| Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Army | | | | | | | | | | | DATE: April 2013 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>2040: *Research, Development, Test & Evaluation, Army*<br>BA 2: *Applied Research* | | | | | R-1 ITEM NOMENCLATURE<br>PE 0602782A: *Command, Control, Communications Technology* | | | | | | | |
| **COST ($ in Millions)** | **All Prior Years** | **FY 2012** | **FY 2013#** | **FY 2014 Base** | **FY 2014 OCO ##** | **FY 2014 Total** | **FY 2015** | **FY 2016** | **FY 2017** | **FY 2018** | **Cost To Complete** | **Total Cost** |
| Total Program Element | - | 25.703 | 28.852 | 34.209 | - | 34.209 | 36.580 | 38.177 | 39.896 | 40.092 | Continuing | Continuing |
| 779: *Command, Control And Platform Electronics Tech* | - | 10.617 | 13.086 | 13.714 | - | 13.714 | 15.823 | 16.107 | 17.421 | 17.745 | Continuing | Continuing |
| H92: *Communications Technology* | - | 15.086 | 15.766 | 20.495 | - | 20.495 | 20.757 | 22.070 | 22.475 | 22.347 | Continuing | Continuing |

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

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

**Note**

FY14 increase for Wireless Personal Area Network research

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

This program element (PE) researches and investigates communications, command and control (C2), and electronics components, sub-components, software and protocols that provide the Army with enhanced capabilities for secure, mobile, networked communications, assured information delivery, and presentation of information that enables decision-making. Commercial technologies are continuously investigated and leveraged where possible. Project 779 researches and develops C2 software, algorithms, protocols and devices that enable management of information across the tactical and strategic battle space; provides automated cognitive reasoning and decision making aids; and allows timely distribution, presentation/display and use of C2 data on Army platforms. Project H92 supports research in communications components, software, algorithms and protocols which potentially allow field commanders to communicate on-the-move to/from virtually any location, through a seamless, secure, self-organizing, self-healing network.

Work in this PE is complimentary of PE 0602705A (Electronics and Electronic Devices), PE 0603008A (Electronic Warfare Advanced Technology), and PE 0603772A (Advanced Tactical Computer Science and Sensor Technology), and is fully coordinated with PE 0602120A, (Sensors and Electronic Survivability), PE 0602783A (Computer and Software Technology), and PE 0602874A (Advanced Concepts and Simulation).

The cited work is consistent with the Assistant Secretary of Defense for Research and Engineering Science and Technology priority focus areas and the Army Modernization Strategy.

Work in this PE is performed by the Army Research, Development, and Engineering Command (RDECOM), Communications -Electronics Research, Development, and Engineering Center (CERDEC), Aberdeen Proving Ground, MD.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Army | | | | | DATE: April 2013 |
|---|---|---|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>2040: *Research, Development, Test & Evaluation, Army*<br>BA 2: *Applied Research* | | | R-1 ITEM NOMENCLATURE<br>PE 0602782A: *Command, Control, Communications Technology* | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2012** | **FY 2013** | **FY 2014 Base** | **FY 2014 OCO** | **FY 2014 Total** |
| Previous President's Budget | 26.075 | 28.852 | 29.171 | - | 29.171 |
| Current President's Budget | 25.703 | 28.852 | 34.209 | - | 34.209 |
| Total Adjustments | -0.372 | 0.000 | 5.038 | - | 5.038 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.372 | - | | | |
| • Adjustments to Budget Years | - | - | 5.038 | - | 5.038 |

| Exhibit R-2A, RDT&E Project Justification: PB 2014 Army | | | DATE: April 2013 |
|---|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>2040: *Research, Development, Test & Evaluation, Army*<br>BA 2: *Applied Research* | R-1 ITEM NOMENCLATURE<br>PE 0602782A: *Command, Control, Communications Technology* | PROJECT<br>779: *Command, Control And Platform Electronics Tech* | |

| COST ($ in Millions) | All Prior Years | FY 2012 | FY 2013# | FY 2014 Base | FY 2014 OCO ## | FY 2014 Total | FY 2015 | FY 2016 | FY 2017 | FY 2018 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 779: *Command, Control And Platform Electronics Tech* | - | 10.617 | 13.086 | 13.714 | - | 13.714 | 15.823 | 16.107 | 17.421 | 17.745 | Continuing | Continuing |

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

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

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

This project researches components, software and algorithms that enable commanders at all echelons to have better and timelier information and allows them to execute mission command from potentially anywhere on the battlefield. Emphasis is on data management and automated analysis to provide course-of-action determination, mission planning and rehearsal, mission execution monitoring and re-planning, and precision positioning (pos) and navigation (nav). This project researches technologies that support multi-modal man-machine interaction, battle space visualization, positioning and navigation in degraded environments (poor Global Positioning System (GPS) performance), automated cognitive decision aids, real-time collaborative tactical planning tools, data transfer, distributed data bases, open system architectures, service oriented architecture (SOA), language translation, and integration concepts which contribute to more efficient mobile operations.

This project supports Army science and technology efforts in the Command, Control, Communications and Intelligence Portfolio.

The cited work is consistent with the Assistant Secretary of Defense for Research and Engineering Science and Technology priority focus areas and the Army Modernization Strategy.

Work in this project is performed by the Army Research, Development, and Engineering Command (RDECOM), Communications - Electronics Research, Development, and Engineering Center (CERDEC), Aberdeen Proving Ground, MD.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2012 | FY 2013 | FY 2014 |
|---|---|---|---|
| ***Title:*** Battle Space Awareness and Positioning | 2.125 | 2.223 | 3.757 |
| ***Description:*** This effort investigates positioning (pos), navigation (nav) and timing sensor/integration technologies to provide position, velocity, and time information to support operational and training requirements, especially in hostile electro-magnetic interference and other radio frequency (RF) degraded/denied environments. Work being accomplished under PE 0603772A/ project 101 compliments this effort. | | | |
| ***FY 2012 Accomplishments:***<br>Developed sensor integration algorithms to combine the selected pos/nav sensors in radios both with and without radio based nav technologies; began assessing brassboard sensor/radio system/suite in a laboratory environment. | | | |
| ***FY 2013 Plans:*** | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2014 Army | | DATE: April 2013 |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>2040: *Research, Development, Test & Evaluation, Army*<br>BA 2: *Applied Research* | R-1 ITEM NOMENCLATURE<br>PE 0602782A: *Command, Control, Communications Technology* | PROJECT<br>779: *Command, Control And Platform Electronics Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2012 | FY 2013 | FY 2014 |
|---|---|---|---|
| Investigate and identify sources of error impacting the performance of the integrated radio and sensor navigation brassboard demonstrator, code advanced algorithms to perform navigation error mitigation in the demonstrator; investigate alternative/ emerging technologies for enhancing navigation in challenged environments such as exploiting Signals Of Opportunity (SOO) from RF sources like broadcast television stations or natural phenomena such as lightning strikes<br>***FY 2014 Plans:***<br>Will research and investigate sensors based on emerging advances in micro-electromechanical systems (MEMS) and exploitation of SOOs to reduce dependence upon GPS as a sole navigation source; investigate advanced anti-jam antennas and pseudo-lite sources to protect and enhance weak GPS signals; examine modernized GPS signals for potential integration into Army systems; design, code and develop interfaces, protocols and software for handheld devices to access secure GPS through emerging M Code capable GPS chips. | | | |
| ***Title:*** Command and Control (C2) On-The-Move (OTM) Enabling Technologies<br>***Description:*** This effort investigates, designs and codes software to improve the Warfighter's ability to access, use, present and understand relevant mission command information. Work on this effort transitions to PE 0603772A/project 101.<br>***FY 2012 Accomplishments:***<br>Refined how human understanding can be measured and improved; refined how large and differing amounts of information can be presented to best align with human processing; continued to improve technologies to enable collaborative mission execution and mission command for near-autonomous and autonomous unmanned systems; investigated and devised techniques to automate portions of the governance and accreditation process for edge-enabled applications; coded and integrated intelligent agent technology for language translation services, which provided automated intelligent reasoning of foreign language data.<br>***FY 2013 Plans:***<br>Investigate software and algorithms to enable complex interactions between UAS, UGV and manned platforms to facilitate collaborative mission execution, increase efficiency of simultaneous use of multiple unmanned systems and reduce cognitive burden on Soldiers while managing multiple unmanned assets; research fundamental human centered design principles to reduce information overload in Army mission command software; assess the cognitive impact on Soldiers of software applications operating on different computing platforms (e.g. viewing maps on computers, tablets, and smart phones); investigate the application of computer learning techniques to capture human experience and apply it in similar but different situations to enable non-expert Soldiers to function at or near expert level; investigate the advantages of cloud technology (e.g. centralized management of distributed computing resources) in the disadvantaged, intermittent and low bandwidth tactical mission area; develop software algorithms to analyze audio speech, automatically identify the language and the intended domain or application (e.g. medical, checkpoint, intelligence), such that the algorithms have ability to select the appropriate translation engine to improve translation accuracy; investigate software applications that facilitate execution of C2 and distribution of intelligence information to | 8.492 | 10.863 | 9.957 |

| Exhibit R-2A, RDT&E Project Justification: PB 2014 Army | | DATE: April 2013 |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>2040: *Research, Development, Test & Evaluation, Army*<br>BA 2: *Applied Research* | R-1 ITEM NOMENCLATURE<br>PE 0602782A: *Command, Control, Communications Technology* | PROJECT<br>779: *Command, Control And Platform Electronics Tech* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2012 | FY 2013 | FY 2014 |
|---|---|---|---|
| Soldiers in small units using hand held devices; investigate architectures and techniques for storage and distribution of software applications for tactical handheld devices.<br>***FY 2014 Plans:***<br>Will investigate software and develop algorithms to increase unmanned platform autonomy and improve multi-platform autonomous collision avoidance; design and refine mission command (MC) systems that learn and adapt based on the users' preferences and mission needs in order to reduce required training; investigate self-forming MC software solutions to reduce setup/tear-down effort and provide some zero-time (initial startup) capability; architect automated troubleshooting tools to reduce MC field service representative support costs and improve system utility; improve upon advanced computing platform display technologies by researching methods of supporting additional points of touch for multiple simultaneous users, larger display form factors, and wireless interface technology to connect to portable computing devices; architect and design a portable, tactical, distributed computing and storage solution to manage the distributed system and data to improve command post (CP) mobility and accessibility from vehicles and dismounts; develop and code a single common cross-platform software interface demonstrator that supports dismounted, mounted, and CP operations to reduce software design and support costs. | | | |
| **Accomplishments/Planned Programs Subtotals** | 10.617 | 13.086 | 13.714 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

| Exhibit R-2A, RDT&E Project Justification: PB 2014 Army | | | DATE: April 2013 |
|---|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>2040: *Research, Development, Test & Evaluation, Army*<br>BA 2: *Applied Research* | R-1 ITEM NOMENCLATURE<br>PE 0602782A: *Command, Control, Communications Technology* | PROJECT<br>H92: *Communications Technology* | |

| COST ($ in Millions) | All Prior Years | FY 2012 | FY 2013# | FY 2014 Base | FY 2014 OCO ## | FY 2014 Total | FY 2015 | FY 2016 | FY 2017 | FY 2018 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H92: *Communications Technology* | - | 15.086 | 15.766 | 20.495 | - | 20.495 | 20.757 | 22.070 | 22.475 | 22.347 | Continuing | Continuing |

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

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

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

This project investigates and applies advanced communications and network devices, software, algorithms and services by leveraging and adapting commercial research and new communications and network sciences work by the Army Research Lab, Network Science Collaborative Technology Alliance or other Basic Research efforts. This project focuses development in wireless transport (e.g. mobile radio based communications systems) to develop new techniques for improving communications in high radio frequency (RF) interference environments and to increase the communications capacity of terrestrial and satellite communications systems. This project also investigates enabling antenna components, materials, designs and configurations to reduce the visual signature of antennas on Soldier, vehicular and airborne platforms and reduce co-site interference on platforms with multiple transceivers such as radios and jammers. Additionally this project investigates cyber security devices, software and techniques to harden narrow band, wireless communications networks against cyber attacks; new mobile networking protocols to make wireless, on-the-move (OTM) communications networks more responsive to user needs. This project also investigates network operations software and techniques that improve the ability of the Soldier to manage and maintain complex, dynamic networks; and improved spectrum management software tools to make more efficient use of over-subscribed RF spectrum.

This project supports Army science and technology efforts in the Command, Control, Communications and Intelligence portfolio.

The cited work is consistent with the Assistant Secretary of Defense for Research and Engineering Science and Technology priority focus areas and the Army Modernization Strategy.

Work in this project is performed by the Army Research, Development, and Engineering Command (RDECOM), Communications-Electronics Research, Development, and Engineering Center (CERDEC), Aberdeen Proving Ground, MD.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2012 | FY 2013 | FY 2014 |
|---|---|---|---|
| ***Title:*** Antenna Technologies | 6.275 | 5.734 | 6.700 |
| ***Description:*** This effort fabricates and assesses low cost, power efficient, conformal and directional antenna technologies for terrestrial, airborne, and tactical satellite ground terminals to enable them to operate OTM over multiple frequency bands, and further investigates armor embedded antenna technologies. Together these efforts will improve ground forces electronic protection, increase signal power and range and provide greater connectivity for both mounted and dismounted forces. Work | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2014 Army | | DATE: April 2013 |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>2040: *Research, Development, Test & Evaluation, Army*<br>BA 2: *Applied Research* | R-1 ITEM NOMENCLATURE<br>PE 0602782A: *Command, Control, Communications Technology* | PROJECT<br>H92: *Communications Technology* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2012 | FY 2013 | FY 2014 |
|---|---|---|---|
| being accomplished under PE 0602270A/project 906, PE 0603008A/project TR1, and PE 0603270A/project K15 compliments this effort.<br><br>***FY 2012 Accomplishments:***<br>Completed integrated K/Ka/Q band low profile electronically steered SATCOM antenna; integrated single package Ka/Q band integrated power amplifier into the K/Ka/Q band SATCOM antenna; completed development of blue force tracking (BFT) SATCOM antenna and modem; developed wafer scale and distributed antenna components and architecture for very small profile on-the-move SATCOM antennas; assessed the Ku Band Simple Manufacturing Array Technology (SMArT) card antenna on an unmanned aerial system; executed antenna performance and ballistic assessment on armor embedded antenna candidates.<br><br>***FY 2013 Plans:***<br>Design wafer scale/smart card antenna for low profile SATCOM OTM and unmanned aerial system antennas; adjust embedded antenna designs to improve performance observed from ballistic assessments; investigate new metamaterials for broadband low profile antennas and nanotechnology for low visual signature armor and ballistic glass embedded transparent antennas; design antenna modifications for interference mitigation to reduce radio frequency (RF) communications and electronic warfare (EW) cosite interference between EW and blue force communication systems.<br><br>***FY 2014 Plans:***<br>Will develop optically non-intrusive antenna arrays for transparent Armor; investigate and advance smart switching for distributed antenna system arrays enabling higher output power, interoperability and improved link connectivity for terrestrial, SATCOM and EW communications; investigate and evolve antenna systems that provide capacity to support simultaneous EW jamming and communications without interference; establish standard interface for distributed terrestrial and SATCOM antenna systems to support interchange of communications modes on battlefield platforms. | | | |
| ***Title:*** Wireless Information Assurance (IA)<br><br>***Description:*** This effort investigates, codes and fabricates software, algorithms and devices to protect wireless tactical networks against computer network attacks. Effort includes technologies that are proactive rather than reactive in countering attacks against tactical military networks. Work being accomplished under PE 0603008A/project TR2 compliments this effort.<br><br>***FY 2012 Accomplishments:***<br>Researched and coded intrusion detection system (IDS) technology to proactively ascertain local threats on tactical host systems and networks using minimal system resources; coded technologies to automatically self-inoculate these systems to limit impact and contain spread of malicious activity; devised suitable IDS agent collaboration schemes to ensure that trusted decisions are made in response to malicious behavior; configured IDS agents to share actionable security information with sustaining | 3.280 | 2.771 | 9.437 |

| Exhibit R-2A, RDT&E Project Justification: PB 2014 Army | | DATE: April 2013 |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>2040: *Research, Development, Test & Evaluation, Army*<br>BA 2: *Applied Research* | R-1 ITEM NOMENCLATURE<br>PE 0602782A: *Command, Control, Communications Technology* | PROJECT<br>H92: *Communications Technology* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2012 | FY 2013 | FY 2014 |
|---|---|---|---|
| base assets for further analysis while still allowing the Warfighter to maintain mission focus and continuity while operating at the resource-constrained tactical edge.<br><br>***FY 2013 Plans:***<br>Research different types of frameworks upon which future cyber security can be developed to remove redundancies and conflicts between disparate software tools and techniques; design and develop communications architecture that standardizes how cyber-security tools and applications should share information (e.g., messages, protocols, cryptography, concealing communications); investigate techniques, limitations and risks of protecting networks by using software methods that obscure the network details to prevent cyber attackers from mapping networks and traffic in preparation for an attack.<br><br>***FY 2014 Plans:***<br>Will design and code sophisticated software assurance algorithms to differentiate between stealthy life cycle attacks and software coding errors; design and assess secure coding methodologies that can detect and self correct against malicious code insertion; investigate theoretical control graph techniques for improvements in malware detection that can detect malware variants incorporating polymorphic and metamorphic transformation engines; research and design sophisticated, optimized cyber maneuver capabilities that incorporate the use of reasoning, intuition, and perception while determining the optimal scenario on when to maneuver, as well as the ability to map and manage the network to determine probable attack paths and the likelihood of exploit; investigate dynamically and efficiently altering tactical network services, ports, protocols and systems to inhibit red force ability to perform malicious network reconnaissance to determine location of critical networking services; research and assess data sharing and collaboration techniques between offensive and defensive operations to enable advanced warning and response actions. | | | |
| ***Title:*** Cognitive Networking<br><br>***Description:*** This effort investigates, evaluates and creates a set of advanced networking devices, software and algorithms to enable wireless networks to sense the dynamic and uncertain nature of mobile ad-hoc multi-tiered, multi-band network environments and spectrum conditions, and automatically adapt network topologies or traffic flows to increase overall performance while reducing the time and human effort required to operate the network. Work being accomplished under PE 0601104A/project H50 and PE 0603008A/project TR1 compliments this effort.<br><br>***FY 2012 Accomplishments:***<br>Exercised the Cognitive Network Engineering Design Analytic Toolset (CNEDAT) with 10 cognitive radios in a coordinated fashion through a set of assessments; used the CNEDAT to design a cognitive network to meet a set of performance goals or requirements (such as robustness to node or link outage); implemented these designs in the radio hardware/software, and under the same set of traffic loads; compared the measured network parameters (i.e., throughput, delay, loss, etc) with those predicted by the design tool; conducted specific experiments in total applied traffic load, and/or various traffic mixes (voice, video, data, | 3.924 | 4.143 | 0.908 |

| Exhibit R-2A, RDT&E Project Justification: PB 2014 Army | | DATE: April 2013 |
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| APPROPRIATION/BUDGET ACTIVITY<br>2040: *Research, Development, Test & Evaluation, Army*<br>BA 2: *Applied Research* | R-1 ITEM NOMENCLATURE<br>PE 0602782A: *Command, Control, Communications Technology* | PROJECT<br>H92: *Communications Technology* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2012 | FY 2013 | FY 2014 |
|---|---|---|---|
| imagery, chat) as well as different mobility rates, mobility patterns, and different node/link outages due to simulated jamming and/or node destruction.<br>***FY 2013 Plans:***<br>Research methods based upon game theory coupled with statistical estimation and machine learning to design new network control protocols and software that improves the ability of wireless communications networks to change behavior, network topology and traffic flow based on changing RF environments and network congestion; design and code new software algorithms that increase the efficiency of current internet protocols; analyze the potential performance improvements using the CNEDAT toolset.<br>***FY 2014 Plans:***<br>Will research software for self initiating and managing wireless networks that supports spectrum efficiency in austere tactical environments; research ad-hoc routing, digital voice and disruption tolerant networking to deliver 2 way voice, data and position-location information to small units. | | | |
| ***Title:*** Dynamic Spectrum and Network Technologies<br>***Description:*** This effort investigates and fabricates components and codes software for radios and network management systems to enable access to spectrum that is unavailable because of current inefficient spectrum management methods. This includes new management and visualization modalities as well as improved radio frequency modulation techniques, devices and software. Work being accomplished under PE 0603008A/project TR1 compliments this effort.<br>***FY 2012 Accomplishments:***<br>Coded dynamic spectrum access (DSA) software and algorithms and added them to the automatic frequency channel sensing and selection capabilities of cellular base stations in order to assist the network planners to set the frequencies for mobile base station setup.<br>***FY 2013 Plans:***<br>Research new software and algorithms to visualize/present and alert Soldiers to the operational state of wireless networks at the company, battalion and brigade levels; use distributed multi-agent software and algorithms to integrate situation awareness of networks (mission and cognitive) with real-time event correlation by timestamp/location to provide Soldiers with correlated event alerts; investigate new SATCOM waveforms to increase communications capacity and improve anti-jam performance.<br>***FY 2014 Plans:***<br>Will research and develop software and hardware techniques allowing EW and communications systems to interoperate without mutual interference; research components, software and algorithms that support a waveform capable of simultaneous automated jamming and communication; investigate coordinated resource allocation, DSA and interference cancellation algorithms to support | 1.607 | 3.118 | 3.450 |

| Exhibit R-2A, RDT&E Project Justification: PB 2014 Army | | DATE: April 2013 |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>2040: *Research, Development, Test & Evaluation, Army*<br>BA 2: *Applied Research* | R-1 ITEM NOMENCLATURE<br>PE 0602782A: *Command, Control, Communications Technology* | PROJECT<br>H92: *Communications Technology* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2012 | FY 2013 | FY 2014 |
|---|---|---|---|
| interoperability between different wireless communication networks; investigate spectrum compatibility techniques to enable detection, identification, exploitation, location, disruption and neutralization of adversary RF systems in dense co-channel and multi-path interference environments, while allowing friendly communications and other RF systems to operate effectively in the same spectrum space. | | | |
| **Accomplishments/Planned Programs Subtotals** | 15.086 | 15.766 | 20.495 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.