prepayment arrangement known as "take or pay"). As long as U.S. capacity exists to make these kinds of arrangements, there appears to be no down side to this alternative. Furthermore, if in the future such an option becomes unavailable, the question of establishing a national foundry can be revisited.

The Department is implementing a long-term strategy to address these issues and others under the Department's Defense Trusted Integrated Circuit Strategy.

Impact of Foreign Sourcing of Systems (January 2004)

The OUSD (AT&L) conducted this study, with the assistance of the Defense Contract Management Agency (DCMA), to review the extent to which the Department depends on foreign suppliers for operationally important defense systems.⁸ This effort complemented and expanded a 2001 Study on Impact of Foreign Sourcing of Systems.

The Department collected supplier information from the Military Departments and DoD program offices, prime contractors, first-tier subcontractors, and second-tier subcontractors for certain systems in high demand during OEF and OIF:

- Guided Multiple Launch Rocket System
- Army Tactical Missile System
- Patriot Advanced Capability Missile
- Tactical Tomahawk Missile
- Stand-Off Land Attack Missile – Expanded Response
- Joint Standoff Weapon
- Laser-Guided Bomb
- Predator Unmanned Aerial Vehicle
- F414 Engine
- Sensor Fuzed Weapon and Wind Corrected Munitions Dispenser
- Joint Service Lightweight Integrated Suit Technology Chemical Protective Suit

The study found that foreign sources provide only limited amounts of materiel for the identified programs. Collectively, foreign subcontracts represented about four percent of the total contract value and less than ten percent of the value of all subcontracts for these programs.

The study also found that the use of foreign sources, in and of itself, does not negatively impact long-term readiness or national security. The vast majority of the foreign sources are from NATO nations or other nations with whom the United States has had enduring military and commercial relationships. Despite the very public opposition of some of the firm's host nations to U.S. actions during operations in Afghanistan or Iraq, at no time did the foreign suppliers (including French and German suppliers) restrict the provision or sale of these components to the Department because of U.S. military operations.

⁸ Report available on the Internet (<http://www.acq.osd.mil/ip>).

The study concluded that the industrial base is not put at risk by the use of the identified foreign suppliers. Additionally, in most cases, domestic suppliers are available for the parts, components, and materials provided by the foreign sources.

Defense Industrial Base Capabilities Study: Battlespace Awareness (January 2004)

In February 2003, the Deputy Under Secretary of Defense for Industrial Policy published *Transforming the Defense Industrial Base: A Roadmap*. That report identified the need for systematic evaluation of the ability of the defense industrial base to develop and provide functional, operational effects-based warfighting capabilities. The Defense Industrial Base Capabilities Study (DIBCS) series begins a systematic assessment of critical technologies and industrial capabilities needed in the 21st century defense industrial base to meet warfighter requirements as framed by the Joint Staff's Functional Concepts and Joint Operational Architecture. The DIBCS series ties directly to warfighter needs by linking industrial base capabilities to warfighter capabilities derived from the Joint Staff's Functional Concepts. This report addresses the first of the functional concepts, Battlespace Awareness.

The overall objectives of the DIBCS series are to: (1) identify technologies critical to the new Joint Staff functional warfighter capabilities, and to establish a reference database of these key critical industrial base capabilities mapped to warfighting functional capabilities; (2) conduct industrial base capability assessments on priority critical technologies to identify deficiencies; and (3) develop a systematic method to craft industrial base strategies to remedy identified industrial base deficiencies and encourage proactive, innovative management of the industrial base.

The DIBCS: *Battlespace Awareness* study validated a recommendation from the earlier transformation study that defense industrial base assessments be linked to warfighting capabilities and assessed in a capabilities-based context.⁹ An initial survey of the Battlespace Awareness Functional Concept area identified 357 warfighting capabilities directly enabling U.S. warfighting leadership in this area. Of this total, 270 technologies qualified as ones where the United States should be ahead of any potential adversary. An assessment for industrial base sufficiency of the 31 more pressing applications of the 270 technologies found that, with few exceptions, available industrial base capabilities are sufficiently innovative and robust. The report noted that policy levers and implementation concepts developed in the study to influence the industrial base—if embedded in DoD planning and acquisition policies, practices, and decisions—will help continue the development of well-crafted program acquisition strategies, as well as remedy any industrial base deficiencies identified.

The report made the following four recommendations:

- The Department should implement the remedies in the report for these specific industrial capability areas:

⁹ Report available on the Internet (<http://www.acq.osd.mil/ip>).

- Active Hyperspectral Imagers for chemical signature and surveillance;
 - Active Electronically Scanned Array (AESA) Radar for wide-ranging applications on platforms in all mediums;
 - Maser Clocks for precision timing devices in next generation systems.
- Within the Department, the Office of the Deputy Under Secretary of Defense (Industrial Policy) (ODUSD (IP)) should be considered the clearinghouse for industrial base deficiencies. ODUSD (IP) will continue to assess Battlespace Awareness industrial base sufficiency using the capabilities framework, databases, and policy tools developed in the study. This framework also will be used for industrial base capabilities assessments for the other Joint Staff Functional Concept areas of Command and Control, Force Application, Protection, Focused Logistics and Net Centric Operations.
 - The Department should establish architects for each of the functional architectures to be accountable for relevant implementation of the Joint Programming Guidance; to be lead integrators within each functional capability; to coordinate cross-architectural issues; and to coordinate issues across functional capabilities. Establishing responsibility for cross-functional industrial base considerations in this way will improve capability delivered to the warfighter and decision-making in the Department.
 - Acquisition strategies should include a plan for industrial base assessments and the systematic consideration of sources of innovation at major opportunities throughout the life of programs. Additional training on industrial base capabilities and considerations should be included in the professional development of acquisition managers.

4.2 Army

Army Transformation Industrial Base Study (April 2003)

The Army, with the assistance of the DCMA, conducted this comprehensive assessment to determine if the industrial base is sufficient to support current and projected Army requirements. The study focused on: ammunition; armaments; combat vehicles; command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR); chemical/biological defense; missiles; rotary wing aircraft; and soldier systems. Key findings of the assessment and actions taken are summarized below:

- Ammunition. Collectively, contractor-owned facilities and Army ammunition plants have the capabilities to meet current and future Force requirements.
- Armaments (Guns and Armor). No critical industrial capabilities or technologies are at risk. The U.S subcontractor base, although consolidating, is capable of meeting current and future DoD requirements.

- Combat Vehicles. The combat vehicle sector is in a state of transition because of the Army's shift from heavy vehicles to lighter ones because of a requirement to achieve mobility for future Forces. The viability of one of the two prime contractors supporting this sector is uncertain after 2004. Two of the four major integration sites are operating at inefficient capacity utilization levels, negatively impacting overhead rates, program costs, and competitiveness in foreign military sales. Capacity utilization will further decline during the 2004-2008 timeframe when modifications or upgrades to the M1 Abrams and the M2/3 Bradley vehicles diminish substantially. However, additional Fiscal Year 2004 funding from Congress has alleviated the situation somewhat by extending Abrams and Bradley production. The Army will continue to evaluate the combat vehicle industrial base to fulfill a Fiscal Year 2004 Congressional requirement to update its 1998 Armored Systems Modernization Strategy.
- C4ISR. Prime contractors and suppliers generally are capable of meeting current and future force requirements. Areas of concern that the Army is monitoring include: (1) foreign dependencies for flat panel display glass; (2) optical coating vendors for infrared sensors; and (3) funding shortfalls and technological challenges for bandwidth use and for the Battlefield Combat Identification System.
- Chemical/Biological Defense. Firms are exiting this predominantly-defense business due to inadequate demand. However, with few exceptions, the study assessed industrial capabilities as adequate. Areas of concern include: (1) the exit of the supplier for the tear gas used to produce L96 and L97 Anti-Riot grenades; (2) planned funding for UDR-13 Radiac units was below the minimum sustaining level to keep the producer in business; and (3) the current supplier of 348 resin used in the M291 Skin Decontamination Kit ended production. The Army has taken action to address these concerns. It has replaced the L96 and L97 grenades with Sting Ball and Flash Bang grenades; increased funding for UDR-13 Radiac units by putting on contract a projected quantity of over 11,000 units; and is seeking FDA approval to substitute sorbent powder for the 348 resin.
- Missiles. The three prime contractors supporting Army tactical missile systems have the capabilities to meet current and future force requirements. The study also concluded that there are no industrial or technology risks within the subcontractor base.
- Rotary Wing Aircraft. The study concluded that prime contractors generally have the capabilities to meet the legacy and interim force requirements through 2006. The assessment also concluded that 96 percent of the critical subcontractor base possesses adequate capabilities to meet forecasted demand. The study found that the gap between completion of current development programs and the start of the next generation of rotary wing vehicles represents an area of risk that the Army needs to monitor. For example, Boeing's Mesa, Arizona, facility is dependent on the AH-64 Apache

helicopter; AH-64 production was scheduled to cease after 2006. The Army recently funded Apache Block III improvement work beginning in Fiscal Year 2005. This work will alleviate that concern.

- Soldier Systems. The study found that the prime contractors generally have the capabilities and capacity to meet all DoD requirements through 2006. One exception is the single source supplier for SpectraShield discussed later in this report.

Combat Vehicle Track Shoes Sub-Sector Assessment (May 2003)

The military track shoe industrial base designs and manufactures critical track necessary to meet current and projected Army and Marine Corps track requirements. In support of OIF requirements, the Army studied near-, mid-, and long-term requirements for track shoes and the supporting industrial base. The study found that Goodyear is the only active, full-service facility—domestic or international—that can design and produce all track shoe models. Goodyear requires an annual minimum production requirement of about 264,000 track shoe assemblies to meet its business case. The Army has made a \$5.2 million investment in Goodyear production facilities in order to enable the contractor to meet surge requirements and to sustain the viability of the track shoes supplier. Because the Army owns the additional equipment purchased, should Goodyear ever cease its track operations, the Army could move it elsewhere to meet its needs.

4.3 Navy

CVN 21 Industrial Base Assessment (March 2003)

The Naval Sea Systems Command initiated this assessment as an update to the CVN(X) assessment conducted in June 2002. The assessment was conducted in order to determine the impact of the CVN 21 new hull configuration and technology insertion on Northrop Grumman Newport News (NGNN) and the supporting industrial base. The study evaluated the capabilities of 12 companies. It concluded that NGNN and the supporting industrial base are fully capable of supporting CVN 21 requirements.

The study identified several areas of moderate risk. The Reconfigurable Island poses a moderate risk due to unknowns such as the final island configuration and the ability of a secondary shipyard to assist NGNN through the design process to final construction. The Reconfigurable Warfare System and Aviation Intermediate Maintenance Department (AIMD) Spaces as well as Warfare System installation and procurement pose a moderate risk due to the uncertainty and challenge of providing detailed and accurate interface requirements sufficiently in advance to preclude adverse schedule impacts. Finally, major changes from the Nimitz-class design to the CVN 21 design add significantly to the workload and experience requirements of the NGNN engineering department. This increased demand on NGNN engineering and design experience poses a moderate risk because of the difficulty in hiring quality engineers to meet projected requirement. Both the Navy and NGNN are addressing the potential shortage of workers.

Submarine Main Storage Battery Industrial Base Capabilities Assessment (July 2003)

The Naval Sea Systems Command conducted this assessment of the Navy's sole source for nuclear submarine flooded lead acid batteries. Submarine main storage batteries are the single product line of the GNB Industrial Power Division of the Network Power Business Group of Exide Technologies. The study was conducted in response to the provider's indication that its Kankakee, IL, facility was at risk of closure due to insufficient demand. Navy orders were falling below those required to meet the facility's minimum-sustaining rate. The study found that current Navy procurement rates are not sufficient to meet the Kankakee facility's economic ordering quantity after 2005—prior to meeting Navy out-year battery requirements.

Additionally, the Navy's current flooded lead acid battery acquisition rate is insufficient to meet submarine new construction and maintenance requirements. The Navy is developing a plan to replace the flooded lead acid storage battery with the Valve Regulated Lead Acid (VRLA) storage battery. The Navy will accelerate the procurement and installation of VRLA batteries to minimize increased costs and schedule disruption. The Navy also will purchase quantities of flooded batteries sufficient to meet the economic ordering quantity at the Kankakee plant for Fiscal Year 2004 and Fiscal Year 2005 to minimize the risk of production line shutdown until the VRLA battery alteration is ready.

Expeditionary Fighting Vehicle Studies (August 2003)

The United States Marine Corps (USMC), with the assistance of the DCMA, initiated this Depot Source of Repair (DSOR) analysis to determine whether internal DSOR recommendations for the Expeditionary Fighting Vehicle (EFV) were: (1) in compliance with United States Code Title X requirements for public and private sourcing of repairs, and (2) best suited for the Marine Corps. The analysis focused on identifying public and private facilities with the capabilities to repair and overhaul critical EFV components and subsystems. The sites analyzed included Detroit Diesel of Warren, MI, and Tooele, UT; original equipment manufacturer MTU of Friedrichshafen, Germany; Marine Corp depots in Albany and Barstow; and Anniston Army Depot. The results of the analysis supported a recommendation for a public-private partnership between the Marine Corps depots and certain manufacturers to maintain the EFV's diesel engine and depot level repairable components. The Marine Corps approved the recommendation, thus moving toward the public-private partnership goals of Title X.

The USMC, also with the assistance of DCMA, conducted a similar analysis for the EFV MK44 30mm Automatic Gun. The sites analyzed included Alliant Techsystems Gun Systems Company; Marine Corps depots in Albany and Barstow; and Naval Surface Warfare Center (NSWC) of Crane, IN. The Marine Corps approved the recommendation supported by the analysis that NSWC was the best choice, both from a Title X and a USMC perspective, for depot repair for the MK44 30mm Automatic Gun.

Update of Microwave Power Tube Industrial Assessment (December 2003)

Microwave Power Tubes (MPTs) are pervasive throughout the Department in microwave radar, electronic warfare, and communication systems. The Navy, as the Department's executive agent for this critical and unique technology, monitors the ability of the industrial base to cost-effectively meet the Department's long-term requirements.

A large number of new DoD systems use MPTs and the Department has continued high-level use during recent operations. Therefore, production and performance requirements for MPTs continue to increase. The Navy continues to monitor two areas of potential production and operational impact: (1) continued satellite/space MPT market share loss to foreign suppliers; and (2) potential tightening by the state of California of exposure limits of beryllium, a critical material used in the manufacture of MPTs. The Navy is focused on ensuring that the MPT industrial base is sufficient to meet DoD's long-term requirements at an affordable cost.

4.4 Air Force

Inertial Technology Supply Base (March 2003)

Inertial components are critical for a broad range of aerospace applications, including both navigation and targeting. The Air Force initiated this assessment to determine the extent to which manufacturers of inertial components are working to miniaturize inertial technologies for various applications, including use in man-portable unmanned aerial vehicles (UAVs) and mini-UAVs. The study documented over 12 U.S. manufacturers of inertial products. All of the large defense electronics firms (BAE Systems, Kearfott, Northrop Grumman and Rockwell Collins) involved in inertial technology have active programs underway to miniaturize various components. Multiple product solutions exist to address man-portable UAV navigation and targeting requirements. Additional investment in micro-electro-mechanical technology will allow further miniaturization of selected components. The Air Force used the results of this study to support a broader Fiscal Year 2003 Science and Technology initiative focused on reducing Battlefield Airspace Operations kit weight and improving targeting accuracy.

Advanced Concept Technology Demonstrations Manufacturing & Producibility Reviews (June 2003)

The Advanced Concept Technology Demonstrations (ACTD) program rapidly develops, demonstrates and fields new technological capabilities and complementary concept of operations to the warfighter in response to Joint Requirements Oversight Council (JROC) validated joint requirements. The ACTD definition and selection criteria emphasize managing and reducing risks to increase the probability of a successful transition. The Air Force reviewed selected Fiscal Year 2003 ACTDs to help identify potential production risks and recommend strategies to mitigate them. Five candidate projects were selected with which to pilot the process during Fiscal Year 2003: Overwatch, Deployable Cargo Screening, Night Vision Cave & Urban Assault, Theater Support Vessel and High Altitude Airship. The reviews focused on producibility, affordability, and industrial base issues as related to each ACTD.

The review identified no industrial base shortfalls. The review included hardware-related recommendations that focused on near-term shortfalls in affordability and/or producibility funding and recommended design or process changes. The recommendations also included targeted investments (or leveraging ongoing efforts) to mitigate risks. The review highlighted the need for early evaluation of manufacturing risks associated with ACTDs.

Each ACTD Service sponsor is using the results of the review to refine transition plans, incorporate the findings in structuring acquisition strategies and conduct trade-offs to reduce transition risks. The Department has used the report findings to initiate two funded activities on High Altitude Airship (HAA) (power systems technologies and automated thermal seaming/inspection).

Key Munitions' Components (Thermal Batteries and Fuzes) (June 2003)

Thermal batteries and fuzes are used in missiles, guided artillery, torpedoes, countermeasure devices, aircraft emergency systems, guided bombs, and mines. The Air Force conducted this assessment to establish an initial baseline to review current, and support future, DoD investments in thermal battery and fuze technology. The assessment identified the types of fuzes and thermal batteries on the market, the domestic and foreign manufacturers, and some of the industry challenges.

- *Thermal Batteries:* The study indicated that manufacturing time and expense are major problems for the industry. There are two major thermal battery manufacturers located in the U.S. One, foreign-owned, supplies over 80 percent of the thermal batteries procured by the Department, thus constricting the Department's ability to obtain sufficient munitions when contingency operations require surge or replenishment of inventories. There are several initiatives underway within the Department to establish a qualified second domestic source, improve battery technology, and reduce battery costs by introducing significant producibility and manufacturing process enhancements.
- *Fuzes:* Due to limited market opportunities, the number of fuze suppliers has declined from 31 in the late 1980s to eight today. Many of the fuzes that remain in the inventory are not adaptable to precision-guided munitions without making major modifications. The cost of modifying old fuzes to support smart munitions is high; it would be better to move toward the new joint programmable fuze.

The study concluded that for both thermal batteries and fuzes, the defense industrial base is thin, having only one or two suppliers for military-unique products. Both industries are also subject to restrictive regulations regarding environmental compliance, occupational safety, and handling of explosives. There is little incentive for the existing manufacturers to invest in either improved facilities or product research. Targeted DoD investment will continue to be required.

Radiation Hardened Components Assessment for Transformational Communication System and Space-Based Radar (August 2003)

The major difference between military and commercial space systems is that the weapon systems threat environment requires radiation hardened electronics (RHE). The Air Force initiated this study to identify current industrial base shortfalls in the availability of RHE vis-à-vis requirements for selected systems; and to develop a plan to address these shortfalls. The assessment documented emerging technologies and radiation response trends in both commercial and radiation hardened semiconductor devices and evaluated their applicability for advanced military space system application.

The study included a preliminary parts assessment for the Transformational Communication System (TSAT) constellation. Pointing and tracking electronics are a particular concern due to requirements for narrow laser communication beam divergence and sophisticated signal processing requirements. In addition, the parts assessment of the Space-Based Radar (SBR) was updated and performance estimates for onboard processors for key missions documented. Besides signal processors, the assessment evaluated RHE requirements for power converter semiconductor technologies. Components are available to support power converter designs; however, there is only a single supplier of RHE power metal-oxide semiconductor field effect transistors and controller circuits. This is a major concern for future systems.

Previous Department RHE assessments resulted in a coordinated DoD investment plan of nearly \$200 million over the past three years. This assessment identified decreasing feature sizes and custom device requirements as needing further research and development and infrastructure investments. The results of this assessment have been integrated into the DoD RHE Roadmap. Current DoD investment projects are being refined to incorporate some of the identified study recommendations.

Fuel Cell and Hydrogen Reformer Supply Base Assessment (September 2003)

A fuel cell is an electrochemical device that combines hydrogen fuel and oxygen (from the air) to produce electricity, heat, and water. Fuel cells are cleaner, more reliable, and more efficient than combustion engines. The total market for fuel cells in Fiscal Year 2004 is estimated at \$2.4 billion, up from \$225 million just four years ago. Hydrogen reformer technology is integral to the future growth of fuel cells as an alternate power source. A hydrogen reformer extracts hydrogen from another energy source. The Air Force initiated this assessment to baseline the industrial base supporting both fuel cells and hydrogen reformers; and also to identify challenges facing the industry.

The assessment identified competing fuel cell and reformer technologies and the suppliers for each. One fuel of interest to the Air Force is JP-8 (jet engine fuel) since it is available at all operating locations. At this time, there is no reformer technology available to convert JP-8 into hydrogen due to the fuel's high sulfur content. One company was identified as having successfully reformed a surrogate of JP-8 into hydrogen. Further work on this technology is ongoing.

Fuel cells face many challenges before they can replace combustion engines or chemical batteries in the commercial market place. One of the biggest challenges is cost. Other challenges include the durability and dependability of fuel cells and the production, delivery, storage, and safety of hydrogen. The Department is targeting investments in those fuel cell technologies that will have direct application to military systems. This assessment provided an initial baseline in support of future DoD investments in fuel cell technology and the related area of hydrogen reformers.

Panoramic Night Vision Goggles Industrial Base Assessment (October 2003)

The ability of the U.S. military to exploit night vision technologies to enhance combat effectiveness has been a proven advantage against a variety of adversaries. The Air Force initiated a study of Panoramic Night Vision Goggles (PNVGs) to evaluate current manufacturers of both light intensifier and thermal imaging systems with emphasis on those developing panoramic capabilities. The study examined both domestic and foreign suppliers of panoramic and non-panoramic goggles. The study found that the two dominant U.S. manufacturers of tubes for panoramic goggles, ITT and Northrop Grumman, are both pursuing producibility and affordability improvements to the 16mm tubes necessary for panoramic capability. Current goals are 50 percent reductions in tube costs.

The study found that PNVGs, while still in development, are most likely to cost between \$20,000 and \$50,000 as compared with the current cost of between \$12,000 and \$14,000 for night vision goggles with a field of view of less than 40 degrees. As the PNVG technology matures, production requirements for the military market should increase and ultimately make the technology more affordable for non-military applications. The Air Force is using the results of the study to support investment planning and a DoD-sponsored effort to examine transitioning selected DoD technologies to First Responders (police and fire departments) in support of Homeland Security/Defense initiatives.

Small Gas Turbine Engines, "Supply Base Production & Support" (October 2003)

Small Gas Turbine Engines (GTEs) are present on both fixed-wing and rotary aircraft, are used for training, transport, reconnaissance, and combat missions. The Small GTE Study was sponsored by the North American Technology and Industrial Base Organization on behalf of the U.S. Department of Defense and the Canadian Department of National Defense. The Air Force, as the DoD Executive Agent, led the GTE assessment to determine the overall responsiveness of the small GTE supply base to meet current military requirements. Specific goals for the study included characterizing the original equipment manufacturer production base, mapping the supply chain, and assessing the ability of suppliers to respond to logistic support requirements. The study assessed those gas turbine engines with less than 8000 shaft horsepower for turboshaft/propeller engines and 8500 pounds of thrust for turbofans. The review included selected engines of the four major original equipment manufacturers with operations in North America. The business base is forecast to be relatively flat in terms of both unit production and sales. To increase market share, the original equipment manufacturers compete aggressively among themselves for military

and commercial contracts. While production of new aircraft is down, service life extension programs and contractor logistic support strategies are providing a stable business base.

A review of problem parts from multiple reporting systems identified no systemic supply base issues. Investment in new technologies by both industry and government is stable and structured to provide a long-term, evolutionary approach to incrementally improve engine performance (power output, fuel consumption, maintainability). The study recommended that, as the Department moves more toward contractor-provided logistics, information management needs to keep pace with commercially available customer support solutions. In addition, the Department needs to improve visibility into the root cause of parts shortages that impact engine/aircraft availability by developing a capability that looks for multiple occurrences on the same engine type and across different engine models. The recommendations are being incorporated into DoD strategies for identifying and resolving issues related to diminishing manufacturing sources and material shortages for non-electronic parts.

4.5 Defense Logistics Agency (DLA)

Reverse Osmosis Water Purification Unit Capability Assessment (March 2003)

The Reverse Osmosis Water Purification Unit (ROWPU), capable of purifying water from any source (including those containing nuclear, biological, and chemical (NBC) contaminants) is a critical system supporting front-line troops during combat. The Defense Logistics Agency (DLA) conducted this assessment to determine whether ROWPU capabilities were sufficient to support projected combat requirements. The study concluded that additional investment was necessary to meet wartime demands. The single ROWPU supplier could not provide certain critical components in a timely and robust fashion to meet surge production requirements. Subsequently, DLA awarded a \$385,000 contract to the ROWPU provider to stock the critical components necessary to meet projected combat requirements for both OEF and OIF.

Tray Pack Ration Readiness Follow-on (September 2003)

To address increased requirements to support OEF and OIF, DLA reevaluated industry's ability to support ration requirements. DLA compared current industrial capabilities for tray pack rations to those required to meet contingency requirements. The study concluded that peacetime production capabilities are insufficient to sustain the production capacity necessary to meet wartime tray pack ration requirements. Based on this reevaluation, DLA awarded contracts totaling \$131,000 to store metal cans in order to compensate for the shortfall in tray pack readiness and to enhance efficiency, reduce production lead-times, and increase production output of tray pack rations.

Joint Services Lightweight Integrated Suit Technology Follow-on (October 2003)

DLA re-evaluated the production process for the Joint Services Lightweight Integrated Suit Technology (JSLIST) because increased OEF and OIF demands

stressed the production processes. The 2003 contingency demand for the liner fabric required that production be surged 50 percent and exhausted the inventory of carbon beads. Beads Activated Carbon (BAC), produced by a sole-source provider—Kureha, in Japan—are the critical long-lead item for the suit. Von Blucher, the liner fabric producer, currently contracts for 63 percent of the carbon bead manufacturer's production. All suppliers, including the BAC manufacturer, met or exceeded program requirements in all previous years, including the unexpectedly high levels of demand that began prior to OIF. Collectively the JSLIST suppliers surged production from 70,000 suits per month to 128,000 suits per month for OIF. However, with its present production capacity, the Japanese manufacturer has limited ability to sustain a long-term production at the extraordinarily high levels of demand experienced in 2003. As a result, supplies of BAC are lower than desired for late FY03 - early FY04. The National Center for the Employment of the Disabled (NCED) recently notified the Department that there will be a 50 percent production shortage as the Japanese BAC manufacturer for the fabric liner works off a backlog of orders that it did not fill as it serviced the U.S. demand prior to and during OIF.

DLA contracted for a reassessment of the industrial capacity to obtain a JSLIST suit. The study concluded that resolution to the broad range of supply chain and material issues facing the JSLIST will require short-term, mid-term, and long-range plans. The recommendations include considering the use of non-specification suits for certain training purposes; budgeting to sustain the industrial base at higher than normal rates of production (approximately 1.5 million suits/year); identifying a domestic supplier of the existing carbon bead or new technology required for the suit; and encouraging and sponsoring private sector research and development for a new generation protective outfit. DLA is considering potential actions to mitigate JSLIST risks. In response to the carbon bead constraint, the German fabric maker has decided to build a carbon bead production facility in the United States and has begun work on site selection. The fabric manufacturer estimates that it will cost an estimated \$50 million and 24 months time to establish a carbon bead production facility in the United States.

Pharmaceutical, Medical/Surgical, Medical Equipment Follow-on (October 2003)

In response to a Combat Support Agency Review Team report, DLA contracted with the Logistics Management Institute (LMI) to reassess the ability of DLA's prime medical suppliers to meet the Department's medical contingency requirements. LMI analyzed OEF and OIF requirements and concluded that DLA can overcome approximately 50 percent of identified Service surge and sustainment shortfalls, just as it could in 2002. In Fiscal Year 2003, DLA invested approximately \$35 million in medical contingency contracts to support the Services' war requirements. These actions provide the Department immediate access to an estimated materiel inventory of \$410 million in pharmaceutical supplies, \$350 million in medical/surgical supplies, and \$10 million in medical equipment.

Nerve Agent Antidotes in Autoinjectors Follow-on (November 2003)

Nerve Agent Antidote Autoinjectors (NAAAs) are military-unique items designed for rapid self-administration through clothing upon exposure to a nerve agent. DLA validated the fact that the industrial base cannot satisfy the Services' requirements for NAAA without DoD intervention. Quantities required to meet mobilization requirements greatly exceed peacetime needs. DLA has contracted with Meridian Medical Technologies, the sole U.S. manufacturer of NAAA, to retain a capability to overcome the Services' wartime surge and sustainment shortfalls. The contract guarantees the production of five million autoinjectors within 142 days of mobilization of the plant. Components for the autoinjectors are prepositioned at the plant. The manufacturer met the requirements placed on it during OEF and OIF.

Small Arms Protective Inserts (November 2003)

Because of increased OIF requirements for Small Arms Protective Inserts (SAPI) for Interceptor Body Armor (IBA), DLA assessed the ability of the industrial base to meet Army and Marine Corp demands. DLA found the industrial base insufficient to meet OIF requirements. The limiting factor for SAPI is the SpectraShield plate produced by Honeywell. Even if the Department received 100 percent of Honeywell's production, it still would not be able to meet all requirements. For the short term, the Army has agreed to accept SAPI plates made from a material that meets ballistic protection requirements but is a few ounces heavier than military specifications permit. The Marine Corp continues to require SpectraShield in its plates.

All U.S. forces in Iraq had IBA in December 2003. Plans are in place to attain industrial base sufficiency for SAPI plates to meet all projected production surge requirements. By March 2004, a licensed foreign source, Dynema, will begin producing a SpectraShield-like material in the U.S. Additionally, Honeywell will increase its production capacity for SpectraShield by 24 percent by June 2004. Collectively, these actions should eliminate SAPI plate production shortfalls.

4.6 Missile Defense Agency (MDA)

During 2003, MDA, with the assistance of the Defense Contract Management Agency (DCMA), completed five studies as part of its effort to develop a baseline assessment of missile defense industrial and technological capabilities.

Divert and Attitude Control System Industrial Capability Assessment (February 2003)

The study surveyed Divert and Attitude Control System (DACS) manufacturers and included the results of site visits to prime contractors. The study concluded that, currently, there are sufficient competitors in the DACS sector. However, if certain key manufacturers were to cease production, options for liquid or solid DACS would be limited. The study found that DACS business is 100 percent reliant on MDA requirements. Contractor-funded research and development activity is stagnant because firms are reluctant to invest in new technologies due to uncertain future DACS

funding. Western Electrochemical, a division of American Pacific Corporation, is the only domestic source for ammonium perchlorate, the primary ingredient in solid rocket fuel. Moog is the single source for valves and thrusters for all DACS manufacturers. DACS business accounts for a relatively small portion of the total business of prime DACS manufacturers. Therefore, if defense business deteriorates, manufacturers may choose to divest their DACS business activities. Additionally, design engineers and skilled technicians are vulnerable to temporary or permanent layoffs if DACS business deteriorates. The MDA will use the findings of this study as it develops and executes a capability-based, evolutionary acquisition strategy for the Ballistic Missile Defense System (BMDS).

Laser Detection and Ranging and Light Detection and Ranging Systems Industrial Capability Assessment (March 2003)

The study focused on laser manufacturers supporting complex defense applications such as Laser Detection and Ranging and Light Detection and Ranging (LADAR/LIDAR) and directed energy weapons that require high amounts of power. The study surveyed LADAR/LIDAR manufacturers and included the results of site visits to prime contractors. The study found that LADAR/LIDAR systems generally are in the research and development or prototype production stages of development. Most applications are low-volume and defense-oriented. In most cases, LADAR/LIDAR systems account for less than ten percent of the manufacturer's business base. LADAR/LIDAR technology development could stagnate without defense-related business. Additionally, small business firms may be reluctant to enter the LADAR/LIDAR manufacturing market because of high material costs relative to current DoD funding levels. The MDA will use the findings of this study to improve BMDS development as it develops and executes acquisition strategies that capitalize on technology advances.

Batteries Industrial Capability Assessment (May 2003)

The study surveyed six domestic and four foreign battery manufacturers and included site visits to the six domestic suppliers. The study found that there are few manufacturers capable of supporting the unique battery requirements for military weapon systems. High capitalization costs, low investor interest in a limited government-dependent business, low profit margins, and stringent environmental regulations make market entry prohibitive. Eagle Picher Technology (Joplin, MO) dominates the weapons battery market (86 percent of domestic and 54 percent of worldwide thermal battery sales) and also supplies critical raw materials to competitors. The U.S. industrial capacity for accelerating thermal battery production in an emergency is marginal, although global capacity appears sufficient for near-term requirements. Rohm and Haas, the only domestic supplier of magnesium oxide, is no longer producing this material, a key ingredient for battery electrolytes. However, domestic battery manufacturers have over a year's supply of magnesium oxide on hand and are working to mitigate the issue.

Overall manufacturing capacity—three domestic and four global sources—for silver zinc batteries is sufficient to meet current and near-term future needs. Other

technologies, such as liquid reserve lithium and lithium ion, which provide higher power and extend operating life in smaller and lighter packages, are being considered to replace silver zinc. To date these technologies have not been proven for missile applications. The MDA will use the findings of the study to craft acquisition strategies that capitalize on current technology advances and to develop future technology strategies to meet BMDS requirements.

Infrared Sensor Industrial Capability Assessment (June 2003)

The study surveyed ten domestic and five foreign Infrared (IR) sensor manufacturers and included site visits to six domestic suppliers. The study concluded that the IR sensor industry is healthy and stable, with increasing sales during the past three years and steady employment. There is overcapacity in the IR sensor industry that may result in future consolidation. Vertically integrated prime contractors (that also manufacture IR imaging systems and detectors), proprietary processes, and high initial investment costs make it difficult for new suppliers to penetrate the market. IR sensor manufacturers remain dependent on DoD funding because of limited commercial applications. Advances in IR technology development to support future MDA needs will require continued DoD funding. The MDA will use the findings of this study as it develops and executes a capability-based, BMDS evolutionary acquisition strategy.

Radiation-Hardened Electronics Industrial Capability Assessment (July 2003)

The study surveyed five domestic radiation-hardened electronic (RHE) component manufacturers and included site visits to the two major DoD suppliers, Honeywell and BAE Systems. The report concluded that the RHE industry is unstable and has an uncertain future. The two major suppliers, Honeywell and BAE Systems, are highly vertically-integrated companies with operations covering many major commercial and defense aerospace markets. Both companies have extensive defense businesses that are healthy but have significant commercial aerospace operations adversely impacted recently by the poor economy. RHE business accounts for less than one percent of their total business. Several other companies produce semiconductors meeting commercial RHE standards for commercial space applications, but their products do not meet the operational environment specifications required for DoD applications. The Department currently has a RHE improvement program underway that includes funding under Title III of the Defense Production Act. The MDA will use the findings of this study to monitor the DoD RHE program to develop and execute a capability-based, evolutionary acquisition strategy for missile defense systems.

5. Related Activities

5.1 Title III of the Defense Production Act

In addition to performing industrial capabilities analyses, there are DoD programs and/or activities specifically designed to develop or improve industrial capabilities. Title III of the Defense Production Act is a prime example.

The Defense Production Act (DPA) (50 U.S.C. App. 2061 *et seq.*) is the primary legislation for ensuring industrial resources and critical technology items essential for national defense are available when needed. Title III of the DPA provides a vehicle to create, maintain, modernize, or expand domestic production capability for technology items, components, and industrial resources essential for national defense when such a production capability would not otherwise be available. A key objective of the Title III Program is to accelerate the transition of technologies from research and development to affordable production and insertion into defense systems.

Title III stimulates investment in key production resources to increase the supply, improve the quality, and reduce the cost of advanced technology. It reduces U.S. dependency on foreign sources of supply for critical materials and technologies, and strengthens the economic and technological competitiveness of the U.S. defense industrial base.

In calendar year 2003, the Title III Program had eight projects underway.

Radiation-Hardened Electronics Capital Expansion

This project is making substantial capital investments to establish a capability for production of 0.15 micrometer (μm) feature size microelectronic devices with strategic levels of radiation hardening. The project is using commercially available microelectronics equipment modified for radiation-hardened production. RHEs enable spacecraft to operate in the extreme radiation environments resulting from nuclear threats and exposure to long-term natural radiation. Numerous defense programs require strategic radiation-hardened microelectronics. Without Title III support, these programs will have difficulty achieving their goals and meeting insertion schedules. The Title III effort is part of an overall Radiation-Hardened Microelectronics Accelerated Technology Development program initiated in 2001. The industrial capability will provide substantially higher electronics operating speeds and will lower the power/size of electronics in spacecraft. The smaller size and higher performance made possible by the Title III Capital Expansion (CAPEX) equipment, combined with advances in radiation-hardened process technology will generate highly leveraged savings for spacecraft in terms of size, weight, reliability, and launch costs. Significant equipment purchases and qualification testing have been completed to date.

Radiation-Hardened Microprocessors

This Title III project is scaling up production capacities for high performance radiation-hardened microprocessors that will provide significant cost and weight savings for space systems. Higher performance means greater on-orbit processing capabilities and lower ground support requirements. Radiation-hardened microprocessors will enable spacecraft to operate in the extreme radiation environments of nuclear threats and high level natural radiation.

Silicon Carbide Substrates

The goals of this project are to establish efficient and affordable domestic sources of high-quality silicon carbide (SiC) semiconductor substrates and to facilitate the transition and insertion of this advanced semiconductor material into defense applications. This Title III project has increased material availability, improved quality, reduced cost, and enabled the transition to full scale manufacturing by establishing the capability to produce 75mm diameter SiC substrates for device fabrication.

The fruits of the Title III SiC program have resulted in early insertion into Defense Advanced Research Projects Agency (DARPA) programs such as the Wide Bandgap Semiconductor Technology Initiative, which is making use of improved substrates to demonstrate devices for military systems. Use of SiC semiconductor substrates will result in smaller, lower-weight, lower-cost, and higher-performance equipment. This effort is expected to generate savings in defense costs that are many times the projected Title III expenditure while also strengthening the position of the U.S. industrial base with respect to a critical state-of-the-art technology.

Laser Eye Protection (LEP)

The objective of this project is to establish a viable, highly responsive, and affordable production capacity for thin-film dielectric coatings on polycarbonate substrates, which will be used to make laser eye protection spectacles and goggles. Thin-film dielectric technologies are expensive and worldwide production capacity is limited. At the start of the project, the world's sole production facility was located in Great Britain and had an annual capacity of only 3,000 units per year. This project established a viable domestic source with sufficient production capacity to satisfy all projected Air Force and Navy demand for affordable thin-film dielectric coatings. The remaining project tasks will demonstrate devices that meet unique Army requirements.

Microwave Power Tube Materials and Components

The objectives of this project are to improve the quality and reduce the production lead-time for microwave power tube materials and components. It also will reduce the production and life cycle costs of microwave power tubes. The project has begun to foster consistent, quality-driven process and material improvements in the supply chain for microwave power tube production. This effort will complement ongoing Defense research and development (R&D) and Manufacturing Technology efforts to improve microwave power tube design and production processes.

Yttrium Barium Copper Oxide High-Temperature Superconducting Coated Conductors

The objective of this Title III program is to establish high volume, high quality, affordable, domestic production capacity for Yttrium Barium Copper Oxide (YBCO) High Temperature Superconducting conductors. The initial phase of the project has begun with two domestic U.S. companies using Title III funding and additional funding through a Memorandum of Agreement with the U.S. Department of Energy (DoE). The DoE also will provide several technical/industrial experts to the Title III integrated product team guiding the project. The companies will match government funding on a dollar-for-dollar basis.

Wireless Vibration Sensors

This project will enable the timely production and fielding of affordable smart sensors that will make Condition-Based Maintenance (CBM) possible. CBM is a critical enabling tool to lower asset lifecycle costs by providing online measurement and quantification of the condition and maintenance needs of an asset (e.g., an aircraft engine). Incorporating this technology into defense systems will enable more effective maintenance strategies. CBM promises substantial reductions in maintenance costs as well as increased readiness levels across a variety of defense systems.

Rigid-Rod Polymeric Materials

This project will transition rigid-rod, ultra-high strength polymer material from a small scale, R&D batch process to a limited production capability. The project is focusing on lowering manufacturing costs to make the material more affordable. Rigid-rod, ultra-high strength polymeric materials can be used as metal substitutes for a variety of applications. The material offers significant weight savings potential and is being explored for lightweight munitions, lightweight tactical system components, lightweight pistols and rifles, lightweight personal armor, and high strength structural foams.

5.2 Defense Priorities and Allocations System/Special Priorities Assistance

Title I of the Defense Production Act provides the President the authority to require preferential performance on contracts and orders, as necessary, to meet national defense and emergency preparedness program requirements. Executive Order 12919 delegates these authorities to various Federal Departments and Agencies. The Secretary of Commerce has been delegated the authority to manage industrial resources. To implement its authority, the Department of Commerce (DoC) administers the Defense Priorities and Allocations System (DPAS). The DoC has further delegated authority to the DoD under the DPAS to: (1) apply priority ratings to contracts and orders supporting national defense programs; and (2) request the DoC provide Special Priorities Assistance (SPA) to resolve conflicts for industrial resources among both rated and unrated (i.e., non-defense) contracts and orders; and (3) authorize priority ratings for other U.S. federal agency and friendly nation defense-related orders in the United States when such authorization furthers U.S. national defense interests.

During 2003, the office of the DUSD (IP) executed 15 SPA requests as depicted in the following table. Thirteen were directly in support of Operation Iraqi Freedom (OIF) or Operation Enduring Freedom (OEF); five were for U.S. forces, six were for the UK, and one each were for Australia and Germany. The two non-OIF/OEF requests were in support of requirements for the UK and Germany.

Defense Priorities and Allocations System/ Special Priorities Assistance Cases - 2003			
Date	Item	Assistance for	Summary
1/03	AN/PRC-112G Search and Rescue Radios and related equipment	UK	Directed industrial priority rating to hold delivery position in support of OEF.
1/03	SpectraShield 2QFY03SPA	Army/ Marines	Directed prioritization of deliveries of existing contracts for Spectra in support of OEF. Used in production of Small Arms Protective Insert (SAPI) plates, vests, and concealable body armor for soldiers.
1/03	IZLID-1000P IR Zoom Laser Illuminator/ Designators	Australia	Directed industrial priority rating. For Australian Marines in support of OEF.
2/03	Phoenix IR Beacons and Glow Tape Tab Kits	UK	Directed industrial priority rating to hold delivery position in support of OEF.
2/03	GEM IV Embedded GPS Modules	Germany	Directed industrial priority rating to hold delivery position. Modules needed for the KEPD 350 Taurus missile.
2/03	Precision Lightweight GPS Receiver II/Antennas	UK	Directed industrial priority rating to hold delivery position in support of OEF.
3/03	Enhanced Paveway II Computer Control Groups (CCGs)	UK	Directed industrial priority rating to hold delivery position of the Rockwell Collins GPS receiver component to the CCGs in support of OIF.
3/03	SpectraShield 3QFY03SPA	Army/ Marines	Directed prioritization of deliveries of existing contracts for Spectra in support of OIF.
6/03	SpectraShield 4QFY03SPA	Army/ Marines	Directed prioritization of deliveries of existing contracts for Spectra in support of OIF.
7/03	Inertial Measurement Units(IMUs) for Enhanced Paveway II Computer Control Groups (CCGs)	UK	Directed industrial priority rating for delivery of Honeywell IMUs for the CCGs in support of OIF.
8/03	SpectraShield 4QFY03SPA	Army/ Marines	Directed prioritization of deliveries of existing contracts for Spectra in support of OIF.
9/03	GPS Cards for Bowman Communications Systems	UK	Directed industrial priority rating for delivery of GPS cards from Rockwell Collins to General Dynamics for Bowman radios. Action taken in support of interoperability.
10/03	SpectraShield Oct-Nov2003	Army/ Marines	Directed prioritization of deliveries of existing contracts for Spectra in support of OIF.
11/03	SpectraShield Dec2003	Army/ Marines	Directed prioritization of deliveries of existing contracts for Spectra in support of OIF.
12/03	SpectraShield Jan2004	Army/ Marines	Directed prioritization of deliveries of existing contracts for Spectra in support of OIF.
Source: ODUSD(IP)			

6. Programs and Actions to Sustain Capabilities

In 2003, the Department acquired and/or maintained facilities, equipment, or components, or took other actions needed to meet projected and actual military contingency requirements. Specifically, the Department:

- In support of OIF, made over 9000 requests to contractors to expedite deliveries of critical items such as C-17 aircraft, structural panels and tube assemblies for the E-3 Sentry Airborne Warning And Control System, and thermal identification panels (to prevent friendly fire).
- In support of OIF, took specific measures to increase industry production capacities for timely replenishment of depleted Joint Direct Attack Munition inventories; inertial measurement unit inventories for precision guided munitions; BA5590 battery inventories; and Small Arms Protective Inserts inventories.
- Contracted with the JSLIST suppliers to surge production from 70,000 suits per month to 128,000 suits per month for OIF.
- For tray pack rations, recognizing that a shortfall in commercial components made peacetime production capabilities insufficient for wartime requirements, awarded contracts to store metal cans in order to compensate for the shortfall in tray pack readiness and to enhance efficiency, reduce production lead times, and increase production output of tray pack rations.
- For pharmaceutical, medical/surgical supplies and medical equipment shortfalls, engaged commercial firms to support wartime requirements.
- For nerve agent antidote autoinjectors, continued a support contract to remedy projected surge and sustainment shortfalls during wartime.
- For water purification capability shortfalls, issued a contract with the sole-source supplier to stock the critical components necessary to meet projected combat requirements.