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**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 0602663D8Z: <i>Data to Decisions 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	-	3.261	9.235	-	9.235	14.139	14.181	19.135	19.162	Continuing	Continuing
P266: <i>Data to Decisions Applied Research</i>	-	3.261	9.235	-	9.235	14.139	14.181	19.135	19.162	Continuing	Continuing

**Note**

The Joint Data Management program has been restructured in FY 2012 to become an expanded Data-to-Decisions program that addresses additional challenges from the Quadrennial Defense Review and Combatant Commanders. This expanded program builds on the FY 2010 and FY 2011 accomplishments with increased objectives and technology developments critical to on-going operations. This Data-to-Decisions program focuses on information management architecture needs located at the seams between ongoing Service research efforts.

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

A critical element in nearly all defense missions is the Decision Support System, which manages the accumulation of important data and provides tools to help commanders make relevant decisions. These "Data-to-Decision" systems have become increasingly more important as our operations have shifted from large-scale force-on-force engagements to asymmetric conflicts. Terrorists and insurgents are deeply buried within local populations and employ operational concepts that blend in with urban clutter. Subsequently, finding these asymmetric targets has driven an explosion in sensing capabilities and modalities. This exponential growth in sensing volume has so stressed our current technologies that the majority of data now collected is thrown away. Additionally, because the targets are diffuse and rapidly adapt to countermeasures, there has been a rapid proliferation of decision support systems. At last count, the Research & Engineering Database had over 388 references to Decision Support programs.

The goal of this program is to develop an Information Open System Architecture (IOSA) that provides a common platform for rapidly developing and integrating new Data-to-Decisions systems. This IOSA will be based on a canonical decision support architecture and support a physical infrastructure for multi-source data management as well as user-driven innovation tools for analytics. The data management infrastructure will provide easy access and management of current and emergent data sources through plug-and-play modules. Data will be contextualized, indexed, conditioned and intelligently stored with approved formats to allow rapid search and retrieval of tactically relevant data sets. The effort will integrate existing analytics tools, and develop applicable new ones where gaps exist. A library of analytic tools will be built and research into end user programming methods will support new innovation models that mimic commercially successful products. The program consists of both applied research and technology development efforts focused on solving challenge problems each year with spiral developments to a prototype system.

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<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	4.940	3.261	3.640	-	3.640
Current President's Budget	-	3.261	9.235	-	9.235
Total Adjustments	-4.940	-	5.595	-	5.595
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Other Program Adjustments	-4.940	-	6.360	-	6.360
• Defense Efficiency - Reports, Studies, Boards, and Commissions	-	-	-0.751	-	-0.751
• Economic Assumptions	-	-	-0.014	-	-0.014

**Change Summary Explanation**

Baseline Review. As part of the Department of Defense reform agenda, beginning in FY 2012, this PE has expanded in scope from the original Joint Data Management program. Additional funding of \$6.360M has been added to reflect this new direction and work plan to align resources to the most critical priorities and eliminate lower priority functions.

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.

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<b>APPROPRIATION/BUDGET ACTIVITY</b>				<b>R-1 ITEM NOMENCLATURE</b>				<b>PROJECT</b>			
0400: <i>Research, Development, Test &amp; Evaluation, Defense-Wide</i> BA 2: <i>Applied Research</i>				PE 0602663D8Z: <i>Data to Decisions Applied Research</i>				P266: <i>Data to Decisions 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>
P266: <i>Data to Decisions Applied Research</i>	-	3.261	9.235	-	9.235	14.139	14.181	19.135	19.162	Continuing	Continuing

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

The Joint Data Management Program has been restructured in FY 2012 to become an expanded Data-to-Decision program. This Data-to-Decision program builds on the FY 2010 and FY 2011 accomplishments with increased objectives and technology developments critical to on-going operations. That program had two subtasks as outlined below:

Data Shaping for Exploitation - When tracing the information processing chain from the sensor inputs to the user/analysts, the automated techniques that are known and can be applied become fewer and less mature. The simple information processing chain goes from (1) data tagging and (2) pre-processing to (3) multi-source common data representation to (4) triage/identify high priority data subsets for analysis and action. Candidate research topics to be explored include pattern analysis, data classification for important and prioritization, criticality assessment, change detection, uncertainty management and reduction, high level structures, data search and retrieval, feature extraction, automatic translation, and automated or assisted pattern recognition.

Data Discovery for Exploitation - In order to better discover and exploit the growing amount of sensor data, the following areas of research are considered: object recognition in scenes and streams, discovery and exploitation at the edge, structuring knowledge for discovery, improving analytic throughput, aiding Intelligence, Surveillance and Reconnaissance (ISR) functions, layered analysis and interpretation, effects prediction for decision support, and cross domain access for effective ISR.

These two tasks will be consumed within a new structure in the Data-to-Decisions program. This new program will focus on developing open-architecture technologies for decision support systems to help reduce future development time and cost of data management, analytics and user interface subsystems. The program will use a spiral development model with four-steps. Each year Operational teams will choose a series of cross-service challenge problems dominated by a specific sensing modality. Representative data for each of those problems will then be collected for testing against that problem. A Development team will design algorithms and data management architectures using high-level languages and self test on controlled data sets to address those challenge problems. Independent assessment will occur with sequestered data sets, but each development tool will also be tested against new sensors not included in the self-testing to determine fragility. A Transition team will host the developed algorithms as services in a spiraling prototype system.

The Applied Research program will concentrate on the Development portion of this collaborative effort, while the Advanced Technology Development program focuses on the infrastructure piece, to include the Operational, Assessment and Transition portions. There will be four thrust areas in total, MOVing INTelligence (MOVINT) analytics, Text analytics, IMagery INTelligence (IMINT) analytics and Integration. Work being conducted under the previous two tasks will be consumed within these new tasks and are appropriately described as below.

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2010</b>	<b>FY 2011</b>	<b>FY 2012</b>
<p><b>Title:</b> MOVINT Analytics</p> <p><b>Description:</b> MOVINT analytics is concerned with developing algorithms to exploit full motion video, Ground Moving Target Indication (GMTI), COMmunications INTelligence (COMINT) and other forms of MOVINT. These algorithms will be implemented in software modules that can be cast as services on a Service-Oriented Architecture. Representative modules include trackers, activity based analytics, behavior detection, start-stop detectors and others.</p> <p><b>FY 2011 Plans:</b> The FY 2011 program will develop a tracker and graph analytic module using a consortium with open source development. - Existing proprietary trackers and graph engines will be evaluated and compared against the consortium-led modules to determine best of breed under various operating conditions. - Applied research will be conducted to determine new strategies for building analytics that are extensible across many cross-Service mission areas.</p> <p><b>FY 2012 Plans:</b> - MOVINT analytics will continue as trackers are improved and tested against more extended operating conditions and sensor/target combinations. - Research will begin on advanced MOVINT analytics to include algorithms for activity-based analytics, start-stop detection. The Operational team will drive specific module foci based on the missions chosen.</p>		-	2.761	4.638
<p><b>Title:</b> Text Analytics</p> <p><b>Description:</b> Text analytics is a growing field and central to the war on insurgents. They form a fundamental basis for Open Source Intelligence, as well as the means for logging, storing and retrieving important information derived from warfighter interactions with local populations. Text-based analytic algorithms include machine translation, sentiment analysis and gisting, as well as other techniques.</p> <p><b>FY 2011 Plans:</b> Understand the state-of-art in machine translation, identify gaps and conduct research to reduce these technical shortfalls</p> <p><b>FY 2012 Plans:</b> - Develop polling and sentiment analysis approaches that allow commanders to track and manage interactions in theater. - Research advances in social network discovery and link entity mining tools. Conduct research to close gaps that make these tools useful to battlefield and intelligence needs.</p>		-	0.500	4.597
<b>Accomplishments/Planned Programs Subtotals</b>		-	3.261	9.235

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

<u>Line Item</u>	<u>FY 2010</u>	<u>FY 2011</u>	<u>FY 2012</u>			<u>FY 2013</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>Cost To</u>	
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	<u>Total Cost</u>
• BA 3, PE# 0603663D8Z, P366: <i>Data-to-Decisions Advanced Development</i>	4.797	5.693	9.235		9.235	14.140	14.181	19.135	19.162	Continuing	Continuing

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

N/A