



U.S. TRANSPORTATION COMMAND INSTRUCTION

TCJ5-SC

USTCI 4300.06
12 JANUARY 2023

POLICY FOR RESEARCH, DEVELOPMENT, TEST, AND EVALUATION PROGRAM

1. Effective Date. This instruction is effective upon signature.
2. Releasability. UNCLASSIFIED UNLIMITED. This directive is approved for public release; distribution is unlimited. Users may obtain copies on the United States Transportation Command (USTRANSCOM) network portal and distribute, as necessary.
3. Superseded/Canceled. USTRANSCOM Instruction 61-01, "Research, Development, Test and Evaluation (RDT&E) Program," dated 19 August 2019 is hereby superseded.
4. Summary of Revisions. The major changes in this instruction include: A) Removal of the requirement to brief prospective new start initiatives to the USTRANSCOM Oversight Council in July (per TCJ8 Fiscal Year 2022 Program Objective Memorandum budget guidance), B) Removal of requirement to brief Chief Information Officer Forum (body no longer exists), C) Removal of requirement to provide annual project update brief to the USTRANSCOM Corporate Board for any standard RDT&E issue; D) Change in TCJ5/J4 funding approval authority; and E) Incorporation of force development/design elements into proposal format submission/assessment process.
5. Purpose. This instruction establishes policy and procedures necessary to develop, implement, and manage the Research, Development, Test, and Evaluation (RDT&E) Program for USTRANSCOM.
6. Applicability. This instruction is applicable to USTRANSCOM Staff, components, Joint Enabling Capabilities Command (JECC) and Joint Transportation Reserve Unit (JTRU). The Transportation Component Commands and JECC are authorized to publish supplements and/or supporting directives and will furnish copies to the Capabilities Branch (TCJ5-SC).
7. Policy.
 - a. To provide required transformational force projection, deployment, and distribution enhancements to the Department of Defense (DOD), USTRANSCOM requires an integrated RDT&E strategy that addresses identified capability gaps. USTRANSCOM reviews requirements with the Joint Deployment and Distribution Enterprise (JDDE) and allocates resources via the Corporate Governance Process, which ensures approved RDT&E proposals and new requirements (NRs) are resourced. This program invests in innovative technologies that address Command priorities and challenges to improve the efficiency and effectiveness of DOD logistics and supply chain operations.

b. This program addresses capability gaps identified through Joint Concept Development documents, the Joint Capabilities Integration and Development System process, Joint Experimentation, Integrated Priority Lists, JDDE Capability Gaps, operational lessons learned, functional analyses, and capability studies to explore and exploit technologies that increase the responsiveness, efficiency, and effectiveness of the JDDE.

c. This program explores innovative changes in force projection and sustainment concepts and capabilities across the full spectrum of operations. It leverages capabilities developed via established DOD processes involving basic research, applied research, and technology transfer vehicles. It assesses and identifies needs of promising technologies to support the rapid projection, sustainment, and reconstitution of force packages in support of our nation's defense strategy. To assist in this effort, an RDT&E Management Team is established to ensure the development of a fiscally responsible, executable RDT&E plan for approval by the Commander USTRANSCOM and subsequent consideration during the budget development process. The 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 directives.

d. Government organizations receiving USTRANSCOM RDT&E funds for development work via contracts with non-federal parties will verify appropriate Federal Acquisition Regulation and/or Defense Federal Acquisition Regulation Supplement clauses, Contract Line-Item Numbers or Contract Data Requirements Lists, and necessary contractual language are included in contracts to appropriately protect government use rights in technical data and computer software. The contracting office will ensure contractors specify all restrictions on deliverable technical data and computer software in their proposals. 'Unlimited Rights' is the preferred category for products developed solely using USTRANSCOM RDT&E funding; if other rights categories are proposed, the government project manager and/or contracting organization will obtain approval from the USTRANSCOM RDT&E program and the USTRANSCOM Staff Judge Advocate's office prior to awarding the contract or task order.

e. RDT&E Management Team Purpose. The RDT&E Management Team will develop a prioritized, fiscally responsible annual plan against approved areas of interest that is informed by Department concepts, the Command strategy, and address validated JDDE Capability Gaps, Technology Challenges, and Integrated Priority List issues. In making its determination, the RDT&E Management Team will ensure the technology developmental effort is of sufficient maturity (i.e., Technology Readiness Level (TRL)), that it addresses a validated JDDE capability shortfall, and that the developmental work is within Congressionally-authorized funding scope. The proposal review will also assess anticipated benefit, competing technologies, and the proposed transition strategy. Transition plans of proven capabilities to command enterprise

programs need to be vetted through Directorate of Acquisition (TCAQ)-Program Executive Office to ensure compliance with acquisition planning. Programs must be designated Acquisition Programs with approved acquisition documentation. Factors to consider in evaluating the transition potential of future technology investments include demonstrated understanding of deployment/distribution integration challenges, ability to adhere to DOD and USTRANSCOM Information Technology (IT) standards, planned operational utility assessment, approach/strategy to manage and mitigate areas of risk, expected benefit, and commitment within out-year budget by the transition/integration agency at project selection, exit criteria (e.g., demonstration or other). USTRANSCOM leverages the Corporate Governance Process to validate/approve proposed RDT&E investments. The team reviews both New Start and NRs (documentation of need in accordance with Enclosure C and USTRANSCOM Instruction [USTCI] 90-6, [projected USTCI 5801.03], “Corporate Governance Process”).

1) RDT&E Management Team Membership. The Strategy Division (TCJ5-S) is the designated office of primary responsibility for the RDT&E Program. The Chief, TCJ5-S, or the RDT&E Program Director in their absence, will serve as the RDT&E Management Team Chair. Other members include representatives from USTRANSCOM Directorates: Intelligence (TCJ2), Operations (TCJ3), Command, Control, Communications and Cyber Systems (TCJ6), Program Analysis and Financial Management (TCJ8), TCAQ, Joint Distribution Process Analysis Center (TCAC), and the Transportation Component Commands/Joint Enabling Capabilities Command with advisory support being provided by the Staff Judge Advocate (TCJA). The team will convene as determined by the Team Chair. To support the rapid transition of innovative ideas into execution, the RDT&E Program Director may virtually seek RDT&E Management Team member review to facilitate a rapid color of money/program scope determination. As deemed by the Chair, representatives from other USTRANSCOM directorates and the Command Support Group staff may be added.

2) Figure 1 depicts the procedure by which USTRANSCOM or JDDE-identified technological needs are received; matched against ongoing Defense Agency, Service laboratory, or industry technology initiatives; and translated into a command-approved RDT&E strategy/vision. An in-depth overview is provided in Enclosure B, RDT&E Program Process.

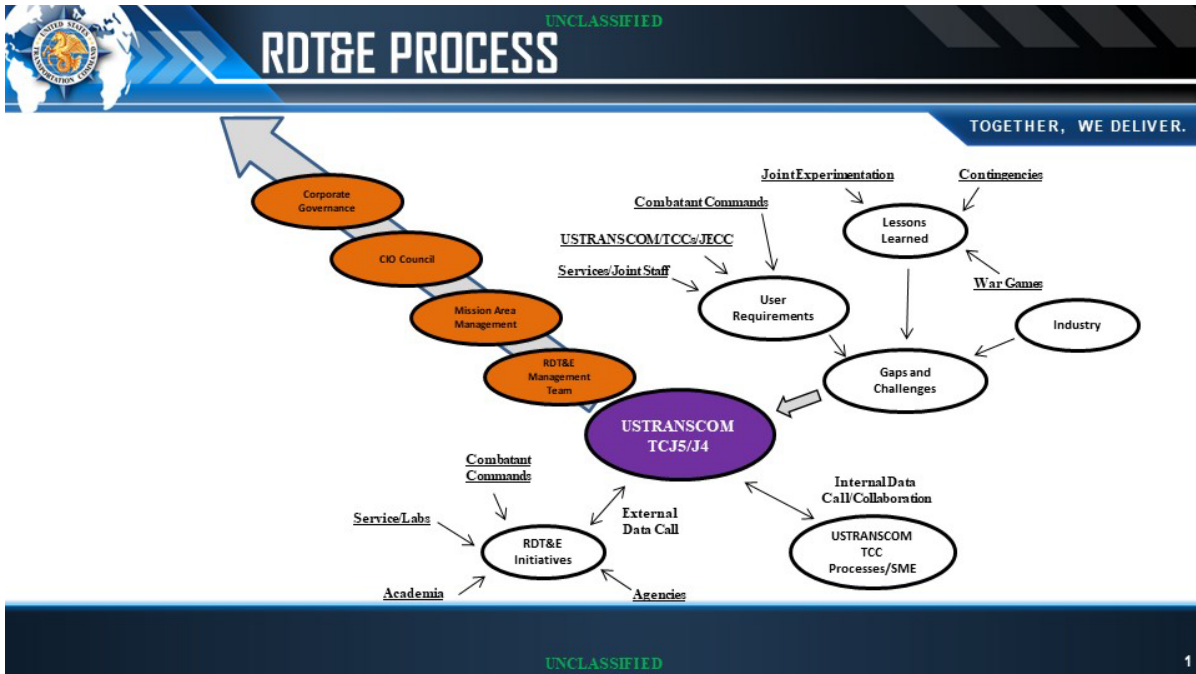


FIGURE 1 – USTRANSCOM RDT&E Process

- 8. Responsibilities. See Enclosure A.
- 9. References and Prescribed Forms. See Enclosure J.

FOR THE COMMANDER

VINCENT B. BARKER
Major General, U.S. Army
Chief of Staff

Enclosures

- A. Roles and Responsibilities
- B. RDT&E Process
- C. USTRANSCOM RDT&E Two-Phase Project Selection – Process Formats and Content for Proposals
- D. Definitions of RDT& E Areas
- E. Technology Readiness Levels
- F. Integrated Product and Process Development
- G. Responsibilities of USTRANSCOM RDT&E Project Coordinators (PCs)
- H. Minimum Requirement for Developing a Technology Transition Strategy for Projects Transition to a USTRANSCOM Program/System of Record
- I. Estimate of Return-on-Investment Instructions and Template
- J. References
- GL. Glossary of Abbreviations, Acronyms, and Terms

Contents

FIGURE 1 – USTRANSCOM RDT&E Process 4

Enclosure A..... 8

 Roles and Responsibilities 8

Enclosure B..... 16

 RDT&E Process 16

 Figure 2 – RDT& E Program Management Timeline 16

Enclosure C..... 18

 USTRANSCOM RDT&E Two-Phase Project Selection..... 18

 Process Formats and Content for Proposals..... 18

 Figure 3 – Required Format – Life cycle Funding Estimates..... 24

 Figure 4 – Recommended Format – Performance Metrics 25

Enclosure D..... 26

 Definitions of RDT&E Areas..... 26

Enclosure E 28

 Technology Readiness Levels (TRLs) 28

Enclosure F 31

 Integrated Product and Process Development (IPPD) 31

 Figure 5 – RDT&E IPPD..... 32

Enclosure G..... 34

 Responsibilities of USTRANSCOM RDT&E Project Coordinators (PCs)..... 34

Enclosure H..... 39

 Minimum Requirements for Developing a Technology Transition Strategy for Projects
 Transitioning to a USTRANSCOM Program/System of Record..... 39

Enclosure I 40

 Estimate of Return-on-Investment Instructions and Template *Note: The below information and examples are loaded on the USTRANSCOM public site at the following location*
 <https://www.ustranscom.mil/cmd/associated/rdte/references.cfm> 40

 Table 1A – Project Savings Benefit (Example)..... 40

 Table 1B – Non-monetary Quantifiable Benefits (Example) 41

 Table 2 – Project Costs/Investment (as details are available) (Example)..... 41

 Table 3 – Project Summary (Example)..... 42

Enclosure J 43

References	43
Glossary	44
Glossary of Abbreviations, Acronyms and Terms	44

Enclosure A
Roles and Responsibilities

1. The Director, TCJ5/J4 or designated Deputy will:

a. Serve as the command's primary RDT&E advocate and provide overall program management per USTCI 1600.03, "Policy for Roles and Responsibilities of the United States Transportation Command Staff, Component, Subordinate, and Functional Component Commands."

b. Develop and execute an RDT&E program to identify and exploit leading edge technology initiatives being pursued by the Military Departments, Defense Agencies, other Combatant Commands, non-DOD government organizations, commercial industry, and academia.

c. Designate staff members within TCJ5/J4 to orchestrate and manage the RDT&E Program.

d. Ensure the development of integrated annual Program Objective Memorandum RDT&E plans to enhance deployment and distribution operations.

e. Conduct an annual GO/FO/SES level review (normally in June) of approved RDT&E projects.

f. Serve as the interface to all other DOD Science and Technology programs (e.g., Emerging Capabilities & Prototyping, Coalition Warfare Program, etc.). Solicit staff and component proposal input and feedback for project review/prioritization.

g. Develop and publish announcements for proposals from the JDDE and RDT&E communities as appropriate.

h. Act as the Principal proponent and accountable senior official for all USTRANSCOM RDT&E.

i. Approve, after consultation with TCJA and TCJ8 and when deemed appropriate, NRs that are under \$1,000,000 and involve no full time equivalent/personnel increases.

2. The Director, TCJ2 will appoint a representative to the RDT&E Management Team.

3. The Director, TCJ3 will:

a. Appoint a representative to the RDT&E Management Team. As the Mission Area Manager (MAM), support the RDT&E Program as described in USTRANSCOM Instruction 90-13, (projected USTCI 3900.01,) "Mission Area Management." Prior to submitting a proposal, the submitter should coordinate proposal with the appropriate Sub-MAM to ensure proposed effort is

addressing a valid Sub-MAM challenge and to secure long-term transition/sustainment support.

b. As the Deployment and Distribution Portfolio Management – Coordinator, coordinate on information technology (IT) proposals transitioning to non-USTRANSCOM portfolios.

4. The Director, TCJ6 will:

a. Appoint a representative to the RDT&E Management Team. As the Enterprise Infrastructure Sub-MAM, ensure related proposals and NRs are reviewed prior to submission to the RDT&E Program Office for consideration.

b. Conduct architecture/engineering technical assessments of new initiatives (during Phase II assessment process) and annual assessments of funded efforts (addressing issues/concerns during annual RDT&E Program Director and TCJ5/J4 Project Reviews).

c. Assess all proposals for potential IT/cyber attributes, and then, if they exist, ensure transformational IT pursuits are in compliance with Defense Business Council requirements by verifying compatibility with the Joint Deployment and Distribution Architecture.

d. As Chief Information Officer, review USTRANSCOM/Component IT-related proposals to ensure consistency with IT, Cyber and Data Management plans (strategies/roadmaps). Ensure compliance with DOD and USTRANSCOM Chief Information Officer policies. Semi-annually review ongoing RDT&E IT efforts to enhance stakeholder knowledge and support future transition planning.

5. The Director, TCJ8 will:

a. Act as the financial advisor for the RDT&E Program. TCJ8 has authority and responsibility for funds propriety approval, and to determine if proposals meet the criteria for USTRANSCOM RDT&E funding. USTRANSCOM receives RDT&E funding authority for the purpose of Advanced Component Development and Prototypes under Budget Activity 4 (or 6.4) with the purpose of funding evolutionary activities that demonstrate the potential to directly benefit and transform JDDE related capabilities. RDT&E is for research to find potential solutions to JDDE capability gaps using technology that currently does not exist in an operational environment.

b. As the Financial Management Sub-MAM, ensure related proposals and NRs are reviewed prior to submission to the RDT&E Program Office for consideration.

c. Monitor the execution of funds for budget-approved initiatives.

d. Provide obligation and expenditure reports of RDT&E efforts to the Air Force in accordance with established Memorandum of Agreement.

- e. Ensure coordination on RDT&E-related Congressional and Office of the Secretary of Defense reports.
 - f. Appoint a representative to the RDT&E Management Team.
 - g. Provide monthly execution report to the RDT&E Program Director.
 - h. Verify Defense Business Council certification is received before issuing funds to USTRANSCOM business systems.
 - i. Review program-associated financial documentation for accuracy and thoroughness.
 - j. Ensure proper execution of RDT&E funds.
 - k. Review all white papers, proposals, and projects to ensure they meet Budget Activity 6.4 funding requirements.
 - l. Ensure, as applicable, that transition and sustainment funding are incorporated into the command's annual budget submission.
 - m. Submit Office of Secretary of Defense budget exhibits as required (usually in July and December) with funding breakout and narrative submission provided by TCJ5/J4.
 - n. Validate all return on investment and business case analysis information.
 - o. As the senior management official responsible for establishing and implementing USTRANSCOM's Managers' Internal Control Program, ensure the RDT&E Program, as an Assessable Unit, is in compliance with USTCI 7100.01, "Policy for Risk Management and Internal Control (RMIC) Program."
6. The Staff Judge Advocate, TCJA, will provide legal support, representation, and project review for the RDT&E Program.
7. The Director, TCAQ will:
- a. Provide acquisition program management for transitioning RDT&E capabilities to USTRANSCOM programs of record, to include the review of technology transition strategies and estimating transition and future maintenance/sustainment funding in compliance with USTRANSCOM Instruction 63-10, (projected USTCI 7500.04,) "Acquisition Program Lifecycle Management."
 - b. Appoint a representative to the RDT&E Management Team.
 - c. Provide contract support, as required, for approved RDT&E projects.
 - d. Provide advice and counsel regarding Small Business Programs, initiatives, and requirements.
 - e. Provide Transportation and Technology Industry Liaison Office support for contractor capability briefings/presentations requests.

8. The Director, TCAC will appoint a representative to the RDT&E Management Team and, as the Long-Range Planning and Analysis sub-MAM, ensure related proposals and NRs are reviewed prior to submission to the RDT&E Program Office for consideration.

9. All USTRANSCOM Directorates/Command Groups will:

a. Submit technology proposals to the USTRANSCOM RDT&E Program Director in TCJ5-SC using Enclosure C sample format. Ensure technology proposals and NRs identify USTRANSCOM approved capability gaps and JDDE capability shortfalls. A description of the various technology budget activities is contained in Enclosure D. A description of Technology Readiness Levels is in Enclosure E. Detailed funding guidance is contained in DOD 7000.14-R, "Department of Defense Financial Management Regulation."

b. USTRANSCOM, Transportation Component Commands and Joint Enabling Capabilities Command IT-related proposals, to include NRs, will be vetted through the Chief Information Officer (TCJ6) before being submitted for funding consideration through the USTRANSCOM Corporate Governance Process. TCJ3 is designated as the MAM with TCJ3, Headquarters Air Mobility Command, Headquarters Military Sealift Command, Headquarters Military Surface Deployment and Distribution Command, TCAC, TCJ6 and TCJ8 designated as Sub-MAMs. Each Sub-MAM has oversight of several systems/projects as outlined in USTCI 90-6, (projected USTCI 5801.03.) Prior to submitting a proposal, the submitter should coordinate the proposal with the appropriate Sub-MAM to ensure proposed effort is addressing a valid Sub-MAM challenge and to secure long-term transition/sustainment support. The RDT&E Program Director will review submissions and vet via USTCI 90-6, (projected USTCI 5801.03) for funding consideration.

c. Ensure compliance with the management principles and documentation requirements defined in the Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 5123.01I, "Charter of the Joint Requirements Oversight Council (JROC) and Implementation of the Joint Capabilities Integration and Development System," and DOD Instruction (DODI) 5000.75, "Business Systems Requirements and Acquisition."

d. Provide subject matter experts, as required, to aid in the analysis/evaluation of technology proposals. Each directorate will indicate their approval/disapproval of the RDT&E assessment of proposals based on their staff's recommendation. This will be done by indicating approval on the Task Management Tool tasker at the directorate level. Comments will be adjudicated by the RDT&E Management Team.

e. Designate a Project Coordinator (PC), in writing, for approved projects under their assigned area of responsibility to manage and assist in orchestrating technology development and transition through the Integrated Product and Process Development principles outlined in Enclosure F. Directors will designate a PC to function as an operational/functional,

technical, or transition manager as appropriate, and ensure required program training is attended. Operational/functional managers provide day-to-day operational direction and expertise in terms of user requirements to help shape/guide technology development. Technical managers are the lead scientist/researcher, normally from a Service laboratory, who are responsible/leading the day-to-day research. The PC is responsible for overseeing the project and managing USTRANSCOM interests (to include the use of emerging and mandated technologies listed in DOD IT Standards Registry and the USTRANSCOM IT Standards intelink site) to ensure the smooth transition of proven technologies. For example, an innovative technology project may have TCJ3 providing functional support with TCJ6 providing technical manager expertise. The RDT&E Program Director recommends that the designated PC be available to manage the project until at least accomplishment of the first milestone. The RDT&E Program Director shall be notified immediately of any change in PC assignment prior to the change to ensure training of the new PC/continuity of effort.

f. Participate, as appropriate, with USTRANSCOM as the interface, in other DOD Science and Technology programs and when tasked via Enterprise Access Management Service.

10. Transportation Component Commands and Joint Enabling Capabilities Command will:

a. Appoint a representative on the RDT&E Management Team. Military Surface Deployment and Distribution Command, Military Sealift Command and Air Mobility Command will ensure all proposals and NRs are reviewed and routed through their Sub-MAM prior to submitting to the RDT&E Program Office for consideration (reference USTCI 90-6, (projected USTCI 5801.03).

b. Submit technology proposals to the USTRANSCOM RDT&E Program Director using sample format in Enclosure C. A description of the various technology budget activities is contained in Enclosure D. A description of Technology Readiness Levels is in Enclosure E. Detailed funding guidance is contained in DOD 7000.14-R.

c. Designate a PC for approved projects under their assigned area of responsibility to manage and assist in orchestrating technology development and transition through Integrated Product and Process Development principles outlined in Enclosure F. Operational/functional managers provide day-to-day operational direction and expertise in terms of user requirements to help shape/guide technology development. Technical managers provide day-to-day technical direction and will be more involved in the detail and programmatic of the project. The PC is responsible for overseeing the project and managing USTRANSCOM interests. Each assigned PC shall attend required program training. The RDT&E Program Director shall be notified of any change in PC assignment prior to the change to ensure training of the new PC/continuity of effort.

11. The Chief, Strategy Division (TCJ5-S) will:

- a. Provide overall monitoring of RDT&E program.
- b. Designate the RDT&E Program Director (from within TCJ5-S) to orchestrate the overall management of the RDT&E Program.
- c. Ensure periodic updates regarding program status are provided to senior level management.

12. The RDT&E Program Director will:

- a. Ensure program management and execution of the command's RDT&E Program.
- b. Solicit technology proposals to fill or address identified capability gaps, develop annual technology plans, and ensure the timely submission of required documentation. Conduct initial screening of proposals to validate the proposed project is likely to reduce or remedy identified JDDE capability shortfalls. Ensure all proposals and NRs are routed through the appropriate Sub-MAM to the MAM prior to being considered for RDT&E funding.
- c. Aid the staff in the development of potential technology solutions. This includes the review of emerging commercial-off-the-shelf and government-off-the-shelf technologies for potential application, even if requirements for the technology have not yet been identified. This also includes assistance in the refinement of documentation to facilitate that proposed innovation is within Congressionally-appropriated funding/scope.
- d. Ensure approved RDT&E projects are incorporated into the command's RDT&E plans.
- e. In conjunction with TCJ8 and the Air Force Financial Management & Comptroller, monitor the proper execution of RDT&E Small Business utilization statistics. The RDT&E Program Director will prepare narratives on budget exhibits and provide to TCJ8 for inclusion in Budget Item Justification R exhibits.
- f. Assist PCs in the employment of Integrated Product and Process Development principles (Enclosure F) and track projects to ensure funded technology sufficiently improves the initial, adjusted, or updated capability gaps.
- g. Conduct a review (normally in February) of funded technology projects.
- h. Monitor both government and non-government RDT&E activities and aggressively seek active partnerships with the Services, Defense Agencies, and national laboratories as well as Combatant Commands. This will ensure an integrated and coordinated pursuit of mutual deployment and distribution projects of interest addressing identified capability gaps.

i. Annually, and upon request, provide updates first to TCJ5/J4 (usually June) and second to senior level leadership, according to the USTRANSCOM Corporate Governance Process, regarding program status.

j. The TCJ5-SC RDT&E Program Director and Office of Research and Technology Applications (see paragraph 14) will collaborate on proposed technology development concepts to determine which efforts should be addressed solely as a USTRANSCOM-funded RDT&E, a Technology Transfer activity, or pursued as a complementary/parallel effort.

k. Within three months of initial assignment, ensure RDT&E Program personnel, which includes Project Coordinators, are trained on RDT&E Program duties and responsibilities.

l. Designate a Project Monitor for each project. The Monitor represents the RDT&E Program Director and assists the PC through the RDT&E life of the project.

m. In accordance with USTCI 7500.05, "Policy for Acquisition Management," develop, staff, and coordinate a consolidated Military Interdepartmental Purchase Request approval package(s) for RDT&E projects outside USTRANSCOM's accounting system. Each Military Interdepartmental Purchase Request must be accompanied by an applicable support agreement per DODI 4000.19, "Support Agreements" and USTRANSCOM Instruction 90-20, (projected USTCI 5100.01,) "Procedures for Command Agreements." The standard agreement is the Bureau of the Fiscal Service Form 7600A, *United States Government Interagency Agreement (IAA), General Terms and Conditions*, located on the fiscal.treasury.gov site. A complimentary, consolidated Form 7600A package will be developed to garner receiving and supplying activity signatures and approval prior to release of funding. Internal USTRANSCOM RDT&E project acquisition packages will be developed and processed by the appropriate USTRANSCOM PC.

n. Monitor requirements and identify opportunities for Small Business Innovation Requirements and Rapid Innovation Funds program inclusion.

o. Serve as the Command's interface to all other DOD Science and Technology programs (e.g., Prototyping, Capabilities and Experimentation, Coalition Warfare Program, Joint Test & Evaluation, Rapid Innovation Funds, etc.). Solicit staff and component proposal input and feedback for project review/prioritization, as applicable.

p. Ensure the principles and operational parameters of the DOD Scientific and Technical Information Program are adhered to per DODI 3200.12, "DoD Scientific and Technical Information Program (STIP)" & DOD Manual 3200.14, Vol.1, "Principles and Operational Parameters of the DoD Scientific and Technical Information Program (STIP): General Processes."

q. Prepare and submit the narrative for the Budget Item Justification R exhibits, as required (usually in mid-Jul and Dec), to TCJ8 for submission.

Ensure Commander USTRANSCOM has been briefed on New Starts/Joint Capability Technology Demonstrations prior to submission.

r. As owner of the RDT&E Assessable Unit, comply with USTCI 7100.01.

s. Participate in Program Executive Office acquisition program reviews involving RDT&E investment.

13. Project Coordinators (PC) will:

a. Execute assigned, funded initiative(s), through the employment of Integrated Product and Process Development principles (Enclosure F).

b. Serve as the Command's research facilitators and the transition agent for successfully developed technologies (Enclosure G).

c. Provide accurate and timely completion of all program data call requirements.

d. Provide detailed project updates to the RDT&E Program Director via designated Project Monitor, as requested.

e. Assist in the orchestration of the smooth transition of successfully completed technology exploration efforts into USTRANSCOM acquisition programs. PCs must ensure a transition strategy is included in their project plan and assist, as required, the Program Manager in budgeting and executing a smooth transition. For RDT&E efforts designated for transition to the USTRANSCOM enterprise, this includes the development of a transition strategy (in accordance with Enclosure H) and securing transition/sustainment funding with appropriate Sub-MAM per USTCI 90-13, (projected USTCI 3900.01.)

f. Provide project spend plan, financial points of contact, breakdown of the distribution of funds, as well as track and report monthly project obligation and expenditure rates to the RDT&E Program Director.

g. Brief proposed projects, as requested by RDT&E Program Director.

h. Ensure the principles and operational parameters of the DOD Scientific and Technical Information Program are adhered to by verifying external projects document all results, regardless of outcome, per DODI 3200.12 and DOD Manual 3200.14, Vol. 1. Internal projects shall submit final results to the RDT&E Program Director for documentation.

i. To help ensure funds are distributed in a timely manner, verify all Military Interdepartmental Purchase Request information required by the receiving organization has been passed to the TCJ8 representative.

j. See Enclosure G for expanded PC responsibilities.

14. Office of Research and Technology Applications (TCJ5-SC) will maintain a liaison with the RDT&E office to ensure efforts are coordinated and de-conflicted. This is especially important in producing technologies which can be spun off to commercial use.

Enclosure B
RDT&E Process

1. Annually the command solicits proposals to address JDDE technical challenges. The process (see Figure 2) begins with a review by government JDDE partners of the current gaps/challenges. Once validated, this revised list serves as the basis for the solicitation from government agencies for solutions.

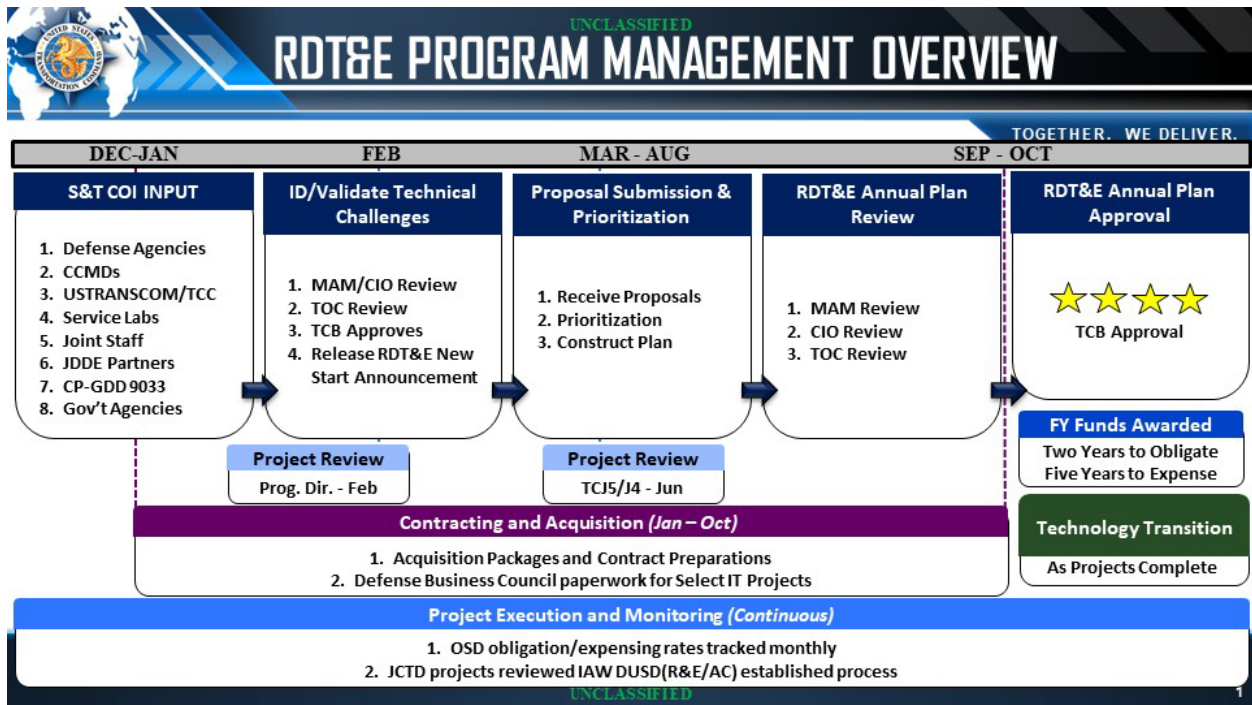


Figure 2 – RDT& E Program Management Timeline

2. The proposed plan is also vetted via the governance process, to ensure the development of joint solutions, provide an additional check to avoid duplication of Service RDT&E initiatives, and to garner concurrence with proposed technology transition strategy.

3. The Corporate Governance approved plan is returned to the RDT&E Program Director who ensures:

a. Projects are properly documented within existing DOD RDT&E documents as well as the budget as deemed by Under Secretary of Defense (Research & Engineering).

b. Formal project reviews are conducted several times per year, in accordance with USTCI 90-6, (projected USTCI 5801.03). These reviews assess project deliverables, spend plan rates, transition strategies, compliance with the technology roadmap (for IT-related efforts) and the expected benefit/return

on investment to ensure viability/suitability for continued funding support. The June and July reviews assess the validity of the next year spend plan to include proposed New Start efforts. Accordingly, support for New Starts and Joint Capability Technology Demonstrations are also presented according to USTCI 90-6, (projected USTCI 5801.03), to ensure visibility prior to incorporation into the August Budget Estimate Submission.

Enclosure C
USTRANSCOM RDT&E Two-Phase Project Selection
Process Formats and Content for Proposals

1. The likelihood of a submission's success will be increased by clearly demonstrating that the capability to be researched/developed covers an important need; the proposer understands the JDDE domain and its challenges; the technical, programmatic, integration, and sustainment challenges of the proposed capability can demonstrate a benefit and/or positive return on investment (ROI) for the effort; there is an experienced/skilled team of researchers who will be assigned to do the developmental work. **Note:** USTRANSCOM's RDT&E Program is not a source selection process. The RDT&E Program solicits only Government agencies for proposals. Although many proposals are developed with an industry or academic partner, USTRANSCOM does not accept vendor specified proposals, or proposals with vendor specific markings (i.e., Copyright XXX Inc., XXX Inc. Propriety, XXX Inc. Logo). The selection of a non-USTRANSCOM submitted project for funding is USTRANSCOM's sole role as a stakeholder in the execution of the project. The submitting agency is responsible for adhering to all contracting regulations and assigning an individual to serve as the Project Manager.

2. Phase I – White Paper. Phase I requires submittal of a “white paper.” White papers are no more than four pages in length with an optional appendix and are intended to preclude unwarranted effort on the part of a proposer whose proposed work is not of interest to USTRANSCOM. The white paper should summarize the full proposal and demonstrate succinctly that the concept is worthy of additional consideration for funding by the government.

a. The white paper must be formatted as stated below. Submittal shall be in Times New Roman font of at least 12 points printed in portrait format. Lines may be single-spaced, though double-spaced is preferred. Pages shall include a 1-inch margin at top, bottom, and both sides. A footer within the 1-inch bottom margin containing page number, submittal title, proposer's organization, and appropriate classification or proprietary notice shall be included and must be in least 8-point Times New Roman font. The cover page and optional two-page appendix are not included in the 4-page limitation.

1) Section A: Cover Page (not included in 4-page limit). Include title of proposed project and acronym/short title, if appropriate; period of performance; estimated total cost and cost per year of performance; technical and contracting points of contact, phone, fax, e-mail, date, company or agency name, and address; and notice of intellectual property content, security level, and other necessary markings; plus, illustrations or logos as chosen by the proposer. This cover page itself should not contain proprietary or otherwise sensitive information.

2) Section B: Project Description.

- a) Describe what the RDT&E project will deliver. Acronyms spelled out on the cover page do not have to be repeated, but all other acronyms should be spelled out at first use.
- b) Describe need being addressed/capability to be researched to demonstrate the proposer knows the domain and its challenges. Cite pertinent formal requirements documentation if it exists. Identify any past/current/programmed development effort, not limited to USTRANSCOM funded efforts, with which the submitted project may have some level of complimentary or duplicative areas of research or deliverable. USTRANSCOM projects may be found at <https://www.ustranscom.mil/cmd/associated/rdte/index.cfm> under the Ongoing Projects and Capabilities tabs. If applicable/appropriate, describe the extent that cyber security will be addressed.
- c) Describe the maturity of the technology, including Technology Readiness Levels (TRLs) at project startup and intended TRL at conclusion of the described RDT&E effort to describe the scope of the research effort and its maturity at the end of the project.
- d) Describe the anticipated benefit/ROI for implementing the proposed capability. Although a quantitative ROI is not mandatory in Phase I, an objective ROI is more compelling than a subjective one. A quantified ROI should be calculated without excessive assumptions prior to the RDT&E effort. If selected for a Phase II submission, anticipated benefit/ROI will need to be detailed as described in the Phase II format below. Provide documented analysis for ROI as required.
- e) List the science/engineering/supply chain or other principles which demonstrate the proposal has technical merit and is likely to be able to solve the problem being addressed.
- f) List the performance metrics by which the RDT&E effort will be measured. This demonstrates the proposer comprehends the factors which dictate success for the effort.
- g) Describe instances where the technical approach has been used in industry or other non-DOD organizations.
- h) List the systems, corporate services, and/or programs with which this capability may be integrated, along with corresponding interfaces. State if there is already commitment by the Program Management Office of the Programs/Systems of Record (P/SOR) to incorporate the capability, once fully developed. This demonstrates a transition destination has been considered.
- i) List the numbers and experience of the designated researchers or other individuals who will perform this work and the location(s) where work will be done. This demonstrates the likelihood and level of expertise that will be applied. List the projects completed previously by the assigned researchers, providing telephone and organizational points of contact for the user of the capability.

j) List major deliverables of the project (mid-term or final reports, prototypes, analysis, etc.), a high-level schedule which includes these deliverables, and the funding proposed for each phase of the effort (including by each fiscal year of the project's span). This demonstrates the proposer's technical/programmatic planning capabilities and understanding of the scope of the effort required.

3) Appendix (not included in 4-page limit). The proposer may include a 2-page appendix, not included in the body page count, consisting of a diagram, photograph, or other visual aid to further describe the proposed RDT&E project and its deliverables, understanding of the domain and the place the technology will have in it, or other illustrative facts. This appendix is meant to be a visual aid or place for tables or lists, and not additional room for the text of the proposal.

3. Phase II – Proposal.

a. Phase II requires submittal of a "proposal." This portion of the process is only for successful proposers selected from Phase I. Selected proposers will be requested to submit a definitive technical and cost proposal for USTRANSCOM to evaluate, no longer than fifteen pages. Selection is dependent on the submission of a sound technical and cost proposal and is subject to successful negotiations as well as the availability of funds.

b. This document is only required from proposers who are notified of the government's selection of their Phase I White Papers.

c. The proposal shall be formatted as stated below. Submittal shall be in Times New Roman font of at least 12 points printed in portrait format. Lines may be single-spaced, though double-spaced is preferred. Pages shall include a 1-inch margin at top, bottom, and both sides. A footer within the 1-inch bottom margin containing page number, submittal title, proposer's organization, and appropriate classification shall be included and must be in 8-point Times New Roman font. The cover page and optional appendix are not included in the 15-page limit.

d. Page limits listed in parentheses for the following sections are recommendations, and may be reallocated by the proposer, as necessary.

1) Cover Page. Include title and short title, technical and financial point(s) of contact, phone number(s), email, date, company, or agency name, estimated total cost and cost per year of performance, and notice of intellectual property content, security level, and other necessary markings, plus illustrations or logos as chosen by the proposer. This cover page itself should not contain proprietary or otherwise sensitive information and is not included in the 15-page limit.

2) General Project Summary (1 page):

a) Define the critical USTRANSCOM/Joint Deployment and Distribution Enterprise (JDDE) capabilities which the project addresses.

Describe the current system/interface, capability, or process deficiency the proposal addresses. Explain the operational gap or issue addressed and how the development effort contributes to the solution. List the specific deliverables of the RDT&E effort (for example, analysis, report, prototype, experimental results of demonstration, etc.)

b) Identify the technologies to be explored/developed, the end user, and how the technology will enhance that user's capabilities. Consider including a short mission scenario, vignette, or Operational View (OV-1) illustration.

c) List the IT and/or hardware/platform/vehicle systems/corporate services/interfaces (potential P/SOR) with which the technology may be integrated.

3) Requirements Traceability (1/2 page):

a) Identify the formal requirements from sources to include Joint JDDE Operational/Technical Challenges, program directives, Joint Capabilities Integration and Development System products, or other formal source of requirements (e.g., Joint Warfighting Concept/Joint Concepts for Contested Logistics) for the effort at the Joint or Service level. For USTRANSCOM internal proposals, sources include the Command Strategy Part B and Functional Campaign Plan-Global Deployment & Distribution. Higher priority will be given to those projects that address a Technology Need/Focus Area identified in the annual USTRANSCOM RDT&E Call for Proposals. Proposals should address the applicable Joint Capability Area. Definitions can be found in CJCSI 5123.01I.

b) Alternately, if no formal requirement can be identified (see paragraph 3.d.3)a) above), identify any capability shortfalls from the USTRANSCOM web page <https://www.ustranscom.mil/cmd/associated/rdte/> not included in formal requirements documentation (previous criteria) that this project will address.

c) If no formal requirement exists, clearly describe the capability gap and the vision for closing the capability gap. Cite any pertinent exercises, operational experience, and/or experimentation. Definitions of analysis can be found in CJCSI 5123.01I.

4) Project Suitability (1½ pages):

a) Describe the anticipated results and the manner in which the work will contribute to enhancing joint defense distribution and/or transportation capabilities. Describe why the technology/capability sought is not purely a Service (Title 10) responsibility and, therefore, qualified for joint USTRANSCOM RDT&E funding.

b) Demonstrate why the project is innovative/transformational and, therefore, worthy of joint RDT&E funding and not simply an upgrade or

modernization of an existing capability. Show the TRL at project start and anticipated TRL at project conclusion.

c) Identify any past/current/programmed development effort, not limited to USTRANSCOM funded efforts, with which the submitted project may have some level of complimentary or duplicative areas of research or deliverable. USTRANSCOM projects may be found at <https://www.ustranscom.mil/cmd/associated/rdte/index.cfm> under the Ongoing Projects and Capabilities tabs.

5) If applicable/appropriate, describe the extent that cyber security will be addressed Benefit, Affordability, and Business Case (3 pages):

a) The proposer must document ROI using Enclosure I (to be included in the proposal's appendix, not counted against the 15-page limit), whether quantifiable or not. A quantitative ROI is mandatory, if computable, and is more compelling than a subjective one. Instructions for completing the template are located in Enclosure I (format available at <http://www.transcom.mil/cmd/associated/rdte/>). ROI is calculated within the template as savings/cost avoidance generated by the investment minus the cost of the investment, divided by the cost of the investment.

(1) $ROI = (\text{Savings and/or Cost Avoidance} - \text{Investment}) / \text{Investment}$.

(2) The template is intended to complement the proposal. Where appropriate, the proposal should refer the evaluator to the template for additional information and vice versa.

(3) Cost savings (e.g., replacing a manual operation performed by contractor personnel with a less expensive automated system) is a reduction to an approved program funding line that can be quantified, reallocated, and/or removed from the budget/Program Objective Memorandum and tracked. Whereas cost avoidance (e.g., overtime pay due to increased workload from inefficient processes or equipment) is a benefit from actions that reduce or eliminate the need for an increase in manpower or cost if present management practices continue. For projects of lower technological maturity or in the early stages of development, ROI/affordability can be based on broader assumptions, non-quantifiable benefits (also called qualitative benefits), and less-stringent criteria than would be expected for a go/no-go acquisition decision--as long as these assumptions are stated clearly. Non-quantifiable benefits (e.g., improve mission planning synchronization) cannot be quantifiably measured and are usually subjective in nature. Non-monetary quantifiable benefits can be measured quantifiably (e.g., reduction in military overtime man-hours). Characteristics such as product or service performance (miles/hour, orders/hour) or work environment (average noise level, mishaps/week) can sometimes be quantified in non-monetary terms. In such cases, non-monetary costs and benefits should be quantified to the greatest extent possible, and direct comparisons among these measures across

alternatives should be made. Where affordability of the fielded capability is tentatively projected at the outset, the research plan should explicitly contain activities to refine these measures and refresh the estimates at project completion. A business case for use should be described.

b) Sources and Assumptions. Document sources and assumptions associated with tangible/intangible costs/benefits for the project which affect (or make possible) the calculation of ROI and affordability. The sources and derivation of the costs/benefits must be documented and should include all interim calculations as appropriate. Source documentation (calculations, technical reports, similar RDT&E efforts, etc.) should be attached or referenced in the ROI template in the designated column.

c) Analysis of Alternatives. Describe why this RDT&E effort is preferable to non-RDT&E approaches; list other courses of action (including non-materiel solutions) considered and why they are not recommended. Other courses of action must address potential solutions based on doctrine, organization, training, materiel, leadership, personnel, facilities, & policy.

d) Business Case for Implementation/ROI. If possible, quantitatively estimate the cost to implement the proposed capability (life cycle cost including RDT&E, development/test, procurement, and sustainment) and life cycle ROI. Describe any existing systems/interfaces which may be retired, or personnel support, which may be reduced (and thus operating costs saved) by use of the technology. Also, describe estimating methods or data sources which were used, and how they contributed to the credibility of the cost estimate.

e) Applicability to Industry Practices and Partnerships. Describe, if possible, instances where the proposed technical approach has been used by industry (e.g., best, or innovative practices) and how the capability, if developed and fielded in the JDDE, may assist DOD in working more economically or seamlessly with its commercial and other supply chain partners.

6) Technical Merit and Maturity (4 pages):

a) Describe the technologies to be developed, their risks for fielding, and methods of better understanding or reducing those risks during RDT&E.

b) State the assessment of experts regarding technical merit of the approach. Is the approach based on sound scientific/engineering principles likely to succeed in achieving stated capabilities? What are the qualifications of the experts who make that judgment?

7) Programmatic (4 pages):

a) Cost, schedule, and performance are interrelated. This section is meant to show the schedule of activities for the RDT&E effort with

accompanying funding requirements for each segment of the project and its deliverables. See Paragraph 9, for references.

b) Provide a detailed schedule, with start and end dates for major activities, appropriate decision point milestones, and completion dates for deliverables such as studies, prototypes, and other outputs of the research, for the entire project. Show links to other development efforts and to P/SOR to illustrate transition paths. If a project has already started, include any activities already completed. Include activities that support transition to further development, demonstration, or acquisition, as appropriate.

c) Describe prior expended and requested funding for the RDT&E effort in then-year thousands. Include an estimate/rough order of magnitude for follow-on development, production, transition (for Transportation Working Capital Fund POR IT efforts) and sustainment costs. It is important in all life cycle phases (see Figure 3.) to plan for Information Assurance security, vulnerability management, patching, and hardware/software life cycle support management. Interoperability and negative security impact are also key considerations factors impacting every project’s funding life cycle. Revised transition costs shall be updated within the Technology Transition Strategy one year after project execution commences. Figure 3 is the required format.

\$K, then-year	FYXX	FYXX	FYXX	FYXX	FYXX	FYXX	FYXX
Prior funding source (name)							
Requested USTRANSCOM R&D							
Estimated additional R&D							
Estimated development/test							
Estimated production/fielding							
Estimated transition*							
Estimated sustainment*							

* Required for all Transportation Working Capital Fund POR IT efforts

Figure 3 – Required Format – Life cycle Funding Estimates

d) List the partner organizations which will collaborate throughout the project’s execution.

e) List similar prior RDT&E work performed for DOD, USTRANSCOM, or other government agencies.

f) Describe performance metrics (see Figure 4) to be used during conduct of the research and development effort. (The RDT&E program is also required to report these metrics on each project in annual DOD-required budget documents). These metrics should be quantitative if at all possible or qualitative only by exception and should be measurable at milestones during the course of the research with enough confidence to determine suitability for further research and development work and/or transition to additional development or even to the user. Describe the performance thresholds and/or

exit criteria for each phase and the end of the project, and TRLs at the beginning and conclusion of the RDT&E effort.

Metric Name	Description (and units)	Purpose of Metric (Decision supported)	Phase in Program Used	Minimum Acceptable (Threshold)	Desired Value(Objective)

Figure 4 – Recommended Format – Performance Metrics

8) Technology Transition Strategy (1 page): Ensure Transition Strategy complies with Enclosure H.

9) Appendix (5 pages). The proposer may include a 5-page diagram, appendix, photograph, or other visual aid, not included in the body page count, to further demonstrate the proposed RDT&E project and its deliverables, demonstrate understanding of the domain and the place the technology will have in it, or other illustrative facts. The USTRANSCOM ROI template Enclosure I should be included in this appendix as well as the Project Quad Chart, which will be provided by TCJ5J4, upon Phase II selection.

Enclosure D
Definitions of RDT&E Areas

1. 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.
2. 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.
3. Advanced Technology Development (BA3). This activity includes development of subsystems and components efforts to integrate subsystems and components into system prototypes/interfaces for field experiments and/or tests. Advanced Technology Development includes concept and technology demonstrations of components and subsystems or system models. Models may be form, fit, and function prototypes or scaled models that serve the same demonstration purpose. The results of this type of effort are proof of technological feasibility and assessment of subsystem and component operability and productivity rather than the development of hardware for Service use. Projects in this category have a direct relevance to identified military needs. Advanced Technology Development demonstrates the general military utility or cost reduction potential of technology. Projects in this category involve pre-Milestone B efforts, such as system concept demonstration, joint and Service- specific experiments, or technology demonstrations, and generally have Technology Readiness Levels of 4, 5 or 6. Projects in this category do not necessarily lead to subsequent development or procurement phases, but should have the goal of moving out of Science and Technology and into the acquisition process within the future year defense program. Upon successful completion of projects that have military utility, the technology should be available for transition.
4. Advanced Component Development and Prototypes (BA4). Efforts necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment are funded in this budget activity. The Advanced Component Development and Prototypes phase includes system specific efforts that help expedite technology transition from the laboratory to operational use. Emphasis is on proving component and subsystem maturity prior to integration in major and complex systems and may involve risk reduction initiatives. Program elements in this category involve efforts prior to Milestone B and are referred to as advanced component development activities and include technology demonstrations. Completion of Technology Readiness Levels 6 and 7 should be achieved for major programs. Program control is exercised at the program and project level. A logical progression of program phases and development and/or production funding must be evident in the future year defense program.

5. System Development and Demonstration (BA5). Includes those projects in engineering and manufacturing development for Service use but which have not received approval for full rate production.
6. RDT&E Management Support (BA6). Includes RDT&E efforts directed toward support of installation or operations required for general RDT&E 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 RDT&E program.
7. Operational System Development (BA7). Includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year. All items are major line-item projects that appear as RDT&E Costs of Weapon System Elements in other programs. Program control is exercised by review of individual projects. Programs in this category involve systems that have received approval for Low-Rate Initial Production. A logical progression of program phases and development and production funding must be evident in the Future Years Defense Program, consistent with the Department's full funding policy.
8. Software and Digital Technology Pilot Program (BA8). Exists within the RDT&E account and is intended to evaluate the effectiveness of a single appropriation for 'Software and Digital Technology' that encompasses development, implementation, fielding and sustainment.

Enclosure E
Technology Readiness Levels (TRLs)

1. Most likely exit TRLs for USTRANSCOM RDT&E funding are TRLs 6 and 7. On occasion, USTRANSCOM may seek a reprogramming of funds for TRL 4 and 5 work that will not deliver a prototype.
2. Lower TRL entry levels suggest follow-on efforts will be additional laboratory work to mature the technology.
3. Higher TRL entry levels suggest follow-on work will be in system program offices for integration, test, and operational qualification.
4. Highest likely exit TRL for USTRANSCOM RDT&E funding is TRL 7. Work beyond TRL 7 generally falls in system program offices.
5. TRL Levels Defined: (From U.S. Government Accountability Office, NSIAD-99-162, Best Practices: Better Management of Technology Can Improve Weapon System Outcomes, Appendix I, Technology Readiness Levels and Their Definitions)
 - a. TRL 1. Basic principles observed and reported. 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. TRL 2. Technology concept and/or application formulated. Invention begins. Once basic principles are observed, practical applications can be invented. The application is speculative, and there is no proof or detailed analysis to support the assumption. Examples are still limited to paper studies.
 - c. TRL 3. Analytical and experimental critical function and/or characteristic proof of concept. Active research and development are 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.
 - d. TRL 4. Component and/or breadboard validation in laboratory environment. Basic technological components are integrated to establish that the pieces will work together. This is relatively "low fidelity" compared to the eventual system. Examples include integration of "ad hoc" hardware in a laboratory.
 - e. TRL 5. Component and/or breadboard validation in relevant environment. Fidelity of breadboard technology increases significantly. The basic technological components are integrated with reasonably realistic supporting elements so that the technology can be tested in a simulated environment. Examples include "high fidelity" laboratory integration of components.

f. TRL 6. System/subsystem model or prototype demonstration in a relevant environment. Representative model or prototype system, which is well beyond the breadboard prototype evaluated as 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 a simulated operational environment.

g. TRL 7. System prototype demonstration in an operational environment. Prototype near or at planned operational system. Represents a major step up from TRL 6, requiring the demonstration of an actual system prototype in an operational environment such as an aircraft, vehicle, or space. Examples include testing the prototype in structured or actual field use.

h. TRL 8. Actual system completed and operationally qualified through test and demonstration. 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.

i. TRL 9. Actual system, proven through successful mission operations. Actual application of the technology in its final form and under mission conditions, such as those encountered in test and evaluation. Examples include using the system under operational mission conditions.

6. DOD Software TRLs: (From U.S. Government Accountability Office, GAO-16-410G, Technology Readiness Assessment Guide: Best Practices for Evaluating the Readiness of Technology for Use in Acquisition Programs and Projects)

a. TRL 1. Lowest level of software technology readiness. The basic research community is investigating a new domain. This level extends to the development of basic use, basic properties of software architecture, mathematical formulations, and general algorithms.

b. TRL 2. 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 using synthetic data.

c. TRL 3. Active R&D is initiated. The level at which scientific feasibility is demonstrated through analytical and laboratory studies. This level extends to the development of limited functionality environments to validate critical properties and analytical predictions using non-integrated software components and partially representative data.

d. TRL 4. Basic software components are integrated to establish that they will work together. They are relatively primitive with regard to efficiency and robustness compared with the eventual system. Architecture development initiated to include interoperability, reliability, maintainability, extensibility,

scalability, and security issues. Emulation with current/legacy element as appropriate. Prototypes developed to demonstrate different aspects of eventual system.

e. TRL 5. Level at which software technology is ready to start integration with existing systems. The prototype implementations conform to target environment/interfaces. Experiments with realistic problems. Simulated interfaces to existing systems. System software architecture established. Algorithms run on a processor(s) with characteristics expected in the operational environment.

f. TRL 6. Level at which the engineering feasibility of a software technology is demonstrated. This level extends to laboratory prototype implementations on full-scale realistic problems in which the software technology is partially integrated with existing hardware/software systems.

g. TRL 7. Level at which the program feasibility or a software technology is demonstrated. This level extends to operational environment prototype implementations, where critical technical risk functionality is available for demonstration and a test in which the software technology is well integrated with operational hardware/software systems.

h. TRL 8. Level at which a software technology is fully integrated with operational hardware and software systems. Software development documentation is complete. All functionality tested in simulated and operational scenarios.

i. TRL 9. Level at which a software technology is readily repeatable and reusable. The software based on the technology is fully integrated with operational hardware/software systems. All software documentation verified. Successful operational experience. Sustaining software engineering support in place. Actual system.

Enclosure F
Integrated Product and Process Development (IPPD)

1. Overview. IPPD is a management technique that simultaneously integrates all essential development and acquisition activities through the use of multi-disciplinary teams to optimize the design, manufacturing, business, and supportability processes. Its ultimate goal is to provide the warfighters with world-class equipment and systems, products, and corporate services at an affordable cost on a schedule responsive to the need.
2. Definition. IPPD is a management technique that simultaneously integrates all essential acquisition activities using multidisciplinary teams to optimize the design, manufacturing, and support-ability processes. IPPD facilitates meeting cost and performance objectives from product concept through production, including field support. IPPD activities focus on meeting needs. Accurately understanding the users' needs and establishing realistic requirements early allows trade-off analyses to be made among design, performance, production, support, cost, and operational needs to optimize the acquisition over its life cycle, making cost an independent rather than dependent variable.
3. Implementation. IPPD requires a disciplined approach that includes five general activities: understanding the requirements, outlining the approach, planning the effort, allocating resources, and executing and tracking the plan. A disciplined approach provides a framework for using tools, teams, and processes in a structured manner that is responsive to systematic improvements. Tools in this IPPD process include documents, information systems, methods, and technologies that can be fit into a generic shared framework that focuses on planning, executing, and tracking. Teams are made up of everyone who has a stake in the outcome. Processes are those activities that lead to both end product and associated processes and include capabilities-based analysis and configuration management. Processes should be developed concurrently with the technologies they are producing/products they support. Life cycle planning for a product and its processes begins in the science and technology phase. Integrated Product Teams (IPT) are essential to the IPPD process.
4. IPT. Members of an IPT represent technical, manufacturing, operational, and support functions of the organizations that are critical to the development, transition, and long-term product sustainment. Chartering is an excellent way for the team to understand its roles and responsibilities. Applying the IPPD management philosophy can result in significant benefits with primary benefits being reduced cost/schedule/risk and improved quality.
5. The RDT&E IPPD Process.
 - a. Implementing the IPPD Process. The basic functions associated with implementing the IPPD principles are shown in the process diagram (Figure 5.)

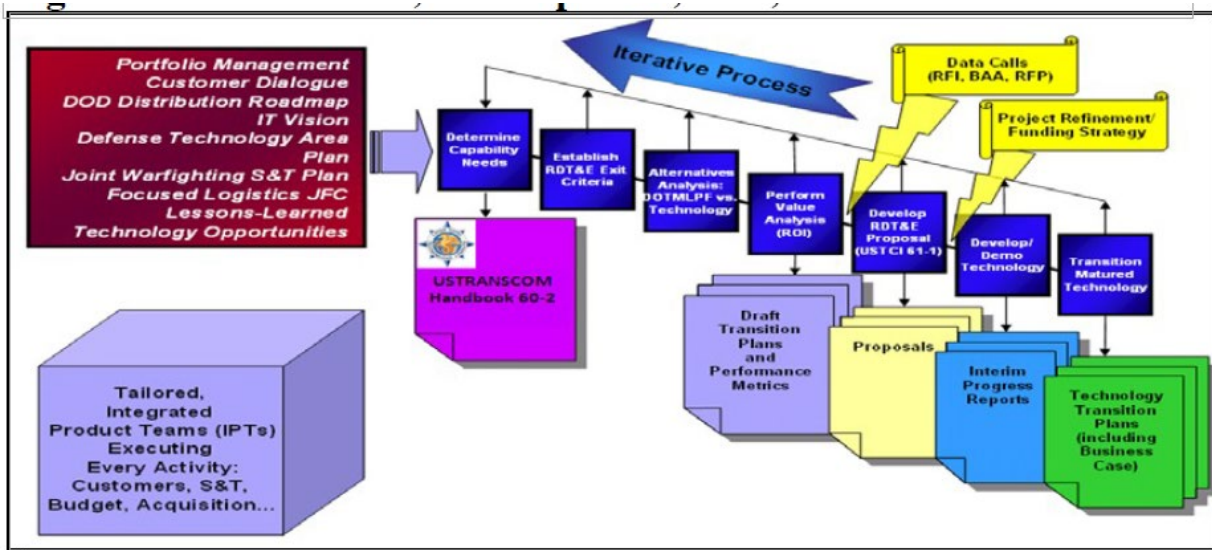


Figure 5 – RDT&E IPPD

b. Determine Capability Needs. The process begins with the IPT defining requirements. This should be done with the participation of all stakeholders (i.e., RDT&E personnel, users, finance, acquisition, and others). A successful IPT achieves the benefit of reduced cost and schedule while maintaining, and often increasing, the quality of the technology being pursued. Appropriate metrics must be established to monitor and adjust the overall strategy/plan to ensure transition able technologies meet the warfighter’s stated need.

c. Exit Criteria. RDT&E exit criteria are the thresholds and objectives (i.e., the must have versus the nice to have) associated with the product’s quantifiable metrics (the measures). They are used to estimate future cost, track technical progress, and ultimately characterize the affordability of new technologies.

d. Technology Alternatives. This activity addresses the issue of defining Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, and Facilities-Policy alternative/complementary solutions/futuristic technology alternatives which represent various technology configurations, solutions, systems/interface sub-systems, and/or corporate services that can be developed and combined to satisfy the exit criteria.

e. Perform Value Analysis. This activity leads to the decision as to whether or not the command should invest in a given RDT&E venture based on the anticipated ROI, which includes the extent to which the technology provides the desired capability enhancement within a certain timeframe balanced against its associated cost benefits.

f. Proposal Submission. This activity involves the preparation and submission of a research and development proposal. Submission format, as

well as project selection criteria and details regarding project selection process, are outlined throughout this instruction.

g. Technology Development/Demonstration. This RDT&E IPPD activity is the technology development and demonstration effort itself. During this phase, the methods and estimates were used in the preliminary analysis are revisited. Impact analysis reveals the overall impact on system performance, producibility, and cost that may result from changing objectives and thresholds. Stakeholder involvement in this phase is crucial to ensure the delivery of the desired capability.

h. Technology Delivery. This activity addresses the analysis and transitioning of project results. This analysis is captured in the business case portion of the Technology Transition Strategy. The Technology Transition Strategy serves as a transition document detailing performance, producibility, and life cycle cost issues, and discussing the overall affordability of the technology in terms of the extent to which it satisfies the exit criteria. The results of the effort are cast in terms of the warfighter's language and perspective. Transition of successfully demonstrated research funded capabilities is dependent on the Project Coordinator working with the identified Program Manager to incorporate the new technologies into the system design and/or allowing for its future incorporation through spiral development.

Enclosure G

Responsibilities of USTRANSCOM RDT&E Project Coordinators (PCs)

1. Introduction.

a. PCs of USTRANSCOM RDT&E projects act as facilitators for the needs of the researchers, as conduits for information between researchers, users, higher headquarters, functional offices (principally budget), and as transition agents (Programs/Systems of Record (P/SOR)). As stewards for highly competitive resources, PCs must ensure requirements are understood, projects are carefully scoped and adequately resourced, and every opportunity is taken for successful transition to further development or fielding. Along the way, regular reporting, close liaison with technical development lead, and teamwork with finance (TCJ8), legal (TCJA), and the USTRANSCOM RDT&E Team (TCJ5-SC) are essential.

b. PCs ensure technology developers have access to appropriate DOD information needed to advance the effort toward its goals. PCs should always be on the lookout for problems involving accomplishment of goals and funds expenditure to give the maximum amount of notice so a workaround can be executed.

2. The USTRANSCOM RDT&E Team, finance (TCJ8), acquisition (TCAQ), and legal (TCJA) experts will assist with specialized knowledge, but the responsibility for accomplishment lies first with the designated PC. The following items describe expectations for PCs of USTRANSCOM RDT&E funded projects:

a. Comprehend purpose and goals of the RDT&E project and the context for transitioning it.

1) PCs must understand and be able to articulate why the project exists (based on user requirements as well as innovation opportunities). In-depth understanding of requirements means that when difficulties are encountered, the PC is able to consider what is important, what can be put aside and how to re-engineer the project without completely losing its utility.

2) If RDT&E is conducted, it means the exact technique or approach to fulfill the need is not fully determined. The PC needs to have a clear picture of why the RDT&E, in other words the investigation, is necessary. Have other non-developmental alternatives been exhausted? It should be clear why RDT&E was called for versus a procedural change or merely an acquisition (bolt-on or upgrade of existing systems/interfaces) effort. This takes collaboration with technical experts as well as users who understand the system into which the technology will be introduced.

3) The PC should understand, through consultation with experts in the field, why the technical approach is valid. Since USTRANSCOM RDT&E

projects typically fall in the applied technology or advanced development area, the validity of the science behind the approach should be clear.

4) The PC needs to understand what the fundamental challenges and risks are for the project. Is technology the major impediment, or is integration with existing systems/interfaces riskier? Perhaps culture or business rules or laws/regulations are more challenging or costly to overcome than the new technology. As a practical example, existing techniques and business rules often are not documented or are not standardized across the enterprise, making it difficult for developers to easily understand the environment and its limitations in which the new technology must operate.

5) Further, the PC will need to understand how the capability fits into the larger operational picture--how is it proposed to be integrated into existing systems/interfaces, what does it need from them, and what must it supply to them? This step also requires the PC to understand whatever formal requirements, vision documents, or other sources of need can be cited to justify the program's existence.

6) The PC will need to understand the intended end-state of the research effort; what knowledge is intended to be gained? What deliverables (measured by accomplishment of exit criteria) are to be accomplished? Will the outcome be a new body of knowledge needing further scale-up or will a prototype be tested and qualified for operational use? What constitutes success in either of these outcomes?

7) In the case of more fundamental research, some of the details of integration may be unanswerable until the basic feasibility of the approach has been determined, but even then, there must be a rationale for pursuing a promising technology at the outset.

8) The PC must work closely with the TCJ6 cybersecurity contact to ensure the requisite level of cyber requirements are appropriately scheduled, adequately funded, and incorporated into the project throughout its life cycle, minimizing risk/failure, to deliver on time and within budget into a successful transition.

b. Facilitate project accomplishment.

1) Close collaboration with the technical (e.g., laboratory, academia, or industry) manager/engineer or scientist will be necessary. The PC will need a good working relationship with end users, financial analysts, contracting specialists, researchers, and testers to ensure all disciplines are properly harnessed for progress. The RDT&E Team will assist in making connections between agencies.

2) The PC assists the technical developers in obtaining the information required for full understanding of the need, including understanding the operational environment in which the capability must work. This implies engaging the right subject matter experts. Typical activities

include providing access to operational environments or command and control databases to allow analysis and development to proceed; processing visit requests and hosting visitors to observe operations; and collaborating with budget, contracting, or legal offices to clear any hurdles to progress.

3) If the project encounters a lack of resources (funding, time, materials, test assets, etc.), the PC will need to assist in obtaining the missing elements. Where resources or other missing elements will significantly impede progress according to earlier plans, the PC must notify their USTRANSCOM RDT&E Team counterpart (i.e., Project Monitor) and/or the Program Director early enough to allow re-scoping the project before a show stopping event occurs.

4) By consultation with finance/budget offices (TCJ8), PCs must ensure the integrity of funding by keeping RDT&E funds reserved for appropriate use (e.g., development, not maintenance or procurement) and avoiding obligation of funds in inappropriate fiscal years (avoiding forward financing, etc.).

5) PCs must also ensure that all projects must be funded in accordance with the Anti-Deficiency Act and other legal requirements.

6) PCs must maintain proper standards in protection of classified, Controlled Unclassified Information, Source Selection Sensitive, contractor proprietary, U.S. Only, and other controlled information. When information improperly crosses these boundaries, the entire project may be threatened (as well as the whole RDT&E program and even the PC's performance assessments). Good stewardship of sensitive information, regardless of its source, and as required by law is crucial.

7) PCs working USTRANSCOM IT projects will ensure the project complies with USTRANSCOM's architecture requirements as part of the transition strategy.

8) USTRANSCOM IT PCs must be knowledgeable of the interoperability IT Standards listed in DOD IT Standards Registry and the USTRANSCOM-unique IT Standards Registry located on the USTRANSCOM IT Standards Intelshare site. The PC must ensure emerging and mandated IT standards from these two registries are used whenever an IT capability is part for the RDT&E project.

9) The PC is responsible to work with the Project Manager, and others associated with the project, until the project is terminated, transitioned, or completed as described in the project proposal. If a contract vehicle is used, once the Period of Performance ends and the contract is complete, the PC will work with TCJ8 and TCAQ to deobligate any unexpended funds. The Contracting Officer's Representative, or other appropriate person, will notify the contract specialist/contracting officer that deobligation is required on any remaining funds.

c. Track and report progress.

1) The PC monitors and reports on accomplishment in cost, schedule, and technical performance terms. Format for regular reporting will be provided by the USTRANSCOM RDT&E Team. The PC is accountable to ensure project goals, as agreed to at project initiation, are well-defined and have a strong potential to be accomplished. During execution, goals must be held constant. This entails not losing focus by straying into additional un-scoped work (“gold plating”) or by dropping or changing goals without coordination with USTRANSCOM RDT&E Team members, users, and the P/SOR. The PC, for projects accomplished by organizations other than Service labs or via a USTRANSCOM contract, shall obtain a copy of the contract that work will be accomplished against to track progress.

2) USTRANSCOM requires, at a minimum, the reports listed below (examples are provided on the RDT&E website accessible from the USTRANSCOM public page <https://www.ustranscom.mil/cmd/associated/rdte/>). PCs also receive the report formats during their initial training session. Formats for the February and June project reviews will be sent to the PC no later than 30 days prior to the scheduled review. Additional reports may also be needed due to unforeseen audits and other reporting requirements. Semi-annual reviews are conducted for ongoing RDT&E IT efforts to enhance stakeholder knowledge and support future transition planning.

a) A February mid-year project review (include status of transition planning) to the RDT&E Program Director (annually).

b) A June annual project review (include status of transition planning) chaired by the Deputy Director, Strategic Plans, Policy, and Logistics Directorate (TCJ5/4-D) (annually).

c) Technology Transition Strategy for IT-related USTRANSCOM enterprise capabilities.

d) Final report that documents projects impact on the Warfighter/user (to include Return on Investment/Transition).

3) The PC should remain sufficiently aware of the effort’s progress to allow anticipation of problems while they still can be addressed without threatening the project. For example, if objectives of the project prove to be infeasible or funding cannot be expensed to reach minimum goals, the PC must notify the RDT&E Team before funds are lost or opportunities to re-scope the effort are no longer possible. This situational awareness will require a close and frequent collaboration between the PC and the technical project manager(s). In short, expectations must be set and adhered to.

4) Metrics (including Performance Metrics) sufficient to gauge progress should be agreed to at project initiation and monitored by the PC throughout the project’s life.

5) If the PC encounters a situation requiring additional expertise not already available and beyond the PC's ability to fix, the USTRANSCOM RDT&E Team should be contacted immediately to seek additional assistance, to allow project re-scoping, or to provide other support to get the effort back on track.

d. Assist in technology transition.

1) Transition occurs when new technologies are developed and co-exist with old technologies before supplanting them. Without a transition strategy, research is purely an academic activity. While not all transition elements may be known at the outset, a destination P/SOR should be targeted to incorporate and sustain the new capability. Each IT project transitioning to a USTRANSCOM P/SOR must include a Technology Transition Strategy that follows the transition guidance identified in Enclosure H.

2) With DOD's vastly complex and interconnected capabilities, early transition and integration planning are critical to project success. Discussions on transition need to first take place with the P/SOR when the project is proposed. The P/SOR must agree to consider integration during early development and will need to be "on board" as the formal P/SOR before development ends if transition is to be successful. Simply put, progress toward integration goals must be constantly monitored so the new technology has somewhere to live after the development is completed. **Note:** Projects/IT capabilities/Software Applications transitioning to a P/SOR must be assessed for cybersecurity impact and complete any required/further certification and accreditation activities.

3) Typical activities will include liaison with the intended P/SOR, refinement of goals if transition/integration encounters difficulty, and briefings to decision-making bodies.

4) PCs may be asked to advocate transition funding via authoring documentation for DOD's Technology Transition Initiative or other "bridging the gap" funds. PCs must effectively use technology transfer tools, where applicable, to support the capabilities and opportunities represented by their projects.

5) PCs will work with the architecture, engineering, test and/or experimentation communities to plan for and actually exercise the technology in the appropriate environment prior to hand-off to the next phase of development or, in the case of very mature technology, to actual fielding.

6) Ensure the principles and operational parameters of the DOD Scientific and Technical Information Program are adhered to by verifying that external projects document all results, regardless of outcome, per DODI 3200.12 and DOD Manual 3200.14 Volume 1. Internal projects shall submit final results to the RDT&E Program Director for documentation.

Enclosure H

Minimum Requirements for Developing a Technology Transition Strategy for Projects Transitioning to a USTRANSCOM Program/System of Record

1. For each RDT&E project transitioning to a USTRANSCOM Program of Record, the Project Coordinator shall provide the RDT&E Program Director, within one year after commencement of the developmental effort, a Technology Transition Strategy. Other projects only need to identify the Program/System of Record for transition.
2. The appropriate Sub-MAM will review these strategies, TCJ8, TCJ6, TCAQ, and TCJA. The Technology Transition Strategy must contain, at a minimum, the below/following information.
 - a. Management Summary: Identify stakeholders and associated roles and responsibilities.
 - b. Capabilities Summary: Describe developmental capabilities and the expected long-term benefits (financial and non-financial) of the transitioned effort.
 - c. Overall Transition Strategy: Describe envisioned transition strategy. This strategy will evolve over the period of the contract/effort. Transition strategy must identify short- and long- term strategy to transition the effort once RDT&E funding is complete. Identify a P/SOR for the effort. If not known, identify possible P/SORs and your plan to garner agreement with the applicable Program Manager.
 - d. Schedule: Develop a project schedule that includes all aspects of the effort and shows the transition path at completion.
 - e. Funding: Incorporate a funding profile that lists RDT&E, transition, and sustainment funds. Garner TCJ8 concurrence with color of money (i.e., Transportation Working Capital Fund or Operations & Maintenance). Ensure coordination with appropriate Sub-MAM to ensure budgeting of transition/sustainment funds.
 - f. Risk Management: Develop a risk management plan to address cost risk, schedule risk, cybersecurity risk, and performance risk.
 - g. Intellectual Property: Address intellectual property rights. Vet with TCJA for concurrence.
 - h. Strategy Update: Continually update the transition plan throughout the life of the project. Transition is an ongoing effort and requires attention from the time the project begins until its end. Transition management actions will be reviewed during annual RDT&E Program Director (February) and TCJ5/J4 (June) Project Reviews to ensure transition and cost/benefit of the project are in the Command's best interest.

5. Table 3. Upon completing Table 1A and Table 2, the project ROI will be automatically calculated in Table 3. **Note:** Contact the POCs below if the year referenced in the "Discounting for Net Present Value" section of Table 3 does not reference the current calendar year (e.g., 2018 OMB Circular A-94 Appendix C Real Discount Rate).

Description	Summary by Year (\$)					Total
	Year 1	Year 2	Year 3	Year 4	Year 5	
Benefits/Savings:						
Cost Savings Subtotal:	149,405	149,405	159,005	159,005	159,005	\$ 775,825
Cost Avoidance Subtotal:	0	0	673,590	673,590	673,590	\$ 2,020,770
Annual Total Savings	149,405	149,405	832,595	832,595	832,595	\$ 2,796,595
Cumulative Total Savings	149,405	298,810	1,131,405	1,964,000	2,796,595	
Costs:						
Annual Costs	688,227	571,172	516,924	341,739	341,739	\$ 2,459,801
Cumulative Costs	688,227	1,259,399	1,776,323	2,118,062	2,459,801	
Discounting for Net Present Value						
ROI Period of Analysis:	5					
2016 OMB Circular A-94 Appendix C Real Discount Rate:	-0.6%					
Mid-Year Discount Factor:	1.0030	1.0091	1.0152	1.0213	1.0275	
Net Present Value of Benefits/Savings:						
NPV of Annual Total Savings	149,855	150,760	845,216	850,318	855,451	\$ 2,851,600
NPV of Cumulative Total Savings	149,855	300,615	1,145,831	1,996,149	2,851,600	
Net Present Value of Costs:						
NPV of Annual Costs	690,301	576,351	524,760	349,013	351,120	\$ 2,491,546
NPV of Cumulative Costs	690,301	1,266,652	1,791,412	2,140,426	2,491,546	
Annual Return on Investment:						
NPV of Annual Return on Investment	(540,446)	(425,592)	320,456	501,305	504,331	\$ 360,054
NPV of Cumulative Return on Investment:	(540,446)	(966,037)	(645,581)	(144,276)	360,054	
Annual Return on Investment Ratio	-78.29%	-73.84%	61.07%	143.63%	143.63%	
Cumulative Return on Investment Ratio	-78.29%	-76.27%	-36.04%	-6.74%	14.45%	14.45%

Table 3 – Project Summary (Example)

6. Document Requirements.

a. The sources and derivation of all savings and cost data must be documented in detail and should include assumptions and interim calculations as appropriate. Ensure that this data is included when the proposal is submitted or attach/reference the files in the "Sources & Assumptions" column provided in the ROI template.

b. To attach source documents to the ROI Template: 1) Click inside the cell of the spreadsheet where you want to insert the object. 2) Select the "Insert" tab at the top. Click "Object" in the Text group to open the Object dialog box. 3) Select the "Create from File" tab. Check the "Display as Icon" box. Click the "Browse" button and locate the file you want to attach. Click the file to select it and click the "Insert" button.

c. Ensure assumptions associated with non-monetary quantifiable and non-quantifiable costs that are being made about the project which affect (or make possible) the calculation of ROI and affordability are included in Table 1B.

7. Points of Contact. USTRANSCOM TCJ8-B is the point of contact for this template.

Enclosure J
References

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

DODI 3200.12, "DoD Scientific and Technical Information Program (STIP)"

DODI 4000.19, "Support Agreements"

DODI 5000.75, "Business Systems Requirements and Acquisition"

DOD Manual 3200.14, Volume 1, "Principles and Operational Parameters of the DoD Scientific and Technical Information Program (STIP): General Processes"

DOD Defense Acquisition University, Glossary of Defense Acquisition Acronyms and Terms

CJCSI 5123.01, "Charter of the Joint Requirements Oversight Council (JROC) and Implementation of the Joint Capabilities Integration and Development System"

U.S. Government Accountability Office, NSIAD-99-162, Best Practices: Better Management of Technology Can Improve Weapon System Outcomes, Appendix I, Technology Readiness Levels and Their Definitions

U.S. Government Accountability Office, GAO-16-410G, Technology Readiness Assessment Guide: Best Practices for Evaluating the Readiness of Technology for Use in Acquisition Programs and Projects)

USTRANSCOM Instruction 1600.03, "Policy for Roles and Responsibilities of the United States Transportation Command Staff, Component, Subordinate, and Functional Component Commands"

USTRANSCOM Instruction 90-13, (projected USTCI 3900.01,) "Mission Area Management"

USTRANSCOM Instruction 90-20 (projected USTCI 5100.01,) "Procedures for Command Agreements"

USTRANSCOM Instruction 90-6 (projected USTCI 5801.03,) "Corporate Governance Process"

USTRANSCOM Instruction 7100.01, "Policy for Risk Management and Internal Control (RMIC) Program.""

USTRANSCOM Instruction 63-10, (projected USTCI 7500.04,) "Acquisition Program Lifecycle Management"

USTRANSCOM Instruction 7500.05, "Policy for Acquisition Management"

Glossary
Glossary of Abbreviations, Acronyms and Terms

CJCSI	Chairman of the Joint Chiefs of Staff Instruction
DOD	Department of Defense
DODI	Department of Defense Instruction
IPPD	Integrated Product and Process Development
IPT	Integrated Product Teams
IT	Information Technology
JDDE	Joint Deployment and Distribution Enterprise
MAM	Mission Area Management
NR	New Requirement
P/SOR	Programs/Systems of Record
PC	Project Coordinator
RDT&E	Research, Development, Test and Evaluation
ROI	Return on Investment
TRL	Technology Readiness Levels
USTCI	USTRANSCOM Instruction
USTRANSCOM	United States Transportation Command