Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy											Date: May 2017	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0607658N *I (U)Cooperative Engagement Capability*							
COST ($ in Millions)	**Prior Years**	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Cost To Complete**	**Total Cost**
Total Program Element	601.250	0.000	84.501	92.571	-	92.571	103.279	111.178	111.616	112.306	Continuing	Continuing
2039: *COOP Engagement*	601.250	0.000	84.501	92.571	-	92.571	103.279	111.178	111.616	112.306	Continuing	Continuing
Program MDAP/MAIS Code: **Project MDAP/MAIS Code(s):** 582												

A. Mission Description and Budget Item Justification

Cooperative Engagement Capability (CEC) significantly improves Battle Force Anti-Air Warfare (AAW) capability by coordinating all Battle Force AAW sensors into a single, real-time, composite track picture to support integrated fire control.

CEC distributes sensor data from each USMC Command Control Unit, USA Aerostat, US Navy Ship, and US Navy Aircraft, or Cooperating Unit (CU), to all other CUs in the battle force through a real-time, line of sight, high data-rate sensor and engagement data distribution network. CEC is highly resistant to jamming and provides accurate gridlocking between CUs. Each CU independently employs high capacity, parallel processing and advanced algorithms to combine all distributed sensor data into a fire control quality track picture which is the same for all CUs. CEC data is presented as a superset of the best AAW sensor capabilities from each CU, all of which are integrated into a single input to each CU's combat weapons system.

CEC significantly improves our Battle Force defense in depth, including both local area and ship defense capabilities against current and future AAW threats. Moreover, CEC provides critical connectivity and integration of over-land air defense systems capable of countering emerging air threats, including land attack cruise missiles, in a complex littoral environment.

The CEC Program Office oversees CEC development for all services with funding provided for their respective combat systems. CEC consists of the Data Distribution System (DDS), the Cooperative Engagement Processor (CEP), and interface with Combat Systems and sensors. The DDS encodes and distributes own-ship sensor and engagement data and is a high capacity, jam resistant, directional system providing high data throughput as well common time and common positional frame of reference. The CEP is a high capacity distributed processor that processes data from all integrated radars. The data is passed to the ship's combat system as a high quality, common, continuous, engageable track.

The Navy implemented a Signal Data Processor (SDP) approach to modify the current equipment to meet reduced size, weight, cost, power and cooling objectives. This SDP approach also supports continuity for interoperability improvements and program protection, as well as supporting open architecture initiatives, and comms independence. The SDP hardware complies with Category 3 Open Architecture Computing Environment (OACE) standards. The SDP-S is being fielded fleet-wide to all US Navy, USMC, US Army, and FMS CEC units.

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy	Date: May 2017
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0607658N *I (U)Cooperative Engagement Capability*

A family of antennas approach will be used to satisfy CEC requirements with lower life cycle costs (procurement, installation, and maintenance). These antennas enable future capability as well as providing a solution extensible to additional platforms. This effort for development and production of Common Array Block (CAB) antennas was competitively awarded in late FY2013.

In support of Interoperability, CEC will continue to work collaboratively with other Combat Systems programs (AWS, E-2C, E-2D, SSDS, CDLMS, C2P, CAC2S and SGS/AC) to develop software and implement design corrections and system changes.

FY 2016 efforts funded under Program Element 0603658N

B. Program Change Summary ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	0.000	84.501	88.945	-	88.945
Current President's Budget	0.000	84.501	92.571	-	92.571
Total Adjustments	0.000	0.000	3.626	-	3.626
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustments	0.000	0.000	3.400	-	3.400
• Rate/Misc Adjustments	0.000	0.000	0.226	-	0.226

Change Summary Explanation

FY 2018 funding is increased by $3.400M for Enterprise Air Surveillance Radar integration efforts.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0607658N / *(U)Cooperative Engagement Capability*	Project (Number/Name) 2039 / *COOP Engagement*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
2039: *COOP Engagement*	601.250	0.000	84.501	92.571	-	92.571	103.279	111.178	111.616	112.306	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 582

A. Mission Description and Budget Item Justification

Cooperative Engagement Capability (CEC) significantly improves Battle Force Anti-Air Warfare (AAW) capability by coordinating all Battle Force AAW sensors into a single, real-time, composite track picture to support integrated fire control.

CEC distributes sensor data from each USMC Command Control Unit, USA Aerostat, US Navy Ship, and US Navy Aircraft, or Cooperating Unit (CU), to all other CUs in the battle force through a real-time, line of sight, high data-rate sensor and engagement data distribution network. CEC is highly resistant to jamming and provides accurate gridlocking between CUs. Each CU independently employs high capacity, parallel processing and advanced algorithms to combine all distributed sensor data into a fire control quality track picture which is the same for all CUs. CEC data is presented as a superset of the best AAW sensor capabilities from each CU, all of which are integrated into a single input to each CU's combat weapons system.

CEC significantly improves our Battle Force defense in depth, including both local area and ship defense capabilities against current and future AAW threats. Moreover, CEC provides critical connectivity and integration of over-land air defense systems capable of countering emerging air threats, including land attack cruise missiles, in a complex littoral environment.

The CEC Program Office oversees CEC development for all services with funding provided for their respective combat systems. CEC consists of the Data Distribution System (DDS), the Cooperative Engagement Processor (CEP), and interface with Combat Systems and sensors. The DDS encodes and distributes own-ship sensor and engagement data and is a high capacity, jam resistant, directional system providing high data throughput as well common time and common positional frame of reference. The CEP is a high capacity distributed processor that processes data from all integrated radars. The data is passed to the ship's combat system as a high quality, common, continuous, engageable track.

The Navy implemented a Signal Data Processor (SDP) approach to modify the current equipment to meet reduced size, weight, cost, power and cooling objectives. This SDP approach also supports continuity for interoperability improvements and program protection, as well as supporting open architecture initiatives, and comms independence. The SDP hardware complies with Category 3 Open Architecture Computing Environment (OACE) standards. The SDP-S is being fielded fleet-wide to all US Navy, USMC, US Army, and FMS CEC units.

A family of antennas approach will be used to satisfy CEC requirements with lower life cycle costs (procurement, installation, and maintenance). These antennas enable future capability as well as providing a solution extensible to additional platforms. This effort for development and production of Common Array Block (CAB) antennas was competitively awarded in late FY2013.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0607658N / *(U)Cooperative Engagement Capability*	**Project (Number/Name)** 2039 / *COOP Engagement*

In support of Interoperability, CEC will continue to work collaboratively with other Combat Systems programs (AWS, E-2C, E-2D, SSDS, CDLMS, C2P, CAC2S and SGS/AC) to develop software and implement design corrections and system changes.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: E-2D	0.000	2.800	3.900	0.000	3.900
Articles:	-	-	-	-	-
FY 2016 Accomplishments: N/A					
FY 2017 Plans: Support initial DSSC 3 lab and flight testing focused on Mode 5 capabilities. Develop DSSC 3 CEC AMIIP and IFC-I capable software and support related lab and flight testing. Analyze test data and implement corrective actions. Conduct technical interchange and implementation planning with the E-2D community on upcoming CEC capability improvements slated for release in DSSC 3./4 timeframes.					
FY 2018 Base Plans: Continue E-2D CEC Accelerated Midterm Interoperability Improvement Project (AMIIP), Mode 5/S, IFF Modernization, and Naval Integrated Fire Control-Counter Air (NIFC-CA)/Increment 2 enhancements systems engineering and software development efforts, and support E-2D CEC DSSC 3 and Developmental Testing (DT) flight testing in conjunction with E-2D DSSC 3 software development and test. Continue systems engineering efforts related to introduction of Signal Data Processor-Sierra (SDP-S)-005 on E-2D. Begin E2D DSSC 4 requirements development.					
FY 2018 OCO Plans: N/A					
Title: B/L 2.1 INTEGRATION AND FOT&E TESTING	0.000	9.000	11.000	0.000	11.000
Articles:	-	-	-	-	-
FY 2016 Accomplishments: N/A					
FY 2017 Plans: CEC will accomplish CEC Interim Training (CIT) testing in Land Based Wallop Island Test Facilities as well as aboard USN Ships in concert with Fleet Synthetic Training (FSI); Conduct Naval Integrated Fire Control-Counter Air (NIFC-CA) Live Fire Test (LFT) #5, and NIFC-CA At Sea 4 Live Fire Test. CEC will also conduct CEC testing aboard, USS MILIUS (DDG 69) during Combat System Ship Qualification Trial (CSSQT), and will conduct a					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0607658N / *(U)Cooperative Engagement Capability*	**Project (Number/Name)** 2039 / *COOP Engagement*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
CVN 78 TRACKEX and developmental testing as well as a DDG 1000 TRACKEX for Developmental Testing. CEC will commence Network Enabled Electronic Defense System (NEEDS) Testing. ***FY 2018 Base Plans:*** CEC will continue support of NIFC-CA testing, Developmental Testing (DT)-D2 of AN/USG-2B with CVN 78. DT-D3 of AN/USG-2B with DDG 1000. CEC will commence DT-D4 of AN/USG-2B with Aegis ACB 16 as well as commence testing of Common Array Block (CAB) antenna systems for both the USN and USMC antenna designs. CEC will continue testing of Network Enabled Electronic Defense System (NEEDS). ***FY 2018 OCO Plans:*** N/A					
Title: SYSTEM IMPROVEMENTS	0.000	15.801	25.971	0.000	25.971
Articles:	-	-	-	-	-
FY 2016 Accomplishments: N/A ***FY 2017 Plans:*** Continue development and integration efforts with multiple Advanced Capability Build (ACB) 16 combat system by completing CEC ACB 16 Critical Design Reviews (CDR) and delivered design for continued developmental/ integration testing. Continue integration efforts for CEC with the CVN 78 combat system, including Ship Self Defense System (SSDS) and the Dual Band Radar (DBR) and also continue integration efforts with the DDG 1000 combat system with the Total Ship Computing Environment (TSCE) combat system and the Multi-Function Radar (MFR). The integration of the DBR and MFR are first of their kind and require significant integration work with a radar system that is different than any previously used by CEC. Moreover, much of the DBR and MFR radar integration efforts must be accomplished on the actual warships due to very limited availability of suitable radar assets at the Land Based Test Sites. Updated CEC element certification for new features put into the CEC baseline. This will involved testing to garner evidence, analyzing the results and then obtaining permission for the CEC element certification panel and then from the combat system certification panel(s) to field the update. Continue Common Array Block (CAB) antenna integration efforts. Provide CEC comments and support meetings for the development of the EASR Interface Documents. ***FY 2018 Base Plans:*** CEC will begin CEC enhanced training (CET) Integration and test, and will complete first CET installation on AEGIS. For SSDS ACB 20 CEC will conduct SBR-1 and for DDG 1000 we will complete Product Release Panel					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0607658N / *(U)Cooperative Engagement Capability*	**Project (Number/Name)** 2039 / *COOP Engagement*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
(PRP) and begin integration and test aboard DDG 1000 and the Self Defense Test Ship. We will conduct an FQT for CVN 78 resulting in a certified software load. CEC will conduct Trade Studies to identify and refine requirements related to SPY-6/ACB 20 integration to support SPY-6 Milestone C as well as SPY-6 related ACB 20 Technical Interchange Meetings (TIMs) and monthly engineering level meetings. CEC will also conduct a CEC SFR/PDR supporting integration with SPY-6 and ACB 20. Continue development of NIFC-CA Increment 2 CEC software with Wrap Around Simulation Program (WASP) updates, and prototyping of advanced kernel and adaptive layer functions. Continue to integrate CEC Air and Missile Defense Radar (AMDR) Adaptive Layer with Aegis Combat System Interface Support Equipment (CSISE) AMDR Mature CEC AMDR Adaptive layer based on findings from CIT-1 and 2. ***FY 2018 OCO Plans:*** N/A					
Title: NETWORK ENABLED ELECTRONIC DEFENSE SYSTEM (NEEDS) ***Articles:*** ***FY 2016 Accomplishments:*** N/A ***FY 2017 Plans:*** Continue iterative Code and Unit Test software development process. Deliver Engineering Load of NEEDS software for Engineering Verification Test (EVT) prior to Verification and Validation (V&V) Testing in Red Nitrum 17. ***FY 2018 Base Plans:*** Continue developmental field testing at LBTS and update NEEDS Software as indicated by analysis. Conduct CEC PRP in support of DDG-79 ALO. ***FY 2018 OCO Plans:*** N/A	0.000 -	6.600 -	4.500 -	0.000 -	4.500 -
Title: FIELD ACTIVITIES ***Articles:*** ***FY 2016 Accomplishments:*** N/A ***FY 2017 Plans:***	0.000 -	8.500 -	8.600 -	0.000 -	8.600 -

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0607658N / *(U)Cooperative Engagement Capability*	**Project (Number/Name)** 2039 / *COOP Engagement*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Continue field activity support of CEC development and fielding efforts (including Software Engineering / Integration Agent (SE/IA), Technical Direction Agent, In-Service Engineering Agent, Integrated Logistics Support planning) and program management support. Facilitate fielding of systems improvements and maintenance efforts (CAB, Airways Database, and Master Ship List updates. ***FY 2018 Base Plans:*** Continue field activity support of CEC development and fielding efforts (including Software Engineering / Integration Agent (SE/IA), Technical Direction Agent, In-Service Engineering Agent, Integrated Logistics Support planning) and program management support. Facilitate fielding of systems improvements and maintenance efforts. ***FY 2018 OCO Plans:*** N/A					
Title: COMMON ARRAY BLOCK (CAB) ANTENNA ***Articles:***	0.000 -	10.200 -	16.300 -	0.000 -	16.300 -
FY 2016 Accomplishments: N/A ***FY 2017 Plans:*** Conduct CAB FoA system-level Development Verification Testing (DVT). Complete the Build and Test of T/R Modules for EDM and PPU. Deliver software builds 2 and 3. Begin ordering Long-Lead Time Material for Pre-production Units (PPU). ***FY 2018 Base Plans:*** Continue Engineering Development Model (EDM) fabrication and deliver EDM hardware. Perform EDM component level Functional Verification Testing, CAB-S EDM Array Integration and Test and Evaluation, EDM Integration and Test and Functional Verification Testing at the system level. Prepare for and conduct Pre-Production Readiness Review and commence material procurement and perform fabrication of 4 CAB-S and 3 CAB-E Pre Production Units. Develop, code, unit test, and deliver CAB software Build 4. Complete Antenna Power Supply Unit build and test. Complete CAB-S and CAB-E Installation Design Packages, and address platform customer CAB installation design issues/questions. Develop and deliver CAB Interactive Electronic Technical Manuals, Corrective Maintenance Exercises, and Product Structure Engineering Change Proposals. ***FY 2018 OCO Plans:***					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0607658N / *(U)Cooperative Engagement Capability*	**Project (Number/Name)** 2039 / *COOP Engagement*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
N/A					
Title: AIR AND MISSILE DEFENSE RADAR (AMDR) ***Articles:*** ***FY 2016 Accomplishments:*** N/A ***FY 2017 Plans:*** Conduct a CEC AMDR Combat System (CS) Early Integration Project (EIP) Software Build Technical Interchange Meeting (SBT) #3. Conduct Combat System Integration Test (CIT) CIT-1 and CIT-2 and continue planning support and test equipment deliveries in support of planned CIT-2. Participate in SRR for Aegis ACB 20 (BL 10) ***FY 2018 Base Plans:*** N/A ***FY 2018 OCO Plans:*** N/A	0.000 -	9.500 -	0.000 -	0.000 -	0.000 -
Title: NAVAL INTEGRATED FIRE CONTROL-COUNTER AIR (NIFC-CA) ***Articles:*** ***FY 2016 Accomplishments:*** N/A ***FY 2017 Plans:*** Complete Preliminary Design Review (PDR)and Critical Design Review (CDR) for NIFC-CA kernel with Wrap Around Simulation Program (WASP) updates, and prototyping of advanced kernel and adaptive layer functions. ***FY 2018 Base Plans:*** N/A ***FY 2018 OCO Plans:*** N/A	0.000 -	5.700 -	0.000 -	0.000 -	0.000 -
Title: FIRE CONTROL LOOP IMPROVEMENT INITIATIVE (FCLIP) PHASE 2 ***Articles:*** ***FY 2016 Accomplishments:***	0.000 -	9.400 -	8.400 -	0.000 -	8.400 -

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0607658N / *(U)Cooperative Engagement Capability*	**Project (Number/Name)** 2039 / *COOP Engagement*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
N/A ***FY 2017 Plans:*** Continue development efforts for Ship Self Defense System (SSDS) Combat System updates, SPQ-9B and CIWS sensor integration and begin planning efforts for follow-on integration and testing phases in close collaboration with other IWS elements in preparation for fielding. ***FY 2018 Base Plans:*** Complete development efforts (through software Release R6) for FCLIP Phase 2, which includes Ship Self Defense System (SSDS) Combat System updates, CIWS sensor integration and Mk9 Multi-Target Tracking (MTT). Transition to follow-on integration and testing phase in close coordination with sensors and SSDS combat system, and provide CEC support for execution of Trackex #1, scheduled for Q4FY18. ***FY 2018 OCO Plans:*** N/A					
Title: CEC INCREMENT 2	0.000	1.900	2.100	0.000	2.100
Articles:	-	-	-	-	-
FY 2016 Accomplishments: N/A ***FY 2017 Plans:*** Begin Composite Surface Tracking (CST) development effort, with System Functional Review (SFR) and System Requirement Review (SRR), to integrate surface radar data and provide it across the CEC Data Distribution System (DDS) Radio to all other networked platforms. In addition to leveraging ongoing Close In Weapons System (CIWS) Sensor Adaptive Layer efforts in FCLIP, begin development of advanced CEC kernel functions to provide surface tracking specific environmental filters to also leverage surface radar measurements from existing sensors. Develop conceptual approach leading to a 2018 demonstration of an Automated Battle Management Aid (ABMA). Coordinate with candidate ABMA's such as the Electronic Warfare Battle Management (EWBM) and examine approaches with potential for successful way					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0607658N / *(U)Cooperative Engagement Capability*	**Project (Number/Name)** 2039 / *COOP Engagement*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
forward to field force level features across battle groups. ***FY 2018 Base Plans:*** Continue CST development effort with Preliminary Design Review (PDR) to integrate surface radar data. In addition to leveraging ongoing Close In Weapons System (CIWS) Sensor Adaptive Layer efforts in FCLIP, begin development of advanced CEC kernel functions to provide surface tracking specific environmental filters to also leverage surface radar measurements from existing sensors. Refine and execute a 2018 demonstration of an Automated Battle Management Aid (ABMA). Coordinate with candidate ABMA's such as the Electronic Warfare Battle Management (EWBM) and examine approaches with potential for successful way forward to field force level features across battle groups. ***FY 2018 OCO Plans:*** N/A					
Title: PROGRAM PROTECTION ***Articles:*** ***FY 2016 Accomplishments:*** N/A ***FY 2017 Plans:*** Provide CEC Program Protection support to manage risks from foreign intelligence collection threats to CEC hardware, software, or supply chain exploitation. The CEC DoD unique or critical technologies are required to be protected using threat resistant anti-tamper technologies. CEC worked closely with the Cyber Assessment Agency and Defense Assessment Management Office to access impacts to the program from exploitation. ***FY 2018 Base Plans:*** Provide CEC Program Protection support to manage risks from foreign intelligence collection threats to CEC hardware,	0.000 -	5.100 -	8.400 -	0.000 -	8.400 -

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0607658N / *(U)Cooperative Engagement Capability*	**Project (Number/Name)** 2039 / *COOP Engagement*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
software, or supply chain exploitation. The CEC DoD unique or critical technologies are required to be protected using threat resistant anti-tamper technologies. CEC will work closely with the Cyber Assessment Agency and Defense Assessment Management Office to access impacts to the program from exploitation. ***FY 2018 OCO Plans:*** N/A					
Title: ENTERPRISE AIR SURVEILLANCE RADAR (EASR) ***Articles:*** ***FY 2016 Accomplishments:*** N/A ***FY 2017 Plans:*** N/A ***FY 2018 Base Plans:*** Continue efforts started in FY 2017 under the CEC System Improvements line to provide CEC comments and support meetings for the development of the EASR Interface Functional Description (IFD), Interface Requirements Specification (IRS), Interface Description Document (IDD) and Interface Description Language (IDL). Support IWS2 lead EASR program SETR milestones and Sprint reviews. Begin initial development for CEC adaptive layers for Fixed and Rotator variants of EASR for CVN and L-Class ships. Prepare for and conduct CEC-EASR SRR/SWBLR and CEC-EASR SBR #1. ***FY 2018 OCO Plans:*** N/A	0.000 -	0.000 -	3.400 -	0.000 -	3.400 -
Accomplishments/Planned Programs Subtotals	0.000	84.501	92.571	0.000	92.571

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• SCN: *Navy, SCN*	34.100	21.200	30.400	-	30.400	18.100	12.500	12.700	12.800	51.200	507.031
• APN/0204152N: *Navy, APN*	16.263	19.886	16.897	-	16.897	13.788	14.064	14.345	14.632	57.200	401.044
• OPN/2606: *CEC*	25.695	22.034	23.892	-	23.892	37.483	32.467	32.142	32.791	40.774	1,037.942
• RDT&E/0206313M: *USMC*	0.762	3.634	2.092	-	2.092	1.255	0.752	0.730	0.730	0.000	32.577

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0607658N / *(U)Cooperative Engagement Capability*	**Project (Number/Name)** 2039 / *COOP Engagement*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• RDT&E/0206335M: *USMC*	0.473	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2.510
• O&M,N/0206626M: *USMC*	1.725	2.291	3.157	-	3.157	3.062	2.970	2.881	2.881	0.000	28.022
• PMC/0206313M: *USMC*	0.680	1.164	8.390	-	8.390	8.070	3.550	0.000	0.000	0.000	24.558
• OPN/0900: *DDG/MOD*	2.400	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	63.911
• OPN/0960: *CG MOD*	0.000	0.000	0.000	-	0.000	0.000	0.000	6.230	6.355	0.000	12.585

Remarks

D. Acquisition Strategy

CEC Acquisition Strategy (AS) approved by OSD (AT&L) on 19 January 2010. CEC Acquisition Plan (AP) approved September 2013. Full Rate Production for CEC AN/USG-3B variant approved April 2014.

Contracts:
Common Array Block (CAB) antenna - contract competitively awarded 4Qtr FY2013.
CEC Design Agent/Engineering Services (DA/ES) follow-on sole source contract awarded 4Qtr FY2013.
CEC Production - Contract competitively awarded in 2Qtr FY2015.
CEC DA/ES contract will be competitively awarded 1Qtr FY2019. For DA, The contractor will maintain the CEC hardware and software development environment and testing infrastructure including; Systems and Software Laboratories, the external RF Range, the Compact Antenna Range, and the CEC Classified Development LAN. For ES, the contractor will provide analysis, design, implementation, integration, testing and evaluation, reliability and maintainability, quality assurance, safety, security, Integrated Logistics Support (ILS), and Configuration Management (CM).

E. Performance Metrics

- Complete the adaptive layer development for the E-2D aircraft. Provide technical support for installation and integration in the Northrop Grumman Systems Integration Laboratory, on board the test aircraft and support the Developmental testing. Continue E-2D Advanced Hawkeye aircraft CEC integration efforts.
- Continue AEGIS Advance Capability Builds CEC integration and demonstration efforts.
- Continue Naval Integrated Fire Control - Counter Air (NIFC-CA) CEC integration and demonstration efforts.
- Continue Crypto Modernization Tech Refresh efforts.

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0607658N / *(U)Cooperative Engagement Capability*	Project (Number/Name) 2039 / *COOP Engagement*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AN/USG-2/3 Design Agent/Engineering Services	C/CPFF	Raytheon : St. Petersburg, FL	127.395	0.000		9.799	Jan 2017	13.328	Oct 2017	-		13.328	Continuing	Continuing	Continuing
TDA	C/CPFF	JHU/APL : Laurel, MD	78.150	0.000		9.535	Feb 2017	13.176	Oct 2017	-		13.176	Continuing	Continuing	Continuing
SI/DA	C/CPAF	General Dynamics : Fairfax, VA	23.979	0.000		0.000		0.000		-		0.000	0.000	23.979	-
SI/DA	C/CPAF	Award Fees : Not Specified	2.903	0.000		0.000		0.000		-		0.000	0.000	2.903	-
DDG 1000	C/CPAF	Raytheon : Massachusetts	10.983	0.000		0.000		0.000		-		0.000	0.000	10.983	-
DDG 1000	C/CPAF	Award Fees : Not Specified	0.447	0.000		0.000		0.000		-		0.000	0.000	0.447	-
NIFC-CA Integration	Various	Various : Various	41.799	0.000		5.700	Jan 2017	0.000		-		0.000	Continuing	Continuing	Continuing
In-Service Engineering Activity	WR	NSWC : Port Hueneme, CA	6.463	0.000		1.825	Dec 2016	3.305	Oct 2017	-		3.305	Continuing	Continuing	Continuing
Software Support Activity/ SEIA	WR	NSWC : Dahlgren, VA	19.718	0.000		1.884	Dec 2016	3.367	Oct 2017	-		3.367	Continuing	Continuing	Continuing
Production Engineering Activity	WR	NSWC : Crane, IN	5.694	0.000		0.258	Dec 2016	0.395	Oct 2017	-		0.395	0.000	6.347	-
JTRS	Various	Various : Various	8.500	0.000		0.000		0.000		-		0.000	0.000	8.500	-
Various	WR	Various : Various	31.873	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
NAVSSI	WR	SPAWAR : San Diego, CA	0.368	0.000		0.000		0.000		-		0.000	0.000	0.368	-
Certification	MIPR	NSA : Fort Meade, MD	1.200	0.000		0.000		0.000		-		0.000	0.000	1.200	-
Certification	WR	SPAWAR : Charleston, SC	0.930	0.000		0.000		0.000		-		0.000	0.000	0.930	-
Joint Exercises	WR	Various : Various	3.744	0.000		0.000		0.000		-		0.000	0.000	3.744	-
LBTS Testing	WR	CDSA Dam Neck : Virginia Beach, VA	7.495	0.000		0.500	Dec 2016	0.500	Oct 2017	-		0.500	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0607658N / *(U)Cooperative Engagement Capability*	**Project (Number/Name)** 2039 / *COOP Engagement*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
LBTS Testing	WR	SCSC : Wallops Island, VA	7.083	0.000		0.500	Jan 2017	0.500	Oct 2017	-		0.500	Continuing	Continuing	Continuing
E-2D Integration	Various	Various : Various	47.758	0.000		2.800	Feb 2017	3.900	Oct 2017	-		3.900	Continuing	Continuing	Continuing
MSI/NCCT	MIPR	Wright Patterson AFB : Dayton, OH	1.228	0.000		0.000		0.000		-		0.000	0.000	1.228	-
Common Array Block Development	C/CPFF	Raytheon : St. Petersburg, FL	40.561	0.000		10.200	Jan 2017	16.300	Oct 2017	-		16.300	Continuing	Continuing	Continuing
NEEDS	Various	Various : Various	31.930	0.000		6.600	Feb 2017	4.500	Oct 2017	-		4.500	Continuing	Continuing	Continuing
AMDR	Various	Various : Various	12.012	0.000		9.500	Feb 2017	0.000		-		0.000	Continuing	Continuing	Continuing
JTMC	C/CPFF	Raytheon : St. Petersburg, FL	1.000	0.000		0.000		0.000		-		0.000	0.000	1.000	-
FCLIP	Various	Various : Various	7.100	0.000		9.400	Feb 2017	8.400	Oct 2017	-		8.400	Continuing	Continuing	Continuing
CEC Increment 2	Various	Various : Various	0.000	0.000		1.900	Feb 2017	2.100	Oct 2017	-		2.100	Continuing	Continuing	Continuing
Program Protection	C/BA	NSMA : Washington, DC	0.000	0.000		5.100	Feb 2017	8.400	Oct 2017	-		8.400	Continuing	Continuing	Continuing
EASR	Various	Various : Various	0.000	0.000		0.000		3.400	Oct 2017	-		3.400	0.000	3.400	-
		Subtotal	520.313	0.000		75.501		81.571		-		81.571	-	-	-

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test/ACB Support	C/CPFF	Raytheon : St. Petersburg, FL	5.114	0.000		1.113	Feb 2017	1.308	Oct 2017	-		1.308	Continuing	Continuing	Continuing
Test/ACB Support	C/CPFF	JHU/APL : Laurel, MD	2.676	0.000		1.058	Feb 2017	1.816	Oct 2017	-		1.816	Continuing	Continuing	Continuing
Test Support	WR	NRL : Washington, DC	0.313	0.000		0.000		0.000		-		0.000	0.000	0.313	-
Test/ACB Support	WR	NSWC : Port Hueneme, CA	24.386	0.000		1.895	Feb 2017	2.147	Oct 2017	-		2.147	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0607658N / *(U)Cooperative Engagement Capability*	**Project (Number/Name)** 2039 / *COOP Engagement*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Air Operations Test Support	WR	NAVAIR (PMA207) : Patuxent River, MD	10.187	0.000		1.047	Feb 2017	1.231	Oct 2017	-		1.231	Continuing	Continuing	Continuing
Test Data Reduction Analysis	WR	NSWC : Corona, CA	17.934	0.000		1.334	Feb 2017	1.541	Oct 2017	-		1.541	Continuing	Continuing	Continuing
Test Support	WR	COMOPTEVFOR : Norfolk, VA	12.607	0.000		1.175	Feb 2017	1.369	Oct 2017	-		1.369	Continuing	Continuing	Continuing
Test/ACB Support	WR	NSWC : Dahlgren, VA	2.290	0.000		1.378	Feb 2017	1.588	Oct 2017	-		1.588	Continuing	Continuing	Continuing
		Subtotal	75.507	0.000		9.000		11.000		-		11.000	-	-	-

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/FFP	Booz Allen & Hamilton : Washington, DC	5.070	0.000		0.000		0.000		-		0.000	0.000	5.070	-
Program Management Support	C/FFP	Tech Marine : Washington, DC	0.360	0.000		0.000		0.000		-		0.000	0.000	0.360	-
		Subtotal	5.430	0.000		0.000		0.000		-		0.000	0.000	5.430	-

	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	601.250	0.000		84.501		92.571		-		92.571	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0607658N / *(U)Cooperative Engagement Capability*	**Project (Number/Name)** 2039 / *COOP Engagement*

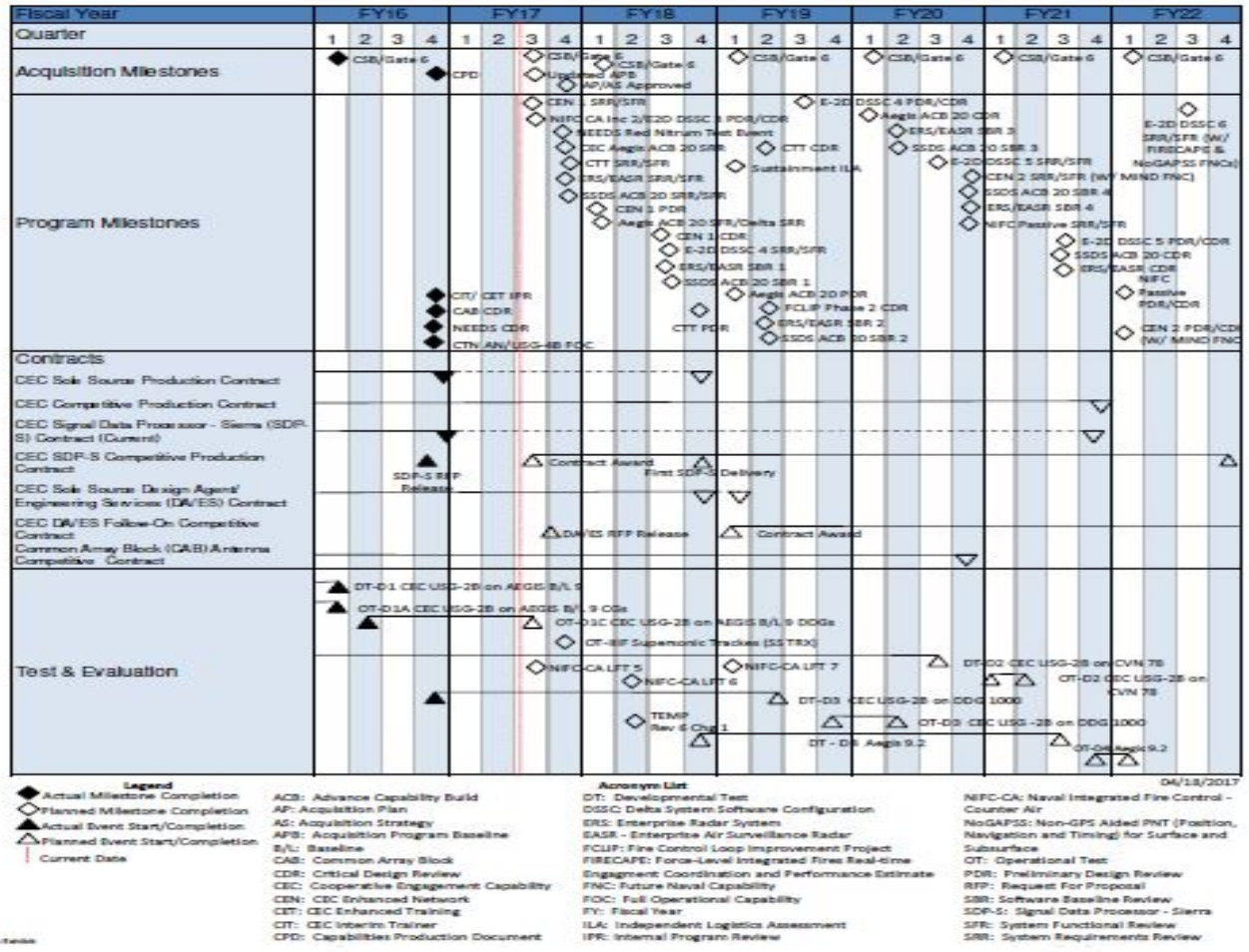

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0607658N / *(U)Cooperative Engagement Capability*	**Project (Number/Name)** 2039 / *COOP Engagement*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2039				
FY16 CSB/Gate 6	1	2016	1	2016
FY17 CSB/Gate 6	1	2017	1	2017
FY18 CSB/Gate 6	1	2018	1	2018
FY19 CSB/Gate 6	1	2019	1	2019
FY20 CSB/Gate 6	1	2020	1	2020
FY21 CSB/Gate 6	1	2021	1	2021
FY22 CSB/Gate 6	1	2022	1	2022
CPD	4	2016	4	2016
Updated APB	3	2017	3	2017
AP/AS Approved	4	2017	4	2017
CEN 1 SRR/SFR	3	2017	3	2017
Sustainment ILA	3	2018	3	2018
NIFC-CA Inc 2/E2D DSSC 3 PDR/CDR	3	2017	3	2017
NEEDS Red Nitrium Test Event	4	2017	4	2017
CEC Aegis ACB 20 SRR	4	2017	4	2017
ERS/EASR SRR/SFR	4	2017	4	2017
CEN 1 PDR	1	2018	1	2018
Aegis ACB 20 SFR/Delta SRR	1	2018	1	2018
CEN 1 CDR	3	2018	3	2018
E-2D DSSC 4 SRR/SFR	3	2018	3	2018
ERS/EASR SBR 1	3	2018	3	2018

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0607658N / *(U)Cooperative Engagement Capability*	**Project (Number/Name)** 2039 / *COOP Engagement*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
SSDS ACB 20 SBR 1	3	2018	3	2018
Aegis ACB 20 PDR	1	2019	1	2019
FCLIP Phase 2 CDR	2	2019	2	2019
ERS/EASR SBR 2	2	2019	2	2019
SSDS ACB 20 SBR 2	2	2019	2	2019
E-2D DSSC 4 PDR/CDR	3	2019	3	2019
Aegis ACB 20 CDR	1	2020	1	2020
ERS/EASR SBR 3	2	2020	2	2020
SSDS ACB 20 SBR 3	2	2020	2	2020
E-2D DSSC 5 SRR/SPR	3	2020	3	2020
CEN 2 SRR/SFR (W/MIND FNC)	4	2020	4	2020
SSDS ACB 20 SBR 4	4	2020	4	2020
ERS/EASR SBR 4	4	2020	4	2020
NIFC Passive SRR/SFR	4	2020	4	2020
E-2D DSSC 5 PDR/CDR	3	2021	3	2021
SSDS ACB 20 CDR	3	2021	3	2021
ERS/EASR CDR	3	2021	3	2021
NIFC Passive PDR/CDR	1	2022	1	2022
CEN 2 PDR/CDR (W/MIND FNC)	1	2022	1	2022
E-2D DSSC 6 SRR/SFR (W/FIRECAPE & NoGAPSS FNCs)	3	2022	3	2022
CIT/CET IPR	4	2016	4	2016
CAB CDR	4	2016	4	2016
NEEDS CDR	4	2016	4	2016
CTN AN/USG-4B FOC	4	2016	4	2016
CEC Sole Source Production Contract	1	2016	4	2018

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0607658N / *(U)Cooperative Engagement Capability*	**Project (Number/Name)** 2039 / *COOP Engagement*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
CEC Competitive Production Contract	1	2016	4	2021
CEC Signal Data Processor - Sierra (SDP-S) Contract (Current)	1	2016	4	2021
CEC SDP-S Competitive Production Contract	3	2017	4	2022
SDP-S RFP Release	4	2016	4	2016
First SDP-S Delivery	4	2018	4	2018
CEC Sole Source Design Agent/Engineering Services (DA/ES) Contract	1	2016	1	2019
CEC DA/ES Follow-On Competitive Contract	1	2019	4	2022
DA/ES RFP Release	4	2017	4	2017
Common Array Block (CAB) Antenna Competitive Contract	1	2016	4	2020
DT-D1 CEC USG-2B on AEGIS B/L9	1	2016	1	2016
OT-D1A CEC USG-2B on AEGIS B/L 9 CGs	1	2016	1	2016
OT-D1C CEC USG-2B on AEGIS B/L 9 DDGs	2	2016	3	2017
OT-IIIF Supersonic Trackex (SS TRX)	4	2017	4	2017
NIFC-CA LFT 5	3	2017	3	2017
NIFC-CA LFT 6	2	2018	2	2018
NIFC-CA LFT 7	1	2019	1	2019
DT-D2 CEC USG-2B on CVN 78	1	2016	3	2020
DT-D3 CEC USG-2B on DDG 1000	4	2016	2	2019
OT-D2 CEC USG-2B on CVN 78	1	2021	2	2021
TEMP Rev 6 Chg 1	2	2018	2	2018
OT-D3 CEC USG-2B on DDG 1000	4	2019	2	2020
DT-D4 Aegis 9.2	4	2018	3	2021
OT-D4 Aegis 9.2	4	2021	1	2022
CIT/SRR/SFR	4	2017	4	2017
SSDS ACB 20 SRR/SFR	4	2017	4	2017