

**SCIENTIFIC, RESEARCH, AND DEVELOPMENT**  
**UNITED STATES TRANSPORTATION COMMAND (USTRANSCOM)**  
**SCIENCE AND TECHNOLOGY (S&T) PROGRAM**

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***BY ORDER OF THE DEPUTY COMMANDER***

***COMPLIANCE WITH THIS PUBLICATION IS MANDATORY***

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This instruction establishes policy and procedures necessary to develop, implement and manage the USTRANSCOM Science and Technology (S&T) Program. It provides the policy, procedures, systems, and responsibilities that apply to USTRANSCOM and the Transportation Component Commands (TCCs). The use of a name or mark of any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by USTRANSCOM. Recommendations for changes and improvements are invited. Send comments to USTRANSCOM/TCJ5-AS (Programs and Analysis Division; Analysis, Simulation and Technology Branch); Scott AFB IL 62225-5357. The TCCs are authorized to publish supplements and/or supporting directives (furnish copies to TCJ5-AS).

**1. References and Supporting Information.** References, related publications, abbreviations, acronyms, and terms used in this instruction are listed in Attachment 1.

**2. General:**

**2.1.** To provide required transformational deployment and distribution enhancements to the Department of Defense (DOD), USTRANSCOM requires an integrated S&T strategy that addresses identified capability gaps within the Defense distribution and transportation systems through a process which prioritizes those needs for funding while exploring, leveraging, and shaping government, commercial and academic community efforts to provide global mobility support, integrated transportation deployment solutions and connection of its customers to the high-tech, high-speed global marketplace.

**2.2.** This program addresses capability gaps identified through Joint Concept Development documents, Joint Capabilities Integrated Development System (JCIDS) process, Joint Experimentation, operational lessons learned, functional analysis, and capability studies to explore and exploit technologies that increase the responsiveness, efficiency, and effectiveness of the Distribution Process Owner (DPO) and Defense Transportation System (DTS) operational arenas. It outlines the framework, roles and required actions for an S&T program that includes both Transportation Working Capital Fund (TWCF) and Research, Development, Testing and Evaluation (RDT&E) funded efforts. TWCF-funded efforts include studies, demonstrations and the maturation of main stream/near-term technologies applicable to the Command's mission. RDT&E-funded efforts address the entire range of R&D activities (see Attachment 2) applicable to the Command's mission. Additional clarification can be obtained through a review of DOD Regulation 7000.14 "DOD Financial Management Regulation."

**2.3.** This program seeks transformational changes in deployment and sustainment concepts and capabilities across the full spectrum of operations. It complements established DOD processes involving basic research, applied research, and technology transfer vehicles such as Advanced Concept Technology

Demonstrations (ACTDs) and Advanced Technology Demonstrations (ATDs). It will explore promising technologies to support the rapid projection, sustainment and reconstitution of force packages in support of our nation's Defense Strategy and identified customer needs as depicted in Figure 1. To assist in this effort, an Executive Oversight Group (EOG) and Management Team will be established to ensure the development of a fiscally responsible, executable S&T plan for Commander United States Transportation Command (TCCC) approval and subsequent consideration during the budget development process. The S&T EOG and Management Team will recommend and promote command efforts for projects that have merit, appear technically feasible, and include a transition/acquisition strategy, as required by DOD regulations, in order to minimize program risk.

**2.4. S&T EOG Purpose.** The S&T EOG will approve the Command's S&T requirements, endorse the S&T Management Team recommended S&T annual and Programmed Objective Memorandum (POM) plans, and forward those plans to the Commander for approval.

**2.4.1. S&T EOG Membership:** The Director, Strategy, Plans, Policy, and Programs (TCJ5) will chair the S&T EOG. Other principal members include the Director, Operations (TCJ3); the Director, Command, Control, Communications, and Computer Systems (TCJ6); the Director, Force Protection (TCFP); Chief, Distribution Process Owner, Project Management Office (DPO PMO); HQ Air Mobility Command (AMC) Director of Plans and Programs (AMC/A5); Military Sealift Command (MSC) Director, Strategic Planning (MSC N9), and Military Surface Deployment and Distribution Command (SDDC) Director, Transportation Engineering Agency (TEA). The Director, Program Analysis and Financial Management (TCJ8), Chief Counsel (TCJA) and Chief, Command Acquisition (TCAQ) will serve as advisory members. As deemed by the chair, representatives from other USTRANSCOM directorates may be added as necessary. Component Commands may invite advisory representatives, as deemed necessary, from across their organization to aid in discussions/deliberations.

**2.4.2. Meeting Schedule and Focus:** The S&T EOG will meet annually upon completion of the S&T Management Team project review and selection process. Additional meetings may be scheduled as required.

**2.5. S&T Management Team Purpose.** The S&T Management Team will meet, as convened by the chair, to develop a prioritized annual plan that links available research and development projects to nominated S&T projects (Attachment 3). In making its determination, the S&T Management Team will ensure that the technology is of sufficient maturity and that the proposed project supports an identified DPO/DTS capability shortfall in order to minimize program risk and enhance project development (Attachments 4 through 6). This team will also amend and forward for S&T EOG consideration the TCJ5 developed S&T POM plan as required to support the budget development and submission process.

**2.5.1. S&T Management Team Membership:** TCJ5-A, is the Designated Office of Primary Responsibility (OPR) for the S&T Program. The Chief, TCJ5-A, will serve as the S&T Management Team Chair. Other members include representatives from TCJ3, TCJ6, DPO PMO, and the TCCs with advisory support being provided by TCJA and TCJ8. As deemed by the chair, representatives from other USTRANSCOM directorates may be added as necessary.

**2.5.2.** The procedure by which USTRANSCOM or customer identified technological needs are received; matched against ongoing Defense Agency, Service laboratory, or industry technology initiatives; and translated into a command approved S&T strategy/vision by the S&T Management Team is depicted in Figure 1. Additional details are provided in paragraph 4.0, S&T Program Process.

### **3. Roles and Responsibilities:**

**3.1.** The Director, TCJ5 will:

- 3.1.1.** Chair the S&T EOG.
- 3.1.2.** Serve as the command's primary S&T advocate and provide overall program management.
- 3.1.3.** Maintain a TCCC-approved integrated TRANSCOM Transformation Technology Plan (T3P) linking validated requirements to transformational technical solutions.
- 3.1.4.** Develop and maintain an S&T program to identify and exploit leading edge technology initiatives being pursued by the Services, selected Defense agencies, other combatant commands, non-DOD government organizations, commercial industry, and academia.
- 3.1.5.** Designate staff members within TCJ5 to orchestrate and manage the S&T Program.
- 3.1.6.** Establish a Memorandum of Agreement (MOA) with the Defense Logistics Agency (DLA) to ensure proper management and execution of the command's S&T Program.
- 3.1.7.** Ensure the development of integrated annual and POM S&T plans to enhance deployment and distribution operations.
- 3.1.8.** Ensure a proactive program to leverage with Service and Agency RDT&E laboratory technology efforts.
- 3.2.** Director, TCJ3 will:
  - 3.2.1.** Serve as a member of the S&T EOG.
  - 3.2.2.** Appoint a representative to the S&T Management Team.
- 3.3.** Director, TCJ6 will:
  - 3.3.1.** Serve as a member of the S&T EOG.
  - 3.3.2.** Appoint a representative to the S&T Management Team.
  - 3.3.3.** Manage any information technology (IT) project approved for S&T funding through the Chief Information Officer (CIO) Program Review Process (CPRP) in accordance with USTRANSCOM Instruction 33-34.
  - 3.3.4.** Ensure that transformation IT technology pursuits are compatible with the DPO/DTS enterprise architecture (EA) by verifying that approved technology proposals are capable of complying with certification and compliance requirements.
- 3.4.** The Director, Force Protection will serve as a member of the S&T EOG.
- 3.5.** The Chief, Distribution Process Owner (DPO) Program Management Office will:
  - 3.5.1.** Serve as member of the S&T EOG.
  - 3.5.2.** Actively support the S&T Program.
  - 3.5.3.** Appoint a representative to the S&T Management Team.
- 3.6.** Director, TCJ8 will:

- 3.6.1.** Act as the financial advisor to the S&T EOG and the S&T Management Team.
- 3.6.2.** Monitor the expenditure of funds for budget-approved S&T initiatives.
- 3.6.3.** Ensure preparation of required S&T-related congressional and Office of the Secretary of Defense reports.
- 3.7.** TCJA will provide legal support to S&T EOG, S&T Management Team and any S&T initiative.
- 3.8.** TCAQ will provide contracting support for approved S&T initiatives.
- 3.9.** All USTRANSCOM Directorates/Command Support Group (CSG) will:
  - 3.9.1.** Submit S&T proposals to the USTRANSCOM S&T Program Coordinator using Attachment 3 format. A description of the various technology budget activities is contained in Attachment 2. A description of Technology Categories is at Attachment 4. Project selection criteria are in Attachment 5. Detailed funding guidance is contained DOD Regulation (DODR) 7000.14, DOD Financial Management Regulation..
  - 3.9.2.** Ensure compliance with the management principles and documentation requirements defined in Chairman Joint Chiefs of Staff Instruction (CJCSI) 3170.01E, “Joint Capabilities Integration and Development System.”
  - 3.9.3.** Actively support the S&T Program.
  - 3.9.4.** Provide subject matter experts (SMEs) to the S&T EOG and Management Teams, as required, to aid in the analysis/evaluation of technology proposals.
  - 3.9.5.** Designate a Program Manager (PM) and/or Program Coordinator for proposals addressing capability shortfalls under their assigned area of responsibility.
- 3.10.** TCCs will:
  - 3.10.1.** Assign the following as S&T EOG members: AMC/A5, MSC (N9) and SDDC (TEA).
  - 3.10.2.** Designate an appropriate person as their representative on the S&T Management Team.
  - 3.10.3.** Submit S&T proposals to the USTRANSCOM S&T Program Coordinator using Attachment 3 format. A description of the various technology budget activities is contained in Attachment 2. A description of Technology Category Levels is at Attachment 4. Project selection criteria are in Attachment 5. Detailed funding guidance is contained in DODR 7000.14.
  - 3.10.4.** Ensure compliance with the management principles and documentation requirements defined in CJCSI 3170.01E.
  - 3.10.5.** Provide SMEs to the S&T EOG and Management Teams, as required, to aid in the analysis and evaluation of technology proposals.
  - 3.10.6.** Designate a PM and/or Program Coordinator for proposals addressing capability shortfalls under their assigned area of responsibility.
- 3.11.** The Chief, Programs and Analysis Division (TCJ5-A) will:

- 3.11.1.** Provide overall monitoring of S&T program execution.
- 3.11.2.** Chair the S&T Management Team.
- 3.11.3.** Designate, from within TCJ5-AS, an S&T Program Coordinator to orchestrate the overall management of the S&T Program and serve as EOG & Management Team Secretariat.
- 3.11.4.** Ensure periodic updates regarding program status is provided to senior level management.
- 3.12.** The S&T Program Coordinator will:
  - 3.12.1.** Ensure the daily program management and execution of the command's S&T program.
  - 3.12.2.** Develop and maintain the T3P which is designed to provide focus to the command's pursuit of transformational technology capability enhancements as well as inform the S&T community of the command's specific technology capability gaps.
  - 3.12.3.** Solicit S&T proposals to support development of the annual and POM S&T plans. Conduct initial screening of proposals to validate that proposed project supports an identified DPO/DTS capability shortfall contained within the T3P using the criteria listed in Attachment 5.
  - 3.12.4.** Assist the staff in linking identified shortfalls to potential technology solutions in DOD laboratories and academic and commercial S&T communities. This includes a review of emerging Commercial-Off-The-Shelf (COTS) and Government-Off-The-Shelf (GOTS) technologies for potential application even if requirements for the technology have not yet been identified.
  - 3.12.5.** Develop and maintain an MOA with DLA to ensure the proper management and execution of the command's S&T Program whose funding line and authority reside within DLA's POM. Serves as command focal point for this interaction.
  - 3.12.6.** Provide S&T EOG and Management Team Secretariat support to include meeting agendas, conduct of technology project briefs, and production of draft S&T annual and POM plans as well as documentation of Management Team and EOG decisions.
  - 3.12.7.** Ensure approved S&T projects are incorporated into the command's S&T plans.
  - 3.12.8.** In conjunction with TCJ8 and DLA, monitor the expenditure of funds for TCCC-approved budgeted S&T initiatives for proper execution.
  - 3.12.9.** Track projects to ensure funded technology adequately addresses the initial, adjusted, or updated capability gaps.
  - 3.12.10.** Monitor other DOD R&D activities, seek active partnership with Service and Agency laboratory technology pursuits, and incorporate these mutual deployment and distribution projects of interest into the command's overall approach to address identified capability gaps.
  - 3.12.11.** Provide periodic updates to senior level management regarding program status.
- 3.13.** Program Managers/Coordinators (PM/Cs) will:

**3.13.1.** Provide oversight of assigned S&T initiative(s) and ensure the accurate and timely completion of all S&T data call requirements associated with those projects to the S&T Program Coordinator per the S&T Program Coordinator provided timeline.

**3.13.2.** During the technology assessment phase, work with the TCJ5-AS team and SMEs, as required, to reclass subjective proposal rating.

**3.13.3.** As requested, brief S&T proposal to the Management Team and/or EOG.

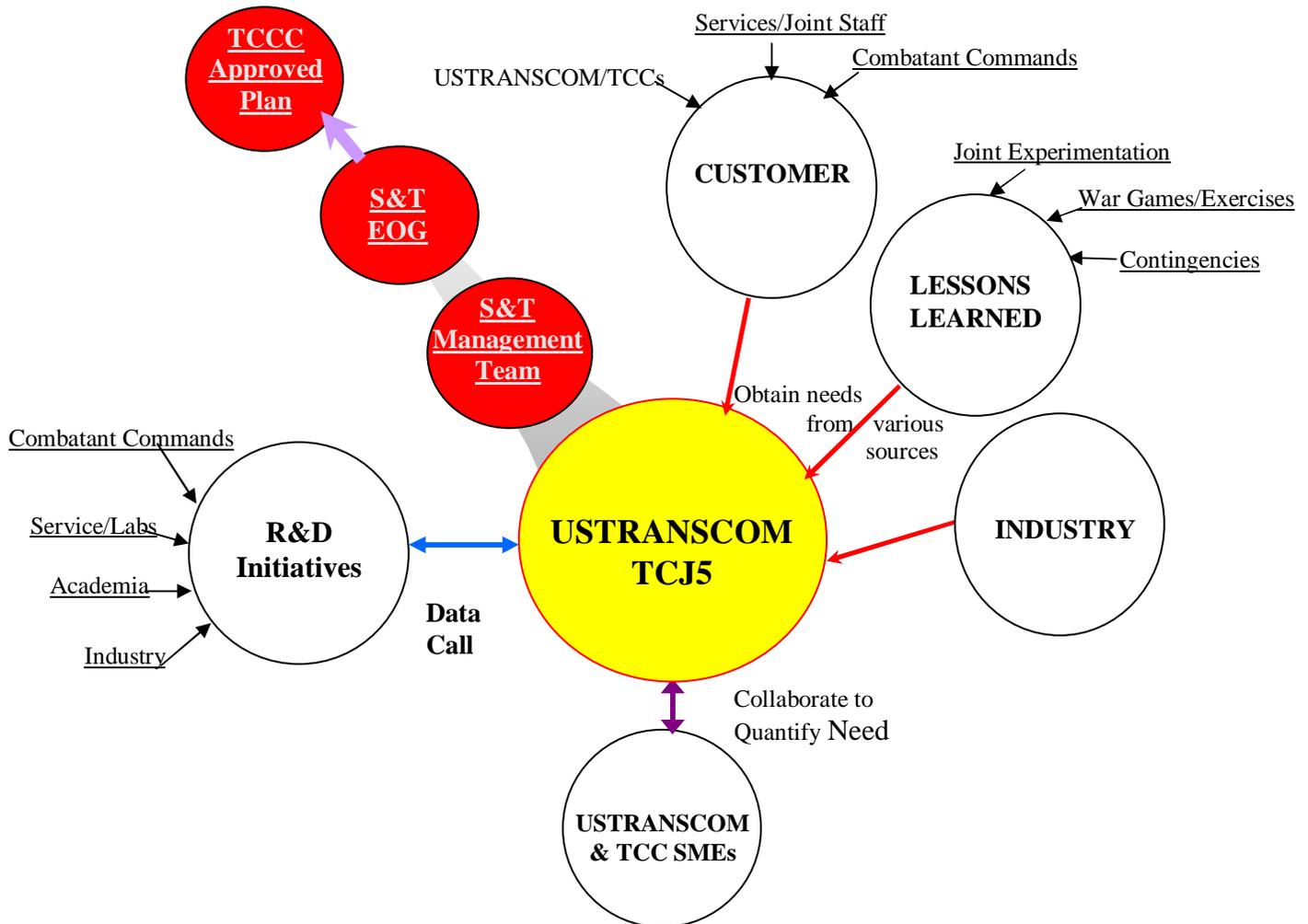


Figure 1: USTRANSCOM S&T Strategy/Vision

**4.0 S&T Program Process (depicted in Figure 2):**

**4.1.** The S&T Program Coordinator will collect proposals to address validated Deployment/Distribution Velocity, Capability-Based Logistics, Sense & Respond/Protection, and Cross Domain Intuitive Planning & Execution technology-related capability shortfalls.

**4.2.** The S&T Program Coordinator will ensure the initial screening of technology proposals, using the criteria listed in Attachment 5, and develop a prioritized list of projects for incorporation into the annual and, when required, POM S&T plans for review by the Management Team and EOG.

**4.3.** The coordinator will ensure appropriate steering groups, (e.g. DPO Portfolio Management, CPRP, etc.) are consulted during the project validation and selection phases.

4.4. The Management Team Chair will announce and convene required meetings for the development of required S&T plans, for EOG consideration, addressing identified transportation and distribution-related technology shortfalls.

4.5. As the chair, TCJ5 will convene the EOG to review command S&T requirements, modify/endorse the S&T Management Team recommended S&T annual and POM plans, and forward those plans to the Commander for approval .

4.6. TCCC-approval of EOG recommendations are returned to the S&T Program Coordinator who will ensure that:

4.6.1. Changes in technology needs are incorporated into the T3P and future proposal solicitation process.

4.6.2. Approved S&T plans are incorporated into USTRANSCOM’s R&D budget products by providing to TCJ8 as well as DLA, per established agreement, required documentation to support submission via the budget process.

4.6.3. Project execution will be coordinated with DLA per established agreement.

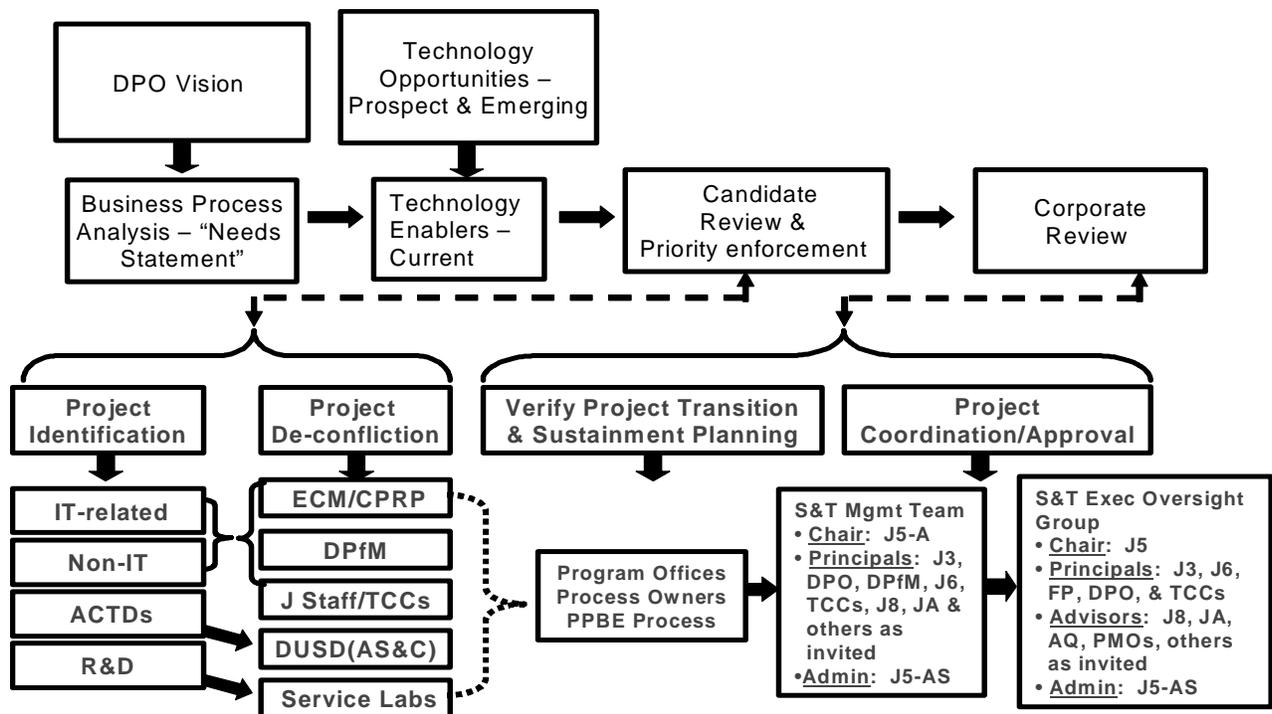


Figure 2: Technology Selection Process

//SIGNED//

MARC L. PURCELL, Rear Admiral, USN  
 Director, Strategy, Policy, Plans, and Programs

6 Attachments

1. References, Abbreviations and Acronyms
2. R&D Budget Activities

3. Technology Proposal Format
4. Technology Categories
5. Technology Proposal Evaluation Criteria
6. Technology Readiness Levels and S&T Project Areas

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**GLOSSARY OF REFERENCES, ABBREVIATIONS AND ACRONYMS**

***References***

Chairman Joint Chiefs of Staff Instruction 3170.01E, Joint Capabilities Integration and Development System

Department of Defense Regulation 7000.14-R, DOD Financial Management Regulation

USTRANSCOM 33-34, USTRANSCOM Corporate Investment Process

USTRANSCOM Instruction 63-2, Command Acquisition

***Abbreviations and Acronyms***

ACTD	Advanced Concept Technology Demonstration
ATD	Advanced Technology Demonstration
AMC	Air Mobility Command
CJCSI	Chairman, Joint Chiefs of Staff Instruction
COTS	Commercial-Off-The-Shelf
CPRP	Chief Information Officer (CIO) Program Review Process
DLA	Defense Logistics Agency
DOD	Department of Defense
DPfM	Distribution Portfolio Management
DPO	Distribution Process Owner
DTS	Defense Transportation System
EA	Enterprise Architecture
EOG	Executive Oversight Group
GOTS	Government-Off-The-Shelf
IT	Information Technology
JCIDS	Joint Capabilities Integration and Development System
KPP	Key Performance Parameters
MOA	Memorandum of Agreement

MSC	Military Sealift Command
OPR	Office of Primary Responsibility
POM	Program Objective Memorandum
PM	Program Manager
PM/C	Program Manager/Coordinator
PMO	Program Management Office
R&D	Research and Development
RDT&E	Research, Development, Test and Evaluation
SDDC	Military Surface Deployment and Distribution Command
S&T	Science and Technology
TCAQ	Command Acquisition
TCC	Transportation Component Command
TCCC	Commander, United States Transportation Command
TCJA	Chief Counsel
TCJ3	Operations Directorate
TCJ5	Strategy, Plans, Policy, and Programs Directorate
TCJ5-A	Programs and Analysis Division
TCJ5-AS	Analysis, Simulation and Technology Branch
TCJ6	Command, Control, Communications, and Computer Systems Directorate
TCJ8	Program Analysis and Financial Management Directorate
T3P	TRANSCOM Transformation Technology Plan
TEA	Transportation Engineering Agency
TRL	Technical Readiness Level
USTRANSCOM	United States Transportation Command

Attachment 2

## DEFINITIONS OF RESEARCH AND DEVELOPMENT AREAS

**Basic Research (Budget Activity 1/BA1)** Systematic study directed toward greater knowledge or understanding of the fundamental aspects of phenomena and/or observable facts without specific applications toward processes or products in mind.

**Applied Research (BA2)** Systematic study to gain knowledge or understanding 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 necessary to evaluate integrated technologies in as realistic an operating environment as possible to assess the performance or costs reduction potential of advanced technology.

**Engineering and Manufacturing Development (BA5)** Includes those projects in engineering and manufacturing development for Service use but which have not received approval for full rate production.

**RDT&E Management Support (BA6)** Includes R&D efforts directed toward support of installation or operations required for general R&D use. Included would be test ranges, military construction, maintenance support of laboratories, operations and maintenance of test aircraft and ships, and studies and analyses in support of R&D program.

**Operational System Development (BA7)** Includes those development projects in support of development acquisition programs or upgrades still in engineering and manufacturing development, but which have received Defense Acquisition Board (DAB) or other approval for production or for which production funds have been included in the DOD budget submission for the budget or subsequent fiscal year.

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**PROPOSAL PREPARATION/FORMAT FOR SCIENCE AND TECHNOLOGY PROJECTS**

**Initial proposals shall be limited to:**

- A cover page with title, point of contact, company or agency name, and security clearance or necessary classification markings;
- A 10-page body (technical description focused on satisfying project selection criteria) (details below);
- A one-page matrix showing results of proposer's assessment of the USTRANSCOM R&D project selection criteria;
- A one-page quad chart to describe project, schedule, costs and display an illustration if desired;
- A one-page appendix (optional). Some situations require special information/supporting documents before funding can be approved. Such information/documentation may be included by appendix to the proposal. An appendix may be used to provide a diagram or concept of operations picture to help describe the proposed effort.

Please use at least 11-point Times New Roman text, single-spaced, with 1-inch margins at sides, top, and bottom. Color diagrams and pictures may be included in color but are wholly optional. Number pages at bottom and include footer with proposer's organization and name. Use security markings prominently as needed.

**NOTE: If selected for the next round of consideration, a more detailed proposal of approximately 40 pages will be requested at a later date which expands information from the first submittal.**

The 10-page body (format follows) of the submittal is meant as the proposer's opportunity to present information relevant to the USTRANSCOM R&D project selection criteria. Refer to the project selection criteria spreadsheet to ensure you have covered the minimum requirements for information.

## **10-Page Body Format**

### **1. Introduction**

Provide a concise identification of the technologies to be explored/developed, the Defense Transportation System (DTS) or Distribution Process Owner (DPO) systems with which they will be integrated, and expected results of the work. Specifically, identify the user of the technology, briefly describe how the technology can enhance existing systems and/or concepts of operation, and describe potential for return on investment (personnel, time, funding) to the user.

### **2. Requirements Traceability**

- a. Clearly identify the operational DTS/DPO problem or issue (including those of USTRANSCOM's Transportation Component Commands and Defense Logistics Agency) and describe how the development effort contributes to the solution.
- b. Briefly reference applicable requirements and program directives by number and name, such as JCIDS products (i.e., Initial Capability Documents; Capability Development Documents; Mission Area Initial Capability Documents; or Doctrine, Organization, Training, Materiel, Leadership, Personnel, and Facilities Change Recommendation packages), Program Management Directives, or any other formal source of requirements for the effort at the joint or service level. If none, clearly describe a proposed Functional Area Analysis/Net Assessment that is being addressed. This analysis should be based on inputs from exercises, operational experience and/or experimentation. Definitions of analysis can be found in CJCSI 3170.01E, Joint Capabilities Integration and Development System. Identify any capability shortfalls from the TRANSCOM Transformation Technology Plan (T3P) that this project will support or fulfill. Include all requirements concentrating on Key Performance Parameters (KPP).

### **3. Applicability to the DPO Enterprise**

- a. State the objectives of the R&D work. Include the nature and extent of the anticipated results and the manner in which the work will contribute to enhancing Defense transportation and/or distribution process capabilities.
- b. Describe what the development effort will do to enhance the utility and supportability of the technology and how this work will be performed.
- c. Describe the technologies to be developed and their level of maturity, their risks and methods to be employed to overcome those risks and sufficiently mature the technology for transition (and fielding if possible).
- d. Describe the technology's peacetime utility to the DTS or DPO.
- e. Describe how the project and its deliverables do not duplicate prior technology efforts.
- f. Describe how the technology addresses capabilities at the joint/multi-agency DPO enterprise level and not purely at the Service-level.

### **4. Return on Investment and Affordability**

- a. Describe the potential return on investment and lifecycle cost/affordability considerations.
- b. Describe the business case for using the technology/capabilities within the DPO environment.

- c. Describe legacy systems which may be retired (and thus operating costs saved) by use of this technology.
- d. Describe lost opportunity costs (quantify if possible) if this technology/application is not followed.
- e. Describe how project cost is considered reasonable for level of effort.

## **5. Technological Merit and Maturity**

- a. Describe the technology merit as applied to the problem at hand. Cite expert assessment/opinions.
- b. Evaluate the Technology Readiness Level and report results using definitions in (next appendix). The more detailed TRL spreadsheet accessible on the Defense Acquisition University website: [http://acc.dau.mil/simplify/ev.php?ID=8796\\_201&ID2=DO\\_TOPIC](http://acc.dau.mil/simplify/ev.php?ID=8796_201&ID2=DO_TOPIC) will be required in the second round of selection process).
- c. Categorize the effort (or its phases) as applied research (BA2); advanced technology development (BA3); or demonstration and validation (BA4) and provide rationale for the category selection based on maturity of the technology and assessment of the development risk. Definitions of research areas are in Attachment 2 in this instruction. Technology maturity is a significant selection criteria.
- d. Identify a defined body of knowledge on the proposed technology, sufficient to gauge its success when applied to the identified need.
- e. Describe how the technology will be sufficiently matured (within the scope of the proposed project) to be successfully transitioned to the next phase of development or fielding.
- f. Describe how the technology and/or its application are/would be successfully/economically applied by industry.

## **6. Programmatic**

- a. Provide a detailed schedule, with start and end dates, for the entire project. Show links to other development efforts to illustrate transition paths. If a project has already started, include any activities already completed. Include transition milestones to further development, demonstration or acquisition as appropriate.
- b. Describe the level of effort to be employed and why that level of effort is sufficient to achieve the objectives and overcome the risks. Describe expected project deliverables by year for multi-year efforts.
- c. Describe the team of experts which will be conducting project activities, briefly citing qualifications and experience.
- d. Provide the performance thresholds and/or exit criteria.
- e. Describe prior expended and proposed funding. Since transformation technology pursuits can only be funded by one source (either TWCF or R&D), ensure your submission indicates the proper funding source. Also include an estimate of follow-on development and/or acquisition costs to integrate/procure the technology, once development is complete.

**Prior (\$K) FYxx FYxx FYxx FYxx FYxx FYxx**

**Requested R&D**

**Requested TWCF**

**7. Technology Transition Planning**

a. Describe interfaces with existing systems required for transitioning or fielding this technology and accompanying integration risks. Estimate follow-on development/fielding/sustainment costs over technology lifecycle.

b. Describe the commitment of or required involvement of DOD laboratories, system program office(s), the developmental/operational test community and/or other entities to successfully integrate and sustain the technology.

c. Identify the organization(s), with appropriate grants and contract authority, to which project funds, once approved, should be forwarded for management/execution of technology proposal.

## TECHNOLOGY CATEGORIES

**Capability-Based Logistics:** Procedures and technologies which address broad joint or enterprise-level capabilities or core competencies (Service missions) critical to the Distribution System to improve performance of the end-to-end DOD supply chain in direct support of the full range of military operations, with ability to rapidly respond to customers' changing demands, with a reliably high level of service. Considers commercial practices. Includes:

- capabilities which enhance any supply or transportation mission (aeromedical, air refueling, joint logistics over-the-shore, seabasing) at a macro level
- analysis, tailoring and implementation of selected best enterprise-level practices from industry
- tools and procedures to optimize transportation plus supply (distribution) plans and schedules in support of an entire operation

**Deployment/Distribution Velocity Enhancements:** Procedures and technologies targeted at optimizing throughput at the nodes and through the conduits of the deployment and distribution supply chains, from origin to point of use and return. Considers commercial practices. Includes:

- inventory management enhancers (includes node cargo management/tracking)
- materiel handling innovations (including methods of reducing handling)
- improved physical access to nodes (includes aircraft all-weather visual systems)
- port throughput enhancements (includes in-port time reduction methods)
- innovative delivery methods (for example, precision airlift, autonomous re-supply)

**Sense & Respond/Protection Capabilities:** Procedures and technologies enabling improved situational awareness along any part of the supply chain, and ability to respond rapidly to changing requirements and changing priorities, threats or other factors to preserve the integrity and timeliness of service of the supply chain. Considers commercial practices. Includes:

- total asset visibility enablers (includes radio frequency identification and data management systems)
- weather, terrain, personnel tracking, and threat sensor systems (includes chemical, biological, radiological, nuclear, and explosives)
- vehicle protection systems (includes aircraft manned-portable air defense detection systems)
- sensors, data links, and communication capabilities (includes austere area communications)
- force protection tools (includes personnel and perimeter detection/situational awareness tools)

**Cross-Domain Intuitive Planning and Execution Capabilities:** Procedures and technologies which improve decision-making and collaboration among any or all decision-makers in the DOD supply chain, from the planning stage to real-time execution and retrograde operations, without need for highly specialized operators of the tools. Considers commercial practices. Includes:

- decision support tools for any echelon of the supply chain or decision-maker
- distribution process simulations and models for analysis and training
- distribution demand forecasting and execution monitoring tools
- on-line training
- automated decision-maker support (cueing, alerting, recommended courses of action)
- automated status monitoring with information fusion and drilldown capability

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Attachment 5

USTRANSCOM R&D Project Selection Criteria Scoresheet		
Project Name:		
Submitting Agency:		
Point of Contact:		
Phone:	E-mail:	
For Funding Beginning in:		
<b>A. Appropriateness of Project</b>		
	YES	NO
<b>1. Capabilities Traceability</b>		
a. (Requirements pull): The technology and its application addresses high-priority need(s) found in documented requirements processes (capability- and/or project-based):		
1. Mission Area ICD/CDD/DOTMLPF Change Recommendation package		
2. Functional Area Analysis/Functional Needs Analysis		
3. Joint or Service Lessons-Learned Databases		
4. Joint Concept Development Document (JOpsC/JOC/JFC/JIC)		
5. Identified/Investigated by Joint Experimentation		
6. USTRANSCOM/COCOM IPL		
7. USTRANSCOM T3P		
8. Other formal requirements documentation		
9. Supported CoCom needs/requirements		
10. Responds to high-level guidance or direction		
11. Identified in ERP/CRP documentation (for IT projects)		
12. For IT-related distribution initiative, is it appropriately linked to Joint Distribution Architecture		
13. Service support		
b. (Technology push): The technology opportunity presented is so compelling to the improvement of DPO operations that the project should receive exploratory funding, regardless of lack of traceability to requirements.		
<b>2. Type of Project/Applicability to the DPO Enterprise</b>		
a. The technology and its application address critical USTRANSCOM DPO enterprise-level capabilities, or Strategic Distribution System component/agency capabilities crucial to operations of the DPO.		
b. The project deliverables are transformational; they are not merely modernization or update efforts.		
c. The project and its deliverables do not duplicate other efforts.		
d. The project addresses capabilities at the joint/multi-agency DPO enterprise level, not purely Service responsibilities.		
<b>3. Potential Return on Investment and Affordability</b>		
a. There is a business case (CONOPS or strategy) presented for the advantageous use of the technology/capability within the DPO.		
b. A positive ROI can be identified for fielding the technology/capability within the DPO.		
c. The scope of the project does not exceed reasonable USTRANSCOM S&T funding constraints.		
d. IT technologies have high potential to eliminate, combine, or otherwise reduce the cost of legacy systems.		
e. Impacts if not funded (lost opportunity costs) are identified and quantified if possible.		
<b>B. Technical Merit</b>		
	YES	NO
<b>1. Technical Merit (as assessed by experts in the discipline)</b>		
a. The proposed technology and its application is based on sound scientific and/or engineering principles.		
b. The proposed application of the technology has a good chance of solving (or contributing to the solution of) the identified problem.		
<b>2. Technical Maturity</b>		
a. The assessed Technology Readiness Level (Attachment 6) falls within the range deemed appropriate for USTRANSCOM S&T programs.		
b. There is a defined body of knowledge on the proposed technology, sufficient to gauge its success when applied to the identified need.		
c. The development agency presents evidence that the technology will be sufficiently matured (within the scope of the proposed project) to be successfully transitioned to the next phase of development or fielding.		
d. The technology and/or its application is successfully/economically utilized in industry.		
<b>C. Project Management and Transition Planning</b>		
	YES	NO
<b>1. Programmatic</b>		
a. The project presents a well-defined schedule for deliverables, and bases project completion on achievement of the appropriate Technology Readiness Level for transition to the next phase or development activity.		
b. The project development/management team is appropriately skilled and staffed for the duration of the effort.		
c. The project (by phases, if appropriate) has defined exit (or completion) criteria aligned with appropriate funding.		
d. The project has well-identified risks, and the developmental effort can be demonstrated to address those risks.		
e. The project has measurable performance thresholds.		
f. The project funding requirements are based on sound principles.		
g. The project deliverables include comprehensive documentation of research results.		
<b>2. Technology Transition Planning</b>		
a. There is a development agency (lab or SPO) committed/staffed/resourced for project execution.		
b. There is a using agency committed to acquisition and sustainment of the developed capability, as evidenced by approved POM entries or other documentation.		
<b>Totals</b>		
	YES	NO

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## TECHNOLOGY READINESS LEVELS AND S&T PROJECT AREAS

Excerpt: DOD Deskbook 5000.2-R, Appendix 6, Technology Readiness Levels and Their Definitions

The following matrix lists the various technology readiness levels and descriptions from a systems approach for both HARDWARE and SOFTWARE. DOD Components may provide additional clarifications for Software. Supplemental definitions follow the table.

*In addition, the matrix is coded by color to generally describe the match between the TRL and its typical S&T funding source. This comparison is only an approximate guide.*

**RED:** (TRLs 1, 2, 8 and 9) Maturity of the technology is outside the scope of the S&T program. (Exception: Some TRL 8 projects may qualify for TWCF if they represent fully mature COTS or GOTS capabilities which have not been demonstrated in the USTRANSCOM environment.)

**YELLOW:** (TRLs 3, 4 and 5) Projects typically qualify for R&D but not TWCF funding.

**GREEN:** (TRLs 6 and 7) Projects typically qualify for R&D (Budget Area 4) or TWCF (demonstration) funding

Technology Readiness Level	Description
<b>1. Basic principles observed and reported.</b>	Lowest level of technology readiness. Scientific research begins to be translated into applied research and development. Examples might include paper studies of a technology's basic properties.
<b>2. Technology concept and/or application formulated.</b>	Invention begins. Once basic principles are observed, practical applications can be invented. Applications are speculative and there may be no proof or detailed analysis to support the assumptions. Examples are limited to analytic studies.
<b>3. Analytical and experimental critical function and/or characteristic proof of concept.</b>	Active research and development is initiated. This includes analytical studies and laboratory studies to physically validate analytical predictions of separate elements of the technology. Examples include components that are not yet integrated or representative.
<b>4. Component and/or breadboard validation in laboratory environment.</b>	Basic technological components are integrated to establish that they will work together. This is relatively "low fidelity" compared to the eventual system. Examples include integration of "ad hoc" hardware in the laboratory.
<b>5. Component and/or breadboard validation in relevant environment.</b>	Fidelity of breadboard technology increases significantly. The basic technological components are integrated with reasonably realistic supporting elements so it can be tested in a simulated environment. Examples include "high fidelity" laboratory integration of components.
<b>6. System/subsystem model or prototype</b>	Representative model or prototype system, which

<b>demonstration in a relevant environment.</b>	is well beyond that of TRL 5, is tested in a relevant environment. Represents a major step up in a technology's demonstrated readiness. Examples include testing a prototype in a high-fidelity laboratory environment or in simulated operational environment.
<b>7. System prototype demonstration in an operational environment.</b>	Prototype near, or at, planned operational system. Represents a major step up from TRL 6, requiring demonstration of an actual system prototype in an operational environment such as an aircraft, vehicle, or space. Examples include testing the prototype in a test bed aircraft.
<b>8. Actual system completed and qualified through test and demonstration.</b>	Technology has been proven to work in its final form and under expected conditions. In almost all cases, this TRL represents the end of true system development. Examples include developmental test and evaluation of the system in its intended weapon system to determine if it meets design specifications.
<b>9. Actual system proven through successful mission operations.</b>	Actual application of the technology in its final form and under mission conditions, such as those encountered in operational test and evaluation. Examples include using the system under operational mission conditions.

**Definitions:**

**Breadboard:** Integrated components that provide a representation of a system/subsystem and which can be used to determine concept feasibility and to develop technical data. Typically configured for laboratory use to demonstrate the technical principles of immediate interest. May resemble final system/subsystem in function only.

**“High Fidelity”:** Addresses form, fit and function. High-fidelity laboratory environment would involve testing with equipment that can simulate and validate all system specifications within a laboratory setting.

**“Low Fidelity”:** A representative of the component or system that has limited ability to provide anything but first order information about the end product. Low-fidelity assessments are used to provide trend analysis.

**Model:** A functional form of a system, generally reduced in scale, near or at operational specification. Models will be sufficiently hardened to allow demonstration of the technical and operational capabilities required of the final system.

**Operational Environment:** Environment that addresses all of the operational requirements and specifications required of the final system to include platform/packaging.

**Prototype:** A physical or virtual model used to evaluate the technical or manufacturing feasibility or military utility of a particular technology or process, concept, end item or system.

**Relevant Environment:** Testing environment that simulates the key aspects of the operational environment.

**Simulated Operational Environmental:** Either 1) a real environment that can simulate all of the operational requirements and specifications required of the final system or 2) a simulated environment that allows for testing of a virtual prototype; used in either case to determine whether a developmental system meets the operational requirements and specifications of the final system.