

**UNCLASSIFIED**

**Exhibit R-2, RDT&E Budget Item Justification:** PB 2012 Office of Secretary Of Defense **DATE:** February 2011

<b>APPROPRIATION/BUDGET ACTIVITY</b>				<b>R-1 ITEM NOMENCLATURE</b>							
0400: <i>Research, Development, Test &amp; Evaluation, Defense-Wide</i> BA 2: <i>Applied Research</i>				PE 0602670D8Z: <i>Human Social Culture Behavior (HSCB) Modeling Applied Research</i>							
<b>COST (\$ in Millions)</b>	<b>FY 2010</b>	<b>FY 2011</b>	<b>FY 2012 Base</b>	<b>FY 2012 OCO</b>	<b>FY 2012 Total</b>	<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>	<b>FY 2016</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
Total Program Element	7.639	9.499	14.923	-	14.923	17.057	17.432	17.821	18.359	Continuing	Continuing
P270: <i>Human Social Culture Behavior (HSCB) Modeling Applied Research</i>	7.639	9.499	14.923	-	14.923	17.057	17.432	17.821	18.359	Continuing	Continuing

**A. Mission Description and Budget Item Justification**

The Human Social Culture Behavior (HSCB) Modeling Program is a vertically integrated effort to research, develop, and transition technologies, tools, and systems to programs of record and users in need. Under three integrated program elements (PEs), the Program will conduct applied research, mature and demonstrate advanced technology, and develop transition-ready components and prototypes. The Program will create software tools that will help intelligence analysts, operations analysts, operations planners, and wargamers represent, understand, and forecast socio-cultural behavior at the strategic, operational and tactical levels. Work under PE 0602670D8Z will focus on developing an applied science base and general-use, cross-domain capabilities/tools to support the HSCB application domains of analysis, operational planning, training, and operations experimentation (wargaming). Research will address needs in four areas: modeling, visualization, training, and data. It will: develop and validate theoretical constructions, generate knowledge products, and develop stand-alone computational models of socio-cultural behavior; develop methods for visualizing socio-cultural behavior variables and their associated complexity and uncertainty; identify cultural competencies indexed to warfighter tasking and develop methods for flexible training of socio-cultural knowledge, skills, and abilities at tactical and operational levels; and develop improved methods for valid collection of quality socio-cultural data that will facilitate subsequent model development and validation.

Human behavior based theory, knowledge products, and stand-alone models will support development of software to help users represent, understand, and forecast socio-cultural behavior at strategic, operational, and tactical levels.

Visualization methods will support rapid assessment of the human activity environments, social, cultural, behavioral at strategic to tactical levels.

Socio-cultural competencies and training methods will enable development of software tools that can support agile, efficient delivery of innovative and high impact training.

Improved data collection methods will help build the socio-cultural science base and facilitate subsequent model development and validation.

**UNCLASSIFIED**

**Exhibit R-2, RDT&E Budget Item Justification:** PB 2012 Office of Secretary Of Defense **DATE:** February 2011

<b>APPROPRIATION/BUDGET ACTIVITY</b>	<b>R-1 ITEM NOMENCLATURE</b>
0400: <i>Research, Development, Test &amp; Evaluation, Defense-Wide</i> BA 2: <i>Applied Research</i>	PE 0602670D8Z: <i>Human Social Culture Behavior (HSCB) Modeling Applied Research</i>

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2010</b>	<b>FY 2011</b>	<b>FY 2012 Base</b>	<b>FY 2012 OCO</b>	<b>FY 2012 Total</b>
Previous President's Budget	7.882	9.499	15.843	-	15.843
Current President's Budget	7.639	9.499	14.923	-	14.923
Total Adjustments	-0.243	-	-0.920	-	-0.920
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-0.028	-			
• SBIR/STTR Transfer	-0.203	-			
• Other Internal Adjustments	-0.012	-	-	-	-
• Defense Efficiency - Reports, Studies, Boards, and Commissions	-	-	-0.898	-	-0.898
• Economic Assumptions	-	-	-0.022	-	-0.022

**Change Summary Explanation**

Defense Efficiency – Report, Studies, Boards and Commissions. As part of the Department of Defense reform agenda, reflects a reduction in the number and cost of reports, studies, DoD Boards and DoD Commissions below the aggregate level reported in the previous budget submission.

Economic Assumptions: \$0.022 M

**UNCLASSIFIED**

**Exhibit R-2A, RDT&E Project Justification:** PB 2012 Office of Secretary Of Defense **DATE:** February 2011

<b>APPROPRIATION/BUDGET ACTIVITY</b> 0400: <i>Research, Development, Test &amp; Evaluation, Defense-Wide</i> BA 2: <i>Applied Research</i>	<b>R-1 ITEM NOMENCLATURE</b> PE 0602670D8Z: <i>Human Social Culture Behavior (HSCB) Modeling Applied Research</i>	<b>PROJECT</b> P270: <i>Human Social Culture Behavior (HSCB) Modeling Applied Research</i>
--	--	---

COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
P270: <i>Human Social Culture Behavior (HSCB) Modeling Applied Research</i>	7.639	9.499	14.923	-	14.923	17.057	17.432	17.821	18.359	Continuing	Continuing

**A. Mission Description and Budget Item Justification**

The Human Social Culture Behavior (HSCB) Modeling Program is a vertically integrated effort to research, develop, and transition technologies, tools, and systems to programs of record and users in need. In three integrated program elements (PEs), the Program will conduct applied research, mature and demonstrate advanced technology, and develop transition-ready components and prototypes. The Program will create software tools that will help intelligence analysts, operations analysts, operations planners, and wargamers represent, understand, and forecast socio-cultural behavior at the strategic, operational and tactical levels. Work under PE 0602670D8Z will focus on developing an applied science base and general-use, cross-domain capabilities/tools to support the HSCB application domains of analysis, operational planning, training, and operations experimentation (wargaming). Research will address needs in four areas: modeling, visualization, training, and data. It will: develop and validate theoretical constructions, generate knowledge products, and develop stand-alone computational models of socio-cultural behavior; develop methods for visualizing socio-cultural behavior variables and their associated complexity and uncertainty; identify cultural competencies indexed to warfighter tasking and develop methods for flexible training of socio-cultural knowledge, skills, and abilities at tactical and operational levels; and develop improved methods for valid collection of quality socio-cultural data that will facilitate subsequent model development and validation.

Human behavior based theory, knowledge products, and stand-alone models will support development of software to help users represent, understand, and forecast socio-cultural behavior at strategic, operational, and tactical levels.

Visualization methods will support rapid assessment of the human activity environments, social, cultural, behavioral at strategic to tactical levels.

Socio-cultural competencies and training methods will enable development of software tools that can support agile, efficient delivery of innovative and high impact training.

Improved data collection methods will help build the socio-cultural science base and facilitate subsequent model development and validation.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2010	FY 2011	FY 2012
<b>Title:</b> Human Behavior Based Theory and Model Development	2.679	3.028	5.265
<b>Description:</b> Conduct the research necessary to develop and refine theoretical constructs and validate them using empirical data. Develop knowledge products (including conceptual models, decision frameworks, ontologies, databases) that will support computational modeling of socio-cultural behavior. Apply validation techniques across the spectrum of applications (Intelligence, Influence Operations, Planning) to quantitative models of socio-cultural factors in coalition warfare and socio-cultural factors of			

**UNCLASSIFIED**

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2012 Office of Secretary Of Defense		<b>DATE:</b> February 2011		
<b>APPROPRIATION/BUDGET ACTIVITY</b> 0400: <i>Research, Development, Test &amp; Evaluation, Defense-Wide</i> BA 2: <i>Applied Research</i>	<b>R-1 ITEM NOMENCLATURE</b> PE 0602670D8Z: <i>Human Social Culture Behavior (HSCB) Modeling Applied Research</i>	<b>PROJECT</b> P270: <i>Human Social Culture Behavior (HSCB) Modeling Applied Research</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2010</b>	<b>FY 2011</b>	<b>FY 2012</b>
<p>military significance for emerging conflicts. Develop stand-alone models that instantiate social science theoretical constructs to address mission-specific needs. Develop a human behavior modeling framework that is independent of specific socio-cultural values, attitudes and beliefs.</p> <p><b>FY 2010 Accomplishments:</b> Developed data, methods and models for representing extremist and insurgent communication as it relates to decision making and behavior (Arizona State University and University of Washington/Applied Physics Laboratory). Developed online game infrastructure that functions as a testbed for social and behavioral models. Tested models of how agents think and models of how networks of agents grow and evolve (University of Southern California). Developed and tested service-oriented architecture (SOA) for modeling and analysis (Carnegie Mellon University). Delivered V1.0 agent-based model for simulating the behavior of participants in Afghan opium markets (Los Alamos National Labs). Completed models that simulate evolution of multigame strategies of state and sub-state actors for one of three test scenarios (University of Chicago). Completed model framework and concept of operations for tool designed to estimate effects of coordinated U.S. Government and (USG) and Non-Governmental Organization (NGO) efforts (eCross Culture). Created initial model to test discrimination of extremist/moderates in psychological terms in five distinct dimensions (ARA Klein). Developed technical approach to transition emerging 6.2 technology and intellectual capital to warfighter.</p> <p><b>FY 2011 Plans:</b> Research and develop methods and models to understand, forecast, and assist analysts and planners to mitigate the spread of violent extremism. Continue application of hybrid modeling environments where hybrid means using a combination of the major modeling modalities (systems dynamics, game theoretic and agent). Continue to develop the theory to support hybrid, generalizable models across the spectrum from tactical to operational to strategic levels. Continue to research the effectiveness of generalizable models at the tactical, operational and strategic levels and determine the data fidelity requirements for each level of modeling.</p> <p><b>FY 2012 Plans:</b> Deliver and test models that can assist in countering violent extremism. Develop methods and data for conducting audience analysis in support of influence operations and strategic communication actions. Support the rapid creation of culturally aware, audience specific messages. Provide methods to measure changes in population sentiment across short periods of time and sectors of society that can be done by U.S. forces. Demonstrate links from sentiment to attitudes and behavior.</p>				
<b>Title:</b> Visualization Methods		1.912	2.930	3.715
<b>Description:</b> Develop common categorization of meta-information (i.e., the data source and pedigree, what types of uncertainty are associated with it, how old is the data, etc.) in existing visualization tools/decision aiding systems. Develop methods for				

**UNCLASSIFIED**

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2012 Office of Secretary Of Defense		<b>DATE:</b> February 2011		
<b>APPROPRIATION/BUDGET ACTIVITY</b> 0400: <i>Research, Development, Test &amp; Evaluation, Defense-Wide</i> BA 2: <i>Applied Research</i>	<b>R-1 ITEM NOMENCLATURE</b> PE 0602670D8Z: <i>Human Social Culture Behavior (HSCB) Modeling Applied Research</i>	<b>PROJECT</b> P270: <i>Human Social Culture Behavior (HSCB) Modeling Applied Research</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2010</b>	<b>FY 2011</b>	<b>FY 2012</b>
visually and digitally depicting the incomplete, subjective, volatile, and/or imprecise nature of cultural information to support manual and automated analysis.  <b>FY 2010 Accomplishments:</b> Delivered V1.0 interface for visualizing dynamics of Afghan opium markets (Los Alamos National Labs). Developed and tested SOA architecture for modeling and analysis with interface that supports visualization of model configuration and workflow (Carnegie Mellon University). Developed methods for geospatial display of state level strategic actions as they evolve over time (University of Chicago).  <b>FY 2011 Plans:</b> Continue development of visualization infrastructure that displays hybrid data sources. Expected focus will include research of visualization capability that will provide end-to-end support for commanders at all levels for operational planning and effects assessment.  <b>FY 2012 Plans:</b> Research methods and techniques for visualization that focus on the most challenging issues of socio-cultural data, including sparseness, volatility, validity, complexity, and uncertainty. Work should produce approaches that will help model users recognize and adjust for these issues.				
<b>Title:</b> Socio-Cultural Competencies and Training Methods  <b>Description:</b> Tactical, Operational and Strategic level non-kinetic actions can be a large force multiplier. This work will develop technologies, models, and skills training to focus on the insertion of technologies to support COCOM and operational level training for planners who will need to integrate socio-cultural factors into operational planning (allowing for the planning, software execution, and rehearsal of certain non-kinetic operations). Develop conceptual model for socio-cultural training of military personnel, including specification of competencies focused on relevant operational scenarios. Develop methods that can use flexible underlying cultural models for training at the operational/tactical level.  <b>FY 2010 Accomplishments:</b> Studies conducted on cross-cultural competencies required to meet specific military domain requirements (Army Research Institute (ARI)). Completed cognitive task analysis and design of a system for cultural training of junior officers and non-commissioned officers (361 Interactive). Conducted "Developing Intercultural Adaptability in the Warfighter", a two-day workshop focused on cultural education and training held 4-5 November 2009 in Orlando, Florida. The workshop was co-sponsored by the Office of the Secretary of Defense (OSD) HSCB Modeling Program, the Office of Naval Research (ONR), the Combating		1.525	1.771	2.972

**UNCLASSIFIED**

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2012 Office of Secretary Of Defense		<b>DATE:</b> February 2011		
<b>APPROPRIATION/BUDGET ACTIVITY</b> 0400: <i>Research, Development, Test &amp; Evaluation, Defense-Wide</i> BA 2: <i>Applied Research</i>	<b>R-1 ITEM NOMENCLATURE</b> PE 0602670D8Z: <i>Human Social Culture Behavior (HSCB) Modeling Applied Research</i>	<b>PROJECT</b> P270: <i>Human Social Culture Behavior (HSCB) Modeling Applied Research</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2010</b>	<b>FY 2011</b>	<b>FY 2012</b>
<p>Terrorism Technical Support Office (CTTSO), and the U.S. ARI. The goals of the workshop were to differentiate capability needs and training methods and for attendees to share information.</p> <p><b>FY 2011 Plans:</b> Determine critical cultural knowledge skills, tailored to Military Occupation Specialties. The FY 2011 program will identify remaining education/training gaps and research tools and techniques for filling them. Expected focus will include leveraging serious gaming techniques for virtual training and mission rehearsal.</p> <p><b>FY 2012 Plans:</b> Conduct research on optimal training delivery methods, including research on methods for accelerated development of training for new regions. Consider which training methodologies are most effective given the knowledge skills and abilities that must be learned. Develop techniques for virtual training of culture-specific skills and basic interpersonal interactions. Research methods for accelerating development of training content for new regions/cultures, cost-effective ways and while maintaining content validity/accuracy.</p>				
<p><b>Title:</b> Data Collection Methods</p> <p><b>Description:</b> Develop scientifically validated strategies to collect cultural and societal information in denied or difficult to penetrate areas. Develop hand-held/portable tools to collect cultural and societal information. Develop methodologies and supporting technologies capable of extracting relevant data into databases for further modeling to support denied, restricted, or unavailable area socio-cultural data. Develop technologies capable of leveraging extracted data (e.g. from surveys), and processing and validating it. Develop methods and supporting technologies in which data can be ascribed a measure of veracity and with evidentiary value such that the data is broadly useful as it perpetuates throughout the system. Examine the use of general use metadata technologies for multipurpose/multimodal applications.</p> <p><b>FY 2010 Accomplishments:</b> Developed instrument to collect data on penetration of Western values in seven Mideast nations (Eastern Michigan University). Have developed initial tool set for collecting data and performing sentiment analysis on virtual communities to investigate propagation patterns and influence patterns (University of Hawaii). Designed a data framework for discourse mining to support simulation of multigame strategic interactions (University of Chicago). Developed tools for harvesting social media content (Lockheed Martin). Developed ontology for ethnographic data collection for use in computational modeling (Penn State University).</p> <p><b>FY 2011 Plans:</b> Integrate tools/models into SOA architecture. Research novel methods for accurate, non-polling collection of data on sentiment, beliefs, opinions. Continue to mature technologies capable of extracting relevant data into databases to support socio-cultural</p>		1.523	1.770	2.971

**UNCLASSIFIED**

**UNCLASSIFIED**

**Exhibit R-2A, RDT&E Project Justification:** PB 2012 Office of Secretary Of Defense **DATE:** February 2011

<b>APPROPRIATION/BUDGET ACTIVITY</b> 0400: <i>Research, Development, Test &amp; Evaluation, Defense-Wide</i> BA 2: <i>Applied Research</i>	<b>R-1 ITEM NOMENCLATURE</b> PE 0602670D8Z: <i>Human Social Culture Behavior (HSCB) Modeling Applied Research</i>	<b>PROJECT</b> P270: <i>Human Social Culture Behavior (HSCB) Modeling Applied Research</i>
--	--	---

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2010	FY 2011	FY 2012
modeling. Continue development of technologies capable of leveraging extracted data (e.g. from surveys), and processing and validating it.  <b>FY 2012 Plans:</b> Test and demonstrate flexible, data-to-model service oriented architecture using multi-sourced datasets. Research and develop an HSCB data collection, analysis and interpretation capability for small units (e.g. platoons, squads). Develop methods and approaches to collect and validate information on denied environments, with particular focus on social media. Research is required on how representative this information is about a society or social group.			
<b>Accomplishments/Planned Programs Subtotals</b>	7.639	9.499	14.923

**C. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
• PE 0603670D8Z BA 3 : <i>HSCB Advanced Development</i>	9.761	10.834	18.101		18.101	20.743	21.150	21.603	22.252	Continuing	Continuing
• PE 0604670D8Z BA 4 : <i>HSCB Research and Engineering</i>	6.295	6.845	10.272		10.272	12.926	13.180	13.440	13.878	Continuing	Continuing

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

N/A