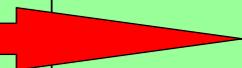




Product Realization Chart

DHS S&T Portfolio	Basic Research			Innovation and Transition						
Technology Phase	Needs Assessment	Science			Technology Development			Product Development		
Technology Readiness Level (TRL)	N/A	TRL 1 - TRL 3			TRL 4 - TRL 6			TRL 7 - TRL 9		
Key Objectives	<ul style="list-style-type: none"> Identify S&T capability gaps (mission needs) requiring material solutions. Preliminary operational requirements are developed. Market survey. Technology scan. Assess technology-based solutions to address gaps. Develop rough order-of-magnitude (ROM) estimates of project cost and schedule. Investigate the value proposition of a product idea. Establish technical objectives and milestones. Conduct preliminary IP review. Ensure the qualification of tools, materials, processes, and suppliers as required. Provide a preliminary production plan. Develop preliminary marketing objectives and milestones. Inclusion of Congressional Appropriations Memo, Technology Transition Agreements (TTA), Program Descriptions (Research and Innovation), and Feasibility Studies lead to Program and Budget Execution. List other objectives when defined. 	TRL 1 <ul style="list-style-type: none"> A program sponsor and end-users / customers have been identified. Mission Needs Statement has been developed. Communication with end-users and customers has been initiated. Preliminary operational requirements have been defined. Program Management Vision has been developed. A Feasibility Study White Paper has been developed and accepted. (TRL 1 and 2) A threat, vulnerability, or gap has been identified. Initial risks have been identified. Develop and update the preliminary product plan. List other objectives when defined. 	TRL 2 <ul style="list-style-type: none"> End-user is involved in concept and requirements development. An empirical or theoretical design solution has been identified. Analytical studies to confirm the basic principles of the technology have been conducted. Operational requirements analysis has been completed. Operational requirements are applied to Functional Requirements. (TRL 2 and 3) Systems Engineering Management Plan (SEMP) draft. Proof of Concept Plan has been developed. Manufacturing / production strategy has been developed. Develop Quality Control Plan to include standards conformance, reliability testing, etc. Develop Marketing Plan to include market size and research. Develop Risk Management Plan to include identified risks. Risk Management Plan has been developed. Risk Management Plan has been developed. (TRL 2 and 3) Program Cost Analysis has been completed and updated. (TRL 2 and 3) Preliminary Security Assessment has been conducted. Develop a Technology Roadmap. Refine the market assessment and technology scan. List other objectives when defined. 	TRL 3 <ul style="list-style-type: none"> Supplemental and alternate technologies throughout DHS S&T have been surveyed. Technology's physical validity has been proven in laboratory experiments. Program Management Plan (PMP) has been developed. Systems Engineering Management Plan (SEMP) draft. Proof of Concept Plan has been developed. Manufacturing / production strategy has been developed. Develop Quality Control Plan to include standards conformance, reliability testing, etc. Develop Marketing Plan to include market size and research. Develop Risk Management Plan to include identified risks. Risk Management Plan has been developed. Risk Management Plan has been developed. (TRL 2 and 3) Program Cost Analysis has been completed and updated. (TRL 2 and 3) Preliminary Security Assessment has been conducted. Develop a Technology Roadmap. Refine the market assessment and technology scan. List other objectives when defined. 	TRL 4 <ul style="list-style-type: none"> All required technology components are integrated for Proof of Concept. Proof of Concept is conducted. IP/T has been briefed on progress of the technology's development. The customer has been briefed on the Proof of Concept results. Functional Requirements Document has been finalized. SEMP has been finalized and updated. (TRL 4, 5, & 6) TEMP has been completed and updated. (TRL 4, 5, & 6) Configuration Management Plan exists. Risk Management Plan is updated. (TRL 4, 5, and 6) Program Cost Analysis is updated. (TRL 4, 5, and 6) Quality Assurance Plan exists. Program Transition Manager is engaged in transition planning. List other objectives when defined. 	TRL 5 <ul style="list-style-type: none"> ORD and CONOPs are developed. Security Assessment is updated. OMB 300 and Acquisition Plan have been completed (if required). IP/T has certified readiness for the transition of the Technology. Program Transition Manager has assisted in transition documentation development. Technology scan and market survey. (ongoing) Analysis of Alternatives is completed and updated. (TRL 5 & 6) Entry Criteria Checklist is developed and delivered to the TM. POD has been created, approved, and signed. (TRL 5 & 6) Director has approved the transition. List other objectives when defined. 	TRL 6 <ul style="list-style-type: none"> Germane to both Acquisition and Commercialization Execute a preliminary Technology Transition Agreement (TTA), or Technology Commercialization Agreement (TCA) as applicable. Program Manager has been identified. Successful TAE in a simulated operational environment has been conducted. End-user / customer has been briefed on the results of T&E. Initial Security Guidelines have been developed. Draft Program Assessment Rating Tool (PART) plan exists, if required. National Environmental Policy Act (NEPA) plan / assessment, if required. Interoperability Assessment. List other objectives when defined. 	TRL 7 <ul style="list-style-type: none"> Germane to both Acquisition and Commercialization S&T and the end-user / customer have begun to develop final transition planning document. Transition Plan has been developed. (TRL 7 and 8) Technology has been successfully demonstrated in an operational environment. (TRL 7 and 8) Updates (if required) have been made to the Operational and / or Functional Requirements Document. Risk Management Plan, Program Cost Analysis and PMP have been updated (as needed). Strategic Program Planning (e.g. Balanced Scorecard) has been conducted. Operations and Maintenance Manual has been completed / updated. Security Manual has been developed. Interoperability has been demonstrated. Management Directives (MD) have been reviewed to assure compliance. List other objectives when defined. 	TRL 8 <ul style="list-style-type: none"> Germane to both Acquisition and Commercialization Technology components are form, fit, and function compatible with an operational system. Technology production has been addressed and planned by DHS and the end-user / customer. Training Plan has been developed and implemented. (TRL 8 and 9) Operational Test Report has been completed. Limited User Test (LUT) Plan has been developed. List other objectives when defined. 	TRL 9 <ul style="list-style-type: none"> Germane to both Acquisition and Commercialization All critical program documentation has been completed. Planning is underway for the integration of the next generation technology into the existing program components. End-user fully demonstrates the technology in CONOPS. Lessons Learned completed. After Action Review completed. Support Plan is completed. List other objectives when defined.
Key Deliverables	<ul style="list-style-type: none"> Preliminary market assessment and technology scan. Congressional Appropriations Memo, Technology Transition Agreements, Program Descriptions (Research and Innovation), and Feasibility Studies lead to Program and Budget Execution. Preliminary product plan that assesses features, benefits, and risk. Initial plan for marketing, production, and supply control. List other deliverables when defined. 	<ul style="list-style-type: none"> Mission Needs Statement. Feasibility Study. Program Management Vision, or Description of Leap-ahead Capability. Written report of findings and recommendations (preliminary product plan). Feasibility Review meeting. List other deliverables when defined. 	<ul style="list-style-type: none"> Preliminary Operational Requirements Document (end-user / customer validation). Program Cost Analysis (updated). (TRL 2 and 3) Program Management Plan (PMP) draft. End-user / Customer Status Review. Detailed product and marketing plan. Quality control plan. Optimization Review meeting. List other deliverables when defined. 	<ul style="list-style-type: none"> Systems Engineering Management Plan (SEMP) draft. Proof of Concept Plan. Program Management Plan (PMP) draft. End-user / Customer Status Review. Detailed product and marketing plan. Quality control plan. Optimization Review meeting. List other deliverables when defined. 	<ul style="list-style-type: none"> Proof of Concept Report. Functional Requirements Document. SEMP (TRL 4, 5, and 6) TEMP (TRL 4, 5, and 6) Quality Assurance Plan. Configuration Plan Management. PMP (updated). (TRL 4, 5, & 6) Risk Management Plan (updated). (TRL 4, 5, and 6) Program Cost Analysis (updated). (TRL 4, 5, and 6) End-user / Customer Status Review. List other deliverables when defined. 	<ul style="list-style-type: none"> ORD and CONOPs. Security Assessment (updated). Program Definition Document (POD). OMB 300 Capital Asset Plan. Acquisition Plan. Entry Criteria Checklist. Analysis of Alternatives. (TRL 5 & 6) List other deliverables when defined. 	<ul style="list-style-type: none"> Germane to both Acquisition and Commercialization Technology Transition Agreement (TTA), or Technology Commercialization Agreement (TCA) as applicable. Initial Security Guidelines. Draft Program Assessment Rating Tool (PART) plan, if required. National Environmental Policy Act (NEPA) initial assessment, if required. Interoperability Assessment. List other deliverables when defined. 	<ul style="list-style-type: none"> Germane to both Acquisition and Commercialization Technology Plan (draft). Operational and Functional Requirements Documentation (updated). Risk Management Plan (updated). Program Cost Analysis (updated). PMP (updated). Strategic Program Planning Documentation (if conducted). Operations and Maintenance Manual. Security Manual. Finalized Interoperability Assurance Report. (TRL 7 and 8) Applicable Management Directives (MD), if required. (TRL 7) List other deliverables when defined. 	<ul style="list-style-type: none"> Germane to both Acquisition and Commercialization Limited User Test (LUT) Plan. Deployment or Transition Plan. Training Plan. Operational Test Report. Customer Acceptance Document. Initial System-level Metrics Assessment. List other deliverables when defined. 	<ul style="list-style-type: none"> Germane to both Acquisition and Commercialization Customer Feedback. Lessons-learned. After-action Review. Support Plan is completed (a. Spiral Development Assessment, b. Prepared Product Improvement, c. Emerging Threats) Assessment, d. Technology Refresh / Insertion, e. Quality Assurance / Metrics Report, f. Risk Management Reassessment). List other deliverables when defined.
Management Review	<ul style="list-style-type: none"> STIC review meeting to ensure exit criteria / deliverables are met. EOC review and approval to move onto the next phase. Corporate review meeting of value proposition and product overview. Results and follow up actions. 	<ul style="list-style-type: none"> STIC review meeting to ensure exit criteria / deliverables are met (incorporate S&T Director of Research). Corporate review meeting of the preliminary product plan. Feasibility Review meeting. Results and follow up actions. 	<ul style="list-style-type: none"> STIC review meeting to ensure exit criteria / deliverables are met (incorporate S&T Director of Research). EOC review and approval to move onto the preliminary product plan and technology roadmap. Results and follow up actions. 	<ul style="list-style-type: none"> STIC review meeting to ensure exit criteria / deliverables are met (incorporate S&T Director of Research). EOC review and approval to move onto the next phase. Optimization Review meeting. Results and follow up actions. 	<ul style="list-style-type: none"> STIC review meeting to ensure exit criteria / deliverables are met (incorporate S&T Director of Innovation, or Transition). Analysis of the engineering and manufacturing plan. Results and follow up actions. 	<ul style="list-style-type: none"> STIC review meeting to ensure exit criteria / deliverables are met (incorporate S&T Director of Innovation, or Transition). EOC review and approval to move onto the manufacturing plan. Results and follow up actions. 	<ul style="list-style-type: none"> STIC review meeting to ensure exit criteria / deliverables are met (incorporate S&T Director of Innovation, or Transition). EOC review and approval to move onto the next phase. Development Phase review meeting. Comprehensive analysis of the engineering and manufacturing plan. Results and follow up actions. 	<ul style="list-style-type: none"> STIC review meeting to ensure exit criteria / deliverables are met (incorporate S&T Director of Innovation, or Transition). Analysis and review of the manufacturing release package. Results and follow up actions. 	<ul style="list-style-type: none"> STIC review meeting to ensure exit criteria / deliverables are met (incorporate S&T Director of Innovation). Analysis and review of the manufacturing plan. Results and follow up actions. 	<ul style="list-style-type: none"> STIC review meeting to ensure exit criteria / deliverables are met (incorporate S&T Director of Transition). EOC review and approval to move onto the next phase / transition. Corporate review of the finalized product plan and sales release package. Sales Release Phase Review meeting.

SECURE PROGRAM



DHS S&T Portfolio Perspective

Type of Project or Program		TRL	Product Maturity	Transition Target	Customer Agreement
Basic Research Project		1-3	Emerging technology	Advanced Research or Innovation	None
Innovation Project	Homeland Innovative Prototypical Solution (HIPS) Project	3-7	System prototype (high-risk game-changing development)	Acquisition Program	
	High-Impact Technology Solution (HITS) Project	3-7	Mature technology (high-risk game-changing development)	Acquisition Program	
Transition Project	Advanced Research Project	3-6	Mature technology (low/medium-risk development)	Acquisition Program	Technology Transition Agreement (TTA) or Technology Commercialization Agreement (TCA)
	System Development Project/Acquisition	6-9	End-user system (fully supportable and deployable, developed by a prime contractor)	Captive users in DHS Sponsor's organization	
	Technology Commercialization Project	6-9	COTS product (fully supported and marketed, developed by a private-sector licensee)	State/Local end users via acquisition, procurement, and grants activities	
Operations Program		-	Service	Customers in Federal Agencies and private sector	Service Level Agreement (agreements are only between Federal entities)