Exhibit R-2, RDT&E Budget Item Justification: PB 2013 Office of Secretary Of Defense	DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0604400D8Z: *Unmanned Aircraft Systems Common Development*

COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
Total Program Element	44.884	24.289	12.368	-	12.368	26.172	21.096	20.380	20.747	Continuing	Continuing
P440: *UAS Airspace Integration*	30.112	20.873	8.937	-	8.937	22.665	17.514	16.719	17.000	Continuing	Continuing
P442: *Interoperability*	14.772	3.000	3.000	-	3.000	3.060	3.121	3.184	3.247	Continuing	Continuing
P443: *Unmanned Systems Road Maps*	-	0.416	0.431	-	0.431	0.447	0.461	0.477	0.500	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Department of Defense (DOD) Unmanned Aircraft Systems (UAS) Common Development is a joint effort to develop and demonstrate common standards, architectures, and technologies that address UAS-specific issues across all Military Services. The intent is to increase interoperability and effectiveness by promoting cooperative development of solutions that are applicable across major classes of UAS. This effort will initially focus on addressing DOD UAS integration into the National Airspace System (NAS) and demonstration of a common, interoperable ground station architecture and associated interface standards.

B. Program Change Summary ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total
Previous President's Budget	49.292	24.289	27.388	-	27.388
Current President's Budget	44.884	24.289	12.368	-	12.368
Total Adjustments	-4.408	-	-15.020	-	-15.020
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	4.394	-			
• SBIR/STTR Transfer	-1.136	-			
• Defense Efficiency - Baseline Review	-	-	-	-	-
• Defense Efficiency - Report, Studies, Boards and Commission	-2.784	-	-	-	-
• Defense Efficiency - Contract Staff Support	-0.223	-	-	-	-
• Economic Assumptions	-0.251	-	-	-	-
• Other Program Adjustments	-4.408	-	-15.020	-	-15.020

Exhibit R-2A, RDT&E Project Justification: PB 2013 Office of Secretary Of Defense			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0604400D8Z: *Unmanned Aircraft Systems Common Development*	PROJECT P440: *UAS Airspace Integration*	

COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
P440: *UAS Airspace Integration*	30.112	20.873	8.937	-	8.937	22.665	17.514	16.719	17.000	Continuing	Continuing
Quantity of RDT&E Articles											

Note

PE 0305220N: RQ-4 UAV (BAMS UAS) contains additional funding for the common GH/BAMS ABSAA development. The Navy BAMS UAS program office is managing the common GH/BAMS ABSAA development.

A. Mission Description and Budget Item Justification

The Department plans to transition from the U-2 to the Global Hawk (GH), but today's restrictions on airspace access preclude this. GH and the Broad Area Maritime Surveillance (BAMS) UAS, also an RQ-4 aircraft, need an autonomous, sense-and-avoid (SAA) as an alternate means of compliance to Title 14 Code of Federal Regulations, Part 91.113, requirement to see-and-avoid other aircraft. MQ-1 Predator, MQ-1C Gray Eagle, and MQ-9 Reaper have similar requirements for SAA capability; their SAA technology development will leverage the GH/BAMS technology. Development of a Ground Based Sense-and-Avoid (GBSAA) system using existing technology can provide a near-term solution for improved airspace access, both for terminal operations (e.g., Beale AFB, GH transit to/from controlled airspace) and for operations/training within the GBSAA system's coverage area (e.g., Gray Eagle at El Mirage, Shadow operations at Cherry Point).

Provides joint funding for the BAMS and GH programs to accelerate the development of a common onboard, autonomous SAA (ABSAA) capability (one upon which a similar SAA system for Predator, Gray Eagle and Reaper can be based). BAMS program is the lead for the ABSAA development. Also, provides a GBSAA capability to meet DoD training and operational objectives at locations where airspace restrictions currently limit training and operations, and establishes dedicated funding to develop standards, modeling and simulation tools, and technology to enable DoD UAS to routinely access the national and international airspace systems.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Title: Unmanned Aircraft System Airspace Integration Initiatives	30.112	20.873	8.937
Description: Starting in FY 2010 the Department's sense-and-avoid (SAA) developmental efforts are enhanced by this defense-wide program element. This program provides joint funding to accelerate the development of ABSAA systems and standards to enable UAS to routinely access the national and international airspace systems, and provides a GBSAA solution for improved airspace access in the near-term. This program also develops UAS airspace integration requirements, standards, recommended practice guides as well as the modeling and simulation tools needed to validate the systems and standards.			
FY 2011 Accomplishments: ABSAA - Phase 1A - Contract awarded March 2011. Initiated development for a common, ABSAA system that satisfies common sense-and-avoid requirements of the United States Air Force (USAF) Global Hawk (GH) and United States Navy (USN) Broad Area Maritime Surveillance (BAMS) Unmanned Aircraft Systems (UAS) that is scalable to medium-altitude UAS. The program successfully conducted a System Requirements Review (SRR) and System Functional Review (SFR).			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Office of Secretary Of Defense		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0604400D8Z: *Unmanned Aircraft Systems Common Development*	PROJECT P440: *UAS Airspace Integration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Standards Development - Developed and initiated plan for development of UAS airworthiness certification criteria, standards, and methods of compliance for both fixed and rotary wing UAS (GCS and links included) for incorporation into MIL-HDBK-516. Developed, assessed, & published evolutionary DoD UAS Airspace Integration CONOPS defining the airspace use profiles. Initiated the development of a consistent methodology across all Military Services for developing a UAS Safety Case and a mid-air target level of safety (TLS) for UAS operations in all classes of airspace. Completed Target Level of Safety series of workshops and Safety Case Analysis of Alternatives. Developed UAS Airspace Integration Recommended Requirements for Terminal Area Operations, and a Sense and Avoid Blueprint tracking tool and definitions for Core Capabilities, Cross-Cutting Capabilities, and SAA attributes. Created UAS Profile Selection Guide and Visual Line of Sight Recommended Practices Guide. Modeling & Simulation (M&S) - Completed 2011 Modeling and Simulation Roadmap and UAS Technical Standards Development Process. GBSAA – The Federal Aviation Administration (FAA) granted the first Certification of Authorization (COA) allowing UAS flight in the NAS with a GBSAA system for operations at El Mirage, CA. In addition, Cherry Point MCAS made strides in FAA/NAVAIR system certification process with a COA approved for GBSAA test/data collection period, augmented with visual observers. In executing these first GBSAA-enabled UAS flights in the NAS, experiences in the following areas were gained: refinement of the process for safety case development and subsequent FAA approval; establishment of a data collection and mitigation tracking process to fulfill service certification and FAA requirements; and identification of an end-to-end process for developing, testing, qualifying, and implementing a GBSAA system. These flights utilized the first stage of GBSAA capability. The Phase 1 capability was advanced in the areas of data fusion, target classification, safety case development and initial algorithm design for maneuvering in airspace with other aircraft. A parallel development effort was conducted for Phase 2 (self-separation, including work on advanced maneuver algorithm requirements, optical sensor trade studies, and Human-Machine Interface (HMI) Studies for an improved user interface.			
FY 2012 Plans: ABSAA - Phase 1A –Continue development of the ABSAA system, further maturing the requirements and developing the preliminary software design culminating in a formal design review. The ABSAA design includes an integrated suite of sensors, decision logic algorithms, data recording, pilot displays, and prognostics & health management (P&HM) necessary to manage collision risk to an acceptable level of safety across the expected range of operational scenarios and mission environments for Global Hawk and BAMS. The Phase 1A effort will complete in FY 2012 with the formal design review. Standards Development - Continue the update of MIL-HDBK-516 for airworthiness criteria, standards, and methods of compliance for both fixed and rotary wing UAS. Develop a consistent methodology across all Military Services for determining an appropriate Target Level of Safety (TLS) methodology for calculating accepted risk from operating in the National Airspace System. Tailor the safety assessment for additional UAS Profiles to include vertical and lateral transit operations. Perform requirements analysis to identify, develop, and document the performance requirements for UAS vertical and lateral transit operational profiles as			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Office of Secretary Of Defense		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0604400D8Z: *Unmanned Aircraft Systems Common Development*	PROJECT P440: *UAS Airspace Integration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
defined in the DoD Airspace Integration Plan. Coordinate performance requirements development within appropriate standards development organizations (SDOs). Develop UAS Airspace Integration Safety Process Guidebook and a UAS Recommended Practices Guides for Terminal, Lateral and Vertical Operations. Modeling & Simulation (M&S) - Provide modeling, simulation and analysis (MS&A) to the FY12 requirements and standards efforts as well as the safety analysis activities. GBSAA – Design, test, and implement a certified Phase 1 system with expanded capability, providing significantly enhanced GBSAA functionality. Design and test further expansion of the Phase 1 capability. Incrementally improve all SAA sub-system capabilities including: sensors, tracker, data fusion, target classifier, network and communications, maneuver algorithms, and user interfaces. Continue Phase 2 self-separation design effort. Conduct collaborative workshops to enable joint development and demonstration of a common set of requirements and standards for a universal GBSAA solution, as well as a common path forward for Software Certification to meet Airworthiness requirements. ***FY 2013 Plans:*** ABSAA - Development transitions to Service Program of Record funding with the initiation of Phase 1B. This multi-year EMD effort will design, develop, integrate, test, and deliver an operational and production representative Group 3-5 UAS scalable common ABSAA capability/solution demonstrated on Global Hawk. Standards Development - Continue the update of MIL-HDBK-516 for airworthiness criteria, standards, and methods of compliance for both fixed and rotary wing UAS. Deliver UAS Airspace Integration Safety Process Guidebook and Interim Guidelines for UAS Airspace Integration recommended Standards. Develop UAS Airspace Integration Recommended Requirements for Dynamic Operations and UAS Recommended Practices Guides for Operating Area and Dynamic Operations. Modeling & Simulation (M&S) - Provide modeling, simulation and analysis (MS&A) to the requirements and standards efforts as well as the safety analysis activities. GBSAA – Begin fielding of a GBSAA System with the certified Phase 1 capability to sites in the NAS. Design, test and implement the further expansion of the Phase 1 capability. Continue Phase 2 design effort. Incrementally improve all SAA sub-system capabilities including: sensors, tracker, data fusion, target classifier, maneuver algorithms, and user interfaces. Conduct collaborative workshops to enable joint development and demonstration of common standards, architectures and technologies that address UAS-specific issues across all services. Begin deliberate planning for GBSAA Phase 3, which is the integration of GBSAA and ABSAA.			
Accomplishments/Planned Programs Subtotals	30.112	20.873	8.937

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2013 Office of Secretary Of Defense		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0604400D8Z: *Unmanned Aircraft Systems Common Development*	PROJECT P440: *UAS Airspace Integration*

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2013 Office of Secretary Of Defense			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0604400D8Z: *Unmanned Aircraft Systems Common Development*	PROJECT P442: *Interoperability*	

COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
P442: *Interoperability*	14.772	3.000	3.000	-	3.000	3.060	3.121	3.184	3.247	Continuing	Continuing
Quantity of RDT&E Articles											

A. Mission Description and Budget Item Justification

The UAS Common Ground Station Demonstration project will develop and demonstrate an interoperable, standards-based, open ground station architecture for RQ/MQ-4 (Global Hawk/BAMS), MQ-1 (Predator/Gray Eagle), MQ-5 (Hunter), MQ-8 (Fire Scout), MQ-9 (Reaper), and future UAS. The intent is to improve joint- and coalition-interoperability and to promote competition through the implementation of open standards and open architectures.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Title: UAS Common Ground Station Demonstration	14.772	3.000	3.000
Description: Develop and demonstrate an interoperable, standards-based, open ground station architecture for RQ/MQ-4 (Global Hawk/BAMS), MQ-1 (Predator/Gray Eagle), MQ-5 (Hunter), MQ-8 (Fire Scout), MQ-9 (Reaper), and future UAS. The intent is to improve joint- and coalition-interoperability and to promote competition through the implementation of open standards and open architectures. ***FY 2011 Accomplishments:*** Developed an "Open" approach to the v2.0 software plan. Transitioned scheduled projects to Programs of Record and user communities. Developed "3rd Party" vendor Integration Plan to reach out to additional vendors to develop services for future use. Established a path forward that allows Industry partners an opportunity to develop and share intellectual property through a body comprised of a federation of industry representatives within the OBM. Developed Interoperability Roadmap based on top down capabilities assessment. Conducted a review of remote video terminals and developed a plan for prototyping a government-owned "best of breed" version that can be released to vendors for open competition. ***FY 2012 Plans:*** Complete work begun in FY2011. Develop an "Open" approach to v2.1 (buildable architecture) which will be transitioned to Programs of Record and user communities. ***FY 2013 Plans:*** Develop and sustain governance over ground station open architecture, ensure model driven architecture stays current, and maintain software and architecture repository.			
Accomplishments/Planned Programs Subtotals	14.772	3.000	3.000

Exhibit R-2A, RDT&E Project Justification: PB 2013 Office of Secretary Of Defense		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0604400D8Z: *Unmanned Aircraft Systems Common Development*	**PROJECT** P442: *Interoperability*

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

n/a

Exhibit R-2A, RDT&E Project Justification: PB 2013 Office of Secretary Of Defense			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0604400D8Z: *Unmanned Aircraft Systems Common Development*	PROJECT P443: *Unmanned Systems Road Maps*	

COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
P443: *Unmanned Systems Road Maps*	-	0.416	0.431	-	0.431	0.447	0.461	0.477	0.500	Continuing	Continuing
Quantity of RDT&E Articles											

A. Mission Description and Budget Item Justification

This effort supports the Department's Unmanned Systems Roadmap and updates. The Unmanned Systems Roadmap provides a DoD vision for the continuing development, fielding and employment of unmanned systems technologies. This roadmap defines a common vision, establishes the current state of unmanned systems in today's force, and outlines a strategy for the common challenges that must be addressed to achieve the shared vision. Funding for this effort was contained within P440 and P442 of this Program Element before FY 2012.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Title: Unmanned Systems Roadmap	-	0.416	0.431
Description: Develops the Department's Unmanned Systems Roadmap and updates. ***FY 2011 Accomplishments:*** None. ***FY 2012 Plans:*** Update the Department's Unmanned Systems Roadmap and performed related studies supporting the Department's vision for unmanned systems. ***FY 2013 Plans:*** Update the Department's Unmanned Systems Roadmap and performe related studies supporting the Department's vision for unmanned systems.			
Accomplishments/Planned Programs Subtotals	-	0.416	0.431

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Provide up to date Unmanned Systems Roadmap providing a DoD vision for the continuing development, fielding and employment of unmanned systems technologies.