CCDoTT
CENTER FOR THE COMMERCIAL DEPLOYMENT
OF TRANSPORTATION TECHNOLOGIES (CCDoTT)
California State University, Long Beach

May 31, 2010

Dr. Paul Rispin, Program Manager
Office of Naval Research, Code 331
875 North Randolph Street, Room 273
Arlington, VA 22203-1995

Subject: Deliverable Number 0022, SM21 CONOPS Revised

Reference: Strategic Mobility 21 Contract N00014-06-C-0060

Dear Paul,

In accordance with the requirements of referenced contract, we are pleased to submit this SM21 CONOPS Revised – Phase II Joint Force Deployment and Distribution Support Platform: Joint Operational Concept for your review.

Your comments on this document are welcomed.

Regards,

Dr. John Hwang
Strategic Mobility 21 Principal Investigator

cc: Administrative Contracting Officer (Transmittal Letter only)
Director, Naval Research Lab (Hardcopy via U.S. Mail)
Defense Technical Information Center

6300 State University Drive, Suite 220, Long Beach, California 90815
562.985.7394 • 562.985.2583 Fax • www.ccdott.org

Strategic Mobility 21

Initial Capabilities Document (ICD)
Revised

Prepared for:

Office of Naval Research
875 North Randolph Street, Room 273
Arlington, VA 22203-1995

Dr. Paul Rispin, Program Manager
ONR Code 331
703.696.0339
rispinp@onr.navy.mil

In fulfillment of the requirements for:

FY 06/07 Contract No. N00014-06-C-0060
CLIN 0022

Prepared and Submitted by:

Enterprise Management Systems
8210 Lone Oak Court
Manassas, VA 20111
September 22, 2006, Revised November 19, 2009

Acknowledgement of Support and Disclaimer: This material is based upon work supported by the Office of Naval Research under Contract No. N00014-06-C-0060. Any opinions, findings and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the Office of Naval Research.

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.

1. REPORT DATE *(DD-MM-YYYY)*	2. REPORT TYPE	3. DATES COVERED *(From - To)*
31-05-2010	Technical	Sept. 2007 - May 2010

4. TITLE AND SUBTITLE

Strategic Mobility 21
Initial Capabilities Document (ICD) Revised

5a. CONTRACT NUMBER

N00014-06-C-0060

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

Ed Savacool, Enterprise Management Systems

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

California State University, Long Beach Foundation
6300 State University Drive, Suite 220
Long Beach, CA 90815

8. PERFORMING ORGANIZATION REPORT NUMBER

Contractor Report 0022

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

Office of Naval Research
875 North Randolph Street, Room 273
Arlington, VA 22203-1995

10. SPONSOR/MONITOR'S ACRONYM(S)

ONR

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

CLIN 0022

12. DISTRIBUTION/AVAILABILITY STATEMENT

DTIC Distribution Statement A: Approved for public release; distribution is unlimited.

13. SUPPLEMENTARY NOTES

14. ABSTRACT

The purpose of this document is to define the initial capabilities for the dual-use Joint Distribution and Deployment Support Platform (JDDSP) being designed by the Strategic Mobility 21 (SM21) program. The JDDSP military initial operating capability (IOC) will support military force deployment form the CONUS source through the strategic port to the final ship stow location. The commercial IOC will support the processes associated with transportation support to the supply chain logistics "deliver" function. The JDDSP full operating capability (FOC) represents a system-of-systems that includes both physical and information management infrastructure. The physical infrastructure is best described as a multi-modal inland terminal that supports one or more commercial strategic ports within a geographic region.

15. SUBJECT TERMS

Joint Deployment and Distribution Support Platform (JDDSP), Initial Operating Capability (IOC), Full Operating Capability (FOC), Joint Capabilities Integrated Development System (JCIDS), Agile Port System (APS), Expeditionary Theater Opening (ETO), Range of Military Operations (ROMO), Global Transportation Management System (GTMS)

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Dr. John Hwang
U	U	U		25	19b. TELEPHONE NUMBER *(Include area code)* 1-562-985-7392

Reset

Standard Form 298 (Rev. 8/98)
Prescribed by ANSI Std. Z39.18

INSTRUCTIONS FOR COMPLETING SF 298

1. REPORT DATE. Full publication date, including day, month, if available. Must cite at least the year and be Year 2000 compliant, e.g. 30-06-1998; xx-06-1998; xx-xx-1998.

2. REPORT TYPE. State the type of report, such as final, technical, interim, memorandum, master's thesis, progress, quarterly, research, special, group study, etc.

3. DATES COVERED. Indicate the time during which the work was performed and the report was written, e.g., Jun 1997 - Jun 1998; 1-10 Jun 1996; May - Nov 1998; Nov 1998.

4. TITLE. Enter title and subtitle with volume number and part number, if applicable. On classified documents, enter the title classification in parentheses.

5a. CONTRACT NUMBER. Enter all contract numbers as they appear in the report, e.g. F33615-86-C-5169.

5b. GRANT NUMBER. Enter all grant numbers as they appear in the report, e.g. AFOSR-82-1234.

5c. PROGRAM ELEMENT NUMBER. Enter all program element numbers as they appear in the report, e.g. 61101A.

5d. PROJECT NUMBER. Enter all project numbers as they appear in the report, e.g. 1F665702D1257; ILIR.

5e. TASK NUMBER. Enter all task numbers as they appear in the report, e.g. 05; RF0330201; T4112.

5f. WORK UNIT NUMBER. Enter all work unit numbers as they appear in the report, e.g. 001; AFAPL30480105.

6. AUTHOR(S). Enter name(s) of person(s) responsible for writing the report, performing the research, or credited with the content of the report. The form of entry is the last name, first name, middle initial, and additional qualifiers separated by commas, e.g. Smith, Richard, J, Jr.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES). Self-explanatory.

8. PERFORMING ORGANIZATION REPORT NUMBER. Enter all unique alphanumeric report numbers assigned by the performing organization, e.g. BRL-1234; AFWL-TR-85-4017-Vol-21-PT-2.

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES). Enter the name and address of the organization(s) financially responsible for and monitoring the work.

10. SPONSOR/MONITOR'S ACRONYM(S). Enter, if available, e.g. BRL, ARDEC, NADC.

11. SPONSOR/MONITOR'S REPORT NUMBER(S). Enter report number as assigned by the sponsoring/ monitoring agency, if available, e.g. BRL-TR-829; -215.

12. DISTRIBUTION/AVAILABILITY STATEMENT. Use agency-mandated availability statements to indicate the public availability or distribution limitations of the report. If additional limitations/ restrictions or special markings are indicated, follow agency authorization procedures, e.g. RD/FRD, PROPIN, ITAR, etc. Include copyright information.

13. SUPPLEMENTARY NOTES. Enter information not included elsewhere such as: prepared in cooperation with; translation of; report supersedes; old edition number, etc.

14. ABSTRACT. A brief (approximately 200 words) factual summary of the most significant information.

15. SUBJECT TERMS. Key words or phrases identifying major concepts in the report.

16. SECURITY CLASSIFICATION. Enter security classification in accordance with security classification regulations, e.g. U, C, S, etc. If this form contains classified information, stamp classification level on the top and bottom of this page.

17. LIMITATION OF ABSTRACT. This block must be completed to assign a distribution limitation to the abstract. Enter UU (Unclassified Unlimited) or SAR (Same as Report). An entry in this block is necessary if the abstract is to be limited.

STRATEGIC MOBILITY 21

INITIAL CAPABILITIES DOCUMENT (ICD)

FOR

Joint Distribution and Deployment Support Platform (JDDSP)

Potential Acquisition Category: (ACAT I)

Validation Authority _____

Approval Authority _____

Milestone Decision Authority _____

Designation: Joint Impact

Prepared for Concept Refinement Decision

Version 2.2

Date: 22 September 2006

Revised November 19, 2009

Executive Summary

The purpose of this document is to define the initial capabilities for the dual-use[1] Joint Distribution and Deployment Support Platform (JDDSP) being designed by the Strategic Mobility 21 (SM21) program. The JDDSP military Initial Operating Capability (IOC) will support military force deployment from the Continental United States (CONUS) source through the strategic port to the final ship stow location. The commercial IOC will support the processes associated with transportation support to the supply chain logistics "deliver" function. The JDDSP Full Operating Capability (FOC) represents a system-of-systems that includes both physical and information management infrastructures. The physical infrastructure is best described as a multi-modal inland terminal that supports one or more commercial strategic ports within a geographic region.

This report has been developed as an Initial Capabilities Document (ICD) to conform to the military requirements of the Joint Capabilities Integrated Development System (JCIDS) procedures. This is the fourth revision of the ICD to document information gained from the recently completed experimentation and analysis supported by modeling and simulation of the JDDSP and Agile Port System (APS) force deployment support capabilities. Two models supported the analysis: the Center for the Commercial Deployment of Transportation Technologies (CCDoTT) Agile Port System (APS) model; and, the SM21 Agile Supply Network (ASN) model.

The JDDSP was developed to better integrate military and commercial execution level systems to enable a more controlled over the flow of force deployments and sustainment distribution. The objective is to provide responsive support to the Combatant Commander during Expeditionary Theater Opening (ETO) operations across the full Range of Military Operations (ROMO) and to continue to sustainment support operations until the conclusion of hostilities or disaster relief operations. To accomplish this, the JDDSP has been designed as a CONUS regional node within the Department of Defense (DOD) Joint Deployment and Distribution Enterprise (JDDE). The JDDSP is designed to manage and regulate force deployment and sustainment distribution flow as articulated in the Joint Logistics (Distribution) Joint Integrating Concept.

The recently completed experimentation with the development of a Global Transportation Management System (GTMS), which was designed to support the JDDSP dual-use transportation requirements, provided significant insight into the full potential of the JDDSP. The lessons learned from the experimentation have influenced the current ICD revision. The GTMS was developed by SM21, in collaboration with Dole Packaged Foods, a division within the Dole Foods Company, to fulfill the dual-use distribution requirements of the JDDSP. The GTMS is based on a Service Oriented Architecture (SOA) using open source software components. The SOA integrates selected best-of-breed commercial software systems and the adaptation of Dole systems. For military IOC, the SOA will adapt military execution level systems. Additional web services will be developed as required by the individual military and commercial customers supported in the future.

[1] Dual use is a cooperative/collaborative commercial and military use of the terminal facilities.

Change History

The table below identifies all changes incorporated into the updated version of this document after initial approval. A change in twenty percent (20%) of the document constitutes a new version, which will also be identified in this table. The Change Request Number (CR #) provides a link to the history of the change request.

CR #	Date	Version #	Change Description
1	31 August 2006	2	Revisions in response from Volpe review to comments on original draft
2	22 September 2006	2.1	Further Revision
3	21 September 2008	2.2	Minor revisions to update the ICD Terminology and evolving vision of the Joint Deployment and Distribution Support Platform
4	15 November 2009	2.3	Updated ICD to include recent concept refinement. Also updated: Appendix A OV-1, Appendix B: Bibliography, Appendix C: Acronyms, and Appendix D: Definitions, and updating of text

Table of Contents

Tables and Figures

Concept of Operations Summary

The US Transportation Command (USTRANSCOM) as the Joint Distribution Process owner and Joint Forces Command (JFCOM) as the Joint Deployment Process owner have restricted capability for supporting the dynamic requirements of Expeditionary Theater Opening (ETO) and force build-out operations. Historically the support provided to the opening of a joint expeditionary theater has, by necessity, focused on providing "mass" through the use of "push" logistics from the CONUS base. The pushing of mass to the theater has been required because of the limited execution level control over the flow of forces and sustainment. The ability to dynamically plan and then re-plan force deployment and sustainment distribution at the "piece" of equipment and sustainment item level on an as required basis did not exist. Combatant Commanders, especially during ETO operations, require the timely arrival of the proper mix of combat power, combat support, and combat service support units along with the required mix of supporting sustainment supplies. Many changes occur after the force deployment has been validated and the units begin planning and movement. Simply moving mass amounts (square footage) of unit equipment and as many sustainment containers to the theater as the available lift will allow does not meet the required support objectives. The ability to dynamically manage shipments enables Agile Port System (APS) processes that have been demonstrated by the Center for the Commercial Deployment of Transportation Technologies (CCDoTT) to increase marine terminal throughput by 300% and have reduced the impact of force deployments on commercial ports in half. Dynamically managing the flow of military forces from the CONUS sources of origin to support the ETO requirements, while minimizing the impact of deployments on both the deploying units and the commercial distribution system, are the objective capability contributions established for the Joint Deployment and Distribution Support Platform (JDDSP) initial operating capability (IOC).

The JDDSP at full operating capability for military support is a CONUS based regional multi-modal node designed as a System of Systems (SOS). For IOC, the JDDSP capability is limited to force deployment planning and execution support from the CONUS source of origin to the final ship stow location on a strategic sealift ship. The system within the JDDSP design to support the military IOC is a Global Transportation Management System (GTMS). The JDDSP – GTMS has been designed to dynamically manage international export and import containerized shipments and military force deployments. As originally envisioned in Joint Vision 2020, the specific initial operational outcome of the JDDSP – GTMS support to ETO operations is the synchronization of Deployment, Employment, and Sustainment (DES) operations from both the strategic provider[2] and combatant commander's perspective. The JDDSP supports the shift away from separate service and strategic provider doctrine that provided linear, stovepipe support structures that are ineffective in responding to the dynamic Combatant Command(COCOM) requirements. The JDDSP is designed to support COCOM, ETO, and DES requirements through an integrated operational system concept, which is designed to complement existing military and commercial systems and functions. The GTMS design is based on loosely coupling best-of-breed commercial and military systems with the addition of value added web services into a system capable of supporting the rapid planning and dynamic replanning and execution of

[2] The strategic providers and the US Transportation Command and US Joint Forces Command in their respective roles as distribution process and deployment process owners.

expeditionary movements to diverse and distributed locations across the full ROMO. In the simplest terms, the GTMS provides the data fusion to enable the synchronized movement of forces and supplies and logistics C^2 operations necessary to control the DES operational flow. This concept compliments the Joint Deployment and Distribution Enterprise (JDDE) requirements.

Lessons learned from the last 20 years of engagements across the full ROMO have highlighted the capabilities needed to better align the support of the strategic providers with the needs of the deploying Combatant Commander. The strategic providers have been hindered, for many complex reasons, in providing coordinated and consistent management of dynamic deployment and distribution capabilities. Further, the collaboration between military, commercial, and public transportation systems and the use of associated infrastructure has been limited. The JDDSP – GTMS concept was developed to align the strategic providers' support requirements with the military, commercial, and public transportation capabilities to provide combatant commands with responsive ETO and sustainment support. The JDDSP dual-use capabilities will be fully established through the continuation of the iterative SOS engineering process currently employed for GTMS experimentation with Dole Packaged Foods. The SOS engineering process is characterized by the design, development, testing, and delivery of distribution planning, execution, and training capability.

The JDDSP – GTMS will be employed as a CONUS regional support node within the JDDE. The JDDSP after reaching full operational capability could be employed at any node within the JDDE including support for sea based operations from an advanced base. In a DES environment, the GTMS will be operationally implemented to control the flow of units and sustainment from the CONUS source of origin through the strategic ports (this also includes reset, retrograde, and redeployment shipments coming back from the combat theater). From the source of origin, the DES flow will be scheduled for movement in the optimal lift asset loading sequence considering the priorities of the Combatant Commander and the capabilities of the commercial and Defense Transportation System. The objectives of scheduling movements by loading sequence and the priorities of the Combatant Commander are the reduction in deployment timelines and reduced impact on the commercial strategic port and the deploying units. This joint capability enables the COCOM Commander to meet the requirement associated with ETO, continued force expansion, and sustainment operations until the return of forces to CONUS.

The JDDSP – GTMS functionality does not require the creation of a new network or the replacement of existing logistics support systems. The new capabilities are enabled by the integration of existing components of the commercial and Defense Transportation System loosely coupled through the GTMS Service Oriented Architecture (SOA). The GTMS provides the CONUS strategic providers, the Combatant Commanders and their respective execution level personnel the ability to share and display force deployment and sustainment distribution information. This is accomplished by executing multiform collaboration over transport, services and application system layers engineered as a SOA to integrate transportation asset and shipment item level information from disparate commercial and military sources. The SOA based JDDSP – GTMS architecture was developed through a collaborative design, development, and

demonstration effort with Dole Packaged Foods, a division of Dole Foods. The JDDSP – GTMS SOA framework is overviewed in Figure 1.

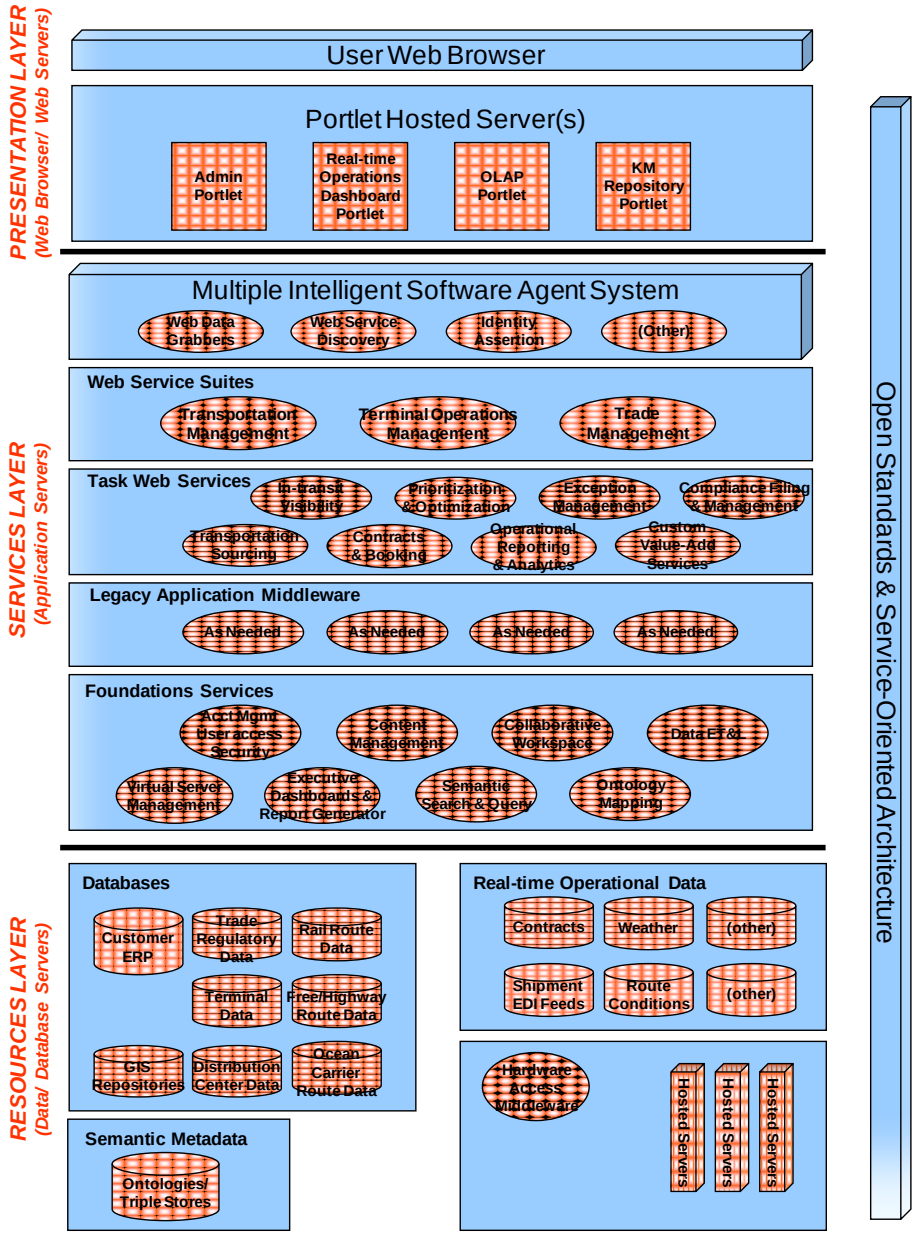

Figure 1: JDDSP – GTMS SOA Based Architecture

Joint Capability Area

The JDDSP – GTMS capabilities are nested in two of the nine Tier 1 Joint Capability Areas (JCAs) approved by the Secretary of Defense on 12 January 2009. The specific Tier 1 JCAs with associated Tier II JCAs are listed in Table 1 of this ICD.

The JDDSP – GTMS Network supports full spectrum operations by delivering a more fully integrated commercial and military force deployment and sustainment distribution capability. This capability extends vertically and horizontally among supporting commercial logistics service providers and the military strategic, operational, and tactical logistics entities. The current pace of Joint operations requires an incremental approach to delivering JDDSP – GTMS Network capabilities.

Plans to migrate current capability to a more tightly integrated architecture are underway with a target date of 2017 for Full Operational Capability (FOC). The Initial Operation Capability (IOC) has a target date of 2012. This aggressive timeline is possible because of the nature of the SOS engineering process engaged and the current development and experimentation in collaboration with Dole Packaged Foods and the completed work on the design and development of the military aspects of the Agile Port System by CCDoTT.

Required Capability

The GTMS must be developed as a System of Systems (SOS) to be successful. This concept takes into account the fact that there are excellent best-of-breed systems that perform selected functions well. In addition, there is a need to combine whatever functionality the GTMS provides with functions in the military force deployment and distribution environment with which USTRANSCOM and JFCOM require to be integrated. The combination of these various capabilities into a common interface was designed to permit synergies unachievable in other manners. This combination also permits commercial and military customers to take advantage of an "ABC" philosophy similar to that used by Defense Information Systems Agency (DISA): "Adopt-before-Buy, Buy-before-Create." In general, this means that the customer is taking advantage of well-developed capabilities that already exist, rather than trying to reinvent from scratch and assume the risk of the learning curve that comes with that approach.

(1) Software as a Service: The Software as a Service (SaaS) model is a required JDDSP – GTMS capability to enable the use of the application by both the commercial and military sectors. This approach provides a number of advantages:

- Data collected from various vendors on shipping can be used by a number of different customers, e.g., the multi-modal terminal operators and shippers would use the same data as the supplier in tracking the shipment. This ensures consistency of data across operations, which is especially useful when trying to reconcile shipping issues.
- All services will be provided across the web, permitting suppliers and related vendors to access the information any place or anytime.
- Being a web service, no updates need to be distributed as services are enhanced. This significantly reduces the software coordination needed to support the services.
- As an organization is prepared to add an additional capability, it is available to all appropriate entities and users upon release.

(2) Service Oriented Architecture: The GTMS needs an architecture that will support a System of Systems (SOS) and Software as a Service (SaaS). The required architecture is a Service Oriented Architecture (SOA). A SOA is designed to alleviate the problems of system and operating environment heterogeneity and interoperability as well as the normal requirements

volatility that exists in most operating environments. The required GTMS SOA is characterized as a collection of services connected by a communication link –also called a bus (in the GTMS case, the Internet). A GTMS user will be on the web and from the web interface will request an action. The request will be sent to the proper service, which will then provide a response to that request. To facilitate this capability, a single sign-on capability is required for the user to enable a smooth transition between the services without the user interrupting their thinking with an additional sign-on when crossing applications.

(3) Communication Protocols: The general required capability of the GTMS will be obtained by using web-based standards that permit communication in the common environment – the Internet. These standard communication protocols are required to not only let the user communicate with the service, but allow services to communicate with each other. That will permit services to be reused outside the areas they would normally operate. This approach will also enable the architecture to interface with any application that can form an interface with the Internet. This capability is mandatory to permit military legacy applications to be a part of the GTMS and extend their life while extending their utility. It is also a required capability for permitting any platform (mainframe, mid-frame, personal computer, and server) and any development environment (Java, COBOL, Microsoft…) to participate in the operation. The most important elements are the existence of the service, a bus (communication link), and an agreed protocol (messaging format).

(4) Services: The foremost GTMS SOA capability is an architecture centered on services. The services will be largely existing military and commercial systems that need to talk to each other and have not in the past. The GTMS SOA will be business and process focused. A basic element of SOA is that the services are loosely coupled – a service will be requested via a messaging system and a response will be returned.

The capabilities essential to the joint force commander include the GTMS support for the critical initial movements involved in the rapid insertion and expansion of force capabilities into an area of operations. The GTMS must match the capability of strategic lift to move personnel, equipment, and material to the theater Port of Debarkation to the capability to receive and process the force. How well the GTMS can support these initial tasks will directly affect the Joint and Combined Forces' ability to expand and adjust force flow in a manner that allows flexible, agile response to asymmetric and dynamic operational requirements that are the hallmark of expeditionary operations.[3]

The timeframe in which the Initial Operational Capabilities (IOC) are required starts in 2012 with full operating capability required in 2017. This timeline is intended to support the deployment of Expeditionary Theater Opening (ETO) capabilities.

The references potentially applicable for integration of JDDSP – GTMS capabilities are listed in Annex B: Bibliography.

- [3] Joint DOTMLPF Change Recommendation for Expeditionary Theater Opening, Deputy Chief of Staff, Logistics (G-4), Headquarters, Department of the Army, Version 1.0, 10 February 2008, p. 2

The associated Joint Capability Areas (JCAs) were evaluated and narrowed to the capabilities identified in this ICD that contribute directly. Listed in Table 1are the associated Tier 1 & 2 JCAs that the JDDSP – GTMS contribute directly.

Tier 1	Tier 2
Net-Centric: The ability to provide a framework for full human and technical connectivity and interoperability that allows all DoD users and mission partners to share the information they need, when they need it, in a form they can understand and act on with confidence, and protects information from those who should not have it.	- Information Transport: The ability of the GTMS to transport information and services via assured end-to-end connectivity within an internet based environment.
Logistics: The ability to project and sustain a logistically ready joint force through the deliberate sharing of national and multi-national resources to effectively support operations, extend operational reach and provide the joint force commander the freedom of action necessary to meet mission objectives.	- Deployment & Distribution: The primary capabilities associated with the GTMS are centered on this Tier 2 JCA. This includes the ability to plan, coordinate, synchronize, and execute force movement for IOC with the addition of sustainment tasks at FOC in support of Expeditionary Theater Opening (ETO) operations. Deployment and distribution includes the ability to strategically and operationally move forces and sustainment to the point of need and operate the Joint Deployment and Distribution Enterprise. (JL(D) JIC page 5 and pages 14-21) - Supply: The GTMS at FOC will directly support the identification and selection of supply sources, the scheduling of deliveries, receiving, verifying, and transferring product. It includes the ability to see and manage inventory levels, capital assets, business rules, supplier networks and agreements (to include import requirements) as well as assessment of transport supplier performance.

Table 1: Associated JCAs

Capability Gaps and Overlaps or Redundancies

The current force deployment and distribution management system has many in-transit visibility "black holes". As identified by USTRANSCOM, in-transit visibility of distribution activities is not sufficiently meeting the needs of the customer. Stakeholders of both force deployment and distribution processes should have the ability to determine shipment status through system access or event management. However, shipment visibility is not adequately supported and often requires manual workarounds due to disparate systems. This lack of in-transit visibility and the resultant inability to influence the flow of equipment and sustainment has severely limited the required dynamic planning and replanning required for agile force deployment and sustainment distribution. As outlined below, the Joint Logistics (Distribution) JIC identifies a number of capability gaps and seams in the current distribution system that the JDDSP – GTMS would be

structured to support. The operative word is support – the JDDSP-GTMS is a "collaborative" system that would support other existing systems and would not completely fill capability gaps listed without collaboration with other systems.

- Lack of full integration between processes that deploy and sustain the joint force.
- Separate DoD systems and doctrine exist for both deployment and distribution.
- Lack of an integrated, Net-Centric environment, capable of supporting the control needed to accommodate E2E distribution activities.
- Limited direct "fort-to-fight" force deployment capabilities.
- Limited and intermittent asset visibility and in-transit visibility of forces and commodities in the distribution pipeline.
- Poor reset, retrograde, and redeployment management and return within the distribution pipeline.
- Limited shared common deployment and distribution picture.
- Lack of standardized rules, tools and processes to enhance joint distribution operations.

The above indicators address only the primary shortfalls that were found to significantly hinder the rapid execution of ETO operations and the employment of joint forces across the range of military operations. Developing more robust operational control capabilities from the source of origin through the CONUS strategic port provides the capabilities to better address these shortfalls within the deployment and distribution flow process.

The attributes of the desired JDDSP – GTMS capabilities are described in detail in the Strategic Mobility 21, Global Transportation Management System Architecture; Technical Report dated October 7, 2009.

The dual-use JDDSP Capabilities-Based Assessment (CBA) was completed through the use of a multi-step Value Stream Analysis and the use of modeling and simulation for both force deployment processes and containerized sustainment shipments. The analysis was then referenced as the basis for a structured JDDSP Experimentation Campaign Plan. The experimentation with Dole Packaged Foods supported validation of the analysis and development of solutions to identified capability gaps. The CBA identified four gaps in the critical risk category that must be solved before the attainment of the JDDSP defined capabilities can be achieved. Any one of the four capability gaps can prevent the successful implementation of the military force deployment capabilities associated with the APS and supporting JDDSP concept.

Priority	Tier 1 (T1) & Tier 2 (T2) JCAs	Description	Metrics	Minimum value
1	T1 – Net-Centric T2 – Information Transport	The ability of the GTMS to transport shipment information and services via assured end-to-end connectivity in a web-based environment. Further defined by the term "in-transit" visibility which for the GTMS enables the management, tracking, and tracing associated with both the movement of unit equipment during force deployments and sustainment distribution.	Accuracy – Timeliness -	100% 98% of the shipments arrive four hours prior to strategic lift loading; 100% arrive prior to scheduled loading time
1	T1 – Logistics T-2 – Deployment & Distribution	The primary capability gaps associated with the GTMS are centered on this Tier 2 JCA. This includes the ability to dynamically and plan and re-plan movement from the source of origin to the final loading position on the transportation asset. Create movement orders based on "best practices" associated with strategic sealift loading. Enable the dynamic re-planning of the ship stow based on updated information on the individual pieces of equipment to be loaded and the ETA of the equipment for ship loading	Accuracy – Timeliness -	100% Establish the initial ship stow plan 14 prior to the start of ship loading operations Dynamically re-stow strategic sealift ships and establish any changes in the shipment movement sequencing in two hours

Table 2: Capability Gap Table

Threat and Operational Environment

Three key aspects of the future security environment will pose an array of military challenges that will influence the conduct of DES Operations: (1) a wider range of adversaries, (2) a more complex and diverse battle space, and (3) technology diffusion and access.

Transportation nodes, such as a strategic port and supporting JDDSP, while a physical targets for terrorism, rely heavily upon IT. As Net-Centric and information-driven warfare become a reality, the security posture and threats to the JDDE infrastructure influences our ability to conduct warfare and support business operations. In order to ensure the reliability of our enterprise, it is paramount to identify the threats to future IT systems and applications at the earliest possible point in the development/ acquisition cycle. This practice is paramount to the security posture of POE and its ability to support the JDDE and thus the war-fighter.

More specific threats to operations are covered in Appendix E.

Ideas for Non-Material Approaches (DOTMLPF Analysis)

Solutions to assure access to strategic ports and provide the C^2 and physical facilities to provide robust agile logistical support providing the warfighter greater control of the DES flow will necessitate non material DOTMLPF changes to adjust to the new paradigms of JV 2020, as well as material changes to provide the resources and facilities to enact change in SPOE operations necessary to support future expeditionary operations.

Final Recommendations

The JDDSP non-material approaches will be developed during the planning for the initiation of a Joint Capabilities Technology Demonstration (JCTD). The JCTD will focus on the JDDSP – GTMS functionality associated with joint force deployment movements from the CONUS source of origin through final strategic sealift ship loading.

Upon completion of the force deployment capability development, the sustainment distribution management aligned with the supply chain logistics "deliver" function should be the next military capability developed. This development would leverage the work completed by SM21 in collaboration with Dole Packaged Foods.

After completion of the IOC and testing during an actual force deployment, experimentation will be considered for development of semantic web technologies that might be applied to support better data fusion or for force deployment planning. The application of semantic web technologies was initiated during the Dole Foods experimentation but was terminated before completion. The knowledge gained during the initial experimentation can be leveraged in the future. The key research issue with the semantic web for force deployment and sustainment distribution is how to best employ the evolving capabilities.

Appendix A : Integrated Architecture Products

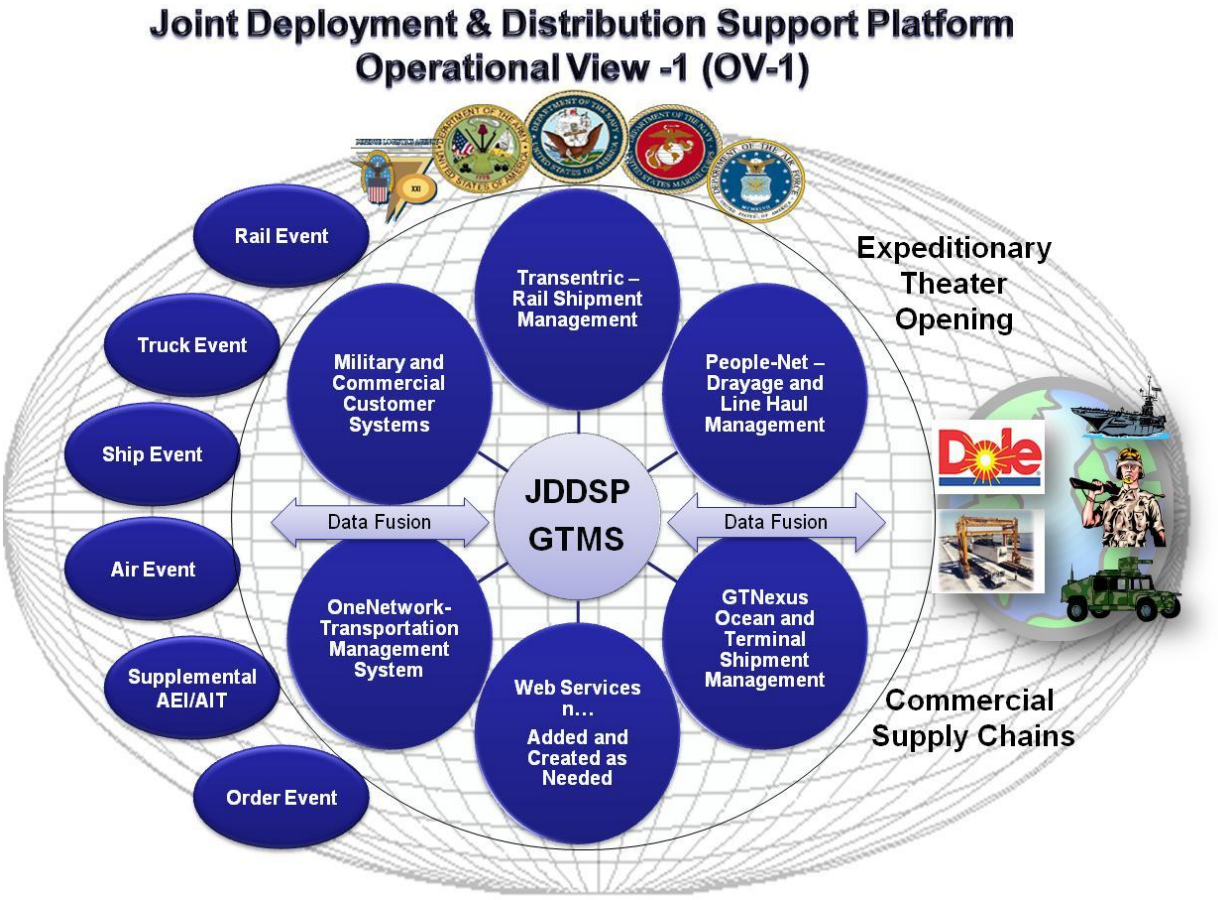

Figure 2: Operational View – (OV-1)

The high-level Operational View (OV-1) in Figure 2 depicts the initial operating capabilities (IOC) [4] of the dual-use JDDSP, which includes regional military force deployment support and support to the deliver function of commercial supply chain logistics. For military support, the IOC is limited to the execution of force deployments from the CONUS source of origin[5] to the final stow location on a strategic sealift ship. The JDDSP IOC will support the continued development of the military functions of the Agile Port System developed by Center for the Commercial Deployment of Transportation Technologies, the Office of Naval Research, and the Military Surface Deployment and Distribution Command. Once the force deployment functions are developed and tested during a proposed JCTD, the development of military sustainment distribution functions will be considered.

[4] Initial operating capability (IOC) will be achieved when the military force deployment capability is available in its minimum usefully deployable form. The JDDSP IOC will be developed in the future through modifications and deployment of greater numbers of web services and systems that will permit a wider application of the capability. Once the capability is fully developed, full operating capability may be declared.

[5] The source of origin includes forts, installations, power projection platforms, and power generation platforms.

As stated above, the OV-1 depicts the IOC functions of the dual-use JDDSP. On the far left of the diagram is the data required for consumption by the JDDSP-GTMS for functions associated with military force deployments and intermodal (containerized) sustainment shipments. The outer circle of the diagram represents the integration of best of breed commercial systems, the adaptation of existing user systems, and the addition of value added web services to create the JDDSP – GTMS. On the far right are the customers of the JDDSP – GTMS IOC, which includes the CONUS "front end" support to Expeditionary Theater Opening operations and commercial supply chain logistics deliver functions.

Appendix B: Bibliography

I. Joint Doctrine Publications

A. Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3170.01F "Joint Capabilities Integration and Development System", 1 May 2007.

b. Chairman of the Joint Chiefs of Staff Manual (CJCSM) 3500.04E, Universal Joint Task List (UJTL), 25 Aug 2008

c. Joint Chiefs of Staff Joint Publication (JP) 3-35, Joint Deployment and Redeployment Operations, 7 May 2007

d. Joint Chiefs of Staff Joint Publication (JP) 4-0, Joint Logistics, 18 Jul 2008

e. Joint Chiefs of Staff Joint Publication (JP) 4-01, Joint Doctrine for the Defense Transportation System, 19 March 2003

f. Joint Chiefs of Staff Joint Publication (JP) 4-01.2, Sealift Support to Joint Operations 31 August 2005

g. Joint Chiefs of Staff Joint Publication (JP) 4-01.4, JTTP For Theater Distribution In Joint Operations, 22 August 2000

h. Joint Chiefs of Staff Joint Publication (JP) 4-07, Joint Tactics, Techniques, And Procedures For Common-User Logistics During Joint Operations, 11 June 2001

1. Joint Chiefs of Staff Joint Publication 4-09, Joint Doctrine For Global Distribution, 14 December 2001

II. DoD Concept Development References

a. Joint Chiefs of Staff Focused Logistics Campaign Plan 2004

b. Objective Assessment of Logistics Campaign Plan 2004 DUSD(L&MR) and Joint Staff (JSJ4) Sponsored Assessment to Review the Effectiveness and Efficiency of Selected Aspects of Logistics Operations During Operation Iraqi Freedom (OIF), March 2004

c. Defense Information Systems Agency, Defense Information Infrastructure Shared Data Environment Capstone Document, Version 1.0, 11 July 1996.

d. DoD Major Combat Operations, Joint Operating Concept, September 2004.

e. Joint Chiefs of Staff Functional Concept for Battlespace Awareness Version 2.1 31 December 2003

f. DoD Joint Command And Control Functional Concept, February 2004

g. DoD Focused Logistics Joint Functional Concept, Version 1.0, December 2003

h. DoD Force Application Functional Concept, Version 1.0 7 April 2005

i. DoD Net Centric Environment Joint Functional Concept, 5 March 2004

j. DoD Command and Control Joint Integrating Concept 1 September 2005 Version 1.0

k. DoD Seabasing Joint Integrating Concept, Version 1.1 August 2005

l. DoD Joint Logistics (Distribution) Joint Integrating Concept Version 1.0, 7 February 2006

m. DoD Net-Centric Operational Environment Joint Integrating Concept Version 1.0 31 October

n. DoD Defense Science Board Task Force on Mobility Report 2005, September 2005

o. DoD Logistics Transformation Strategy, Achieving Knowledge-Enabled Logistics, 10 December 2004

p. DoD Joint Technical Architecture (JTA), Version 5.0, 4 April 2003.

q. DON CIO Memorandum, Policy on the use of Extensible Markup Language (XML), 13 December 2002.

r. DON CIO, Data Management and Interoperability (DMI) Implementation Planning Guide, Version 1.0, November 2000.

s. Joint Forces Command, "Joint Deployment, Employment, and Sustainment (JDES) as an Adaptive System" briefing presented to the OSD Adaptive Enterprise Seminar, 3 December 2003, Col Dave Sffold JDES Concept Team Lead.

t. United States Joint Forces Command Joint Doctrine Series Pamphlet 8 Doctrinal Implications of the Joint Deployment Distribution Operations Center (JDDOC), 10 February 2006

u. Operational Sense and Respond Logistics: Coevolution Of An Adaptive Enterprise Capability Office Of Force Transformation Concept Document (Long Version) 6 May 2004

v. US Army Training and Doctrine Command (TRADOC) Guide For Development Of Army Initial Capabilities Documents (ICDs) 22 October 2003.

w. Marine Corps Reference Publication (MCRP) 4-16.3G Unit Embarkation Handbook, 10 December 2004.

III. Independent References

a. Sustainment of Army Forces in Operation Iraqi Freedom, Eric Peltz, Marc L. Robbins,
Kenneth J. Girardini, Rick Eden, John M. Halliday, Jeffrey Angers, Rand Corporation 2005

b. White Paper A Case for the Joint Distribution and Deployment Support Platform, Larry Mallon, SM21 Program, September 2006

c. White Paper: Functional Needs Analysis for the Joint Distribution and Deployment Support Platform, Larry Mallon, SM21 Program, September 2006

IV. Superseded

a. Joint Chiefs of Staff Joint Publication (JP) 4-01.8, Tactics, Techniques, and Procedures
Joint Reception, Staging, Onward Movement, and Integration (JRSOI), 11 June 2000; Superseded by JP 3-35, Joint Doctrine for Deployment and Redeployment Operations, 7 May 2007

b. US Army Field Manual (FM) 3-35.4 Deployment Fort to Port, 18 June 2002.
Superseded by FM 3-35, Army Deployment and Redeployment, 15 June 2007

c. US Army Field Manual (FM) 100-17-3 Reception, Staging, Onward Movement, and Integration (RSOI), 17 March 1999; Superseded by FM 3-35, Army Deployment and Redeployment, 15 June 2007

Appendix C : Acronyms

I. Acronyms found in JP 1-02

ACRONYM	DEFINITION
(A)(S)POD	(Arial) (Sea) Port of Debarkation
(A)(S)POE	(Arial) (Sea) Port of Embarkation
APS	Agile Port System
AOR	Area of Responsibility
ASN	Agile Supply Network
C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
CBA	Capabilities-Based Assessment
CCDoTT	Center for the Commercial Deployment of Transportation Technologies
CDD	Capabilities Development Document
CJCS	Chairman of the Joint Chiefs of Staff
CJCSI	Chairman of the Joint Chiefs of Staff Instruction
CJCSM	Chairman of the Joint Chiefs of Staff Memorandum
COCOM	Combatant Command
COI	Community Of Interest
CONUS	Continental United States
COOP	Continuity of Operations
COTS	Commercial Off-The-Shelf
CR #	Change Request Number
CRD	Capstone Requirements Document
DCN	Document Control Number
DISA	Defense Information Systems Agency
DoD	Department of Defense
DoDD	Department of Defense Directive
DOTMLPF	Doctrine, Organization, Training, Material, Leadership, Personnel and Facilities
E2E	Exchange-to-Exchange
EDI	Electronic Data Interchange
EMP	Electromagnetic Pulse
ETO	Expeditionary Theater Opening
EW	Electronic Warfare
FOC	Full Operating Capability
GTMS	Global Transportation Management System
IA	Information Assurance
ICD	Initial Capabilities Document
IOC	Initial Operational Capability
IT	Information Technology
ITV	In Transit Visibility
JCA	Joint Capability Area
JCIDS	Joint Capabilities Integration Development System

ACRONYM	DEFINITION
JCTD	Joint Capabilities Technology Demonstration
JDDE	Joint Deployment Distribution Enterprise
JDDOC	Joint Deployment Distribution Operations Center
JDDSP	Joint Deployment Distribution Support Platform
JFC	Joint Force Commander
JFCOM	Joint Forces Command
JL (D) JIC	Joint Logistics (Distribution) JIC
JROC	Joint Requirements Oversight Council
JTA	Joint Technical Architecture
JTF	Joint Task Force
JV	Joint Vision
KPP	Key Performance Parameter
MOE	Measure of Effectiveness
MOP	Measure of Performance
MOS	Military Occupational Specialty
NSS	National Security Strategy
O&M	Operations and Maintenance
OA	Operational Architecture
OIF	Operation Iraqi Freedom
PPP	Power Projection Platform
RFID	Radio Frequency Identification
ROMO	Range of Military Operations
RSOI	Reception, Staging, Onward movement, and Integration
SaaS	Software as a Service
SM21	Strategic Mobility 21
SOA	Service Oriented Architecture
SOS	System of Systems
TBD	To Be Determined
TCA	Transformational Communications Architecture
TTP	Tactics, Techniques, and Procedures
U.S.	United States
UJTL	Universal Joint Task List
USTRANSCOM	United States Transportation Command

II. Acronyms Recognized by DoD not found in JP 1-02

ACRONYM	DEFINITION
AOA	Analysis of Alternatives
CLM	Car Locator Message
ESDE	Enterprise Shared Data Environment
FAA	Functional Area Analysis
FNA	Functional Needs Analysis
ICD	Initial Capabilities Document

ACRONYM	DEFINITION
ITI	Information Technology Infrastructure
JFC	Joint Functional Concept
JIC	Joint Integrating Concept
JOC	Joint Operating Concept
NCOW	Network-Centric Operations and Warfare
OV	Operational View

III. Acronyms Used, Not Recognized by DoD or found in JP 1-02

ACRONYM	DEFINITION
(J)DES	(Joint) Deployment Employment Sustainment
AV	Asset Visibility
FA	Force Application
FL	Focused Logistics
J-AIT	Joint Automatic Identification Technology
JOpsC	Joint Operations Concept
MT	Mission Task
ODS	Operation Desert Storm
S & RL	Sense and Respond Logistics
SDE	Shared Data Environment

Appendix D: Definitions

Deployment, Employment, Sustainment (DES) – Deployment, Employment, Sustainment as a concept is the merging of current disparate force projections operations of Deployment, Employment and Sustainment into a single Expeditionary Operation that views deployment in an end to end construct where deployment initializes the flow of men, equipment, and materials into theater in a manner that is cognizant of employment requirements and sustainment of in theater resources. DES is the description of the transitional paradigm envisioning deployment and distribution operations as one seamless operation, versus the traditional view of deployment, employment, and sustainment as separate operational concepts.

Joint Deployment Distribution Operations Center (JDDOC) -- Mission: Directs Intra-theater distribution and synchronizes the strategic operational lift capabilities for theater commander. Responsibilities: Maintains Visibility of Forces / Material, Directs Intra-theater Movement of Forces / Material, Synchronizes Strategic / Operational Lift, Tracks Movement of Forces / Material from origin to Tactical Assembly Area (TAA) / Supply Support Activity (SSA).

Joint Deployment Distribution Enterprise (JDDE) -- The JDDE is described as an integrated system consisting of assets, material, personnel, leaders, organizations, procedures, tools, training, facilities, and doctrine – will provide logistics solutions to the JFC to minimize seams in the pipeline that characterize current strategic and theater distribution segments. The JDDE will complement, interact with and augment Service or JFC-unique distribution responsibilities and capabilities.

Appendix E: Project Threat Environment

THREAT	DESCRIPTION
Threat to Critical Infrastructure	Vulnerability to disruption by physical and computer attack.
Insider Threat	Trusted insiders, terrorists, criminals, and other groups or individuals that are positioned to conduct well-coordinated strikes against selected critical nodes or to exploit accessible information.
External Threat	Adversarial pre-attack exploitation and attack preparations with nearly undetectable signatures.
Tactical Threat	The tactical threat to JDDSP comes from IO.
Adversaries	Adversaries recognize our civilian and military reliance on advanced information technologies and systems, and understand that information superiority provides the United States (U.S.) with unique advantages.
Probing and Scanning	Systems are regularly probed and scanned as prerequisites to exploitation and/or attack, via foreign locations in order to define network architectures and assess vulnerabilities.
Electronic Warfare (EW) Tactics	The rapid global growth of commercially available wireless communications systems has caused some countries to be interested in developing EW tactics against those systems, not necessarily against the U.S.
Perception Management and Physical Attack	Perception management and physical attack may be used against JDDSP personnel and facilities, including not only those controlled by United States personnel in host nations, but also those portions controlled by foreign personnel in host nations.
Future Threats	Includes Commercial Off-The-Shelf (COTS) Technology, CNA/CNE Tools and Electromagnetic Pulse (EMP).
COTS Technology	As DoD increasingly uses COTS technology and systems, the threat to unprotected systems will continue to grow.
Computer Network Attack (CNA)/ Computer Network Exploitation (CNE) Tools	CNA/CNE tools will become increasingly available on the Internet and will continue to grow in capability while the required level of user experience and knowledge to use them effectively decreases.
Environmental	Environmental threats include Destructive Weather, Tsunami, Seismic and Geothermal Events, and other naturally occurring events that have proven harmful to either equipment or personnel.
Unintentional	The Unintentional Threat encompasses disruptions and/or destruction or compromise of information and assets caused by

THREAT	DESCRIPTION
Threat to Critical Infrastructure	Vulnerability to disruption by physical and computer attack.
Insider Threat	Trusted insiders, terrorists, criminals, and other groups or individuals that are positioned to conduct well-coordinated strikes against selected critical nodes or to exploit accessible information.
External Threat	Adversarial pre-attack exploitation and attack preparations with nearly undetectable signatures.
Tactical Threat	The tactical threat to JDDSP comes from IO.
Adversaries	Adversaries recognize our civilian and military reliance on advanced information technologies and systems, and understand that information superiority provides the United States (U.S.) with unique advantages.
Probing and Scanning	Systems are regularly probed and scanned as prerequisites to exploitation and/or attack, via foreign locations in order to define network architectures and assess vulnerabilities.
Electronic Warfare (EW) Tactics	The rapid global growth of commercially available wireless communications systems has caused some countries to be interested in developing EW tactics against those systems, not necessarily against the U.S.
Perception Management and Physical Attack	Perception management and physical attack may be used against JDDSP personnel and facilities, including not only those controlled by United States personnel in host nations, but also those portions controlled by foreign personnel in host nations.
Future Threats	Includes Commercial Off-The-Shelf (COTS) Technology, CNA/CNE Tools and Electromagnetic Pulse (EMP).
COTS Technology	As DoD increasingly uses COTS technology and systems, the threat to unprotected systems will continue to grow.
Computer Network Attack (CNA)/ Computer Network Exploitation (CNE) Tools	CNA/CNE tools will become increasingly available on the Internet and will continue to grow in capability while the required level of user experience and knowledge to use them effectively decreases.
Environmental	Environmental threats include Destructive Weather, Tsunami, Seismic and Geothermal Events, and other naturally occurring events that have proven harmful to either equipment or personnel.
EMP	The effects of the nuclear EMP against JDDSP and its supporting infrastructure must be considered and calculated.