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USTRANSCOM

UNITED STATES TRANSPORTATION COMMAND

Joint Deployment & Distribution Enterprise (JDDE) Challenges

Mr. Lou Bernstein – RDT&E Program Director

Distribution Statement A: Approved for Public Release

JOINT DEPLOYMENT & DISTRIBUTION ENTERPRISE (JDDE) CHALLENGES

FY26 Challenges

Ready Now and in the Future

- Scalable End-to-End Patient Movement
- Rapid Construction for Ports of Debarkation
- Convoy Security
- 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
- Mobility Aircraft
- Entry Control Facilities/Control Point Access

Empower a Competitive and Resilient Warfighting Team

Drive Cyber Domain Mission Assurance

- Security of the Cloud
- Cyber and Electronic Resilience/Cloud Security
- Contested Cyber Global Logistics
- Secure Collaboration with Commercial/Interagency/Coalition Partners
- Resilient Communications
- Application Rationalization

Create Decision Advantage

- End-to-End Visibility
- Integrated Common Intelligence Picture
- Supply Chain Sustainment Simulation Tools
- Process Management and Business Rules
- Information Visualization
- Deployment/Distribution Modeling, Simulation and Optimization
- Predictive Logistics, Maintenance Forecasting and Damage Repair
- Distribution Planning
- Automatic Identification Technology
- Human System Interface
- All Domain Maneuver Warfare Planning and Execution
- Transportation Node Optimization
- Knowledge Management
- Information Science and Technology
- Data
- Risk Assessment
- Distributed Global Mobility C4

Detailed description in following slides

JDDE CHALLENGE DESCRIPTIONS

Ready Now and in the Future

Scalable End to End Patient Movement (E2E-PM): Future Large Scale Combat Operations may result in significantly larger numbers of casualties in areas with intermittent air parity/superiority than DoD has managed in recent conflicts and be complicated by location/distance chemical, biological or homeland threats. As a result, E2E-PM may be delayed or modified to adjust to an environment in which many casualties, including chemical, biological and contagious, will need to be managed and moved over longer distances in contested environments. Patient holding and regulating, information transfer, en route care, and throughput at Patient Movement nodes will need to accommodate beyond current practices. Command and control processes and systems should seamlessly and deftly direct patient flow from point of injury/illness to facilities prepared to provide definitive and rehabilitative care. Patient Movement personnel, equipment, and Class VIII to include refrigerated whole blood products must be reconstituted and returned to the right point in the system within planned cycle times.

Rapid Construction for Points of Debarkation: To support the expeditionary nature of the Joint Force, the Joint Deployment & Distribution Enterprise (JDDE) requires an agile ability to rapidly assess, establish, repair, and secure air/sea/rail ports of debarkation up to/very near the tactical edge in contested and A2/AD environments, to include development of novel rapid-setting, heat-resistant infrastructure concrete materials.

Convoy Security: The Theater Commander requires a variety of available lift asset options 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.

JDDE CHALLENGE DESCRIPTIONS CONTINUED

Ready Now and in the Future

Delivery Technologies: Innovative air, land, sea and space solutions, to include autonomous, Artificial Intelligence (AI) and Machine Learning (ML) technologies, that provide for the safe, accurate and timely delivery of joint forces and their sustainment within an austere or contested 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 and fuel 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, cargo, and fuel 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, aircraft systems to reduce workload, increase payloads, increase inter-service and Allied/Partner interoperability/functionality human integration and training, and have greater range, speed, payload, offload and access.

JDDE CHALLENGE DESCRIPTIONS CONTINUED

Ready Now and in the Future

Aircraft/Ship Survivability: Advanced capabilities to increase aircraft/ship survivability, self defense, signature management control, 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, chemical and radiation decontamination, 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 C-sUAS are also needed to help provide survivability for ships during ocean transit, departures, arrivals, both CONUS, OCONUS and expeditionary locations.

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; their embarked cargo, equipment and personnel; and the hardening of facilities against peer threats that mobility assets will leverage (i.e., hangers, warehouses, fuel equipment, ammunition points). 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

Ready Now and in the Future

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 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 basing 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.

Standardized Intermodal Containers/Pallets and Advanced Stowage Aids: Systems, including those that leverage AI/ML, that can be used by automated aircraft/ship/space 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.

Mobility Aircraft: This challenge addresses anti-access concerns, ergonomically designed crew stations to increase crew comfort, reduce fatigue and 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.

JDDE CHALLENGE DESCRIPTIONS CONTINUED

Ready Now and in the Future

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.

Drive Cyber Domain Mission Assurance

Security of the Cloud: Conducting best practices and policies designed to protect data, applications, and infrastructure in cloud computing environments from cyber threats and data breaches are critical to the JDDE. Cloud security encompasses various aspects such as data encryption, access controls, threat detection, and compliance with data privacy regulations. With the rise of sophisticated cyber threats, cloud security is crucial for protecting sensitive data, maintaining compliance with industry regulations, and ensuring the integrity and availability of cloud-based systems. Looking for technologies/capabilities to improve security in the Cloud.

Cyber and Electronic Resilience: The JDDE must be able to defend its information, detect and mitigate cyber and electronic threats against mobility platforms, networks, and Command and Control systems. USTRANSCOM struggles with the ability to share information within our own systems and environments as well as limited capacity to mature threat intelligence capabilities and processes. 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 threats and provide recommended response actions to operators. Capability must provide for trusted communications protected with Federal Information Processing Standard (FIPS) 140-3 compliant cryptography while also robustly withstanding or adapting to direct electronic attack.

JDDE CHALLENGE DESCRIPTIONS CONTINUED

Drive Cyber Domain Mission Assurance

Contested Cyber Global Logistics: Global contested cyber logistics is a comprehensive, holistic approach to meet threats aimed at cyber systems, installations and supply chains. Resiliency resources are necessary to support multi-domain and distributed operations in contested environments. Interested in technologies, including AI/ML, and distributed ledger technology (DLT) using blockchain and directed acyclic graph (DAG) transactions into existing systems to reduce risk and secure logistic information from external and internal attacks.

Secure Collaboration with Commercial/Interagency/Coalition Partners: Information sharing among partners/interagency can help achieve increased productivity, improved policymaking, and integrated services which is often limited by technical, organizational, and other barriers. The JDDE has interest in exploring concepts which minimize risk to passenger, patient, cargo, and fuel 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 partners. Capability must allow for assured, secure and trusted communications. 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.

Application Rationalization: Legacy systems/processes continue to introduce risk through technical debt accumulation and capability atrophy. USTRANSCOM requires assistance in identifying and assessing applications and application components to determine which should be kept, replaced, retired, or consolidated to become more efficient and effective. We are interested in technologies to deliver detailed, data-driven understanding of our applications with an end-state to be more agile and less costly to rapidly provide emerging mission capabilities, to address this challenge.

JDDE CHALLENGE DESCRIPTIONS CONTINUED

Create Decision Advantage

End-to-End Visibility: Deployment and Distribution (D2) stakeholders require accurate visibility to determine shipment estimated delivery dates and 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. D2 stakeholders must be able to leverage this data to quickly identify, process, and load materiel either in motion or delivered on other transportation modes to maximize velocity of joint cargo movement through the Defense Transportation System. While some asset visibility data resides in USTRANSCOM's Integrated Data Environment/Global Transportation Network Convergence system, the Department has directed an acceleration plan to satisfy all supply class visibility requirements within Advana or other linked Federated Data and Analytics Platforms. 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 asset visibility data integration challenges into appropriate business processes/systems.

Integrated Common Intelligence Picture: The JDDE requires the ability to build, maintain, and share an effective Common Intelligence Picture (CIP). The CIP provides battlespace awareness and decision-making advantage to the Combatant Commander's ability to utilize the JDDE to project and sustain the Joint Force. The CIP requires a dynamic, map-based visualization depicting neutral, hostile, friendly forces, and commercial activity; which integrates all levels of classification with TRANSCOM's Common Operation Picture.

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.

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.

JDDE CHALLENGE DESCRIPTIONS CONTINUED

Create Decision Advantage

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. The JDDE 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. The JDDE 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.

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.

JDDE CHALLENGE DESCRIPTIONS CONTINUED

Create Decision Advantage

Automatic Identification Technology (AIT): The JDDE 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 (HSI): 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, mobile and convergent Joint Forces 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.

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.

JDDE CHALLENGE DESCRIPTIONS CONTINUED

Create Decision Advantage

Knowledge Management: The operational and technical requirements of an effective near real-time global transportation network requires fully adopted and integrated data centric software; robust, widely adopted information flows and decision cycles; and intuitive, customizable visualizations, dashboards, and portals. 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 creating an information-centric knowledge management portal that will connect information to a data-centric Corporate Data Environment.

Information Science and Technology: This area involves the maturing state-of-the-art and disruptive technologies that support 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.

Data: The JDDE remains committed in the pursuit and exploration of advancements in data science. 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 at the speed of war. 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 visibility, accessibility, understanding, linking, trustworthiness, interoperability, and security across the JDDE. Research interest includes but is not limited to active metadata management, evolved data stewardship; data discovery, predictive/ prescriptive analytics; and deep learning algorithms.

JDDE CHALLENGE DESCRIPTIONS CONTINUED

Create Decision Advantage

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 enroute to final destinations or to an intermediate staging locations in contested environments. USTRANSCOM is interested in leveraging technologies that employ AI/ML enabled modeling to increase understanding of risk, to include cybersecurity risks, on a real-time basis.

Distributed Global Mobility C4: C4 is the heart of successful military endeavors, especially in austere and/or contested environments. For global mobility, C4 must be seamless regardless of theater of operation and/or customer being supported. This includes technologies that allow distributed C4 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.