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USTRANSCOM

UNITED STATES TRANSPORTATION COMMAND

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Joint Deployment & Distribution Enterprise (JDDE) Challenges

1. Warfighter Readiness

- Scalable End-to-End Patient Movement
- Process Management and Business Rules
- Joint Retail Inventory Interoperability
- Rapid Construction for Points of Debarkation
- Convoy Security
- Mobility Aircraft

2. Cyber Domain Mission Assurance

- Cyber and Electronic Security
- Cross-Domain Information Exchange & Collaboration
- Secure Collaboration with Commercial Partners
- Resilient Communications
- Improved Intelligence (New challenge added by J2)

3. Evolve for Tomorrow

- Delivery Technologies
- Rapid Distribution Technologies
- Energy Generation/Efficiencies and Power Distribution
- Advanced Mobility Aircraft
- Aircraft/Ship Survivability
- Opportune Landing Site Identification
- Autonomous Approach and Landing Guidance
- Force Protection
- Sea Basing Technologies/Logistics-Over-The-Shore/Connectors
- Standardized Intermodal Containers/Pallets

4. Advance Decision Making

- End-to-End Visibility
- Information Visualization
- Deployment/Distribution Modeling, Simulation and Optimization
- Predictive Logistics, Maintenance Forecasting and Damage Repair
- Distribution Planning
- Supply Chain Sustainment Simulation Tools
- Automatic Identification Technology
- Human System Interface
- All Domain Maneuver Warfare Planning and Execution
- Transportation Node Optimization
- Knowledge Management
- Information Science and Technology
- Cloud Computing
- Big Data
- Electronic Data Interchange
- Risk Assessment
- Distributed Global Mobility C2

5. Take Care of Troops

- Entry Control Facilities/Control Point Access

Blue = FY23 Focus Areas

JDDE Challenge Descriptions

Warfighter Readiness

Scalable End-to-End Patient Movement (MM-PM): Future contingency operations may result in significantly large numbers of seriously injured casualties in denied areas, where PM requirements cannot be met exclusively with strategic airlift platforms and USAF Aeromedical Evacuation personnel and equipment. As a result, PM activities may be delayed, take place over longer distances, and require use of different transportation platforms and en route care capabilities than currently employed. USTRANSCOM needs viable solutions to provide MM-PM (air-, sea-, and ground-based) through the continuum of care to the appropriate support base under a variety of operational conditions (contested, permissive, cyber-degraded environments, etc.). Solutions should be scalable, with the capability to address single critical/contaminated MM-PM or larger numbers of patients per movement. (AQ)

Process Management and Business Rules: Joint process descriptions and business rules either do not exist or are unclear for many key deployment and distribution processes. A lack of well-defined, integrated process descriptions causes shipment delays, wastes resources, and undermines efforts to streamline the supply chain. The lack of business rules creates organizational and communication breakdown and precipitates a lack of control. Additionally individuals spend large amounts of time combing through mountains of data, often stored in silo enclaves, to assemble pertinent information for decision-makers.

Joint Retail Inventory Interoperability: DOD cannot optimize customer requirements as it does not provide inventory interoperability across all Services and theaters. Information and material exchange across the DOD is inhibited by disparity of systems and insufficient interfaces. Inventory status and shipment information cannot be optimized due to lack of connectivity between the various components in supply chain.

Rapid Construction for Points of Debarkation: To support the expeditionary nature of the Joint force, the JDDE requires an agile ability to rapidly assess, establish, repair, and secure air/sea/rail points of debarkation up to/very near the tactical edge in contested and A2/AD environments.

Convoy Security: The Theater Commander requires a variety of available lift asset options at his disposal to optimize distribution and best mitigate risks depending on Mission, Enemy, Terrain and Weather, Troops and Support Available, Time Available and Civil Considerations. There is limited ability to provide support for multiple, small, widely-dispersed detachments. Additional efforts in RDT&E in Counter-small Unmanned Aerial Systems (C-sUAS) and self-protection capabilities against a broader spectrum of domain-specific threats via active/passive countermeasures are needed to help provide security for ground and sea-going convoys. (MSC)

JDDE Challenge Descriptions Continued

Warfighting Readiness Cont…

Mobility Aircraft: This challenge addresses anti-access concerns, ergonomically designed crew stations to reduce aircrew workload, assured global line of sight/beyond line of sight secure airborne voice and data communications to enable dynamic mission re-tasking while enhancing aircrew situational awareness, and modular concepts that allow for multiple configurations/missions with same/like airframe. Additionally, aging airlift and aerial refueling fleet present a need for technologies that increase the reliability of aircraft systems and structures to include electronic control systems and more reliable avionics packages that will increase aircraft availability and airlift capacity.

Cyber Domain Mission Assurance

Cyber and Electronic Security: USTRANSCOM and its components must be able to defend its information, detect and mitigate cyber and electronic threats against mobility platforms, networks, and C2 systems to continue uninterrupted operations. This requires a platform independent capability to secure deployment/distribution information resident in or traversing low assurance info networks/environments. This includes anomaly detection and predictive analysis techniques/tools (e.g. artificial intelligence (AI), machine learning (ML) & cognitive computing (CC)) to dynamically assess future threats, attack vectors, and attacker intent and anticipate actions before they happen (i.e., the capability to defeat an attack before it happens, instead of having to react to it as it occurs). Capability should dynamically respond to these threats and provide recommended response actions to operators. Capability must allow for assured, secure and trusted communications protected with Federal Information Processing Standard (FIPS) 140-3 compliant cryptography while also robustly withstanding or adapting to direct electronic attack. Solutions must require minimal management/infrastructure overhead, be able to integrate into existing DOD and commercial information systems, and leverage government-owned/operated capabilities to the maximum extent possible. Capability must enhance government collaboration in its ability to predict, detect, analyze, assimilate, mitigate, and deter cyber and electronic threats.

JDDE Challenge Descriptions Continued

Cyber Domain Mission Assurance Con't…

Cross-Domain Information Exchange & Collaboration: The Command requires a secure means to transition information across multiple classification domains to enable process improvements and reduce system requirements. This includes interaction/interoperability with military, inter-governmental, and civilian partners which has grown in importance and immediacy with the shift in focus toward home basing and homeland defense posturing. Closer interoperability between non-traditional actors is key to preparing and responding to threats in a truly global manner. Solution must comply with DODI 8540.01 and CJCSI 6211.02D. (J6)

Secure Collaboration with Commercial Partners: USTRANSCOM has interest in exploring concepts which minimize risk to passenger, patient and cargo movement data on commercial scheduled or chartered plane, ship, truck, bus, barge, and rail services leaving the Defense Information Systems Network (DISN) and shared with commercial partners. Capability must allow for assured, secure and trusted communications protected with Federal Information Processing Standard (FIPS) 140-3 compliant cryptography. Solutions must require minimal management/infrastructure overhead, be able to integrate into existing DOD and commercial information systems, and leverage government-owned/operated capabilities to the maximum extent possible. Goal is to securely collaborate and share information with commercial partners while ensuring confidentiality, integrity, and availability of U.S. transportation data residing outside of the DISN.

Resilient Communications: The JDDE needs technical solutions that address resilient and secure communications and networks, information infrastructure protection, and engineered systems. The objectives of the research are to provide secure, resilient, and assured communications over both wired and wireless networks to include highly mobile networks.

Improved Intelligence: USTRANSCOM requires near to real-time Indications and Warning of activity against JDDE information systems to ensure Combatant Commander's ability to actualize the JDDE and project and sustain the Joint Force." (Challenge added by J2 Dec 20)

JDDE Challenge Descriptions Continued

Evolve for Tomorrow

Delivery Technologies: Innovative air, land, sea and space solutions, to include autonomous, AI and ML technologies, that provide for the safe, accurate and timely delivery of joint forces and their sustainment within an Anti-Access/Area Denial (A2/AD) environment across a complex, distributed battlefield. This includes the re-supply of forces in austere conditions and in high threat areas. This area applies to technologies to ensure survivability of delivery vessel, its crew and receiving personnel while delivering cargo to a precise location within a high threat environment. May include one-way spaceflight transit (via expendable vehicles) or low-cost round-trip transit to achieve precision delivery of exceptionally high value payloads at or very near the point of need.

Rapid Distribution Technologies: Concepts and technologies that improve the end-to-end flow of military unit equipment and cargo through ocean ports, aerial ports and intermodal inter-change points. This includes autonomous capabilities and motion compensation interface platforms for use with commercial cargo conveyances to enhance throughput.

Energy Generation/Efficiencies and Power Distribution: Mobility assets are the largest consumers of fuel within DOD. Seeking technologies that reduce the dependence and/or consumption of fossil fuels while maintaining or improving speed, flexibility, range, and responsiveness in contested environments.

Advanced Mobility Aircraft: Next generation mobility (to include patient movement) and air refueling aircraft to provide inter and intra-theater maneuvers. This includes leveraging technologies used for hybrid and unmanned aircraft as well as next generation information, surveillance, and reconnaissance platforms. Advanced mobility aircraft capabilities will include future platforms that have more efficient airframes and engines, improved Command and Control (C2) and defensive systems capabilities, human integration and training, and have greater range, speed, payload, offload and access. (SG)

JDDE Challenge Descriptions Continued

Evolve for Tomorrow Cont…

Aircraft/Ship Survivability: Advanced capabilities to increase aircraft/ship survivability, self defense, and enhance aircrew situational awareness (SA). Affordable, open system technologies are needed to detect and counter the full range of threats, navigate in contested environments, fuse onboard and off-board data for crew SA, and counter directed energy threats to crew and sensors. Additional efforts in RDT&E for Counter-small Unmanned Aerial System (C-sUAS) are needed to help provide aircraft survivability during landings, departures, in-flight, on the flight line and in hangars in both CONUS, OCONUS and expeditionary locations. RDT&E efforts in Counter-small Unmanned Systems (C-sUAS) are also needed to help provide survivability for ships during ocean transit, departures, arrivals, both CONUS, OCONUS and expeditionary locations. (MSC/J6)

Opportune Landing Site Identification: All-weather airfield independence capability, leveraging various technologies to include AI/ML, focused on mobility aircraft to determine the security of a landing site for arrival and throughput operations without use of a pre-coordinated survey or on-site, ground party analysis.

Autonomous Approach and Landing Guidance: All-weather and lights-out taxi, take-off and landing capability, leveraging multiple technologies to include AI/ML for mobility aircraft operations from prepared and unprepared fields. Operations may require taxi, takeoff, and landing for aircraft under inclement weather conditions without assistance from navigation guidance systems that are commonly available at most U.S. airports.

Force Protection: Terrorism and asymmetric warfare pose an ever-present threat to our Nation's strategic mobility assets and their embarked cargo, equipment and personnel. This broad area of interest supports proposals to counter these types of threats. Of particular interest is the application of technology to create virtual borders at the point of loading, decontamination of transportation assets, and enhance seaborne and air cargo container standards. Screen cargo for smuggled goods as well as explosive, chemical, and biological threats. Technology interests are in those systems with stand-off, hand-held, robotic and/or unmanned vehicle inspection/detection capabilities (both on land and in the water) as well as fixed detectors to allow for the identification of potential threats before endangering personnel and/or resources. Interests include technologies that, when applied, detect access attempts and can be monitored for intrusion.

JDDE Challenge Descriptions Continued

Evolve for Tomorrow Cont…

Sea Basing Technologies/Logistics-Over-The-Shore/Connectors: Technologies and enablers to enhance the Joint Force Commander's flexibility to deploy and employ from/through a joint sea base as well as deliver and sustain warfighting capabilities at the point of effect and point of need. Enhancements should minimize the need to build up a logistics stockpile ashore and permit the forward positioning of joint forces for immediate employment. This includes autonomous technologies that facilitate the trans-loading and/or transporting of supplies, equipment, and bulk petroleum in a sea base operation within a contested or austere access environment. Solutions could include stealth capabilities to include under surface solutions, masking or other capabilities to minimize risk to the asset and subsequent delivery operations. Solution should also enhance survivability in a contested environment . (MSC/J5-I)

Standardized Intermodal Containers/Pallets and Advanced Stowage Aids: Systems, including those that leverage AI/ML, that can be used by automated aircraft/ship loading/unloading systems, to include those designed to automatically scan standardized containers and pallets as they are on-loaded/off-loaded. Initiatives must be designed to increase cargo throughput by eliminating the requirement to handle cargo multiple times during shipping, reduce the requirement for multiple Materials Handling Equipment (MHE) systems, reduce need for additional ground personnel throughout the en route system, minimize the requirement to reposition MHE to support deployment/distribution, address pallet construction (current capabilities do not tie to shipments pallet break down, holding, frustration clearance, and costs), and improve the flexibility to be rapidly embarked on multiple expeditionary platforms. Additionally automated warehousing handing and stowage capabilities are needed. (MSC)

Advanced Decision Making

End-to-End Visibility: Deployment and distribution (D2) stakeholders require accurate visibility to determine shipment status (where has it been, where is it now, when it will arrive, what threats may impact process, and what condition is it in) via system access at the beginning of a movement through the various nodes to the final destination/point of need. The availability of this information increases supply chain confidence, improves logistics processes performance, and enhances the expertise in the employment/command & control of D2 resources. Although much asset visibility data resides in USTRANSCOM's Integrated Data Environment/Global Transportation Network Convergence (IGC) system, challenges remain in the effectiveness and efficiency of data capture, visibility of assets in-theater, and ability to create an enterprise view of the data. USTRANSCOM is interested in partnering with other organizations to provide solutions to overcome challenges relating to the integration of asset visibility data into appropriate business processes and system(s) to include, but are not limited to: advanced cryptology, distributed ledger technologies and AI.

JDDE Challenge Descriptions Continued

Advanced Decision Making Cont…

Information Visualization: The Warfighter requires an integrated geo-referenced digital image map and dashboard view of logistics and transportation land, sea, air, and waterway operational information with drill-down capability into specific details such as capacity, capability and readiness of equipment, personnel, built and natural infrastructure, common intelligence picture of threats, and other assets at current or potential operating locations. Both mission planners and operators require this dual-faceted visualization of mission information to ensure diminished risk to warfighters and the mission.

Deployment/Distribution Modeling, Simulation and Optimization: Budget uncertainty and the evolving global strategic environment drive the need to modify D2 business processes, equipment and infrastructure. USTRANSCOM is limited in its ability to visualize highly interdependent D2 systems, weigh alternative courses of action and/or measure the effectiveness of the proposed changes. USTRANSCOM requires modeling & decision support tools to transform systems, programs, initiatives, and measure contested environment/attrition effects on transportation/logistics movement to ensure operational efficiency.

Predictive Logistic, Maintenance Forecasting and Damage Repair: Seeking solutions, to include remote inspection, autonomous vehicles, digital twin, and AI/ML technologies to enhance the warfighter's ability to more accurately forecast future logistics and maintenance requirements (including early parts requisition, reduction of unplanned repairs, increased reliability of platform structures and systems, and identification of emerging reliability risks). This challenge seeks to enhance operational needs/availability and optimize the supply chain in both forward and reverse flow. Predictive maintenance/logistics forecasting capabilities today are not linked (machine-to-machine) to distribution and logistics support responses informed with analysis of emerging threat trends and adversary capability developments. Additional efforts are needed to help expedite damage repair assessment and improve damage repair timelines. (MSC)

Distribution Planning: There is a lack of collaborative distribution planning, based on an understanding of aggregate customer requirements, for optimizing the JDDE. Require solutions, to include AI/ML, that synchronize planning, forecasting, modeling, and collaboration capabilities to ensure people, processes and assets are in place to execute planned operations.

Supply Chain Sustainment Simulation Tools: Joint simulation tools are poorly equipped to integrate sustainment flow modeling at the strategic and operational levels (wholesale and Service-level retail). Little capability exists to do unconstrained "what-if" supply scenarios without manual effort.

JDDE Challenge Descriptions Continued

Advanced Decision Making Cont…

Automatic Identification Technology (AIT): USTRANSCOM is interested in partnering with other organizations in AIT solutions that improve logistics processes in a resource-constrained budget environment. AIT and automated information systems (AIS) are two of the basic building blocks in DOD's effort to provide timely asset visibility in the logistics pipeline, whether in-storage, in-transit, in-process or in-theater. Specifically, AIT is used by a business AIS to capture the identity of materiel or packaging at each layer of consolidation to improve logistics processes. AIT also contributes to the track-and-trace capability within the Department's supply and distribution operations.

Human System Interface: Poor HSI is a major contributor to data integrity problems in business systems supporting the Defense Transportation System. There is a need for intuitive HSI (e.g. artificial intelligence (AI), machine learning (ML) and cognitive computing (CC) technologies) that reduces cognitive workload and lowers data entry errors for planners/port operators. Edit checks and suggested data correction alerts connected to DOD data dictionaries are needed to improve HSI input.

All Domain Maneuver Warfare (ADMW) Planning and Execution: DOD's move to ADMW operations requires new and innovative equipment, concepts and processes to sustain dispersed Joint Forces that are mobile and convergent at a time and place to bring maneuver power to bear on targets of opportunity. The planning community requires trained personnel, well defined and validated processes, standardized data, and the essential technologies, including AI/ML, to ensure the Department's ability to rapidly develop, assess, adapt, converge, and execute plans in a multi-domain operational environment. (J6)

Transportation Node Optimization: Warfighters need a single integrated view of force movement and sustainment planning requirements to provide a continuous and optimal balancing of total demand and capacity from plan inception to mission completion. Solution should provide insight into planning assumptions, logic supporting decision making and execution risks.

Knowledge Management: The operational and technical requirements of an effective near real-time global transportation network cannot be achieved through the application of legacy data-centric software design and development principles. Such a network calls for a degree of interoperability and a level of collaborative decision-support that is not available in any existing industry or government software environment of comparable scale. USTRANSCOM is looking to create an information-centric knowledge management layer on top of a data-centric Corporate Data Environment meta database layer.

JDDE Challenge Descriptions Continued

Advanced Decision Making Cont…

Information Science and Technology: This area involves the maturing of technologies that support state-of-the-art capabilities for the Warfighter in the analysis, assimilation, and dissemination of real and simulated digitized battlespace information. Interests include, but are not limited to: artificial intelligence (AI), machine learning (ML), cognitive computing (CC), distributed ledgers, advanced cryptology, course of action analysis, transportation planning and feasibility, embedded training, optimization and resource allocation solutions, collaborative technologies for distributed work environments, and data visualization.

Cloud Computing: Explore, demonstrate and prototype a modern cloud computing environment which supports migration of multiple applications from current DOD environments. Goal is to show the utility of a vendor agnostic cloud computing environment which demonstrates the value of open architectures, modern tools and services while adhering to appropriate DOD Cyber Security Service Provider security methodologies. Prototype environment must demonstrate and support these key areas of interest: business intelligence, analytics, rapid prototyping, performance dashboards, continuous development and testing, and containerization.

Big Data: USTRANSCOM remains committed in the pursuit and exploration of advancements in data science. Computational processing technologies like artificial intelligence, machine learning, and advanced analytics, continue to advance rapidly and have enormous potential to improve USTRANSCOM mission outcomes. Leadership recognizes that advanced decision making capabilities are paramount in projecting and sustaining a decisive force whenever and wherever required. The ability to manage data as a strategic resource remains foundational to USTRANSCOM's transformation to a data driven command and underpins implementation of business reform initiatives such as the implementation of a Transportation Management System. As our data environment continues to evolve, USTRANSCOM remains engaged in research which drives data standardization, provenance, governance and analytics across the JDDE. Research interest includes but is not limited to advanced big data management; manipulation/integration of large data sets; data discovery, predictive/ prescriptive analytics; and deep learning algorithms.

JDDE Challenge Descriptions Continued

Advanced Decision Making Cont…

Electronic Data Interchange (EDI): There is a need to assess the current state of how EDI is being used and then evaluate where there may be opportunities for future enhancement. Today USTRANSCOM and its components use EDI to communicate with its industry partners. EDI continues to evolve/mature to meet requirements. The move towards a service-oriented architecture provides additional opportunities for EDI that did not exist previously.

Risk Assessment: There is a lack of available real-time risk assessment information for commanders and deploying units to rapidly determine acceptable levels of risk while en route to final destinations or to an intermediate staging locations. Interested in technologies, to include AI/ML enabled modeling of contested environment/attrition effects, to address this gap.

Distributed Global Mobility C2: C2 is the heart of successful military endeavors. For global mobility, C2 must be seamless regardless of theater of operation and/or customer being supported. This includes technologies that allow distributed C2 with mobile platforms (whether on land, sea , air, or space) as well as technologies, including AI/ML, that provide the capability to replicate large databases, in a synchronized fashion, across a globally distributed network. In addition, these enclaves must be capable of working “off-line,” then seamlessly rejoining the global network following combat or contingency degradation. Additionally, a capability that can plan, allocate and integrate logistics resources effectively and quickly on a global scale in support of the operational needs of the combatant commanders.

Take Care of Troops

Entry Control Facilities/Control Point Access: Joint Regulation AR 55-80 states that DOD transportation networks must meet national standards and guidelines. Looking for technologies/capabilities to improve highway safety and reduce traffic congestion on DOD installation roads and on routes providing access to installations.