FY 2010 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: May 2009
Exhibit R-2

BUDGET ACTIVITY: 04
PROGRAM ELEMENT: 0604707N
PROGRAM ELEMENT TITLE: SPACE & ELECTRONIC WARFARE (SEW) ARCHITECTURE/ENGINEERING SUPPORT

COST: (Dollars in Millions)

Project Number & Title	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate
Total PE	40.401	48.116	42.533
0798 OTH TARGETING	2.056	1.896	0.923
2144 SPACE & ELEC WARFARE ENGINEERING	8.180	14.610	11.078
2357 MARITIME BATTLE CENTER	30.165	30.812	30.532
9999 CONGRESSIONAL PLUS-UPS	0.000	0.798	0.000

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This Program Element (PE) contains three projects: Maritime Battle Center (MBC), Over-the-Horizon Targeting (OTH-T), and Space and Electronic Warfare (SEW) Engineering. The MBC project (2357) focuses on Fleet experimentation in order to eliminate warfighting gaps and validate Navy Concept of Operations (CONOPS) and Doctrine coordinated by the Navy Warfare Development Command (NWDC). The MBC also manages US Fleet Forces Command's (USFFC) Sea Trial program of Fleet experimentation that is administered by the Sea Trial Executive Steering Group (STESG). Both MBC and Sea Trial integrate emergent concepts and technologies through experiments/analysis/modeling and simulation to support warfighting capability development. Sea Trial experimentation is dedicated to providing solutions to near term (within the Fiscal Year Defense Plan) warfighting gaps through focused Operational Agent (Commander Second Fleet, Commander Third Fleet and Commander Naval Network Warfare Command) led experimentation. The USFFC chaired Flag level Sea Trial Executive Steering Group prioritizes proposed Sea Trial experiments annually. The MBC will also serve as the Navy representative to the Joint Battle Center and the Battle Labs of other services.

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The OTH-T and SEW Engineering projects (0798 and 2144 respectively) are systems engineering non-acquisition programs to develop, test, implement Technical Authority, and validate Naval Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) architectures to support naval missions in the Joint and Coalition Theater. The mission of these projects are carried out by multiple tasks that are used to ensure Naval C4ISR Command and Control Warfare (C2W) components of SEW are effectively integrated into service-oriented architecture delivering net centric warfare capability. Additionally, these projects ensure that (1) the composite operational capabilities of SEW systems (not the individual component systems) conform to the Naval C4ISR architecture and enhance warfighting capability as related to the objectives of National Defense Strategy and evolving joint visions and direction, such as Joint Vision 2020 (JV 2020), "Sea Power 21" and "Net-Centric Capability" and are guided by warfighter requirements; and (2) that SEW systems and systems integration efforts involve leading-edge technology transfer of information processing technologies primarily through integration of government and commercial off-the-shelf (GOTS/COTS) products to enhance the Navy's operational capability, interoperability, warfighter effectiveness, flexible reconfiguration, as well as reduce costs; and (3) that SEW systems integration efforts promote the delivery of FORCEnet and the Navy's contribution to the Global Information Grid (GIG).

The SEW Engineering project (2144) also includes efforts supporting the Maritime Domain Awareness (MDA) program. MDA is "the effective understanding of anything associated with the global maritime domain that could impact the security, safety, economy, or environment of the United States." MDA can only be achieved through the combined efforts of federal, state, and local government agencies, international governments, and commercial and private enterprise. MDA is a key enabler for maritime security; as well as counter-piracy, counter-drug, freedom of navigation, counter-terrorism, humanitarian assistance and disaster relief, stability, and major combat operations.

Due to the number of efforts in this PE, the programs described are representative of the work included in this PE.

BUDGET ACTIVITY: 04
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PROGRAM ELEMENT TITLE: SPACE & ELECTRONIC WARFARE (SEW) ARCHITECTURE/ENGINEERING SUPPORT

B. PROGRAM CHANGE SUMMARY:

	FY 2008	FY 2009	FY 2010
Previous President's Budget	41.592	47.518	51.231
Congressional Program Reductions	0.000	-0.191	0.000
Program Adjustments	0.000	0.000	-8.687
Rate/Misc Adjustments	0.000	-0.011	-0.011
SBIR/STTR Transfer	-0.191	0.000	0.000
Total Congressional Increases	0.000	0.800	0.000
Total Reprogrammings	-1.000	0.000	0.000
Current BES/President's Budget	40.401	48.116	42.533

PROGRAM CHANGE SUMMARY EXPLANATION:
Technical: Not applicable

Schedule: Not applicable

C. OTHER PROGRAM FUNDING SUMMARY:
Not applicable.

D. ACQUISITION STRATEGY:
Not applicable

E. PERFORMANCE METRICS:
Maritime Battle Center:
- Refine concepts and identify key performance levels necessary for implementation.
- Demonstrate feasibility and discriminate among competing concepts and implementation alternatives.
- Understand potential military effectiveness and risk.
- Evaluate how much of the new capability and attendant force structure is needed.
- Learn how to operate the new force and combine it with the legacy force.
- Develop recommended Doctrine, Organization, Training, Material, Leadership, and Personnel (DOTMLP) changes.

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- Develop fleet warfighting requirements for submission to the OPNAV Navy Capabilities Development Process (NCDP) to inform Navy acquisition decisions.
- Integrate emergent concepts and technologies, leading to rapid introduction of needed warfighting capabilities in the fleet.
- Rapidly mature Sea Shield, Sea Strike, Sea Basing, and FORCEnet concepts, technologies, and doctrine.
- Focus on near, mid and long term warfighting challenges to realize increased warfighting effectiveness.

BUDGET ACTIVITY: 04
PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SPACE & ELECTRONIC WARFARE (SEW) ARCHITECTURE/ENGINEERING SUPPORT
PROJECT NUMBER: 0798 PROJECT TITLE: OTH TARGETING

COST: (Dollars in Millions)

Project Number & Title	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate
0798 OTH TARGETING	2.056	1.896	0.923

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The OTH-T/Allied Interoperability program provides a virtual, global systems integration and test facility for C4ISR technology that supports the collection, transmission, correlation, and display of track data into Common Operational and Tactical Pictures (COTP) in support of warfighting requirements. The common view of the battle space applies across the spectrum of warfare missions. However, technology and doctrine has changed radically. The first objective of the OTH-T/Allied Interoperability program is to transition the Joint/Navy architectures and systems to state-of-the-art COTS and GOTS products that support Network Centric Warfare. The second objective is to support development, integration, and joint interoperability of all National Security System (NSS), Information Technology (IT), and C4I systems into warfighting capabilities. This support includes providing technical expertise afloat and ashore via a cadre of highly trained Fleet Systems Engineers in order to integrate, validate, and evaluate new OTH-T/Allied Interoperability capabilities during major Fleet exercises and demonstrations. The OTH-T/Allied Interoperability program integration and testing in support of warfighting capabilities includes joint and coalition interoperability testing for C4ISR equipment. Coalition and joint interoperability is an important issue for future naval operations, especially with the Navy initiative to expand Internet Protocol (IP) networking throughout the Fleet Navy Marine Corps Intranet/Base Level Information Infrastructure (NMCI/BLII) with the GIG. Currently, IP connectivity with Coalition forces is limited, requiring extensive backhaul through ashore infrastructure. Funding allows for development of solutions for emerging Coalition and joint interoperability requirements. Data throughput needs to be increased for the exchange of large size files within the limitations of high frequency (HF) and ultra-high frequency (UHF) mediums in support of, for example, Collaboration at Sea (CAS) and Maritime Domain Awareness (MDA). Funding allows for further development of potential solutions for merging improved transmission control protocol/internet protocol (TCP/IP) capability with advance digital network systems (ADNS) and existing international standards (e.g. Standardization Agreement 5066). Funding will also allow for development of Subnet Relay and other tactical networking technologies and protocols as well as automatic link establishment standards, which provides for a significant improvement within, and between, battle groups.

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PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SPACE & ELECTRONIC WARFARE (SEW) ARCHITECTURE/ENGINEERING SUPPORT
PROJECT NUMBER: 0798 PROJECT TITLE: OTH TARGETING

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2008	FY 2009	FY 2010
ADVANCED RELAY/WIRELESS/ANTENNA TECHNOLOGIES	0.731	0.778	0.723

FY 2008 Accomplishments:

Designed, fabricated, and tested Generation 4 Spatially Aware Wireless Networking (SPAWN) prototype antennas in seaworthy brassboard form with wireless network equipment. Performed a line-of-sight (LOS) field demonstration of SPAWN in Trident Warrior 2008.

FY 2009 Plans:

Design, fabricate and test Generation 5 SPAWN antennas in integrated form with wireless network equipment. Perform an Over-the-Horizon (OTH) field demonstration of SPAWN in Trident Warrior 2009.

FY 2010 Plans:

Design, fabricate and test Generation 6 SPAWN antennas in an integrated form with wireless network equipment. Perform an Over-the-Horizon (OTH) field demonstration of SPAWN in Trident Warrior or similar venue to include airborne relay platforms for a demonstration of high bandwidth Naval Tactical Networking. The demonstration will also include the integration of advanced relay technology with mobile ad hoc network (MANET) controllers and High Assurance Internet Protocol Encryption (HAIPE) devices on CENTRIXS. Develop advanced routing, application and Information Assurance/Computer Network Defense (IA/CND) architectures and solutions for the coalition Naval Tactical Networking (NTN) environment that maximize network efficiency using multiple, dissimilar bearers.

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PROJECT NUMBER: 0798 PROJECT TITLE: OTH TARGETING

	FY 2008	FY 2009	FY 2010
INTEROPERABILITY VALIDATION	0.182	0.153	0.000

FY 2008 Accomplishments:

- Used the Reconfigurable Land Based Sites (RLBTS) and Over-the-Horizon Targeting (OTH-T) resources to validate Global Information Grid (GIG) technologies prior to shipboard installation, supported ten Net Ready-Key Performance Parameters (NR-KPP) Migration Plan Developments and four joint interoperability C4ISR certifications, ensured interoperability requirements between sensors, weapon systems and information systems were met.

FY 2009 Plans:

- Continue to use the RLBTS and OTH-T resources to validate GIG technologies prior to shipboard installation, support ten NR-KPP Migration Plan Developments and four joint interoperability C4ISR certifications to ensure interoperability requirements between sensors, weapon systems and information systems are met.

	FY 2008	FY 2009	FY 2010
SUBNET RELAY	0.194	0.209	0.200

FY 2008 Accomplishments:

- Continued to refine Subnet Relay allied interoperability in concert with Chief of Naval Operations for Communication Networks. Venues of opportunity were exploited to validate and evaluate developed portions of Subnet Relay configurations through testing, trials, and demonstrations. Investigated airborne deployment of Subnet Relay.

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FY 2009 Plans:

- Continue to refine Subnet Relay allied interoperability in concert with the Office of the Chief of Naval Operations. Venues of opportunity will be exploited to validate and evaluate developed portions of Subnet Relay configurations through testing, trials, and demonstrations. Complete field demonstration of Subnet Relay airborne deployment.

FY 2010 Plans:

- As a part of the refinement of Subnet Relay allied interoperability in concert with Office of the Chief of Naval Operations, develop interoperable wide-band ultrahigh frequency (UHF) solutions to enhance throughput and progress the standardization of Subnet Relay into a Standard NATO Agreement (STANAG). Exploit venues of opportunity to evaluate and validate developed portions of Wide-Band Subnet Relay configurations through testing, trials and demonstrations.

	FY 2008	FY 2009	FY 2010
SYSTEMS INTEGRATION & INTEROPERABILITY TESTING	0.521	0.418	0.000

FY 2008 Accomplishments:

- Conducted/participated in five overall Joint/Navy integration and interoperability tests as available; facilitated two planning reviews for Joint Test and Evaluations as available; participated in the Joint Users Interoperability Communications Exercise (JUICE), Joint Distributed Engineering Plant (JDEP), and other joint test events.

FY 2009 Plans:

- Continue to conduct/participate in five overall Joint/Navy integration and interoperability tests as available; facilitate two planning reviews for Joint Test and Evaluations as available; participate in JUICE, JDEP, and other joint test events.

BUDGET ACTIVITY: 04
PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SPACE & ELECTRONIC WARFARE (SEW) ARCHITECTURE/ENGINEERING SUPPORT
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	FY 2008	FY 2009	FY 2010
TESTING OTH-T SYSTEMS	0.428	0.338	0.000

FY 2008 Accomplishments:

- Conducted six developmental, integration, and certification tests of OTH-T and combat systems with tactical data exchanged over Common Operational Picture (COP) Common Synchronization Tools (CST) networks and other networks; three integration test events for Joint Command and Control, Combat Decision Systems, and Collaboration technologies within the GIG. Tested to also address issues of Fleet essential capabilities and emerging mission essential needs both for new, legacy, and technology refreshed systems. This included developmental testing between Joint C2 systems and combat systems.

FY 2009 Plans:

- Continue to conduct six developmental, integration, and certification tests of OTH-T and combat systems with tactical data exchanged over COP CST networks and other networks; three integration test events for Joint Command and Control, Combat Decision Systems, and Collaboration technologies within the GIG. Testing to also address issues of Fleet essential capabilities and emerging mission essential needs both for new, legacy, and technology refreshed systems. This includes developmental testing between Joint C2 systems and combat systems.

C. OTHER PROGRAM FUNDING SUMMARY - NAVY RELATED RDT&E:
Not applicable.

OTHER PROGRAM FUNDING SUMMARY - NON-NAVY RELATED RDT&E:

D. ACQUISITION STRATEGY:
Not applicable.

FY 2010 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: May 2009
Exhibit R-3

BUDGET ACTIVITY: 04
PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SPACE & ELECTRONIC WARFARE (SEW) ARCHITECTURE/ENGINEERING SUPPORT
PROJECT NUMBER: 0798 PROJECT TITLE: OTH TARGETING

Exhibit: R-3 Cost Analysis APPROPRIATION/BUDGET ACTIVITY: RDT&E, N / BA 4						Date: May 2009 PROJECT NAME and NUMBER: OTH Targeting 0798						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY-09 Cost	FY-09 Award Date	FY-10 Cost	FY-10 Award Date			CostToComp	Total Cost	Target Value of Contract
Advanced Relay/ Wireless / Antenna Technologies	Various	Various	5.704	.778	Various	.725	Various			CONT	CONT	
Interoperability Requirements	Various	Various	3.266								3.266	
T & E Tools Development	Various	Various	0.429								.429	
Systems Int. & Interop. Testing (LBTN)	Various	Various	3.590	.418	Various	0.000	Various			CONT	CONT	
Interoperability Validation	Various	Various	2.647	.153	Various	0.000	Various			CONT	CONT	
Joint Interoperability	Various	Various	1.174								1.174	
Testing OTH-T Systems	Various	Various	2.850	.338	Various	0.000	Various			CONT	CONT	
Subtotal T&E			19.660	1.687		.725				CONT	CONT	
Remarks												
Contractor Engineering Support											0.000	
Subnet Relay	Various	Various	4.702	.209	Various	.198	Various			CONT	CONT	
Program Management Support	Various	Various	1.468								1.468	
Travel											0.000	
Transportation											0.000	
Subtotal Management			6.170	.209		.198				CONT	CONT	
Remarks												
Total Cost			25.830	1.896		.923				CONT	CONT	

BUDGET ACTIVITY: 04
PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SPACE & ELECTRONIC WARFARE (SEW) ARCHITECTURE/ENGINEERING SUPPORT
PROJECT NUMBER: 2144 PROJECT TITLE: SPACE & ELEC WARFARE ENGINEERING

Project Number & Title	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate
2144 SPACE & ELEC WARFARE ENGINEERING	8.180	14.610	11.078

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: OPNAVINST 3050.23 defines the policy to fuse validated/approved Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) architectures and interoperability requirements with requirements, milestones and program decisions. C4ISR integrated architectures/requirements are the underpinnings for all C4ISR mission areas and capabilities and, as such, requirements and acquisition processes have been reengineered to use these Integrated Architectures for decisional purposes and strategic planning. Furthermore, Office of the Secretary of Defense (OSD) has defined key programs/efforts Global Information Grid (GIG) Baseline Extension (BE), Transformational Satellite (TSAT), Joint Tactical Radio System (JTRS), Network Centric Enterprise Services (NCES), Information Assurance (IA) and standards that will drive and change the Navy's C4ISR integrated architectures and associated business processes for requirements, budgets and acquisition. To that end, the SEW provides two main functions: 1) Development of C4ISR Integrated Architecture Products and 2) Supporting C4ISR Systems Engineering processes and standards. The integrated architecture products are used to support the Navy's C4ISR budget process by providing the critical core architecture and enabling capabilities to the Warfighter. The C4ISR systems engineering processes and standards provide the construct for distributed C2 interoperability requirements analyses to identify capability shortfalls/gaps and for systems engineering to compare/test alternatives in a joint end-to-end environment while identifying associated Navy wide C4ISR implications. Processes include developing and applying criteria for use in Systems Engineering Technical Reviews mandated by Assistant Secretary of the Navy for Research, Development and Acquisition (ASN RDA) and providing technical input to governance bodies such as the FORCEnet Coordination Council and the Information Technology Management Council. This includes Human Systems Integration (HSI) to provide a mission-centered orientation to ensure effective operational employment of fielded capability. As joint concepts and OSD driving efforts/programs are matured/defined the Navy's C4ISR integrated architectures are refined and the supporting C4ISR Systems Engineering processes and standards work to engineer and enact C4ISR implementations Navy wide across all C4ISR mission areas.

The SEW Engineering project supports the Maritime Domain Awareness (MDA) program. MDA is "the effective understanding of anything associated with the global maritime domain that could impact the security, safety,

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economy, or environment of the United States." MDA can only be achieved through the combined efforts of federal, state, and local government agencies, international governments, and commercial and private enterprise. MDA is a key enabler for maritime security; as well as for counter-piracy, counter-drug, freedom of navigation, counter-terrorism, humanitarian assistance and disaster relief, stability, and major combat operations.

Products provided:

1) C4ISR Integrated Architectures
- Integrated Architectures and Standards - Architecture Views (Operational Views, Service Views, Technical Views, System Views)
- Migration Roadmaps to the target Architectures
- Architecture technical authority, studies, interpretation assistance, and white papers

2) Supporting C4ISR Systems Engineering processes
- Distributed C2 Interoperability Requirement Analysis – Gaps Analysis, Overlap Analysis, System Priority Lists, C4ISR Metrics and Models, Analysis of Alternatives, Requirements Database, Assessment Repository, Resource Implications Studies, Baseline Performance Models, Mission Task Analysis, Human Systems Integration (HSI) assessments.
- End-to-End Systems Engineering and Integrated Design – Operational feasibility studies, technical feasibility studies, technical roadmap engineering validations, Architectures and Assessment traceability matrices.
- Joint and Coalition interoperability trials – Joint end-to-end prototyping trials, and Joint/Coalition interoperability demonstrations, Interoperability assessments and metrics, Interoperability studies via the Coalition Warrior Interoperability Demonstration (CWID) and the Joint Rapid Architecture Experimentation (JRAE) process. Chairman of the Joint Chiefs of Staff Instruction 6260.01B (CJCSINST 6260.01B) directs the USN to provide $1.7 million to the general CWID operating budget and to participate by operating a US Navy demonstration site.

3) Compliance and alignment reports with Navy Enterprise Architecture/Data Strategy and Assistant Secretary of the Navy for Research, Development and Acquisition (ASN RDA) system engineering policies generated during Systems Engineering Technical Reviews.

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B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2008	FY 2009	FY 2010
C4ISR ARCHITECTURE AND STANDARDS	0.517	0.147	0.000

FY 2008 Accomplishments:

- Implemented technical authority for architecture and standards across Program Executive Office C4I systems.
- Provided architecture data to support required analyses, testing, modeling and simulation.
- Updated technical and system data.
- Produced system architecture products as required in support of programming decisions.
- Provided various white papers and studies as needed to develop architecture products.

FY 2009 Plans:

- Implement technical authority for architecture and standards across Program Executive Office C4I, PEO Space and PEO-IT systems.
- Conduct spiral development of the FORCEnet Integration Architecture including Operational, System, Service and Technical Views.
- Conduct technical analysis to review Joint Capabilities Integration and Development System (JCIDS) documentations.

FY 2010 Plans:

- Combined with C4ISR Systems Engineering

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	FY 2008	FY 2009	FY 2010
C4ISR SYSTEMS ENGINEERING	0.000	0.000	5.254

FY 2010 Plans:

- Department of Navy (DoN) C4ISR Transformation/Strategic Planning within DoN/Joint/Department of Defense (DoD) Framework: Assesses existing and emerging capabilities, develops and evaluates Navy-wide policies, plans, requirements, and compliance; develops integration and investment strategies; and accelerates innovation, testing, assessment and fielding of material and non-material solutions for enhanced operational capability, Joint/Allied/Coalition interoperability and application/enforcement of enterprise requirements/architectures/standards toward greater Net-Centric Operations/Warfare (NCO/W) capability.

- Implementing and validating FORCEnet requirements: Perform Systems Engineering Technical Reviews (SETR) utilizing validated assessment tools, system engineering methodologies and Compliance Action Lists (CALs) to ensure standard engineering processes (e.g., information assurance, data strategy, architecture, modeling, status of action (SOA) development) are being developed and utilized to ensure FORCEnet compliance.

	FY 2008	FY 2009	FY 2010
COALITION WARRIOR INTEROPERABILITY DEMONSTRATION (CWID)	2.504	2.000	1.290

FY 2008 Accomplishments:

- Continued to investigate solutions for known capability gaps. While the Combatant Command (COCOM) executive agent for CWID 2008/2009 had not been identified, it was clear that both Allied Interoperability and Homeland Defense (HLD)/Homeland Security (HLS) inter-governmental agency interoperability remained cornerstones of the CWID charter. Space and Naval Warfare Systems Command (SPAWARSYSCOM) remained the USN site and continued to host both Coalition and HLD/HLS venues.

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FY 2009 Plans:

- Continue to investigate solutions for known capability gaps. While the COCOM executive agent for CWID 2009 has not been identified, it is clear that both Allied Interoperability and Homeland Defense (HLD)/Homeland Security (HLS) inter-governmental agency interoperability will remain cornerstones of the CWID charter. Chairman of the Joint Chiefs of Staff Instruction 6260.01B requires each Service to provide $1.7 million for CWID participation. The remaining $300K is required for SPAWARSYSCOM representation to the Coalition portion of the CWID 09 venue.

FY 2010 Plans:

- Coalition Warrior Interoperability Demonstration (CWID) will de-scope its current Joint/Navy effort to focus exclusively on Joint capability gaps. As directed by the CWID Joint Management Office, funding will be provided to the various Joint organizations for execution of the Joint portions of the CWID effort.

- The Navy site will evaluate known Navy capability gaps and will perform demonstration management, planning, installation/de-installation, security certification and accreditation, infrastructure (Networks, Crypto, laboratories, etc.), data collection and analysis, final report, and documentation.

	FY 2008	FY 2009	FY 2010
DISTRIBUTED C2 INTEROPERABILITY REQUIREMENTS ANALYSIS	2.155	0.992	0.000

FY 2008 Accomplishments:

- 2016-2022 Model C4ISR architectures for 3 Major Combat Operations / Mission areas in support of force level assessments for 5 Navy analytic issues / Capability Based Assessments (CBA). Supported NCW Level 2 block builds.

FY 2009 Plans:

- 2020-2026 Model C4ISR architectures for 3 Major Combat Operations / Mission areas in support of force level assessments for 5 Navy analytic issues / Capability Based Assessments (CBA). Support NCW Level 3 block builds. FORCEnet Capability List (FCL) efforts will continue to develop a web-based software system required

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to implement the FCL. It will provide the direct correlation of joint interoperable capabilities to activities, functions, and systems mapped to Mission Essential Tasks (METs). It will provide linkages to the metrics assessing value of systems relevance to joint interoperable capability, functions, and associated tasks and activities.

FY 2010 Plans:

- Combined with C4ISR Systems Engineering

	FY 2008	FY 2009	FY 2010
END-TO-END SYSTEM ENGINEERING AND INTEGRATED DESIGN	0.704	0.147	0.000

FY 2008 Accomplishments:

-Provided systems engineering support to apply end-to-end integrated architectures across the Naval Enterprise.
-Supported Team SPAWAR PMs in development of JCIDS documents, Integrated Support Plans (ISPs) and NR-KPPs.
-Provided training for Team SPAWAR personnel on how to meet interoperability certification requirements.
-Continued development of the Composeable Test Environment (CTE) effort with emphasis on linking Team SPAWAR labs and facilities to Naval Enterprise labs and facilities.
-Worked with ASN RDA on implementation of the Interoperability and Integration Management Plan (I&IMP).

FY 2009 Plans:

-Continue to provide systems engineering support to apply end-to-end integrated architectures across the Naval Enterprise.
-Support Team SPAWAR PMs in development and implementation of Joint Capabilities Integration and Development System (JCIDS) documents, ISPs and NR-KPPs through the Systems Engineering Technical Review (SETR) process.
-Continue to provide training for Team SPAWAR personnel on how to meet interoperability certification requirements.
-Begin implementation of the CTE CONOPS/effort with emphasis on linking Team SPAWAR labs and facilities to Naval Enterprise labs and facilities.
-Continue to work with ASN RDA on implementation of the I&IMP.

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FY 2010 Plans:

- Combined with C4ISR Systems Engineering

	FY 2008	FY 2009	FY 2010
JOINT RAPID ARCHITECTURE EXPERIMENTATION (JRAE)	0.300	0.300	0.000

FY 2008 Accomplishments:

- JRAE efforts were driven by Joint Forces Command (JFCOM) interoperability risk areas at the horizontal (tactical) level as identified by the Joint Architecture efforts under the JFCOM Joint Battle Management Command and Control (JBMC2). The JRAE process was used to prototype the “to be” joint integrated architectures, and integrated and collaboratively tested with the Army and the Air Force to promote joint interoperability between the Services’ next generation tactical Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) architectures.

FY 2009 Plans:

- Navy will continue to provide representation to Joint Rapid Architecture Experimentation (JRAE) activities and will collaborate with the Joint Community and Defense Agencies in identifying interoperability risk areas for Service Oriented Architectures.

	FY 2008	FY 2009	FY 2010
MARITIME DOMAIN AWARENESS (MDA)	2.000	7.039	0.000

FY 2008 Accomplishments:

Architecture:
- Operational Views (OV) 1, 4, 5 & 6 completed.
- System Views (SV) 1, 2 & 6 completed.
- Architecture View (AV) 1 final.

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Certifications & Accreditations:
- IATOs (Interim Authority to Operate) approved: Comprehensive Maritime Awareness (CMA), Google and Extended-Maritime Interdiction Operations (E-MIO) Assured Database Server.
- ATOs (Authority to Operate) approved: Maritime Awareness Global Network (MAGNET), Sensor Management System (SMS), MDA Data Sharing Community of Interest and Tripwire.- Interim Certificate to Operate (ICTO) approved.
-Interim Certificate to Operate (ICTO) approved.

FY 2009 Plans:

Provide systems engineering support for the MDA acceleration initiative to include:
- Architecture Development
- Risk reduction, data collection and analysis
- Requirements generation and validation
- Capability demonstrations Coalition Warrior Interoperability Demonstration (CWID), Joint Rapid Architecture Experimentation (JRAE), Joint Capabilities Technology Demonstration (JCTD), Advanced Concept Technology Demonstration (ACTD)
- Fleet experimentation
- Fielding of prototypes and transition of successful prototypes to programs.

	FY 2008	FY 2009	FY 2010
SYSTEMS ENGINEERING AND INTEGRATION REVITALIZATION	0.000	1.110	1.270

FY 2009 Plans:

- Develop and improve systems engineering models, tools, and databases to improve the quality of C4ISR products.
- Develop the Systems Engineering Technical Review database.
- Initiate the systems engineering plan e-Builder.
- Initiate the measurement repository and analysis database.

BUDGET ACTIVITY: 04
PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SPACE & ELECTRONIC WARFARE (SEW) ARCHITECTURE/ENGINEERING SUPPORT
PROJECT NUMBER: 2144 PROJECT TITLE: SPACE & ELEC WARFARE ENGINEERING

FY 2010 Plans:

- Certify competency standards for systems engineering qualification.
- Increase access to systems engineering training resources.
- Deliver an assessment of systems engineering capability and recommend improvements.

	FY 2008	FY 2009	FY 2010
SYSTEMS ENGINEERING STANDARDS AND PROCESSES	0.000	2.875	3.264

FY 2009 Plans:

- Develop prototypes and excursions of emerging C4ISR systems for use in potential product enhancements.
- Integrate existing technologies in novel ways to substantially increase systems capabilities at low risk.
- Combine existing stovepiped data systems into integrated operational pictures across programs of record.
- Enable excursions from existing ISR systems to use existing sensors to solve non-traditional problems.
- Reduce network bandwidth overhead and inefficiencies.

FY 2010 Plans:

- Improve process for using modeling and simulation in Systems Engineering Technical Review.
- Develop processes, model, and collect data to link probability of program success to systems engineering performance.
- Improve linkage between requirements analysis and enterprise architecture products.

C. OTHER PROGRAM FUNDING SUMMARY - NAVY RELATED RDT&E:
Not applicable.

OTHER PROGRAM FUNDING SUMMARY - NON-NAVY RELATED RDT&E:
Not applicable.

D. ACQUISITION STRATEGY:
Not applicable.

FY 2010 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: May 2009
Exhibit R-3

BUDGET ACTIVITY: 04
PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SPACE & ELECTRONIC WARFARE (SEW) ARCHITECTURE/ENGINEERING SUPPORT
PROJECT NUMBER: 2144 PROJECT TITLE: SPACE & ELEC WARFARE ENGINEERING

Exhibit: R-3 Cost Analysis (page 1 of 2)						Date: May 2009						
APPROPRIATION/BUDGET ACTIVITY: RDT&E, N / BA 4						PROJECT NAME and NUMBER: SEW Engineering 2144						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY-09 Cost	FY-09 Award Date	FY-10 Cost	FY-10 Award Date			CostToComp	Total Cost	Target Value of Contract
Primary Hardware Development											0.000	
Ancillary Hardware Development											0.000	
Systems Engineering											0.000	
Licenses											0.000	
Tooling											0.000	
GFE											0.000	
Award Fees											0.000	
Subtotal Product Development			0.000	0.000		0.000				0.000	0.000	
Remarks												
Development Support	Various	Various	4.554								4.554	
SEW/C4I Technology Integration	Various	Various	12.985								12.985	
MDA Prototype SE Support	Various	Various	4.500	7.039	Various	0.000				CONT	CONT	
Systems Engineering & Integration Revitalization	Various	Various		1.110	Various	1.270	Various			CONT	CONT	
Systems Engineering Standards & Processes	Various	Various		2.875	Various	3.264	Various			CONT	CONT	
Systems A&E and Validation	Various	Various	13.188								13.188	
Distributed C2 Interoperability Requirement Analysis	Various	Various	15.520	.992	Various	0.000				CONT	CONT	

FY 2010 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: May 2009
Exhibit R-3

BUDGET ACTIVITY: 04
PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SPACE & ELECTRONIC WARFARE (SEW) ARCHITECTURE/ENGINEERING SUPPORT
PROJECT NUMBER: 2144 PROJECT TITLE: SPACE & ELEC WARFARE ENGINEERING

Exhibit: R-3 Cost Analysis (page 2 of 2) Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: RDT&E, N / BA 4 PROJECT NAME and NUMBER: SEW Engineering 2144

Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY-09 Cost	FY-09 Award Date	FY-10 Cost	FY-10 Award Date	-		CostToComp
C4ISR Architecture and Standards	Various	Various	14.111	.147	Various	0				CONT
End-to-End System Engineering and Integrated Design	Various	Various	10.837	.147	Various	0				CONT
Info. Repository/Naval Architecture	Various	Various	4.000							
Navy Collaborative										
C4ISR Systems Engineering	Various	Various				5.254	Various			CONT
Subtotal Support			79.695	12.310		9.788				
Remarks										
SEW Eng/CWID	Various	Various	26.965	2.000	Various	1.290	Various			CONT
SEW Eng/JRAE	Various	Various	15.688	.300	Various	0				CONT
Subtotal T&E			42.653	2.300		1.290				
Remarks										
Contractor Engineering Support										
Government Engineering Support										
Program Management Support										
Travel										
Transportation										
Subtotal Management			0	0		0				
Remarks										
Total Cost			122.348	14.610		11.078				

FY 2010 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: May 2009
Exhibit R-2a

BUDGET ACTIVITY: 04
PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SPACE & ELECTRONIC WARFARE (SEW) ARCHITECTURE/ENGINEERING SUPPORT
PROJECT NUMBER: 2357 PROJECT TITLE: MARITIME BATTLE CENTER

Project Number & Title	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate
2357 MARITIME BATTLE CENTER	30.165	30.812	30.532

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The mission of the Maritime Battle Center (MBC), a department within the Navy Warfare Development Command (NWDC), is the development of new or improved warfighting capabilities through Sea Trial, the Fleet's experimentation process. The MBC's program evaluates and validates emerging Navy Concept of Operations (CONOPS), Doctrine and technologies through focused experimentation, rigorous analysis and assessment. Sea Trial experimentation, on the other hand, is dedicated to providing solutions to near term (within the Fiscal Year Defense Plan) war fighting gaps. The US Fleet Forces Command (USFFC) chairs the Flag level Sea Trial Executive Steering Group (STESG). It is the STESG that prioritizes and approves the Sea Trial's annual Execution Plan (ExPlan).

The Maritime Battle Center acts as the executive agent to conduct and coordinate experiments that are focused on both technological and non-technological solutions to warfighting gaps across all naval warfare areas. The MBC is involved in all facets of experimentation including planning, systems engineering and integration, execution, data collection, analysis, and assessment for fleet experiments, limited objective experiments (LOEs), limited technical experiments (LTEs), wargames, seminars and workshops. The MBC supports the early and sustained involvement of Joint Warfighters in refining the technologies and the tactics, techniques, and procedures (TTP) needed in the Joint fight.

This program historically does not meet established execution benchmarks. MBC experimentation differs from other Research, Development, Test and Evaluation (RDT&E) programs because it is based upon Fleet operational availability vice independently scheduled through warfighting labs. Because Fleet experimentation frequently must occur during the spring/summer operational schedules, the overall RDT&E obligation/expenditure rates do not align with OSD practice. As a result, MBC's obligation rates do not begin to approach benchmark until the program nears the fiscal year's end while its expenditure rates generally do not approach benchmark until midway through the second year of its appropriation.

BUDGET ACTIVITY: 04
PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SPACE & ELECTRONIC WARFARE (SEW) ARCHITECTURE/ENGINEERING SUPPORT
PROJECT NUMBER: 2357 PROJECT TITLE: MARITIME BATTLE CENTER

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2008	FY 2009	FY 2010
FBE ANALYSIS AND CORE SUPPORT	30.165	30.812	30.532

Because of the synergistic relationship between NWDC's Maritime Battle Center experimentation efforts and the Fleet's Sea Trial experimentation efforts, funding for both endeavors have been combined under one project, the Maritime Battle Center. The Sea Trial aspect of this project's mission is driven by the priorities of the designated Operational Agents – Commander Second Fleet for Sea Strike and Seabasing, Commander Third Fleet for Sea Shield, and Commander Naval Network Warfare Command for FORCEnet. The priorities of these Operational Agents are further prioritized and approved by the Sea Trial Executive Steering Group (STESG) in conjunction with Commander U.S. Fleet Forces.

FY 2008 Accomplishments:

- Continued participation in Joint Forces Command experimentation continuum
- Continued Limited Objective Experiments
- Continued CONOPS Development validation events
- Initiated and executed Sea Trial Experiments, War Games, and Seminars
- Completed the FY 08 spiral of the multi-year series of Maritime and Joint Fires experiments
- Completed the FY 08 spiral of the multi-year series of Surface Ship Periscope Detection experiments
- Completed the FY 08 spiral of the multi-year series of Fusion/Correlation experiments
- Completed the FY 08 spiral of the multi-year series of Net-Centric Environment Services/Service Oriented Architecture (NCES/SOA) experiments
- Completed the FY 08 spiral of the multi-year series of Sensor Integration experiments
- Completed the FY 08 spiral of the multi-year series of C2/Collaboration experiments
- Completed the FY 08 spiral of the multi-year series of Cross Domain Solution experiments
- Completed the FY 08 spiral of the multi-year series of Information Assurance/Computer Network Defense (IA/CND) experiments
- Completed the FY 08 spiral of the multi-year series of Communications at Speed and Depth experiments
- Completed the FY 08 spiral of the multi-year series of Offensive Information Operations experiments
- Completed the FY 08 spiral of the multi-year series of Information Management/Knowledge Management (IM/KM) experiments

BUDGET ACTIVITY: 04
PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SPACE & ELECTRONIC WARFARE (SEW) ARCHITECTURE/ENGINEERING SUPPORT
PROJECT NUMBER: 2357 PROJECT TITLE: MARITIME BATTLE CENTER

- Completed the FY 08 spiral of the multi-year series of Electronic Warfare (EW) Improvements experiments
- Completed the FY 08 spiral of the multi-year series of Network Instrumentation/Visualization experiments
- Completed the FY 08 spiral in the multi-year series of Maritime Headquarters with Maritime Operations Center experiments
- Completed the FY 08 spiral in the multi-year series of Command and Control, Maritime Domain Awareness experiments
- Completed the FY 08 spiral in the multi-year series of Networking of the Maritime Operations Centers experiments
- Completed the FY 08 spiral in the multi-year series of Network Operations, Information Operations, and Space Support experiments
- Completed the FY 08 spiral in the multi-year series of Coalition Operations experiments
- Completed the FY 08 spiral in the multi-year series of Maritime Dynamic Targeting experiments
- Completed the FY 08 spiral in the multi-year series of Airborne Tactical Internet Protocol Networks experiments
- Completed the FY 08 spiral of the multi-year series of Littoral Combat Ship Mine Counter Measures Modular Mission Packages experiments
- Completed the FY 08 spiral of the multi-year series of Tactical Tomahawk Third Party Targeting experiments
- Completed the FY 08 spiral of the multi-year series of Bandwidth Optimization experiments
- Completed the FY 08 spiral of the multi-year series of TAPA Electronic Warfare Anti Ship Missile Defense (EW/ASMD) experiments
- Completed the final spiral in the multi-year series of Littoral Active Multistatic Program (LAMP) experiments
- Completed the final spiral of the multi-year series of Sub-Surface Guided Missile Nuclear/Special Operations Forces (SSGN/SOF) CONOPS & Full Range Connectivity experiments
- Completed the Counter Maritime Improvised Explosive Device Experiment
- Completed Terminal Fury 08 Exercise and Experiment
- Completed Austere Challenge 08 Exercise and Experiment

FY 2009 Plans:

- Continue all FY 2008 efforts less those noted as completed above.
- Continue participation in JFCOM experimentation continuum
- Continue Limited Objective Experiments

BUDGET ACTIVITY: 04
PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SPACE & ELECTRONIC WARFARE (SEW) ARCHITECTURE/ENGINEERING SUPPORT
PROJECT NUMBER: 2357 PROJECT TITLE: MARITIME BATTLE CENTER

- Continue CONOPS Development Experiments
- Initiate and execute Sea Trial Experiments, War Games, and Seminars
- Initiate and complete the Sonar/Radar Data Comparison experiment
- Initiate and complete Submarine Automated Identification System Buoy experiment
- Initiate and complete the Maritime Domain Awareness Analyst Tools experiment
- Initiate and complete the Millimeter Wave Chaff experiment
- Initiate and complete the Surface Action Group Modeling experiment
- Initiate and complete the Harpoon Seeker Modeling in an Electronic Attack environment experiment
- Initiate and complete the Surface Meteorological and Oceanographic experiment
- Initiate and complete the Global Ocean Forecasting experiment
- Initiate and complete the Fast Attack Craft/Fast Inshore Attack Craft experiment
- Initiate and complete the Submarine Launched Unmanned Aerial System Experiment
- Initiate and complete the first of the multi-year series of Littoral Force Protection experiments
- Initiate and complete the final spiral of the multi-year series of Tactical Tomahawk 3rd Party Targeting experiments
- Initiate and complete the FY-09 spiral of the multi-year series of Maritime Headquarters with Maritime Operations Center experiments
- Initiate and complete the FY-09 spiral of the multi-year series of Intelligence, Surveillance and Reconnaissance (ISR) Support to the Maritime Headquarters with Maritime Operations Center experiments
- Initiate and complete the FY-09 spiral of the multi-year series of Networking of Military Operations Center experiments
- Initiate and complete the FY-09 spiral of the multi-year series of Network Operations, Information Operations and Space Support experiments
- Initiate and complete the FY-09 spiral of the multi-year series of Information Assurance/Computer Network Defense experiments
- Initiate and complete the FY-09 spiral of the multi-year series of Electronic Warfare Improvement experiments
- Initiate and complete the FY-09 spiral of the multi-year series of Maritime Domain Awareness experiments
- Initiate and complete the FY-09 spiral of the multi-year series of Coalition Networks experiments
- Initiate and complete the FY-09 spiral of the multi-year series of Unclassified Common Operational Picture (COP) experiments
- Initiate and complete the FY-09 spiral of the multi-year series of Bandwidth Optimization experiments

BUDGET ACTIVITY: 04
PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SPACE & ELECTRONIC WARFARE (SEW) ARCHITECTURE/ENGINEERING SUPPORT
PROJECT NUMBER: 2357 PROJECT TITLE: MARITIME BATTLE CENTER

- Initiate and complete the FY-09 spiral of the multi-year series of Surface Ship Periscope Detection experiments
- Initiate and complete the FY-09 spiral of the multi-year series of Submarine Unmanned Aerial System experiments
- Initiate and complete the FY-09 spiral of the multi-year series of Submarine Communications at Speed and Depth experiments
- Initiate and complete the FY-09 spiral of the multi-year series of Network Instrumentation and Visualization experiments
- Initiate and complete the FY-09 spiral of the multi-year series of Offensive Information Operations experiments
- Initiate and complete the FY-09 spiral of the multi-year series of Cross Domain Solution experiments
- Initiate and complete the FY-09 spiral of the multi-year series of Command and Control/Real-Time Collaboration experiments
- Initiate and complete the FY-09 spiral of the multi-year series of Persistent Day/Night Tracking experiments
- Initiate and complete the FY-09 spiral of the multi-year series of Mine Countermeasures in Support of Homeland Defense experiments
- Initiate and complete the FY-09 spiral of the multi-year series of Littoral Combat Ship Mine Warfare Mission Modules experiments
- Initiate and complete the FY-09 spiral of the multi-year series of Naval Obscurant experiments

FY 2010 Plans:

FY 2010 plans will be prioritized and approved by the end of Feb 2009; items listed below represent some of the experiments being considered.

- Continue all FY 2009 efforts less those noted as completed above.
- Continue participation in JFCOM experimentation continuum
- Continue Limited Objective Experiments
- Continue CONOPS Development Experiments
- Initiate and execute Sea Trial Experiments, War Games, and Seminars

BUDGET ACTIVITY: 04
PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SPACE & ELECTRONIC WARFARE (SEW) ARCHITECTURE/ENGINEERING SUPPORT
PROJECT NUMBER: 2357 PROJECT TITLE: MARITIME BATTLE CENTER

C. OTHER PROGRAM FUNDING SUMMARY - NAVY RELATED RDT&E:
Not applicable.

OTHER PROGRAM FUNDING SUMMARY - NON-NAVY RELATED RDT&E:
Not applicable

D. ACQUISITION STRATEGY:
Not applicable.

FY 2010 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: May 2009
Exhibit R-3

BUDGET ACTIVITY: 04
PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SPACE & ELECTRONIC WARFARE (SEW) ARCHITECTURE/ENGINEERING SUPPORT
PROJECT NUMBER: 2357 PROJECT TITLE: MARITIME BATTLE CENTER

Exhibit R-3 Cost Analysis														Date: MAY 2009
APPROPRIATION/BUDGET ACTIVITY: RDT&E, N/BA 4			PROGRAM ELEMENT 0604707N											PROJECT NAME and NUMBER: Maritime Battle Center 2357
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost			FY-09 Cost	FY-09 Award Date	FY-10 Cost	FY-10 Award Date			Cost To Comp.	Total Cost	Target Value of Contract
System Test and Evaluation	Various	Various	196.747			26.245	Various	26.097	Various			CONT	CONT	CONT
Subtotal T&E			196.747			26.245		26.097				CONT	CONT	CONT
Program Management	Various	Various	41.126			4.567	Various	4.435	Various			CONT	CONT	CONT
Subtotal Management			41.126			4.567		4.435				CONT	CONT	CONT
Total Cost			237.873			30.812		30.532				CONT	CONT	CONT

BUDGET ACTIVITY: 04
PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SPACE & ELECTRONIC WARFARE (SEW) ARCHITECTURE/ENGINEERING SUPPORT
PROJECT NUMBER: 9999 PROJECT TITLE: CONGRESSIONAL PLUS-UPS

CONGRESSIONAL PLUS-UPS:

	FY 2008	FY 2009
CROSS-DOMAIN NETWORK ACCESS SYSTEM	0.000	0.798