



Scientific, Research and Development

RESEARCH, DEVELOPMENT, TEST AND  
EVALUATION (RDT&E) PROGRAM

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This instruction establishes policy and procedures necessary to develop, implement, and manage the Research, Development, Test, and Evaluation (RDT&E) Program for USTRANSCOM. It provides the policy, procedures, systems, and responsibilities that apply to all USTRANSCOM staff, components, subordinates, and functional commands. Recommendations for changes and improvements are invited. Refer recommended changes and questions about this instruction to the office of primary responsibility using AF Form 847, *Recommendation for Change of Publication*. Ensure that all records created as a result of processes prescribed in this instruction are maintained in accordance with USTRANSCOM Instruction 33-32, *USTRANSCOM Records Management Program*. The Transportation Component Commands (TCC) and Joint Enabling Capabilities Command (JECC) are authorized to publish supplements and/or supporting directives (furnish copies to TCJ5-GC).

## SUMMARY OF REVISIONS

The changes in this instruction include: 1) adherence to USTRANSCOMI 65-3, Managers' Internal Control Program, 2) adherence to IT Standards compliance as addressed by DoD Instruction (DoDI) 8301.01 for IT RDT&E, 3) adherence to IT Standards addressed in the DoD IT Standards Registry (DISR) and USTRANSCOM-unique IT Standards Registry for IT RDT&E, 4) inclusion of the requirement for DD Form 1144 (or similar support agreement) as required by DoDI 4000.19, *Support Agreements*, 5) addition of an Estimate of Return on Investment Template, and 6) strengthening collaboration across the RDT&E approval, development and transition/sustainment process.

**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 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 vets requirements with the JDDE and allocates resources via the Corporate Governance Process (CGP), which ensures approved RDT&E proposals and new requirements (NRs) are resourced. This program invests in relevant technologies addressing command & control/optimization/modeling & simulation, end-to-end visibility, cyber, and global access to enhance warfighter support and improve the efficiency and effectiveness of DoD logistics/supply chain operations while reducing costs.

**2.2.** This program addresses capability gaps identified through Joint Concept Development documents, the Joint Capabilities Integration and Development System process, Joint Experimentation, 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.

**2.3.** This program seeks transformational changes in force projection 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 Joint Capability Technology Demonstrations and Advanced Technology Developments. It explores promising technologies to support the rapid projection, sustainment, and reconstitution of force packages in support of our nation's Defense Strategy and identifies customer needs. To assist in this effort, a RDT&E Management Team is established to ensure the development of a fiscally responsible, executable RDT&E plan for approval of 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, in order to minimize program risk.

**2.4.** The program will strive to secure Government interest on all RDT&E funded efforts, where applicable. 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 clauses, Contract Line Item Numbers or Contract Data Requirements Lists, and 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' and 'Government Purpose Rights' are the preferred categories 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 USTRANSCOM Staff Judge Advocate's office prior to awarding the contract or task order.

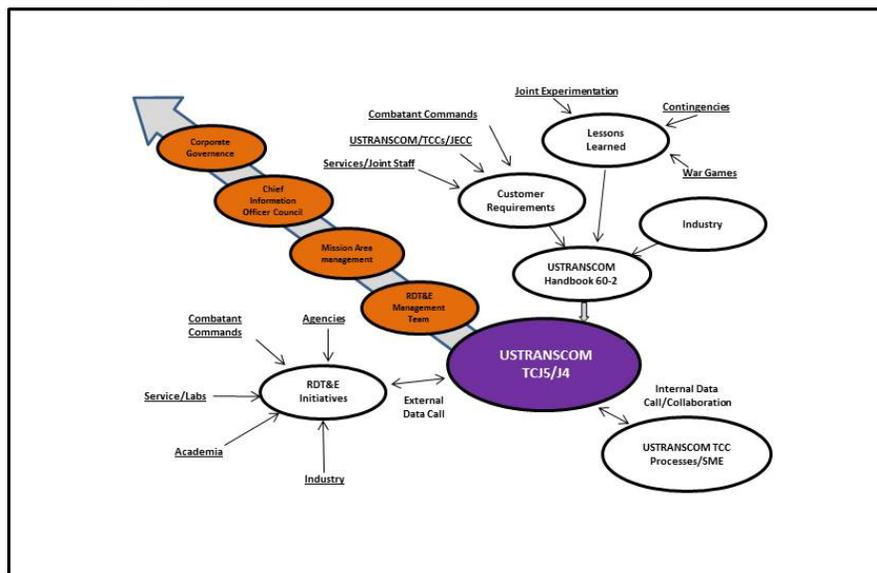
**2.5. RDT&E Management Team Purpose.** The RDT&E Management Team will develop a prioritized, fiscally responsible annual plan against TCJ5/J4 approved areas of interest that align nominated projects to validated JDDE Capability Gaps and USTRANSCOM Handbook 60-2, *USTRANSCOM Research, Development, Test, and Evaluation*, technology challenges. In making its determination, the RDT&E Management Team will ensure the technology is of

sufficient maturity and the proposed project supports an identified JDDE capability shortfall to minimize program risk and enhance project development. It will also review the plan for transitioning successful technologies. 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-unique IT standards, planned operational utility assessment, expected benefit, and commitment within out-year budget by the transition/integration agency at project selection. USTRANSCOM leverages the CGP to validate RDT&E investments and approve announcements seeking RDT&E proposals that address validated JDDE technology capability gaps, as well as review proposed funding/execution plans as required to support the budget development, submission, and documentation processes. The team will also review out of cycle NRs (documentation of need in accordance with USTRANSCOMI 90-6) and other requirements, as needed, prior to being presented to the CGP.

**2.5.1. RDT&E Management Team Membership.** The Plans, Access, & Capabilities Division (TCJ5-G) is the designated office of primary responsibility for the RDT&E Program. The Chief, TCJ5-G, or designated O-6 or civilian equivalent, will serve as the RDT&E Management Team Chair. Other members include representatives from USTRANSCOM Directorates: Operations and Plans (TCJ3), Command, Control, Communications and Cyber Systems (TCJ6), Financial Management and Program Analysis (TCJ8), Command Acquisition (TCAQ), Joint Distribution Process Analysis Center (TCAC), and the TCCs/JECC with advisory support being provided by the Staff Judge Advocate (TCJA). The team will convene as determined by the team chair. As deemed by the Chair, representatives from other USTRANSCOM directorates and the Command Support Group staff may be added.

**2.5.2.** Figure 2.1 depicts 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 RDT&E strategy/vision. An in-depth overview is provided in paragraph 4, RDT&E Program Process.

**Figure 2.1. USTRANSCOM RDT&E Process.**



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

#### **3.1. The Director, TCJ5/J4 or designated Deputy will:**

**3.1.1.** Serve as the command's primary RDT&E advocate and provide overall program Management per USTRANSCOM Instruction 90-9.

**3.1.2.** Maintain the integrated USTRANSCOM RDT&E Handbook 60-2, linking validated requirements to transformational technical solutions.

**3.1.3.** Develop and execute an RDT&E program to identify and exploit leading edge technology initiatives being pursued by the Services, select Defense agencies, other combatant commands, non-DoD government organizations, commercial industry, and academia.

**3.1.4.** Designate staff members within TCJ5 to orchestrate and manage the RDT&E Program.

**3.1.5.** Ensure the development of integrated annual Program Objective Memorandum (POM) RDT&E plans to enhance deployment and distribution operations.

**3.1.6.** Conduct an annual flag level review (normally in June) of approved RDT&E projects.

**3.1.7.** Develop and publish announcements for proposals from the RDT&E community as appropriate. Include Small Business participation in announcements and proposals.

**3.1.8.** Act as the Principal proponent and accountable senior official for all USTRANSCOM Research, Development, Test, and Evaluation.

**3.1.9.** Ensure the Deputy Under Secretary of Defense (Acquisition, Technology and Logistics), the Assistant Secretary of Defense (Research and Engineering), and appropriate Joint Staff Functional Capabilities Boards are informed of efforts and initiatives.

**3.1.10.** As the Distribution Portfolio Management - Coordinator, coordinate on information technology proposals transitioning to non-USTRANSCOM portfolios.

**3.1.11.** Annually (normally in February) approve the Consolidated Operational/Technical Challenge List for inclusion in the Government Only Solicitation Announcement.

**3.2. The Director, TCJ3 will** appoint a representative to the RDT&E Management Team. As the Mission Area Manager (MAM), support the RDT&E Program as described in USTRANSCOMI 90-13, *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.

#### **3.3. The Director, TCJ6 will:**

**3.3.1.** 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.

**3.3.2.** Conduct architecture/engineering technical assessments of new initiatives (during Phase II assessment process) and annual assessments of funded efforts (addressing issues/concerns during annual RDTE Program Director and TCJ5/J4-D Project Reviews).

**3.3.3.** Assess all proposals for potential IT/cyber attributes, and then, if they exist, ensure transformational Information Technology (IT) pursuits are in compliance with Defense Business Council requirements by verifying compatibility with the Joint Deployment and Distribution Architect.

**3.3.4.** As Chief Information Officer (CIO), review USTRANSCOM/Component IT-related proposals to ensure compliance with the IT, Data, and/or Cyber strategies/roadmaps, as well as DoD CIO policies. Semi-annually review ongoing RDT&E IT efforts to enhance stakeholder knowledge and support future transition planning.

**3.4. The Director, TCJ8 will:**

**3.4.1.** 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 Technology Development (ATD) under Budget Activity 3 (BA3) with the purpose of funding evolutionary activities that demonstrate the potential to directly benefit and transform JDDE related capabilities. TCJ8 observes the following considerations when making determinations:

**3.4.1.1.** RDT&E is for research to find potential solutions to capability gaps, as well as JDDE enhancements and process improvements, using technology that currently does not exist in an operational environment.

**3.4.1.2.** TWCF Capital is the proper funding source for programs that support common user transportation that have reached a level of demonstrated capability. TWCF Capital is for proven (existing) technology efforts.

**3.4.1.3.** TWCF Operating is the proper funding source for programs that support common user transportation, are fully operational, and have reached sustainment.

**3.4.1.4.** Operations & Maintenance (O&M) appropriation is the proper funds source for programs that do not support common user transportation. Obligations incurred in continuing operations and current services are budgeted in the O&M appropriations. Modernization costs under \$250,000 are considered O&M, as are one-time projects such as developing planning documents and studies.

**3.4.1.4.1.** Software releases categorized as iterations on the basic release and not involving significant performance improvements or extensive testing are considered a maintenance effort.

Minor improvements in software functionality which are accomplished during routine maintenance may also be O&M funded.

**3.4.1.4.2.** Items purchased from a commercial source that can be used without modification (e.g., COTS and nondevelopmental items) will be funded in either the Procurement or O&M appropriations, as determined by the expense and investment criterion.

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

**3.4.3.** Monitor the execution of funds for budget-approved initiatives.

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

**3.4.5.** Ensure coordination on RDT&E-related Congressional and Office of the Secretary of Defense reports.

**3.4.6.** Appoint a representative to the RDT&E Management Team.

**3.4.7.** Provide a monthly execution report to the RDT&E Program Director.

**3.4.8.** Verify Defense Business Council certification is received before issuing funds to USTRANSCOM business systems.

**3.4.9.** Review program-associated financial documentation for accuracy and thoroughness.

**3.4.10.** Ensure proper execution of RDT&E funds.

**3.4.10.1.** Promote maximum practical consideration and opportunity for Small Business. Include the following statement on all RDT&E Military Interdepartmental Purchase Requests (MIPR): "USTRANSCOM supports the attainment of established DoD small business goals and encourages the consideration of small business contracting opportunities during the acquisition/awarding process."

**3.4.10.2.** Ensure the principles and operational parameters of the DoD Scientific and Technical Information Program (STIP) are adhered to by including the following statement on all RDT&E MIPRs: "Acceptance of funds acknowledges requirement to ensure all results, regardless of outcome, are documented per DoDI 3200.12 & DoD Manual (DoDM) 3200.14."

**3.4.11.** Review all white papers, proposals and projects to ensure they meet BA 6.3 funding requirements.

**3.4.12.** Ensure transition and sustainment funding are incorporated into the command's annual budget submission.

**3.4.13.** Submit Office of Secretary of Defense budget exhibits as required (usually in July and December) with funding breakout and narrative submission provided from TCJ5.

**3.4.14.** Validate all return on investment and business case analysis information.

**3.4.15.** 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 USTRANSCOMI 65-3.

**3.5. The Staff Judge Advocate, TCJA, will** provide legal support, representation and project review for the RDT&E Program.

**3.6. The Director, TCAQ will:**

**3.6.1.** Provide acquisition program management for transitioning RDT&E capabilities to USTRANSCOM acquisition programs, to include the review of technology transition plans and estimating transition and future maintenance/sustainment funding in compliance with USTRANSCOMI 63-10.

**3.6.2.** Appoint a representative to the RDT&E Management Team.

**3.6.3.** Provide contract support, as required, for approved RDT&E projects.

**3.6.4.** Provide advice and counsel regarding Small Business Programs, initiatives and requirements.

**3.6.5.** Provide Transportation and Technology Industry Liaison Office (TTILO) support for contractor capability briefings/presentations requests.

**3.7. The Director, TCAC will** appoint a representative to the RDT&E Management Team. 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.

**3.8. All USTRANSCOM Directorates/Command Support Group will:**

**3.8.1.** Submit technology proposals to the USTRANSCOM RDT&E Program Director in TCJ5-GC using Attachment 2 sample format. Ensure Technology proposals and NRs identify USTRANSCOM approved capability gaps and JDDE Capability shortfalls contained within USTRANSCOM Handbook 60-2. A description of the various technology budget activities is contained in Attachment 3. A description of Technology Readiness Levels is in Attachment 4. Detailed funding guidance is contained in DoD 7000.14-R, *Financial Management Regulations*.

**3.8.1.1.** USTRANSCOM, TCC and JECC IT-related proposals, to include NRs, will be vetted through the CIO before being submitted for funding consideration through the USTRANSCOM CGP. TCJ3 is designated as the MAM with TCJ3, HQ Air Mobility Command (AMC), HQ Military Sealift Command (MSC), HQ Surface Deployment and Distribution Command

(SDDC), TCAC, TCJ6 and TCJ8 designated as Sub-MAMs. Each Sub-MAM has oversight of several systems/projects as outlined in USTRANSCOMI 90-6, *Corporate Governance Process*. 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 make a recommendation to the TRANSCOM Oversight Council for funding. Refer to USTRANSCOMI 90-6, *Corporate Governance Process*.

**3.8.2.** Ensure compliance with the management principles and documentation requirements defined in the CJCSI 3170.01 series, *Joint Capabilities Integration and Development System*, and DoDI 5000.02, *Operation of the Defense Acquisition System*.

**3.8.3.** 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 TMT tasker at the directorate level. Comments will be adjudicated by the RDT&E Management Team.

**3.8.4.** Designate a Project Coordinator (PC) 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 (IPPD) principles outlined in Attachment 5. 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 provide day-to-day technical direction and will be more involved in the detail and programmatics of the project. The PC is responsible for overseeing the project and managing USTRANSCOM interests (to include the use of emerging and mandated technologies listed in DISR 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 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/continuity of effort.

### **3.9. TCCs and JECC will:**

**3.9.1.** Appoint an appropriate person as their representative on the RDT&E Management Team. SDDC, MSC and AMC 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 USTRANSCOMI 90-6 *Corporate Governance Process*.

**3.9.2.** Submit technology proposals to the USTRANSCOM RDT&E Program Director using sample format in Attachment 2. A description of the various technology budget activities is contained in Attachment 3. A description of Technology Readiness Levels is in Attachment 4.

Detailed funding guidance is contained in DoD 7000.14-R.

**3.9.3.** Designate a PC for approved projects under their assigned area of responsibility to manage and assist in orchestrating technology development and transition through IPPD principles outlined in Attachment 5. 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/continuity of effort.

**3.10. The Chief, Plans, Access, and Capabilities Division (TCJ5-G) will:**

**3.10.1.** Provide overall monitoring of RDT&E program.

**3.10.2.** Designate the RDT&E Program Director (from within TCJ5-G) to orchestrate the overall management of the RDT&E Program.

**3.10.3.** Ensure periodic updates regarding program status are provided to senior level management.

**3.11. The RDT&E Program Director will:**

**3.11.1.** Ensure program management and execution of the command's RDT&E Program.

**3.11.2.** Develop and maintain USTRANSCOM Handbook 60-2, which contains a long-range technology strategy and is designed to provide focus to the command's pursuit of transformational technology capability enhancements, as well as inform the Science and Technology community of the command's specific technology capability gaps.

**3.11.3.** 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 contained within USTRANSCOM Handbook 60-2. Ensure all proposals and NRs are routed through the appropriate Sub-MAM to the MAM prior to being considered for RDT&E funding.

**3.11.4.** Aid the staff in linking identified shortfalls to potential technology solutions in DoD laboratories, academic, and commercial Science and Technology communities. This includes a 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.

**3.11.5.** Ensure approved RDT&E projects are incorporated into the command's RDT&E plans.

**3.11.6.** In conjunction with TCJ8 and Air Force, 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 R exhibits.

**3.11.7.** Assist PCs in the employment of IPPD principles (Attachment 5) and track projects to ensure funded technology sufficiently improves the initial, adjusted, or updated capability gaps.

**3.11.8.** Conduct review (normally in February) of funded technology projects.

**3.11.9.** 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.

**3.11.10.** Annually, and upon request, provide updates to TCJ5 and senior level management (usually at the July TRANSCOM Oversight Council (TOC)) regarding program status.

**3.11.11.** The RDT&E Program Director and Office of Research and Technology Applications 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.

**3.11.12.** Within three months of initial assignment, ensure RDT&E Program personnel are trained on RDT&E Program duties and responsibilities.

**3.11.13.** 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.

**3.11.14.** Develop, staff, and coordinate a consolidated MIPR approval package(s) for RDT&E projects outside USTRANSCOM's accounting system. Each MIPR must be accompanied by an applicable support agreement per DoDI 4000.19, *Support Agreements* and USTRANSCOMI 90-20, *Procedures for Command Agreements*. The standard agreement is the DD Form 1144. A complimentary, consolidated DD 1144 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.

**3.11.15.** Monitor requirements and identify opportunities for Small Business Innovation Requirements (SBIR) and Rapid Innovation Funds (RIF) program inclusion.

**3.11.16.** Serve as the Command's interface to all other DoD science and technology programs (e.g. Emerging Capabilities & Prototyping, Coalition Warfare Program, Joint Test & Evaluation, and RIF).

**3.11.17.** Ensure the principles and operational parameters of the DoD STIP are adhered to per DoDI 3200.12 & DoDM 3200.14.

**3.11.18.** Prepare and submit the narrative for the R-2/R-2A budget exhibits, as required (usually

in mid-Jul and Dec), to TCJ8 for submission.

**3.11.19.** As owner of the RDT&E Assessable Unit, comply with USTRANSCOMI 35-3 *Management Inventory Control Program*.

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

**3.12. Project Coordinators (PC) will:**

**3.12.1.** Execute assigned, funded initiative(s), through the employment of IPPD principles (Attachment 5).

**3.12.2.** Serve as the command's research facilitators and the transition agent for successfully developed technologies (Attachment 6).

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

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

**3.12.5.** Manage the smooth transition of successfully completed technology exploration efforts. PCs must ensure a transition strategy is included in their project plan and monitor the effort to ensure the Program Manager clearly outlines and budgets for a smooth transition. For RDT&E efforts designated for transition to the USTRANSCOM enterprise, this includes the development of a transition plan (in accordance with Attachment 7) and securing transition/sustainment funding with appropriate Sub-MAM per USTRANSCOMI 90-13.

**3.12.6.** 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.

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

**3.12.8.** Ensure the principles and operational parameters of the DoD STIP are adhered to by verifying external projects document all results, regardless of outcome, per DoDI 3200.12 & DoDM 3200.14. Internal projects shall submit final results to the RDT&E Program Director for documentation.

**3.12.9.** To help ensure funds are distributed in a timely manner, verify all MIPR information required by the receiving organization has been passed to the TCJ8 representative.

**3.12.10.** See Attachment 6 for expanded PC responsibilities.

**3.13. Office of Research and Technology Applications (ORTA) will** maintain a liaison with the RDT&E office to ensure efforts are coordinated and deconflicted. This is especially

important in producing technologies which can be spun off to commercial use.

**4. RDT&E Program Process:**

**4.1.** Annually the command solicits proposals to address JDDE technical challenges. The process (see Figure 4.1) 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. A detailed description of the steps to evaluate proposed solutions, vet these proposals internally (via RDT&E Management Team, MAM, CIO Council and Corporate Governance) is defined in Figure 4.2.

**4.2.** The proposed plan is vetted via the Distribution Process Owner (DPO) 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.

**Figure 4.1. RDT&E Program Management Timeline.**

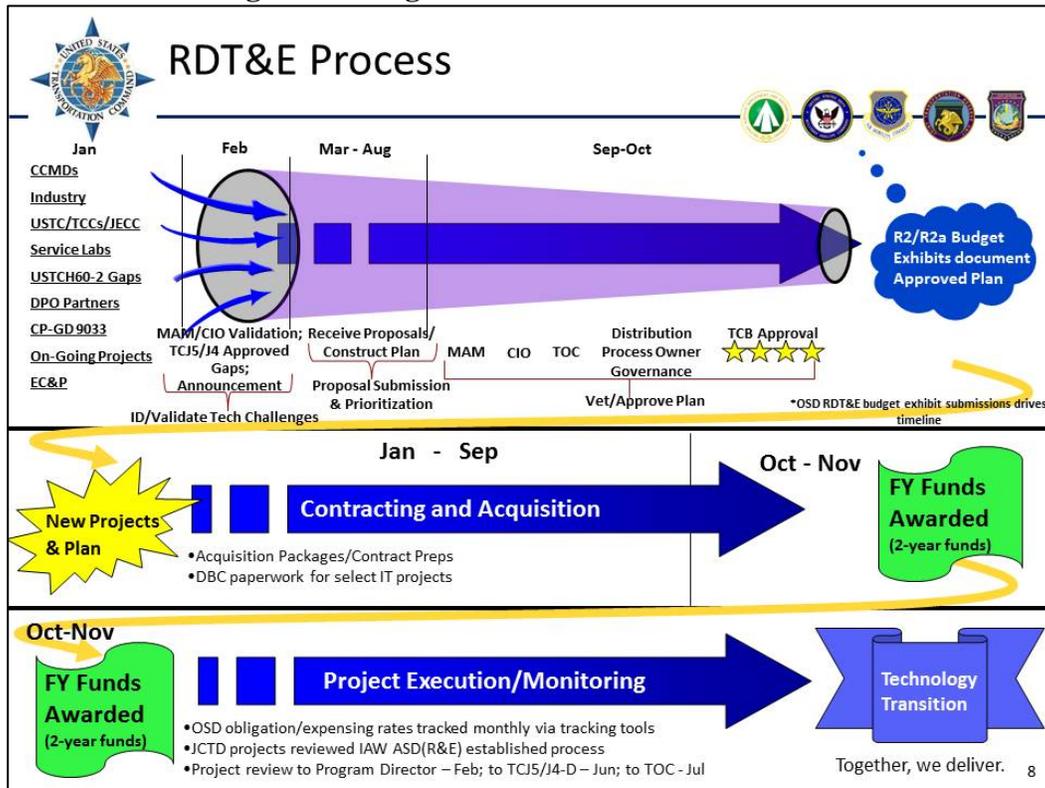
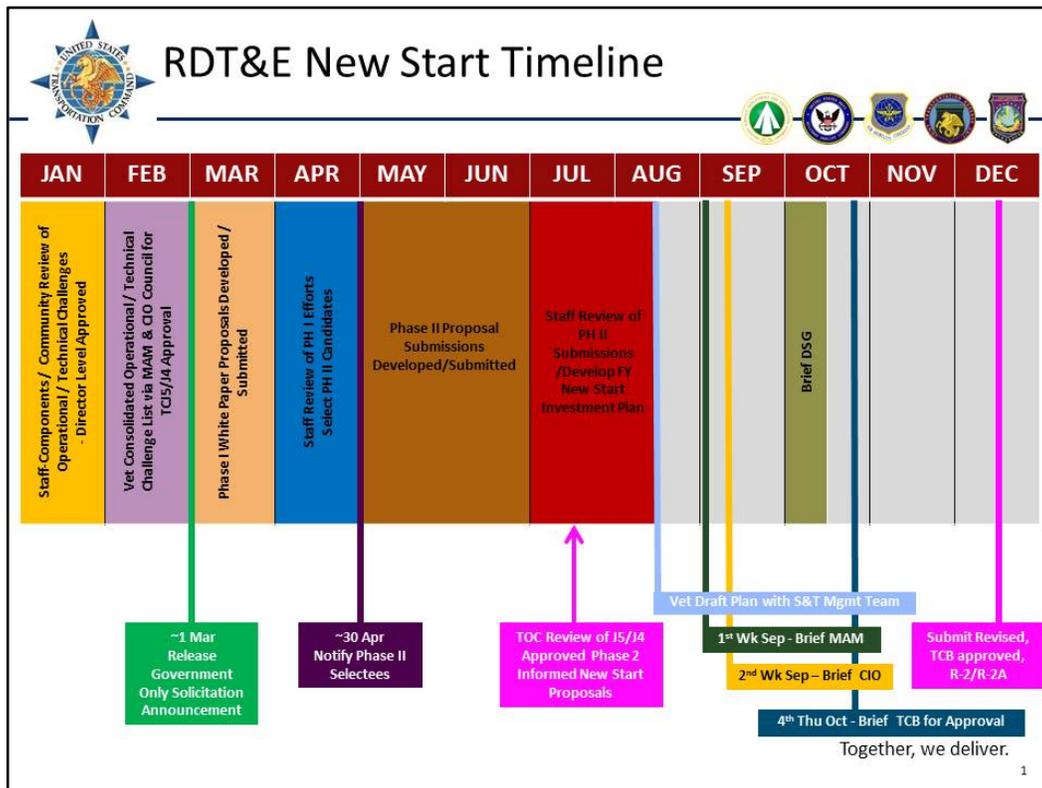


Figure 4.2 RDT&E New Start Timeline.



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

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

4.3.2. Formal project reviews are conducted three times per year (normally February to the Program Director, June to the TCJ5/J4-D and July to the TOC). 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 next year’s spend plans.

LAWRENCE B. JACKSON  
 Rear Admiral, USN  
 Director, Strategy, Capabilities,  
 Policy, and Logistics

#### Attachments

1. References, Abbreviations and Acronyms
2. USTRANSCOM RDT&E Two-Phase Project Selection Process
3. Definitions of RDT&E Areas
4. Technology Readiness Levels
5. Integrated Product and Process Development
6. Responsibilities of USTRANSCOM RDT&E Project Coordinators
7. Minimum Requirements for Developing a Technology Transition Strategy
8. Estimate of Return on Investment Template

**Attachment 1****GLOSSARY OF REFERENCES, ABBREVIATIONS AND ACRONYMS****Section A – References**

Department of Defense 7000.14-R, *Financial Management Regulation*  
Department of Defense Manual 3200.14, Vol 1, *Principle and Operational Parameters of the DoD Scientific and Technical Information Program (STIP): General Process*  
Department of Defense Instruction 3200.12, *DoD Scientific and Technical Information Program (STIP)*  
Department of Defense Instruction 3200.20, *Scientific and Engineering Integrity*  
Department of Defense Instruction 4000.19, *Support Agreements*  
Department of Defense Instruction 5000.02, *Operation of the Defense Acquisition System*  
Department of Defense Instruction 8310.01, *Information Technology Standards in the DoD*  
Chairman Joint Chiefs of Staff Instruction 3170.01 series, *Joint Capabilities Integration and Development System*  
USTRANSCOMH 60-2, *USTRANSCOM RDT&E Handbook*  
USTRANSCOMI 63-7, *USTRANSCOM Acquisition Management*  
USTRANSCOMI 63-10, *Acquisition Program Lifecycle Management*  
USTRANSCOMI 65-3, *Managers' Internal Control Program*  
USTRANSCOMI 90-6, *Corporate Governance Process*  
USTRANSCOMI 90-9, *Roles and Functions*  
USTRANSCOMI 90-13, *Mission Area Management*  
USTRANSCOMI 90-20, *Procedures for Command Agreements*  
USTRANSCOMI 90-22, *Deployment and Distribution Based Decision Support*

**Section B – Abbreviations and Acronyms**

BA - Budget Activity  
BAA - Broad Area Announcement  
CIO - Chief Information Officer  
CP-GD - Campaign Plan for Global Distribution  
DISR – DoD IT Standards Registry  
DoD - Department of Defense  
DPO - Distribution Process Owner  
IPPD - Integrated Product and Process Development  
IT - Information Technology  
JDDE - Joint Deployment and Distribution Enterprise  
JECC - Joint Enabling Capabilities Command  
PC - Project Coordinator  
P/SOR - Programs/Systems of Record  
POM - Program Objective Memorandum  
RDT&E - Research, Development, Test and Evaluation  
STIP - Scientific and Technical Information Program  
TCAC - Joint Distribution Process Analysis Center

TCAQ - Acquisition Directorate  
TCB – USTRANSCOM Corporate Board  
TCC - Transportation Component Command  
TCCC - Commander, USTRANSPORTATION Command  
TCCS - Chief of Staff  
TCJ3 - Operations and Plans Directorate  
TCJ5/J4 - Strategy, Capabilities, Policy, and Logistics Directorate  
TCJ5/J4-D - Deputy Director, Strategy, Policy, Programs, and Logistics  
TCJ5-G - Plans, Access, & Capabilities Division  
TCJ5-GC - Capabilities Branch  
TCJ6 - Command, Control, Communications, and Cyber Systems Directorate  
TCJ8 - Financial Management and Program Analysis Directorate  
TCJA - Staff Judge Advocate  
TOC - USTRANSCOM Oversight Council  
TTS – Technology Transition Plan  
USTRANSCOM - United States Transportation Command

**Section C – Terms**

This section not used.

## Attachment 2

### USTRANSCOM RESEARCH, DEVELOPMENT, TEST & EVALUATION (RDT&E) Two-Phase Project Selection Process

#### Formats and Content for Proposals

**A2.1.** The likelihood a submission's success will be increased by clearly demonstrating the capability to be researched/developed covers an important need; that the proposer understands the Joint Deployment and Distribution Enterprise domain and its challenges; and 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; and has an experienced/skilled team of researchers who will be assigned to do the developmental work.

Note: This is not a source selection.

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 only involves USTRANSCOM to act as a stakeholder in the execution of the project. It is the role of the submitting agency to adhere to all contracting regulations and serve as the Project Manager.

**A2.2. 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.

**A2.3. 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. 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.

(CONTINUED ON NEXT PAGE)

### **Phase I - White Paper (4-page limit)**

**A2.4.** 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 company name, 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.

**A2.5. 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 point(s) 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.

#### **A2.6. Section B: Project Description:**

**A2.6.1.** Write a brief introduction describing 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 (here and throughout document).

**A2.6.2.** 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.

**A2.6.3.** Describe the maturity of the technology, including Technology Readiness Level (TRL) 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.

**A2.6.4.** Describe the anticipated benefit/ROI for implementing the proposed capability. Although a quantitative ROI is not mandatory, 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 requested.

**A2.6.5.** 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.

**A2.6.6.** 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.

**A2.6.7.** Describe instances where the technical approach has been used in industry or other non-DoD organizations.

**A2.6.8.** List the systems, corporate services, and/or programs of record with which this capability may be integrated, along with corresponding interfaces. State if there is already commitment by the Program Management Office of the system or program of record to incorporate the capability, once fully developed. This demonstrates a transition destination has been considered.

**A2.6.9.** 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 customer and/or user of the capability.

**A2.6.10.** 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.

**A2.7. 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, not additional room for the text of the proposal.

(CONTINUED ON NEXT PAGE)

## **Phase II - Proposal (20-page limit)**

**A2.8.** This document is only required from proposers who are notified of the government's selection of their Phase I proposals.

**A2.8.1.** 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 company name, and appropriate classification or proprietary notice shall be included and must be in 8-point Times New Roman font. The cover page and optional appendix are not included in the 20-page limit.

**A2.8.2.** Page limits listed in parentheses for the following sections are recommendations, and may be reallocated by the proposer, as necessary, within the 20-page limit.

**A2.8.3. Cover Page.** Include title and short title, point(s) of contact, phone number(s), fax and 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 20 page limit.

### **A2.8.4. General Project Summary (1 page):**

**A2.8.4.1.** Describe 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. Describe the operational gap or issue addressed and how the development effort contributes to the solution. Describe the specific deliverables of the RDT&E effort (for example, analysis, report, prototype, experimental results of demonstration, etc.)

**A2.8.4.2.** Identify the technologies to be explored/developed, the end user, and how the technology will enhance that user's capabilities. Consider including a mission scenario, vignette, or Operational View (OV-1) illustration.

**A2.8.4.3.** List the information technology and/or hardware/platform/vehicle systems/corporate services/interfaces (potential programs or systems of record) with which the technology may be integrated.

### **A2.8.5. Requirements Traceability (1 page):**

**A2.8.5.1.** Identify the formal requirements, program directives, Joint Capabilities Integration and Development System products, DPO gap, or other formal source of requirements for the effort at the Joint or Service level. 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 (JCA), Tier IV,

Logistics capabilities. If no Tier IV capability applies, then identify the appropriate Tier I and II capability area. Definitions can be found in CJCSI 3170.01 series, as well as USTRANSCOMH 60-2 for Tier I and II areas. Tier I and II JCA capabilities will be evaluated separately.

**A2.8.5.2.** Alternately, if no formal requirement can be identified (see A2.8.5.1. above), identify any capability shortfalls from the USTRANSCOM RDT&E Handbook (USTRANSCOMH 60-2) not included in formal requirements documentation (previous criteria) that this project will address.

**A2.8.5.3.** If no formal source of requirements 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 3170.01 series, *Joint Capabilities Integration and Development System*.

**A2.8.6. Project Suitability (2 pages):**

**A2.8.6.1.** 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.

**A2.8.6.2.** 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.

**A2.8.6.3.** Describe what steps were taken to ensure the effort is not duplicative.

**A2.8.7. Benefit, Affordability, and Business Case (5 pages):**

**A2.8.7.1.** If declaring a quantitative Return on Investment (ROI) as a benefit for the to be fielded capability, the proposer must document using Attachment 8 (to be included in the proposal's appendix, not counted against the 20 page limit. Although a quantitative ROI is not mandatory, an objective ROI is more compelling than a subjective one. Instructions for completing the template are located within the document (format obtainable via the annual call for proposals and 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.

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

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.

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/POM 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.

**A2.8.7.2. 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.

**A2.8.7.3. Evaluation 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.

**A2.8.7.4. Business Case for Implementation/ROI.** If possible, quantitatively estimate the cost to implement the proposed capability (lifecycle cost including RDT&E, development/test, procurement, and sustainment) and lifecycle 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.

**A2.8.7.5. 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.

**A2.8.8. Technical Merit and Maturity (4 pages):**

**A2.8.8.1.** Describe the technologies to be developed, their risks for fielding, and methods of better understanding or reducing those risks during RDT&E.

**A2.8.8.2.** 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?

**A2.8.9. Programmatic (4 pages):**

**A2.8.9.1.** 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 Attachment 1, Section A, for references.

**A2.8.9.2.** 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 Programs/Systems of Record (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.

**A2.8.9.3.** Describe prior expended and requested funding for the RDT&E effort in then-year thousands. Include an estimate of follow-on development, production, and sustainment costs. Recommended format (which may be included in the appendix):

**Figure A2.1. Recommended Format – Lifecycle Funding Estimates.**

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

\* Required for all Transportation Working Capital Fund (TWCF) Program of Record IT efforts

**A2.8.9.4.** Describe the team of experts which will be dedicated to conducting project technical/management activities, citing prior experience and qualifications.

**A2.8.9.5.** List similar prior RDT&E work performed for DoD or other government agencies, if any, and points of contact (name and phone).

**A2.8.9.6.** Describe performance metrics (see table below) 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. A recommended format is:



### Attachment 3

#### DEFINITIONS OF RESEARCH, DEVELOPMENT, TEST AND EVALUATION (RDT&E) AREAS

**A3.1. 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.

**A3.2. 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.

**A3.3. Advanced Technology Development (ATD) (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. ATD 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. ATD 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.

**A3.4. Advanced Component Development and Prototypes (BA4).** Includes all efforts necessary to evaluate integrated technologies in as realistic an operating environment as possible to assess the performance or cost reduction potential of advanced technology.

**A3.5. 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.

**A3.6. 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.

**A3.7. 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.

## Attachment 4

### TECHNOLOGY READINESS LEVELS (TRLs)

**A4.1.** Most likely entry TRLs for USTRANSCOM RDT&E funding are TRLs 4-6. Work beginning in TRL 7 generally falls in the area of system acquisition, not science and technology.

**A4.2.** Some projects at TRL 3 may compete well for funding; for example, scientifically based studies to refine needs or explore the potential (the possible envelope of performance) for new technologies.

**A4.3.** Lower TRL entry levels suggest follow-on efforts will be additional laboratory work to mature the technology.

**A4.4.** Higher TRL entry levels suggest follow-on work will be in system program offices for integration, test, and operational qualification.

**A4.5.** Highest likely exit TRL for USTRANSCOM RDT&E funding is TRL 7. Work beyond TRL 7 generally falls in system program offices.

**A4.6. TRL Levels Defined (USTRANSCOM RDT&E focus areas in bold type):**

**A4.6.1.** 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.

**A4.6.2.** 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.

**A4.6.3.** 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.

**A4.6.4. 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.

**A4.6.5. 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.

**A4.6.6. 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.

**A4.6.7. 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.

**A4.6.8. 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.

**A4.6.9. 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.

<sup>1</sup> Adapted from GAO/NSIAD-99-162 Best Practices Appendix I Technology Readiness Level Descriptions

## Attachment 5

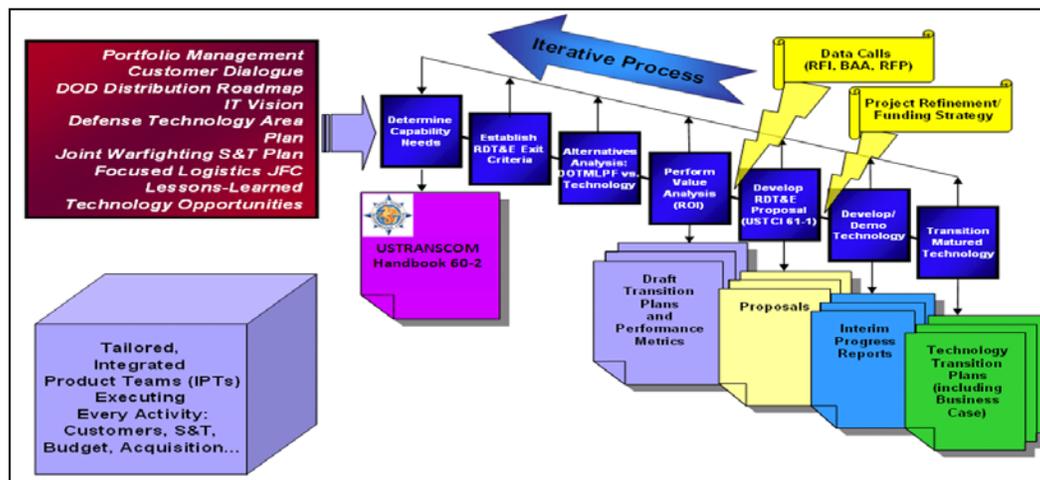
### INTEGRATED PRODUCT AND PROCESS DEVELOPMENT (IPPD)

**A5.1. 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.

**A5.2. Definition.** DoD defines IPPD as, “A management process that integrates all activities from product concept through production/field support, using a multi-functional team, to simultaneously optimize the product and its manufacturing and sustainment processes to meet cost and performance objectives.” IPPD activities focus on the customer and meeting customer(s) need. 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.

**A5.3. 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.

**Figure A5.1. RDT&E Integrated Product and Process Development.**



**A5.4. 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.

**A5.5. The Research, Development, Test and Evaluation (RDT&E) IPPD Process:**

**A5.5.1. Implementing the IPPD Process.** The basic functions associated with implementing the IPPD principles are shown in the process diagram (Figure A5.1).

**A5.5.2. 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, customers, 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 transitionable technologies meet the warfighter's stated need.

**A5.5.3. 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 affordability, track technical progress, and ultimately characterize the affordability of new technologies.

**A5.5.4. Technology Alternatives.** This activity addresses the issue of defining Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, and Facilities (DOTMLPF) 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 in an effort to satisfy the exit criteria.

**A5.5.5. 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.

**A5.5.6. 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.

**A5.5.7. 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. Customer involvement in this phase is crucial to ensure the delivery of the desired capability.

**A5.5.8. 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 (TTS). The TTS 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 RDT&E is dependent on the Project Coordinator working with the lead system integrator to incorporate the new technologies into the system design and/or allowing for its future incorporation through spiral development.

## **Attachment 6**

### **RESPONSIBILITIES OF USTRANSCOM RESEARCH, DEVELOPMENT, TEST, AND EVALUATION (RDT&E) PROJECT COORDINATORS**

#### **A6.1. Introduction:**

**A6.1.1.** Project Coordinators (PC) of USTRANSCOM RDT&E projects act as facilitators for the needs of the researchers, conduits for information between researchers, users, higher headquarters, functional offices (principally budget), and 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 managers, and teamwork with finance, legal, and the USTRANSCOM RDT&E Team (TCJ5-GC) are essential.

**A6.1.2.** 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.

**A6.1.3.** The USTRANSCOM RDT&E Team, finance, acquisition, and legal 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:

#### **A6.2. Comprehend purpose and goals of the RDT&E and the context for transitioning it:**

**A6.2.1.** 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.

**A6.2.2.** 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.

**A6.2.3.** 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.

**A6.2.4.** 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 more risky? 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 their new technology must operate.

**A6.2.5.** 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.

**A6.2.6.** 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?

**A6.2.7.** 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.

### **A6.3. Facilitate project accomplishment:**

**A6.3.1.** 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, finance, contracting, and testers to ensure all disciplines are properly harnessed for progress. The RDT&E team will assist in making connections between agencies.

**A6.3.2.** The PC assists the technical developers in obtaining information needed 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.

**A6.3.3.** If the project encounters a lack of resources (funding, time, materials, or 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., Monitor) and/or the Program Director early enough to allow re-scoping the project before a show stopping event occurs.

**A6.3.4.** By consultation with finance/budget offices, 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.).

**A6.3.5.** PCs must also ensure the government makes no un-resourced obligation when dealing with industry-based technology development--in other words, complying with the Anti-Deficiency Act and other legal requirements. The USTRANSCOM finance and legal staffs are

available to assist with compliance.

**A6.3.6.** PCs must rigorously maintain proper standards in protection of classified, For Official Use Only, 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, is crucial.

**A6.3.7.** PC working USTRANSCOM IT projects will ensure the project complies with USTRANSCOM's architecture requirements as part of the the transitioning plan.

**A6.3.8.** USTRANSCOM IT PCs must be knowledgeable of the interoperability IT Standards listed in DISR 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 a technical capability is as part for the RDT&E project.

**A6.3.9.** PC must work with the Project Manager and project through the life of the project. Once the Period of Performance ends and the contract is complete, the PC will work with TCJ8 and TCAQ to de-obligate any unexpensed 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.

#### **A6.4. Track and report progress:**

**A6.4.1.** 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 Teams members, users, and the P/SOR.

**A6.4.2.** USTRANSCOM requires, at a minimum, the following reports listed below (examples are provided on the RDT&E website accessible from the USTRANSCOM public page <https://www.ustranscom.mil/cmd/associated/rdte/>). Project Coordinators 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-annually review ongoing RDT&E IT efforts to enhance stakeholder knowledge and support future transition planning.

- Funds obligation and expenditure percentages against goals (monthly)
- A February mid-year project review to the RDT&E Program Director (include status of transition planning)
- A June annual project review (chaired by the Deputy Director, Strategy, Capabilities, Policy, and Logistics Directorate (TCJ5/4-D)) (include status of transition planning)
- Technology Transition Strategy for IT-related USTRANSCOM enterprise capabilities

- Final report that documents projects impact on the Warfighter/customer (to include ROI/Transition)

**A6.4.3.** The PC should remain sufficiently aware of the technical 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 expended 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.

**A6.4.4.** Metrics (including Performance-Based Metrics) sufficient to gauge progress should be agreed to at project initiation and monitored by the PC throughout the project's life.

**A6.4.5.** 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.

**A6.4.6.** The PC will provide the USTRANSCOM RDT&E team a one page final report summarizing the benefits of the project. The report should be focused on warfighter benefits, the return on investment and transition.

#### **A6.5. Assist in technology transition:**

**A6.5.1.** 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 effort must include a transition plan that follows the transition guidance identified in Attachment 7.

**A6.5.2.** 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 needs to agree to consider integration during early development and will need to be "on board" as 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.

**A6.5.3.** Typical activities will include liaison with the intended P/SOR, refinement of goals if transition/integration encounters difficulty, and briefings to decision-making bodies (e.g., the Corporate and DPO governance structures).

**A6.5.4.** 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.

**A6.5.5.** 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.

**A6.5.6.** Prior to fielding new IT capabilities costing over \$1M, PCs will, as applicable, satisfy Defense Business Council documentation requirements and also comply with extended documentation and certification requirements that may be imposed by various Investment Review Boards/Processes.

**A6.5.7.** Ensure the principles and operational parameters of the DoD Scientific and Technical Information Program (STIP) are adhered to by verifying that external projects document all results, regardless of outcome, per DoDI 3200.12 & DoDM 3200.14. Internal projects shall submit final results to the RDT&E Program Director for documentation.

## Attachment 7

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

**A7.1.** For each RDT&E effort a Technology Transition Strategy (TTS) will be produced within one year after commencement of the developmental effort for all projects transitioning to a USTRANSCOM Program of Record (POR). These strategies will be reviewed by the appropriate Sub-MAM, TCJ8, TCJ6, TCAQ (PEO-T), and TCJA. The TTS must contain, at a minimum, the below/following information.

**A7.1.1.** Management Summary: Identify stakeholders and associated roles and responsibilities.

**A7.1.2.** Capabilities Summary: Describe developmental capabilities and the expected long term benefits (non-financial and financial) of the transitioned effort.

**A7.1.3.** Overall Transition Strategy: Describe envisioned transition strategy. This strategy will evolve over the period of the contract. Transition strategy must identify short and long term strategy to transition the effort once RDT&E funding is complete. Identify a POR for the effort. If not known, identify possible PORs and your plan to garner agreement with the applicable Program Manager.

**A7.1.4.** Schedule: Develop a project schedule that includes all aspects of the effort and shows the transition path at completion.

**A7.1.5.** 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 (TWCF) or Operations & Maintenance (O&M)). Ensure coordination with appropriate Sub-MAM to ensure budgeting of transition/sustainment funds.

**A7.1.6.** Risk Management: Develop a risk management plan to address cost risk, schedule risk and performance risk.

**A7.1.7.** Intellectual Property: Address intellectual property rights. Vet with TCJA for concurrence.

**A7.1.8.** 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-D (June) Project Reviews to ensure proper transition and cost/benefit of the project are in the Command's best interest.



## INSTRUCTIONS FOR RETURN ON INVESTMENT TEMPLATE

### **Financial Reporting Requirements**

All financial data in this template is to be entered as uninflated dollars. The template's formulas apply inflation.

### **Table 1A - Project Savings/Benefits**

Enter Sources & Assumptions, Benefit/Savings Description, Savings Category and all financial data for Savings by Year. Project savings include all cost savings, cost avoidances, non-monetary quantifiable benefits and non-quantifiable benefits (choose applicable category from drop-down list). Source data and descriptions are required for non-monetary quantifiable and non-quantifiable data, but the financial detail is not required.

Attach or reference assumptions and source documentation used to calculate/estimate savings detail in the "Sources & Assumptions" column (see "Documentation Requirements" below for instructions). Detailed descriptions for all non-monetary quantifiable and non-quantifiable benefits must be included in the proposal and in Table 1B.

#### **Savings Definitions:**

These definitions are copied from USTRANSCOMI 61-1 for your convenience:

**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.

**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.

**Non-monetary quantifiable** 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.

**Non-quantifiable** benefits (e.g. improve mission planning synchronization) cannot be quantifiably measured and are usually subjective in nature.

### **Table 1B - Non-Monetary Quantifiable/Non-Quantifiable Narrative**

If applicable, describe the methodology used to estimate non-monetary quantifiable benefits. Describe how non-quantifiable benefits were determined.

### **Table 2 - Project Cost/Investment**

Enter Sources & Assumptions, Cost Description and all financial data for Costs by Year (as available). Attach or reference assumptions and source documentation used to calculate/estimate cost detail in the "Sources & Assumptions" column (see "Documentation Requirements" below for instructions).

### **Table 3 - Project Summary**

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. 2015 OMB Circular A-94 Appendix C Real Discount Rate).

### **Documentation Requirements**

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.

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.

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.

### **Points of Contact**

USTRANSCOM points of contact for this template are Shannon Krievs, shannon.a.krievs.civ@mail.mil, (618) 220-4748, and Kyle Wiesemeyer, kyle.j.wiesemeyer.civ@mail.mil, (618) 229-5066.

