United States Transportation Command (USTRANSCOM)
Challenges & Opportunities

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Distribution Statement A: Approved for Public Release

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Overview

- **USTRANSCOM 101**

- **RDT&E Program Overview/Process**

- **Technology Focus Areas/Challenges**

- **Overview of Select Current Initiatives**

Mission

USTRANSCOM Provides Full-Spectrum Global Mobility Solutions & Related Enabling Capabilities for Supported Customers' Requirements in Peace and War
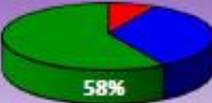
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The Global Distribution Network

USTRANSCOM Assets/Team

RDT&E Program Foundation

Program Element (PE) ($M) – Air Force	FY18	FY19	FY20	FY21	FY22	FY23
Deployment & Distribution (PE0604776F)	26.22	28.35	28.94	29.44	30.05	30.60

- **As the Joint Deployment & Distribution Coordinator, USTRANSCOM actively pursues collaborative partnerships to:**
  - Rapidly integrate deployment and distribution capability enhancements to improve Joint Deployment & Distribution Enterprise (JDDE) logistics effectiveness & efficiency
  - Provide tangible cost savings/avoidances
- **Goals:**
  - Develop and deploy joint, relevant technologies to improve Warfighter support while reducing costs
  - Improve precision, reliability, visibility and efficiency of the DOD supply chain
  - Assure superior strategic, operational and tactical mobility support

~$523M Services/Agency/OSD leveraged; **90.8%** Transition Rate (DOD metric is 30%)

DOD Levels of RDT&E Budget Activity (BA)

- Basic Research (BA1): Systematic study directed toward a greater understanding of the fundamental aspects of phenomena and/or observable facts without specific applications toward processes or products
- Applied Research (BA2): Systematic study to gain knowledge necessary to determine the means by which a recognized and specific need may be met
- Advanced Technology Development (BA3): Includes all efforts that have moved into the development and integration of hardware for field experiments and tests
- **Demonstration and Validation (BA4): Includes all efforts to evaluate integrated technologies in a realistic operating environment to assess performance or cost reduction potential of the advanced technology**
- Engineering and Manufacturing Development (BA5): Includes projects in engineering and manufacturing development for Service use which have not received approval for full rate production
- RDT&E Management Support (BA6): Includes R&D efforts directed toward support of installation operations required for general R&D use. This includes test ranges; military construction; maintenance support of laboratories; operations and maintenance of test aircraft and ships; and studies and analysis in support of a R&D program
- Operational System Development (BA7): Includes projects in support of development acquisition programs or upgrades still in engineering and manufacturing development. These projects have received Defense Acquisition Board or other approval for production or for which production funds have been included in the DOD budget

USTRANSCOM Budget Line Shifted from DLA to USAF in FY17

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Technology Readiness Levels (TRL)

- **TRL 1: <u>Basic principles</u> observed and reported**

- **TRL 2: Technology <u>concept/application formulated</u>**

- **TRL 3: Analytical or experimental <u>proof of concept</u>**

USTC RDT&E Program Focus
- **TRL 4: Component(s) validated in <u>normal lab environment</u>**

- **TRL 5: Component(s) validated in <u>realistic lab environment</u>**

- **TRL 6: System or subsystem <u>prototype in relevant environment</u>**

- **TRL 7: System prototype <u>demonstration in operational environment</u>**

- **TRL 8: Actual system <u>qualified through developmental T&E</u>**

- **TRL 9: Actual system <u>proven through operational T&E</u>**

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Commander's Priorities

TOGETHER, WE DELIVER.

P1 ENSURE TODAY'S READINESS...ADVOCATE FOR TOMORROW'S CAPABILITIES...

P2 ADVANCE CYBER DOMAIN CAPABILITIES...

P3 EVOLVE FOR TOMORROW...

P4 CHAMPION AN INNOVATIVE, DIVERSE, AND AGILE WORKFORCE...

JDDE Enduring Challenges

- **Cyber and Electronic Security**
- **Big Data**
- **End-to-End Visibility**
- **Sea Basing Technologies/Logistics-Over-The-Shore**
- **Delivery Technologies**
- **Rapid Distribution Technologies**
- **Rapidly Establish Points of Debarkation**
- **Distribution Planning and Forecasting**
- **Predictive Forecasting**
- **Secure Collaboration with Commercial Partners**
- **Cloud Computing**
- **Electronic Data Interchange**
- **Resilient Communications**
- **Transportation Node Optimization**
- **Modeling**
- **Supply Chain Sustainment Simulation Tools**
- **Adaptive Planning and Execution**
- **Interoperable, Multi-modal Patient Movement**

FY 20 Focus Areas

- Knowledge Management
- Automatic Identification Technology
- Risk Assessment
- Process Management and Business Rules
- Information Science and Technology
- Distributed Global Mobility C2
- Information Visualization
- Cross-Domain Information Exchange & Collaboration
- Joint Retail Inventory Interoperability
- Human System Interface
- Fuel Efficiency
- Advanced Mobility Aircraft
- Mobility Aircraft
- Convoy Security
- Aircraft Survivability
- Force Protection
- Autonomous Approach and Landing Guidance
- Opportune Landing Site Identification
- Standardized Intermodal Containers/Pallets

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FY20 New Start Solicitation Process Timeline

- Revised Operational/Technical Challenges
  - ✓ 27 Oct 17 - 17 Jan 18: Changes submitted by JDDE Community
  - ✓ 24 Jan – 20 Feb: Reviews by multiple boards
  - ✓ 26 Feb: Commander USTRANSCOM approved
- ✓ 1 Mar: FY20 Solicitation Released (http://www.transcom.mil/cmd/associated/rdte/)
- 30 Mar: Phase I White Papers Due
- 2-27 Apr: Phase I Evaluation Period
- 30 Apr: Phase II Selection Notification
- 29 Jun: Phase II Proposals Due
- 2 Jul – 14 Aug: Phase II Evaluation Period
- 28 Aug – 30 Sep: Vet Draft FY20 New Start Investment Plan via multiple boards
- 16 Oct: TRANSCOM Oversight Council (★★) FY20 Investment Plan Review
- 31 Oct: TRANSCOM Corporate Board (★★★★) FY20 Plan Approval
- 31 Oct: Notification of Final Selection

Partners & Collaboration
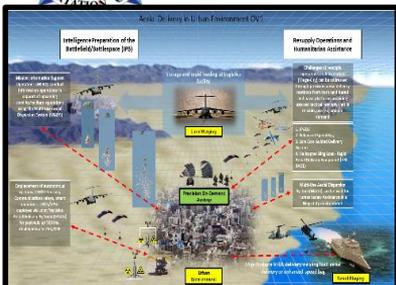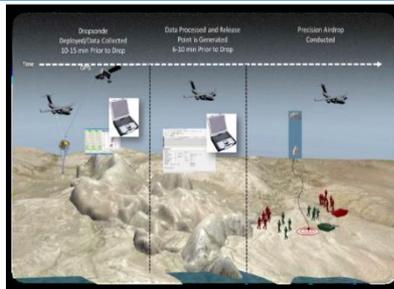
Select Current Initiatives

Autonomous Aerial Insertion and Resupply into Dense, Urban, Complex Terrain

Autonomously insert sensors, munitions, unmanned ground vehicles & supplies into an urban environment

Dropsonde Optimization

Pursue single pass airdrop capability to enhance delivery aircraft/crew safety

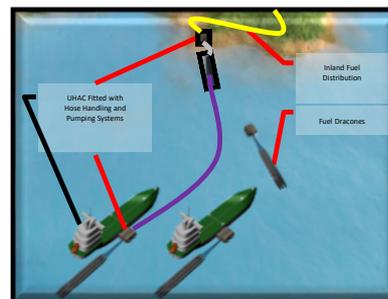**Preamble Initial Look Leading to Accelerated Results/Port Improvement via Exigent Repair**

Rapid repair capability to fix a damaged pier

Mini-Robotic Dredge

Expeditionary dredging capability to support improved access to the shore
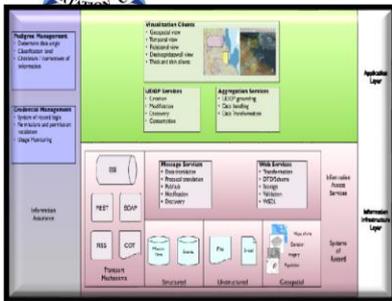

Expeditionary End-to-End Fueling Concept

Modular pumping system to address over-the-shore & inland distribution needs and inform future Service Programs of Record

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Current Initiatives

Strategies for Enterprise Metadata Management

Implementation strategies for enterprise-wide metadata management

Sprint to Big Data/Data Lakes

Explore repository for structured & unstructured data that preserves data fidelity for real time analysis
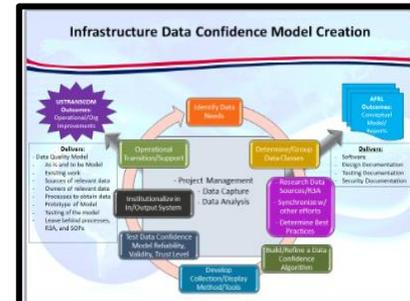
Infrastructure Information Confidence Model with Automation

Info collaboration process provides a confidence assessment
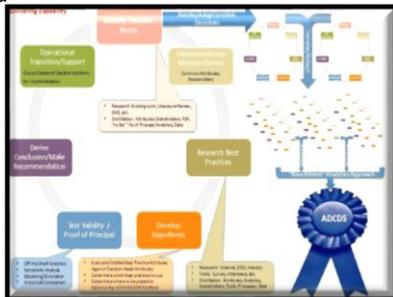
Analytics Driven Command Decision Support

Enhance organizational decision making by providing a holistic methodology
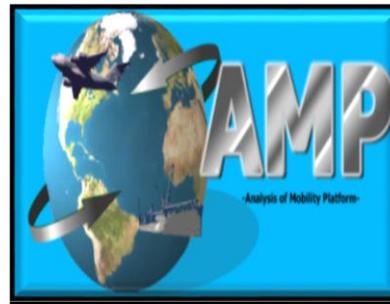
End-to-End (E2E) Distribution Modeling

Enhance E2E modeling/analysis to optimize force projection, distribution and redeployment

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FY18 New Starts

Autonomous Drone Delivery from Airdrop Systems

Develop air-droppable Unmanned Aerial System (UAS) capability

Synchronizing Mobility Allocations and Resources for Transportation

Squadron scheduling/allocation/collaboration crew utilization forecasting tool

Advanced Planning for Global Response Force

Analytical/visual tools to provide joint warfighting planners the ability to plan missions
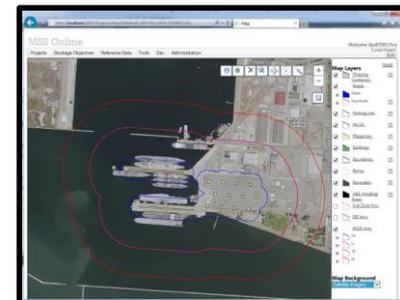
Web Based Seaport Explosive Safety Planning

Develop an ammunition storage and explosive safety application

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RDT&E Info (http://www.transcom.mil/cmd/associated/rdte/)

USTRANSCOM
United States Transportation Command

Enterprise Readiness Center | Doing Business with USTRANSCOM | Moving Passengers and Cargo | Defense Transportation Regulations

Incoming Personnel | Command Information | **Associated Websites** | Freedom Of Information Act | **Customer Feedback**

Research Development Test & Evaluation

The USTRANSCOM Research Development Test & Evaluation program explores innovative joint technologies that address Distribution Process Owner (DPO) and Defense Transportation System (DTS) capability gaps.

Our History

On 16 September 2003, the Secretary of Defense designated United States Transportation Command (USTRANSCOM) as the Department of Defense (DOD) Distribution Process Owner (DPO), responsible for the overall efficiency and interoperability of distribution-related activities supporting the deployment, sustainment, and redeployment of forces conducting the full range of military operations. The paramount goal of the DPO Science and Technology program is to enhance support to USTRANSCOM's customers in peace and war through exploration of transformational distribution technologies. The S&T program fosters development of new bodies of knowledge on distribution, then enables evaluation and integration of the resulting transformational approaches.

As the DOD's DPO, USTRANSCOM's business enterprise stretches from the point at which warfighting materiels have been procured to their point of use in a theater of operations--anywhere in the world. This "global supply chain" requires close synchronization between operational planners and the materiel, personnel, and facilities that support the warfighting customer. Often the system must respond with only a few hours' notice. For capital assets like aircraft and tanks, the supply chain also has a retrograde requirement--to return items for employment in future operations. Movement and sustainment of personnel are also missions USTRANSCOM executes.

USTRANSCOM's mission is unique in the fact that it does not direct all the organizations and agencies that accomplish the missions of mobilization, deployment, sustainment, employment, and redeployment. Rather, as an orchestrator, USTRANSCOM must collaborate rapidly, with many partners, to ensure the supply chain operates effectively and efficiently.

In recognition of the vastly complex business of DOD distribution, USTRANSCOM received its first increment of Research, Development, Test and Evaluation (RDT&E) funds in fiscal year 2006 to

Navigation

RDT&E Home

Ongoing Projects

References

Capabilities

FY19 Project Solicitation (Government Only)

Related Links

Program Training

Frequently Asked Questions

Backups

JDDE Challenge Descriptions

- **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 must allow for assured, secure and trusted communications protected with Federal Information Processing Standard (FIPS) 140-2 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

- **Big Data:** USTRANSCOM lacks the ability to provide authoritative data at the Speed of War at the right time and place to drive informed decisions and operational effectiveness. Today's data environment has many independently managed data sources and no common standards, resulting in inconsistent outcomes that drive increased risk to operations and decision making. Ability to manage data as a strategic resource is 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. USTRANSCOM requires the definition, evaluation, and proposal of tools and implementation methodologies for Machine Learning (ML) and Artificial Intelligence (AI) solutions to support planning, analysis, operations, logistics, and real-time decision making for the JDDE. Includes but is not limited to advanced big data management; manipulation/integration of large data sets, discovery, predictive/ prescriptive analytics, and deep learning algorithm schema. Solutions must allow transparent access to, data mining of, and knowledge discovery in large, distributed, relational and non-relational databases; and ability to autonomously explore, analyze and identify trends and correlations between elements of large data sets to enhance data analytics and aid decision support, ML, AI, and cognitive computing.

JDDE Challenge Descriptions Continued

- **End-to-End Visibility:** Stakeholders throughout the deployment and distribution process require the ability to determine shipment status (where has it been, where is it now, and what condition is it in) through system access at the beginning of a movement through the various nodes to the final destination/point of need.   The availability of this information contributes to inform decision making, confidence in the supply chain, and improve overall performance of the logistics processes. 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 artificial intelligence (AI).

- **Sea Basing Technologies/Logistics-Over-The-Shore:** 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. 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 and equipment in a sea base operation within a degraded 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 provide protective or defensive capability to ensure asset can deliver its requirements in a hostile environment.

JDDE Challenge Descriptions Continued

- **Delivery Technologies:** Seeking innovative 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, just two of the missions driving the need for more accurate and single-pass precision airdrop. This area applies to technologies to ensure survivability of aircraft and personnel on the ground while delivering cargo to a precise location within a high threat environment.

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

- **Rapidly Establish Points of Debarkation:** The JDDE lacks the ability to rapidly assess, establish, and secure points of debarkation in an anti-access/area denial/contested environment to make the Joint force more expeditionary.

- **Distribution Planning and Forecasting:** 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 and collaboration capabilities to ensure people, processes and assets are in place to execute planned operations.

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JDDE Challenge Descriptions Continued

- **Predictive Forecasting**: Seeking solutions, to include AI/ML, to enhance the warfighter's ability to more accurately forecast future logistics requirements. The JDDE lacks the capability to predict maintenance and logistics requirements to enhance operational needs and optimize the supply chain, both forward and reverse flow. Where predictive maintenance/logistics forecasting capabilities exist, they are not linked (machine-to-machine) to distribution and logistics support responses.

- **Secure Collaboration with Commercial Partners:** USTRANSCOM has interest in exploring concepts which minimize risk to passenger 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) 140-2 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. Technologies of interest may include, but are not limited to: advanced cryptology, distributed ledger technologies and artificial intelligence (AI).

JDDE Challenge Descriptions Continued

- **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 Computer Network Defense Service Provider (CNDSP) 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.

- **Electronic Data Interchange:** Today USTRANSCOM and its components use electronic data interchange (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. There is a need to assess the current state of how EDI is being used and then evaluate opportunities, to include AI/ML, for future enhancement.

- **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.

- **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. Looking for technologies, to include AI/ML, to provide desired capability.

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JDDE Challenge Descriptions Continued

- **Modeling:** Budget uncertainty and the evolving global mobility environment drive the need to modify our business processes, equipment and infrastructure. Currently USTRANSCOM is limited in its ability to weigh alternative courses of action and/or measure the effectiveness of the proposed changes. USTRANSCOM requires modeling & decision support tools to transform systems, programs and initiatives to ensure operational efficiency.

- **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.

- **Adaptive Planning and Execution:** The planning community requires trained personnel, well defined processes and the essential technologies, including AI/ML, to ensure DOD's ability to rapidly develop, assess, adapt and execute plans in a dynamic environment.

- **Interoperable, Multi-modal Patient Movement (MM-PM):** Future contingency operations may result in significantly larger 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 CONUS support base under a variety of operational conditions (contested, permissive, cyber-degraded environments, etc.)

JDDE Challenge Descriptions Continued

- **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.

- **Automatic Identification Technology (AIT):** 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. 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. USTRANSCOM is interested in partnering with other organizations in solutions, to include AI/ML, that improve logistics processes in a resource-constraint budget environment.

- **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, to address this gap.

JDDE Challenge Descriptions Continued

- **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.

- **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. (removed – intelligent software agents (ISA)).

JDDE Challenge Descriptions Continued

- **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 or in the air) 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.

- **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 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.

- **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/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.

JDDE Challenge Descriptions Continued

- **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.

- **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 HIS (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.

- **Fuel Efficiency:** 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 and air refueling aircraft to provide 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.

JDDE Challenge Descriptions Continued

- **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.

- **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) are needed to help provide security for ground convoy security.

- **Aircraft Survivability:** USTRANSCOM seeks advanced capabilities to increase aircraft survivability, self defense, and enhance aircrew situational awareness (SA). Affordable, open system technologies are needed to detect and counter the full range of surface-to-air and air-to-air threats, navigate in contested environments, fuse onboard and off-board data for aircrew SA, and counter directed energy threats to aircrew and sensors. Additional efforts in RDT&E for C-sUAS are needed to help provide A/C survivability during landing and departures in both CONUS, OCONUS and expeditionary locations.

JDDE Challenge Descriptions Continued

- **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. Additional efforts in RDT&E for C-sUAS are needed to help provide A/C security while on the flight line and in hangers in both CONUS, OCONUS and expeditionary locations.

- **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.

- **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.

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JDDE Challenge Descriptions Continued

- **Standardized Intermodal Containers/Pallets:** 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.