Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Defense Advanced Research Projects Agency	DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602305E: *MACHINE INTELLIGENCE*

COST ($ in Millions)	All Prior Years	FY 2012	FY 2013#	FY 2014 Base	FY 2014 OCO ##	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
Total Program Element	-	49.717	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
MCN-01: *MACHINE INTELLIGENCE*	-	49.717	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

The FY 2014 OCO Request will be submitted at a later date

A. Mission Description and Budget Item Justification

The Machine Intelligence project developed technologies that enable computing systems to extract and encode information from dynamic and stored data, observations, and experience, and to derive new knowledge, answer questions, reach conclusions, and propose explanations. Enabling computing systems with machine intelligence is now of critical importance because sensor, information, and communication systems continuously generate and deliver data at rates beyond which humans can assimilate, understand, and act. This explosion in available data/information ("big data"), combined with the ready availability of inexpensive mass storage and ubiquitous, inexpensive, computation-on-demand, provide the foundation for entirely new machine intelligence capabilities.

B. Program Change Summary ($ in Millions)	FY 2012	FY 2013	FY 2014 Base	FY 2014 OCO	FY 2014 Total
Previous President's Budget	52.276	0.000	0.000	-	0.000
Current President's Budget	49.717	0.000	0.000	-	0.000
Total Adjustments	-2.559	0.000	0.000	-	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-1.134	0.000			
• SBIR/STTR Transfer	-1.425	0.000			

Change Summary Explanation

FY 2012: Decrease reflects reductions for the SBIR/STTR transfer and internal below threshold reprogrammings.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
Title: Machine Reading and Reasoning Technology	24.359	0.000	0.000
Description: The Machine Reading and Reasoning Technology program developed enabling technologies to acquire, integrate, and use high performance reasoning strategies in knowledge-rich domains. Such technologies provide DoD decision makers with			

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
rapid, relevant knowledge from a broad spectrum of sources that may be dynamic and/or inconsistent. To address the significant challenges of context, temporal information, complex belief structures, and uncertainty, new capabilities were developed to extract key information and metadata, and exploit these via context-capable search and inference. ***FY 2012 Accomplishments:*** - Developed the capability to automatically learn reading patterns by addressing ambiguity resolution and discovering inference patterns. - Demonstrated temporal reasoning over facts and events extracted from text. - Initiated application of machine reading technology to operations of transition customer.			
Title: Mind's Eye ***Description:*** The Mind's Eye program is developing a machine-based capability to learn generative representations of action between objects in a scene, directly from visual inputs, and then to reason over those learned representations. Mind's Eye will create the perceptual and cognitive underpinnings for reasoning about the action in scenes, enabling the generation of a narrative description of the action taking place in the visual field. The technologies developed under Mind's Eye have applicability in automated ground-based surveillance systems. This effort is funded in PE 0602702E, Project TT-13 in FY 2013. ***FY 2012 Accomplishments:*** - Developed improved visual intelligence capabilities based on initial assessments and evaluated on operationally relevant datasets. - Integrated visual intelligence into three smart camera prototypes and performed concept demonstration to U.S. Army.	13.441	0.000	0.000
Title: Visual Media Reasoning (VMR) ***Description:*** The Visual Media Reasoning (VMR) program is creating technologies to automate the analysis of enemy-recorded photos and videos and identify, within minutes, key information related to the content. This will include the identification of individuals within the image (who), the enumeration of the objects within the image and their attributes (what), and the image's geospatial location and time frame (where and when). Large data stores of enemy photos and video are available but cannot be leveraged by a warfighter or analyst attempting to understand a specific new image in a timely fashion. The VMR program will enable users to gain insights rapidly through application of highly parallelized image analysis techniques that can process the imagery in massive distributed image stores. VMR technology will serve as a force-multiplier by rapidly and automatically extracting tactically relevant information for the human analyst and alerting the analyst to scenes that warrant the analyst's expert attention. This effort is funded in PE 0602702E, Project TT-13 in FY 2013. ***FY 2012 Accomplishments:***	11.917	0.000	0.000

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Created application programming interfaces as the basis for an open architecture that facilitates integrating new computer vision algorithms. - Demonstrated and integrated initial set of biometric, object, and scene description algorithms into a single system. - Identified high priority operational use cases for each of the areas: Who, What, Where and When, using feedback from the warfighter/analyst user group. - Established a collaborative relationship with the National Media Exploitation Center (NMEC) under which VMR researchers accessed a sample comprised of tens of thousands of images and videos from NMEC's large corpus of adversary photos/videos and experimented with a "mini-clone" of NMEC's new NEXSYS multimedia exploitation system.			
Accomplishments/Planned Programs Subtotals	49.717	0.000	0.000

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

N/A

F. Performance Metrics

Specific programmatic performance metrics are listed above in the program accomplishments and plans section.