| Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Office of the Secretary Of Defense | Date: February 2018 |
|---|---|
| **Appropriation/Budget Activity**<br>0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)* | **R-1 Program Element (Number/Name)**<br>PE 0603288D8Z *I Science and Technology (S&T) Analytic Assessments* |

| COST ($ in Millions) | Prior Years | FY 2017 | FY 2018 | FY 2019 Base | FY 2019 OCO | FY 2019 Total | FY 2020 | FY 2021 | FY 2022 | FY 2023 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 27.444 | 11.603 | 13.154 | 19.472 | - | 19.472 | 19.485 | 19.721 | 20.015 | 20.336 | Continuing | Continuing |
| 328: *Science and Technology Analytic Assessments* | 27.444 | 11.603 | 13.154 | 19.472 | - | 19.472 | 19.485 | 19.721 | 20.015 | 20.336 | Continuing | Continuing |

**Note**

Service Requirements Review Board (SRRB) efficiencies are included.

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

This Program Element (PE) directly supports The Office of the Under Secretary of Defense, Research and Engineering (OUSD (R&E)) and OUSD Acquisition and Sustainment with assessments and analysis to inform the strategic direction of research, development, and acquisition of innovative capabilities to meet the emerging threats from the diverse range of state and non-state actors confronting the Unites States. Due to the complexity of these challenges, the process for developing and executing these analytic assessments span fiscal years and may have multiple phases.

The analysis process addresses the following Joint and Cross-Cutting missions: 1) Operational and Technical Assessments identify gaps and options to fill those gaps; 2) Technical Analysis quantifies key attributes of the challenge, assess counter technology options, and provide an operational value assessment; and 3) Development of Analytic Tools to help understand complex and longer term challenges. The Quick Reaction Analysis Team provides quick turn analysis on emerging challenges and senior leader issues using the Federally Funded Research and Development Center/University Affiliated Research Center (FFRDC/UARC) community as performers while leveraging previous related experience and work done for the Department of Defense (DoD).

Typically, the ratios of resources applied to Operational and Technical Assessments, Technical Analysis and Quick Reaction Analysis Team, and development of Analytic Tools will be roughly 30/60/10 percent. Implementation of this process could span multiple years causing the portfolio to cascade from year to year. Throughout this process the analysis will be tightly coupled with both the Intelligence community and the operational community through the Combatant Commands.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Office of the Secretary Of Defense | Date: February 2018 |
|---|---|
| **Appropriation/Budget Activity**<br>0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)* | **R-1 Program Element (Number/Name)**<br>PE 0603288D8Z *I Science and Technology (S&T) Analytic Assessments* |

| B. Program Change Summary ($ in Millions) | FY 2017 | FY 2018 | FY 2019 Base | FY 2019 OCO | FY 2019 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 12.048 | 13.154 | 16.676 | - | 16.676 |
| Current President's Budget | 11.603 | 13.154 | 19.472 | - | 19.472 |
| Total Adjustments | -0.445 | 0.000 | 2.796 | - | 2.796 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.431 | - | | | |
| • Other Program Adjustments | -0.002 | - | 2.927 | - | 2.927 |
| • FFRDC Transfer | -0.012 | - | - | - | - |
| • Economic Assumptions | - | - | -0.131 | - | -0.131 |

**Change Summary Explanation**

The FY 2019 baseline increase of $2.927 million is to pay for higher priority DoD requirements. Funding increases support the OUSD(R&E)'s efforts to better advise the Secretary and DoD on key investments to retain technical superiority.

| Exhibit R-2A, RDT&E Project Justification: PB 2019 Office of the Secretary Of Defense | | | | | | | | | | | Date: February 2018 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>0400 / 3 | | | | | R-1 Program Element (Number/Name)<br>PE 0603288D8Z / *Science and Technology (S&T) Analytic Assessments* | | | | Project (Number/Name)<br>328 / *Science and Technology Analytic Assessments* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2017** | **FY 2018** | **FY 2019 Base** | **FY 2019 OCO** | **FY 2019 Total** | **FY 2020** | **FY 2021** | **FY 2022** | **FY 2023** | **Cost To Complete** | **Total Cost** |
| 328: *Science and Technology Analytic Assessments* | 27.444 | 11.603 | 13.154 | 19.472 | - | 19.472 | 19.485 | 19.721 | 20.015 | 20.336 | Continuing | Continuing |

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

The Science and Technology (S&T) Analytic Assessments Program Element (PE) directly shapes the development of innovative capabilities to meet the emerging threats from the diverse range of state and non-state actors confronting the Unites States. These areas include: space and terrestrial-based indications and warnings systems, integrated and resilient Intelligence, Surveillance, Reconnaissance (ISR) platforms, strategic lift, long-range precision strike weapons, missile defense technologies, undersea systems, remotely operated vehicles and technologies, special operations forces, the Cyber Mission Force, ground systems, and others outlined in the 2016 National Military Strategy. Due to the complexity of these challenges, the process for developing and executing these analytic assessments span fiscal years and may have multiple phases. The emerging nature of the problem sets makes specific identification of all the study projects beyond the budget year unlikely. Implementation of this process could span multiple years causing the portfolio to cascade from year-to-year.

Operational and Technical Assessments are informed by comprehensive Kill Chain Analysis (KCA) across all domains and the time continuum from 2018-2038 to identify prioritized operational issues and associated actionable technology focus areas. These products support detailed analyses and assessments to help shape technology investment decisions and inform the strategic direction of capability development Because of the 20 year timeframe, these analyses will also help to inform requirements rather than waiting for current processes to develop them. Main lines of effort include the following activities:
- KCA across Defense Planning Scenarios and other relevant DOD Vignette to identify and characterize capability disadvantages and opportunities across the battlespace.
- Developed and maintain an all source-like database of military capabilities and a standalone software application, KCA Results Display System, to provide data and analysis on operational issues.
- Produce operational impact assessments of potential technology improvements to military capabilities in the near, mid, and far term.
- Consolidate Technology focused roadmaps of US capability development and S&T developmental strategic plans.

Technical Analysis and Quick Reaction Analysis Team perform engineering level systems analysis using the DoD sponsored FFRDC/UARC and Department of Defense and Department of Energy (DoD/DoE) laboratories. Using these research performers, previously sponsored research on relevant topics is leveraged in the new research providing value and experience on new projects. Main lines of effort include the following activities:
- Technical threat assessments building on intelligence community products for identifying gaps in U.S. capability for critical threats.
- Quantitative analysis of potential new technology and concepts to address capability gaps and counter emerging threat technologies.
- Architecture development and evaluation to develop new U.S. capability.
- Independent assessment of critical capability and technology development.

Analytic Tools include modeling, simulation, and analysis (MS&A), computer based engineering models, and purposed designed equipment to demonstrate or confirm theoretical performance of technical concepts. Main lines of effort include the following activities:
- Develop analytic tools to inform and provide decision support to resourcing recommendations.

| Exhibit R-2A, RDT&E Project Justification: PB 2019 Office of the Secretary Of Defense | | Date: February 2018 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603288D8Z / *Science and Technology (S&T) Analytic Assessments* | **Project (Number/Name)**<br>328 / *Science and Technology Analytic Assessments* |

- Develop strategic analytic tools enabling the analysis and evaluation of critical capability and technology development.
- Integrated MS&A leveraging Service- and Agency–level virtual and constructive resources to provide insight into complex acquisition and operational decisions.
- Red Teaming existing and planned US capabilities and weapons systems using emerging threat systems and capabilities in emerging scenarios.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2017 | FY 2018 | FY 2019 |
|---|---|---|---|
| ***Title:*** Science and Technology Analytic Assessments | 11.603 | 13.154 | 19.472 |

***Description:*** Science and Technology (S&T) Analytic Assessments Program Element (PE) directly supports the development of innovative capabilities to meet the emerging threats from the diverse range of state and non-state actors confronting the Unites States. These capabilities include: space and terrestrial-based indications and warnings systems, integrated and resilient Intelligence, Surveillance, Reconnaissance (ISR) platforms, strategic lift, long-range precision strike weapons, missile defense technologies, undersea systems, remotely operated vehicles and technologies, special operations forces, the Cyber Mission Force, ground systems, and others outlined in the 2015 National Military Strategy. Throughout this process the analysis will be tightly coupled with both the Intelligence community and the operational community through the Combatant Commands.
In order to accomplish a balanced program of assessments, the target ratios of quick reaction studies, strategic and operational analysis, and analytic tool development is planned to be 30/60/10 percent. Accordingly, the following activities are planned for FY 2018 and FY 2019.

***FY 2018 Plans:***
To fully inform the analytic assessments, maintenance and expansion of the KCA analytic foundation is required each year. This will include improvements in the underlying data fidelity and breadth, and in all aspects of display, analysis, assessment, integration, entity relationships and interactions. Specific tasks that will be executed within the KCA area include:
- Continue research of new, emerging and modified Blue and Red platforms and components and integration into the KCA data environment.
- Conduct a data refresh at the platform and component level of detail to ensure the KCA database is populated with the latest intelligence and technical data.
- Update Kill Chain and Target Set assessments in support of the overall Operational Analysis within KCA.
- Continue development of threat agnostic Operational and Technical Issues and integration into the KCA environment.
- Expansion of the scope of Operational and Technical Issues into new Warfare Areas.
- Integrate Science and Technology elements (initiatives, potential solutions, technologies etc.) into the KCA environment (Operational and Technical Issues, Kill Chains, Target Sets etc.).
- Continue development, enhancements, and upgrades to the entire KCA Toolset including the KCA Results Display System.

Quick Reaction Analysis Team (QRAT):
- Quick Reaction Analytic efforts respond to critical questions related to potential vulnerabilities in current and future U.S. systems to identify opportunities or challenges related to developing foreign capabilities. These short studies typically focus on the

| Exhibit R-2A, RDT&E Project Justification: PB 2019 Office of the Secretary Of Defense | | Date: February 2018 |
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| **Appropriation/Budget Activity**<br>0400 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603288D8Z / *Science and Technology (S&T) Analytic Assessments* | **Project (Number/Name)**<br>328 / *Science and Technology Analytic Assessments* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2017 | FY 2018 | FY 2019 |
|---|---|---|---|
| following capability areas: foreign, integrated air and missile defense capabilities; options for U.S. electronic warfare and capability to counter adversaries; resiliency in U.S. Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) systems and options to counter adversaries C4ISR capabilities; ground combat offensive and defensive capabilities, air dominance and missile defense, and undersea engagements. The QRAT is enabled by a weekly meeting of FFRDC/UARC lead contacts to review on-going and emerging tasks and collaborative technical interchanges on OUSD(R&E) and OUSD(A&S) focus areas.<br><br>Technical Analysis (Strategic Studies):<br>Strategic studies are 6-12 month engineering level systems analysis. Strategic studies parametrically define the emerging threat space, determine feasibility of potential solutions and parametrically analyze the solution trade space. Specific tasks that will be executed within the strategic studies area include:<br>- Evaluate options to counter foreign missile capabilities.<br>- Explore feasibility and potential of next generation electronic warfare technologies.<br>- Characterize an architecture for theater-level electronic warfare threat awareness and battle management to effectively and efficiently apportion resource in a constrained environment.<br>- Identify future threat detection and identification capabilities for future electronic support systems.<br>- Evaluate threats to High Value Air Assets (HVAA) and identify potential countermeasures to develop and alternative ways to accomplish the HVAA missions.<br>- System and technology assessments for surface and sub-surface warfare.<br>- Evaluate options for land based defense against a missile raid.<br>- Evaluate options for maritime based defense against a missile raid.<br>- Evaluate efficacy of passive systems and counters to passive systems.<br><br>Analytic Tools:<br>- Develop analytic tools to inform and evaluate new technologies' potential to counter emerging threats and exploit adversary vulnerabilities from air, land, sea, and space domains.<br>- Develop of analytic tools to provide inform and provide decision support to resourcing recommendations.<br>- Develop integrated modeling, simulation, and analysis tools to aid complex acquisition decisions.<br>- Develop Red Teaming methodology for evaluating US capabilities and systems in the context of emerging threats in relevant scenarios. | | | |
| ***FY 2019 Plans:***<br>Operational and Technical Assessments:<br>Specific tasks that will be executed within the Kill Chain Analysis (KCA) area include: | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2019 Office of the Secretary Of Defense | | Date: February 2018 |
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| **Appropriation/Budget Activity**<br>0400 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603288D8Z / *Science and Technology (S&T) Analytic Assessments* | **Project (Number/Name)**<br>328 / *Science and Technology Analytic Assessments* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2017 | FY 2018 | FY 2019 |
|---|---|---|---|
| - Conduct KCA on new threat scenarios and projected threat capabilities.<br>- Assess emerging operational scenarios against future red and blue capability timelines.<br>- Update existing KCA based on emerging red and blue capability assessments.<br><br>Quick Reaction Analysis Team (QRAT):<br>- Quick Reaction Analytic efforts responding to critical questions related to potential vulnerabilities in current and future US systems to identify opportunities or challenges related to developing foreign capabilities. These short studies typically focus on the following capability areas: foreign, integrated air and missile defense capabilities; options for US electronic warfare and capability to counter adversaries; resiliency in US Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) systems and options to counter adversaries C4ISR capabilities; ground combat offensive and defensive capabilities, air dominance and missile defense, and undersea engagements. The QRAT is enabled by a weekly meeting of FFRDC/UARC lead contacts to review on-going and emerging tasks and collaborative technical interchanges on OUSD(R&E) and OUSD(A&S) focus areas.<br><br>Technical Analysis (Strategic Studies):<br>Strategic studies are 6-12 month engineering level systems analysis. Strategic studies parametrically define the emerging threat space, determine feasibility of potential solutions and parametrically analyze the solution trade space. Specific tasks that will be executed within the strategic studies area include:<br>- Explore feasibility and potential of next generation electronic warfare technologies.<br>- Analyze potential components of a theater-level electronic warfare threat awareness and battle management architecture.<br>- Evaluate options to increase survivability of US weapons against advanced Integrated Air Defense System (IADS) and counter-measures<br>- Identify and evaluate countermeasures to adversary smart weapons.<br>- Identify and evaluate potential technologies' to aid tracking and communications for underwater operations.<br><br>Analytic Tools:<br>- Develop analytic tools to inform and evaluate new technologies' potential to counter emerging threats and exploit adversary vulnerabilities from air, land, sea, and space domains.<br>- Develop analytic tools to provide inform and provide decision support to resourcing recommendations.<br>- Develop integrated modeling, simulation, and analysis tools to aid complex acquisition decisions.<br>- Red Team US capabilities and systems in the context of emerging threats in relevant scenarios. | | | |
| ***FY 2018 to FY 2019 Increase/Decrease Statement:*** | | | |

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| B. Accomplishments/Planned Programs ($ in Millions) | FY 2017 | FY 2018 | FY 2019 |
|---|---|---|---|
| Expanded mission for the new USD(R&E). | | | |
| **Accomplishments/Planned Programs Subtotals** | 11.603 | 13.154 | 19.472 |

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

- Critical gaps in U.S. capability are identified.
- Gaps in U.S. technology development are identified.
- New architectures and evaluation criteria for developing U. S. capability are identified.
- Analytic tools to evaluate new technologies' potential to mitigate and counter emerging threats and exploit adversary vulnerabilities are developed.