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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2021 Army **Date:** February 2020

|   |   |
|---|---|
| <b>Appropriation/Budget Activity</b><br>2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 4: Advanced Component Development &amp; Prototypes (ACD&amp;P)</i> | <b>R-1 Program Element (Number/Name)</b><br>PE 0603790A / NATO Research and Development |
|---|---|

| COST (\$ in Millions)             | Prior Years | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total | FY 2022 | FY 2023 | FY 2024 | FY 2025 | Cost To Complete | Total Cost |
|-----------------------------------|-------------|---------|---------|--------------|-------------|---------------|---------|---------|---------|---------|------------------|------------|
| Total Program Element             | -           | 3.564   | 5.406   | 4.762        | -           | 4.762         | 4.852   | 4.951   | 5.008   | 5.066   | 0.000            | 33.609     |
| 691: <i>NATO Rsch &amp; Devel</i> | -           | 3.564   | 5.406   | 4.762        | -           | 4.762         | 4.852   | 4.951   | 5.008   | 5.066   | 0.000            | 33.609     |

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

This Project implements the provisions of Title 10 United States (U.S.) Code, Section 2350a, Cooperative Research and Development (R&D) Projects: Allied Countries. The objective is to improve, through the application of emerging technologies, the conventional defense capabilities of the U.S. and our cooperative partners, including the North Atlantic Treaty Organization (NATO), U.S. major non-NATO allies and Friendly Foreign countries through technology sharing and joint equipment development, thereby reducing U.S. acquisition costs. Cooperative efforts also improve multinational force compatibility with potential coalition partners through the development and use of similar equipment and improved interfaces. The Project focuses specifically on international cooperative technology demonstration, validation, and interoperability of Army weapon and command, control, communications and information (C3I) systems, including the NATO Defense Against Terrorism initiatives. Activities are implemented through international agreements with foreign partners that define scope, cost and work sharing arrangements, management, contracting, security, data protection and third party transfers. Funds are used to pay for only the U.S. work share that occurs in the United States at U.S. Government and U.S. contractor facilities.

| <b>B. Program Change Summary (\$ in Millions)</b> | <b>FY 2019</b> | <b>FY 2020</b> | <b>FY 2021 Base</b> | <b>FY 2021 OCO</b> | <b>FY 2021 Total</b> |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| Previous President's Budget                       | 3.682          | 5.406          | 5.516               | -                  | 5.516                |
| Current President's Budget                        | 3.564          | 5.406          | 4.762               | -                  | 4.762                |
| Total Adjustments                                 | -0.118         | 0.000          | -0.754              | -                  | -0.754               |
| • Congressional General Reductions                | -              | -              |                     |                    |                      |
| • Congressional Directed Reductions               | -              | -              |                     |                    |                      |
| • Congressional Rescissions                       | -              | -              |                     |                    |                      |
| • Congressional Adds                              | -              | -              |                     |                    |                      |
| • Congressional Directed Transfers                | -              | -              |                     |                    |                      |
| • Reprogrammings                                  | -0.118         | -              |                     |                    |                      |
| • SBIR/STTR Transfer                              | -              | -              |                     |                    |                      |
| • Adjustments to Budget Years                     | -              | -              | -0.754              | -                  | -0.754               |

**Change Summary Explanation**

FY 2021 funding decrease to realize efficiencies per Leadership Priorities.

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|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|---|----------------------------|-------------------------|-------------------|
| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army |                    |                |                |                     |   |                      |                |                |   | <b>Date:</b> February 2020 |                         |                   |
| <b>Appropriation/Budget Activity</b><br>2040 / 4                   |                    |                |                |                     | <b>R-1 Program Element (Number/Name)</b><br>PE 0603790A / NATO Research and Development |                      |                |                | <b>Project (Number/Name)</b><br>691 / NATO Rsch & Devel |                            |                         |                   |
| <b>COST (\$ in Millions)</b>                                       | <b>Prior Years</b> | <b>FY 2019</b> | <b>FY 2020</b> | <b>FY 2021 Base</b> | <b>FY 2021 OCO</b>  | <b>FY 2021 Total</b> | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024</b>  | <b>FY 2025</b>             | <b>Cost To Complete</b> | <b>Total Cost</b> |
| 691: NATO Rsch & Devel   | -                  | 3.564          | 5.406          | 4.762               | -   | 4.762                | 4.852          | 4.951          | 5.008   | 5.066                      | 0.000                   | 33.609            |
| Quantity of RDT&E Articles   | -                  | -              | -              | -                   | -   | -                    | -              | -              | -   | -                          |                         |                   |

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

This Project implements the provisions of Title 10 United States (U.S.) Code, Section 2350a, Cooperative Research and Development (R&D) Projects: Allied Countries. The objective is to improve, through the application of emerging technologies, the conventional defense capabilities of the U.S. and our cooperative partners, including the North Atlantic Treaty Organization (NATO), U.S. major non-NATO allies and Friendly Foreign countries through technology sharing and joint equipment development, thereby reducing U.S. acquisition costs. Cooperative efforts also improve multinational force compatibility with potential coalition partners through the development and use of similar equipment and improved interfaces. The Project focuses specifically on international cooperative technology demonstration, validation, and interoperability of Army weapon and command, control, communications and information (C3I) systems, including the NATO Defense Against Terrorism initiatives. Activities are implemented through international agreements with foreign partners that define scope, cost and work sharing arrangements, management, contracting, security, data protection and third party transfers. Funds are used to pay for only the U.S. work share that occurs in the United States at U.S. Government and U.S. contractor facilities.

**B. Accomplishments/Planned Programs (\$ in Millions)**

|   | <b>FY 2019</b> | <b>FY 2020</b> | <b>FY 2021</b> |
|---|----------------|----------------|----------------|
| <b>Title:</b> Armaments Cooperation Enterprise Support  | 2.687          | 4.098          | 3.609          |
| <b>Description:</b> Armaments Cooperation Enterprise Support/ International Online (IOL) Development and Implementation NATO/ International Cooperative R&D (AR 70-41) and International Acquisition (AR 70-1, AR 70-3).<br><br>The goal of this activity is to expand worldwide allied standardization and interoperability through cooperative Research and Development (R&D) and technology sharing per SECDEF guidance and especially in support of the U.S. Army. The execution AR 70-41 responsibilities requires DASA (DE&C) to conduct engagement with key strategy foreign partners in all regions of the world through the SNR(A) program, international agreement negotiations, and other bilateral and multilateral forums involving DASA (DE&C) personnel. This program will fund the travel costs and administrative support (studies, analysis, interpretation, equipment, etc.) required to participate internationally, such as the NATO Army Armaments Group (NAAG), Defense Against Terrorism (DAT) and to pursue new cooperative R&D initiatives and international cooperative agreements such as memoranda of understanding. |                |                |                |
| <b>FY 2020 Plans:</b><br>Funds will allow the coordination for cooperative research, development and evaluation of defense technologies / systems / equipment plus joint production and follow-on support of defense systems or equipment and the procurement of foreign technologies.  |                |                |                |
| <b>FY 2021 Plans:</b>   |                |                |                |

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army   |   | <b>Date:</b> February 2020                              |                |                |
| <b>Appropriation/Budget Activity</b><br>2040 / 4   | <b>R-1 Program Element (Number/Name)</b><br>PE 0603790A / NATO Research and Development | <b>Project (Number/Name)</b><br>691 / NATO Rsch & Devel |                |                |
| <b>B. Accomplishments/Planned Programs (\$ in Millions)</b>  |   | <b>FY 2019</b>  | <b>FY 2020</b> | <b>FY 2021</b> |
| <p>Funds will allow the coordination for cooperative research, development and evaluation of defense technologies / systems / equipment plus joint production and follow-on support of defense systems or equipment and the procurement of foreign technologies.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b><br/>FY 2021 funding decrease to realize efficiencies per Leadership Priorities.</p>   |   |   |                |                |
| <p><b>Title:</b> Communications Interoperability, and Electronics Technologies</p> <p><b>Description:</b> The goal of this activity is to develop technologies that enable interoperability among partner countries' command, control, communications, sensors, and information systems. Efforts include development of a single solution standard avoiding development of multiple unique solutions and leverage existing interoperability standards developed by NATO. Such standards include common doctrine, technical and procedural specifications to make better use of existing information, shared data, leveraged national operating picture capabilities and enable the development of interoperability of data, databases, applications, security domains and national networks architectures. Includes efforts from areas formerly titled Multi-National Network Enabled Capabilities, Low Level Air Defense Interoperability, JTRS, Combat Identification, and Multilateral Interoperability Program.</p> <p><b>FY 2020 Plans:</b><br/>FY 2020 funds include efforts from areas formerly titled Multi-National Network Enabled Capabilities, Low Level Air Defense Interoperability, JTRS, Combat Identification, and Multilateral Interoperability Program.</p> <p><b>FY 2021 Plans:</b><br/>FY 2021 funding include efforts from areas formerly titled Multi-National Network Enabled Capabilities, Low Level Air Defense Interoperability, JTRS, Combat Identification, and Multilateral Interoperability Program.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b><br/>A decrease in funding from FY 2020 to FY 2021 due to economic adjustments.</p> |   | 0.203   | 0.302          | 0.266          |
| <p><b>Title:</b> Senior National Representatives (Army) (SNR-(A))</p> <p><b>Description:</b> Senior National Representatives (Army) (SNR-(A)) Projects (Partners: France, Germany, United Kingdom and Italy): Supports harmonization of programs at various levels: exchanging information, identifying knowledge gaps and conducting feasibility studies to further promote cooperative development; standardizing, fielding and road-mapping various processes; distributing the workload among the different nations. Technology Demonstrations hosted by the U.S. reps to Land Group 6, NATO Army Armaments Group (NAAG), will provide an opportunity to observe and demonstrate the current and future capability of participating NATO nations with a view to assisting future operational and materiel interoperability. Army support of NAAG studies, analysis and technology demonstrations.</p>  |   | 0.021   | 0.031          | 0.028          |

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army  |   | <b>Date:</b> February 2020                              |                |                |
| <b>Appropriation/Budget Activity</b><br>2040 / 4  | <b>R-1 Program Element (Number/Name)</b><br>PE 0603790A / NATO Research and Development | <b>Project (Number/Name)</b><br>691 / NATO Rsch & Devel |                |                |
| <b>B. Accomplishments/Planned Programs (\$ in Millions)</b>   |   | <b>FY 2019</b>  | <b>FY 2020</b> | <b>FY 2021</b> |
| <p><b>FY 2020 Plans:</b><br/>Funds will be used to pursue cooperative initiatives that were postponed, cancelled or not pursued due to funding reductions in previous years such as forums and engagement with long-standing foreign partners to identify interoperability gaps and develop necessary standardization programs.</p> <p><b>FY 2021 Plans:</b><br/>Funds will be used to pursue cooperative initiatives that were postponed, cancelled or not pursued due to funding reductions in previous years such as forums and engagement with long-standing foreign partners to identify interoperability gaps and develop necessary standardization programs.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b><br/>A decrease in funding from FY 2020 to FY 2021 due to economic adjustments.</p>  |   |   |                |                |
| <p><b>Title:</b> Weapons and Munitions Technologies</p> <p><b>Description:</b> The goal of this activity is to cooperate with partner countries to increase interoperability and develop jointly technologies to improve range, payloads, speed, survivability and lethality to maintain U.S. technical superiority and combat overmatch for Army weapons systems and associated munitions. Areas of cooperation include fuzing and warhead systems, guidance systems, counter improvised explosive device neutralization, directed energy, and fire control systems. Such cooperative development will be done under the auspices of international agreements established among the participating countries for the purposes of improving defense capabilities of the U.S. and partner countries.</p> <p><b>FY 2020 Plans:</b><br/>Weapons and munitions technologies (Partners: France, Germany, Italy, UK): The Participants in this program will develop an automated software interface between their national field artillery command and control systems. The nations will be able to receive and provide mutual fire support (i.e. cannon and rocket fire) in combined operations more rapidly and with minimal errors.</p> <p><b>FY 2021 Plans:</b><br/>Weapons and munitions technologies (Partners: France, Germany, Italy, UK): The Participants in this program will develop an automated software interface between their national field artillery command and control systems. The nations will be able to receive and provide mutual fire support (i.e. cannon and rocket fire) in combined operations more rapidly and with minimal errors.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b><br/>A decrease in funding from FY 2020 to FY 2021 due to economic adjustments.</p> |   | 0.163   | 0.243          | 0.214          |
| <p><b>Title:</b> Ground Systems Technologies</p>  |   | 0.163   | 0.243          | 0.214          |

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army   |   | <b>Date:</b> February 2020                              |                |                |
| <b>Appropriation/Budget Activity</b><br>2040 / 4   | <b>R-1 Program Element (Number/Name)</b><br>PE 0603790A / NATO Research and Development | <b>Project (Number/Name)</b><br>691 / NATO Rsch & Devel |                |                |
| <b>B. Accomplishments/Planned Programs (\$ in Millions)</b>  |   | <b>FY 2019</b>  | <b>FY 2020</b> | <b>FY 2021</b> |
| <p><b>Description:</b> The goal of this activity is to cooperate with partner countries to increase interoperability and develop jointly technologies to improve survivability, weapons, ground platforms (manned and unmanned), and mobility and counter-mobility to provide soldiers with unmatched offensive and defensive capabilities in weapons and military vehicles. Areas of cooperation include ground systems design, propulsion, structures, robotics, alternative fuels and lubricants, systems integration, electronics, and power management. Such cooperative development will be done under the auspices of international agreements established among the participating countries for the purposes of improving defense capabilities of the U.S. and partner countries.</p> <p><b>FY 2020 Plans:</b><br/>FY 2020 funding will be used to fund the continuation of cooperative projects in armored vehicle underbody blast protection and unmanned ground vehicles such as Hybrid Electric Project Agreement between US and Japan.</p> <p><b>FY 2021 Plans:</b><br/>FY 2021 funding will be used to fund the continuation of cooperative projects in armored vehicle underbody blast protection and unmanned ground vehicles such as Hybrid Electric Project Agreement between US and Japan.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b><br/>A decrease in funding from FY 2020 to FY 2021 due to economic adjustments.</p> |   |   |                |                |
| <p><b>Title:</b> Aviation Systems Technologies</p> <p><b>Description:</b> The goal of this activity is to cooperate with partner countries to increase interoperability and develop jointly improved aerodynamics, aeromechanics, avionics, weapons and sensor integration, propulsion, and aviation autonomy technologies that improve range, payloads, speed, survivability and lethality to maintain U.S. technical superiority and combat overmatch for vertical lift aviation systems. Such cooperative development will be done under the auspices of international agreements established among the participating countries for the purposes of improving defense capabilities of the U.S. and partner countries.</p> <p><b>FY 2020 Plans:</b><br/>FY 2020 funding will be used to pursue cooperative projects (i.e., the development of advance rotorcraft technologies and improve systems that aid pilots and aircrew in degraded visual environments).</p> <p><b>FY 2021 Plans:</b><br/>FY 2021 funding will be used to pursue cooperative projects (i.e., the development of advance rotorcraft technologies and improve systems that aid pilots and aircrew in degraded visual environments).</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b></p>   |   | 0.327   | 0.489          | 0.431          |

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army |   | <b>Date:</b> February 2020                              |
| <b>Appropriation/Budget Activity</b><br>2040 / 4                   | <b>R-1 Program Element (Number/Name)</b><br>PE 0603790A / NATO Research and Development | <b>Project (Number/Name)</b><br>691 / NATO Rsch & Devel |

| <b>B. Accomplishments/Planned Programs (\$ in Millions)</b>                | <b>FY 2019</b> | <b>FY 2020</b> | <b>FY 2021</b> |
|--|----------------|----------------|----------------|
| A decrease in funding from FY 2020 to FY 2021 due to economic adjustments. |                |                |                |
| <b>Accomplishments/Planned Programs Subtotals</b>                          | 3.564          | 5.406          | 4.762          |

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

N/A

**Remarks**

**D. Acquisition Strategy**

Acquisition Strategy:

The goal of this program is to expand worldwide allied standardization interoperability through cooperative research and development (R&D) and technology sharing per SECDEF guidance and especially in support of the of the U.S. Army.

All projects are test or technical demonstrations to feed into potential new requirements in support of Army Transformation to the Future Force or as product improvements to the Current Force.

List of the programs curenly in place:

Communications, Interoperability, and Electronics Technologies

The goal of this project is to develop technologies that enable interoperability among partner countries' command, control, communications, sensors, and information systems. Efforts under this project include development of a single solution standard avoiding development of multiple unique solutions and leverage existing interoperability standards developed by NATO. Such standards include common doctrine, technical and procedural specifications to make better use of existing information, shared data, leverage national operating picture capabilities and enable the development of interoperability of data, databases, applications, security domains and national networks architectures. Includes projects formerly titled Multi-National Network Enabled Capabilities, Low Level Air Defense Interoperability, JTRS, Combat Identification, and Multilateral Interoperability Program.

Aviation Systems Technologies

The goal of this project is to cooperate with partner countries to increase interoperability and develop jointly improved aerodynamics, aeromechanics, avionics, weapons and sensor integration, propulsion, and aviation autonomy technologies that improve range, payloads, speed, survivability and lethality to maintain U.S. technical superiority and combat overmatch for vertical lift aviation systems. Such cooperative development will be done under the auspices of international agreements established among the participating countries for the purposes of improving defense capabilities of the U.S. and partner countries.

Ground Systems Technologies

The goal of this project is to cooperate with partner countries to increase interoperability and develop jointly technologies to improve survivability, weapons, ground platforms (manned and unmanned), and mobility and counter-mobility to provide soldiers with unmatched offensive and defensive capabilities in weapons and military vehicles. Areas of cooperation include ground systems design, propulsion, structures, robotics, alternative fuels and lubricants, systems integration, electronics, and

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army  |  | <b>Date:</b> February 2020   |
| <b>Appropriation/Budget Activity</b><br>2040 / 4  | <b>R-1 Program Element (Number/Name)</b><br>PE 0603790A / <i>NATO Research and Development</i> | <b>Project (Number/Name)</b><br>691 / <i>NATO Rsch &amp; Devel</i> |
| <p>power management. Such cooperative development will be done under the auspices of international agreements established among the participating countries for the purposes of improving defense capabilities of the U.S. and partner countries.</p> <p><b>Weapons and Munitions Technologies</b><br/>The goal of this project is to cooperate with partner countries to increase interoperability and develop jointly technologies to improve range, payloads, speed, survivability and lethality to maintain U.S. technical superiority and combat overmatch for Army weapons systems and associated munitions. Areas of cooperation include fuzing and warhead systems, guidance systems, counter improvised explosive device neutralization, directed energy, and fire control systems. Such cooperative development will be done under the auspices of international agreements established among the participating countries for the purposes of improving defense capabilities of the U.S. and partner countries.</p> <p><b>Armaments Cooperation Enterprise Support</b><br/>The goal of this program is to expand worldwide allied standardization and interoperability through cooperative research and development (R&amp;D) and technology sharing per SECDEF guidance and especially in support of the U.S. Army. This program will fund the travel costs and administrative support (studies, analysis, interpretation, equipment, etc.) required to participate internationally, such as the North Atlantic Treaty Organization (NATO) Army Armaments Group (NAAG), Defense Against Terrorism (DAT) and to pursue new cooperative R&amp;D initiatives and international cooperative agreements such as memoranda of understanding. This program will also include: the United States' share of costs of the NATO Civil Budget, Chapter IX, which funds the NATO Industrial Advisory Group (NIAG) and the Special Fund for Cooperative Planning (U. S. Army is Executive Agent for this NATO bill); the Technical Cooperation Program, and Army armaments cooperation working groups with many nations.</p> |  |  |

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

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| <b>Appropriation/Budget Activity</b><br>2040 / 4 | <b>R-1 Program Element (Number/Name)</b><br>PE 0603790A / NATO Research and Development | <b>Project (Number/Name)</b><br>691 / NATO Rsch & Devel |
|--|---|---|

| <b>Management Services (\$ in Millions)</b>                                  |                        |                                     |             | FY 2019 |            | FY 2020 |            | FY 2021 Base |            | FY 2021 OCO |            | FY 2021 Total | Cost To Complete | Total Cost | Target Value of Contract |
|--|------------------------|-------------------------------------|-------------|---------|------------|---------|------------|--------------|------------|-------------|------------|---------------|------------------|------------|--------------------------|
| Cost Category Item   | Contract Method & Type | Performing Activity & Location      | Prior Years | Cost    | Award Date | Cost    | Award Date | Cost         | Award Date | Cost        | Award Date | Cost          |                  |            |                          |
| ArmamentsCooperation Enterprise Support                                      | MIPR                   | DASA DEC HQDA : Ft Belvoir, VA      | 0.010       | -       |            | -       |            | -            |            | -           |            | -             | 0.000            | 0.010      | -                        |
| Weapons and Munitions  | TBD                    | CECOM : Aberdeen Proving Ground, MD | 0.008       | -       |            | -       |            | -            |            | -           |            | -             | 0.000            | 0.008      | -                        |
| Communications Interoperability and Electronic Technologies Interoperability | MIPR                   | SPAWAR : Various                    | 0.010       | -       |            | -       |            | -            |            | -           |            | -             | 0.000            | 0.010      | -                        |
| Ground Systems Technologies  | MIPR                   | TARDEC : Warren, MI                 | 0.010       | -       |            | -       |            | -            |            | -           |            | -             | 0.000            | 0.010      | -                        |
| Chemical and Biological Technologies   | MIPR                   | Aberseen Proving Groun : MD         | 0.010       | -       |            | -       |            | -            |            | -           |            | -             | 0.000            | 0.010      | -                        |
| <b>Subtotal</b>  |                        |                                     | 0.048       | -       |            | -       |            | -            |            | -           |            | -             | 0.000            | 0.048      | N/A                      |

| <b>Product Development (\$ in Millions)</b>                    |                        |   |             | FY 2019 |            | FY 2020 |            | FY 2021 Base |            | FY 2021 OCO |            | FY 2021 Total | Cost To Complete | Total Cost | Target Value of Contract |
|--|------------------------|---|-------------|---------|------------|---------|------------|--------------|------------|-------------|------------|---------------|------------------|------------|--------------------------|
| Cost Category Item   | Contract Method & Type | Performing Activity & Location                              | Prior Years | Cost    | Award Date | Cost    | Award Date | Cost         | Award Date | Cost        | Award Date | Cost          |                  |            |                          |
| Missiles and Rocket Technologies                               | MIPR                   | APG, Redstone Arsenal : MD, AL                              | 0.100       | -       |            | -       |            | -            |            | -           |            | -             | 0.000            | 0.100      | -                        |
| Communications, Interoperability, and Electronics Technologies | MIPR                   | CECOM, JTRS, COALWNW, JTNC, SPAWAR : San Diego, CA, various | 0.529       | -       |            | -       |            | -            |            | -           |            | -             | 0.000            | 0.529      | -                        |
| Weapons and Munitions  | Various                | ARDEC, PEO AMMO, PM-CAS : VARIOUS                           | 0.752       | -       |            | -       |            | -            |            | -           |            | -             | 0.000            | 0.752      | -                        |
| Aviation Systems Technologies                                  | Various                | AMRDEC : RED STONE, VARIOUS                                 | 0.175       | -       |            | -       |            | -            |            | -           |            | -             | 0.000            | 0.175      | -                        |
| Ground Systems Technology                                      | FFRDC                  | Various : Various   | 0.125       | -       |            | -       |            | -            |            | -           |            | -             | 0.000            | 0.125      | -                        |

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| Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army         |                        |   |             |   |            |         |            |                         |            |             |            | Date: February 2020 |                  |            |                          |
|--|------------------------|---|-------------|---|------------|---------|------------|-------------------------|------------|-------------|------------|---------------------|------------------|------------|--------------------------|
| Appropriation/Budget Activity                                  |                        |   |             | R-1 Program Element (Number/Name)           |            |         |            | Project (Number/Name)   |            |             |            |                     |                  |            |                          |
| 2040 / 4   |                        |   |             | PE 0603790A / NATO Research and Development |            |         |            | 691 / NATO Rsch & Devel |            |             |            |                     |                  |            |                          |
| Product Development (\$ in Millions)                           |                        |   |             | FY 2019                                     |            | FY 2020 |            | FY 2021 Base            |            | FY 2021 OCO |            | FY 2021 Total       |                  |            |                          |
| Cost Category Item   | Contract Method & Type | Performing Activity & Location  | Prior Years | Cost  | Award Date | Cost    | Award Date | Cost                    | Award Date | Cost        | Award Date | Cost                | Cost To Complete | Total Cost | Target Value of Contract |
| SNR(A)   | C/TBD                  | ARDEC: Arlington, VA : Various  | 9.012       | -   |            | -       |            | -                       |            | -           |            | -                   | Continuing       | Continuing | Continuing               |
| FY 2019 SBIR / STTR Transfer                                   | TBD                    | TBD : TBD   | -           | 0.118                                       |            | -       |            | -                       |            | -           |            | -                   | 0.000            | 0.118      | -                        |
| <b>Subtotal</b>  |                        |   | 10.693      | 0.118                                       |            | -       |            | -                       |            | -           |            | -                   | Continuing       | Continuing | N/A                      |
| Support (\$ in Millions)                                       |                        |   |             | FY 2019                                     |            | FY 2020 |            | FY 2021 Base            |            | FY 2021 OCO |            | FY 2021 Total       |                  |            |                          |
| Cost Category Item   | Contract Method & Type | Performing Activity & Location  | Prior Years | Cost  | Award Date | Cost    | Award Date | Cost                    | Award Date | Cost        | Award Date | Cost                | Cost To Complete | Total Cost | Target Value of Contract |
| Armaments Cooperation Enterprise Support                       | C/FFP                  | LSS/GDIT : Fairfax, VA  | 6.639       | 1.746                                       |            | 2.870   |            | 2.530                   |            | -           |            | 2.530               | 0.000            | 13.785     | -                        |
| Missiles and Rocket Technologies                               | MIPR                   | APG, Redstone Arsenal : MD, AL  | 0.100       | 0.600                                       |            | 0.895   |            | 0.785                   |            | -           |            | 0.785               | 0.000            | 2.380      | -                        |
| Communications, Interoperability, and Electronics Technologies | MIPR                   | Joint Tactical Radio (JTRS), JTNC, COALWNW, SPAWAR, CERDEC, ARDEC W1DF : San Diego, CA, Red Stone Arsenal | 0.959       | 0.300                                       |            | 0.448   |            | 0.395                   |            | -           |            | 0.395               | 0.000            | 2.102      | -                        |
| Aviation Systems Technologies                                  | MIPR                   | RDECOM/ AMRDEC : Red Stone Arsenal  | 0.810       | 0.300                                       |            | 0.448   |            | 0.395                   |            | -           |            | 0.395               | 0.000            | 1.953      | -                        |
| Ground Systems Technology                                      | MIPR                   | TARDEC : Various  | 0.478       | -   |            | -       |            | -                       |            | -           |            | -                   | 0.000            | 0.478      | -                        |
| Weapons and Munitions  | Various                | CECOM, ARDEC, AMMO, PEO C3T : Aberdeen Proving Ground, Various  | 1.039       | 0.500                                       |            | 0.745   |            | 0.657                   |            | -           |            | 0.657               | 0.000            | 2.941      | -                        |
| Soldier Technologies   | TBD                    | Various : Various   | 0.346       | -   |            | -       |            | -                       |            | -           |            | -                   | 0.000            | 0.346      | -                        |

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| Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army         |                        |  |             |   |            |         |            |                         |            |             |            | Date: February 2020 |                  |            |                          |
|--|------------------------|--|-------------|---|------------|---------|------------|-------------------------|------------|-------------|------------|---------------------|------------------|------------|--------------------------|
| Appropriation/Budget Activity                                  |                        |  |             | R-1 Program Element (Number/Name)           |            |         |            | Project (Number/Name)   |            |             |            |                     |                  |            |                          |
| 2040 / 4   |                        |  |             | PE 0603790A / NATO Research and Development |            |         |            | 691 / NATO Rsch & Devel |            |             |            |                     |                  |            |                          |
| <b>Support (\$ in Millions)</b>                                |                        |  |             | FY 2019                                     |            | FY 2020 |            | FY 2021 Base            |            | FY 2021 OCO |            | FY 2021 Total       |                  |            |                          |
| Cost Category Item   | Contract Method & Type | Performing Activity & Location                     | Prior Years | Cost  | Award Date | Cost    | Award Date | Cost                    | Award Date | Cost        | Award Date | Cost                | Cost To Complete | Total Cost | Target Value of Contract |
| SNR(A)   | C/TBD                  | ARL, HQDA, JCGISR: Army : Various                  | 2.318       | -   |            | -       |            | -                       |            | -           |            | -                   | Continuing       | Continuing | Continuing               |
| Chemical & Biological Defense Technologies                     | MIPR                   | ECBC : Edgewood, Aberdeen, MD                      | 0.270       | -   |            | -       |            | -                       |            | -           |            | -                   | 0.000            | 0.270      | -                        |
| <b>Subtotal</b>  |                        |  | 12.959      | 3.446                                       |            | 5.406   |            | 4.762                   |            | -           |            | 4.762               | Continuing       | Continuing | N/A                      |
| <b>Test and Evaluation (\$ in Millions)</b>                    |                        |  |             | FY 2019                                     |            | FY 2020 |            | FY 2021 Base            |            | FY 2021 OCO |            | FY 2021 Total       |                  |            |                          |
| Cost Category Item   | Contract Method & Type | Performing Activity & Location                     | Prior Years | Cost  | Award Date | Cost    | Award Date | Cost                    | Award Date | Cost        | Award Date | Cost                | Cost To Complete | Total Cost | Target Value of Contract |
| Communications, Interoperability, and Electronics Technologies | Various                | JTRN, JTNC, COALWNW, CERDEC, NIGHT VISION : SPAWAR | 0.444       | -   |            | -       |            | -                       |            | -           |            | -                   | 0.000            | 0.444      | -                        |
| Weapons and Munitions  | TBD                    | ARDEC, PEO AMMO, ASCA : Various                    | 0.200       | -   |            | -       |            | -                       |            | -           |            | -                   | 0.000            | 0.200      | -                        |
| Aviation Systems Technologies                                  | TBD                    | RDECOM, AMRDEC : RED STONE                         | 0.080       | -   |            | -       |            | -                       |            | -           |            | -                   | 0.000            | 0.080      | -                        |
| Ground Systems Technologies                                    | MIPR                   | TARDEC : Various                                   | 0.050       | -   |            | -       |            | -                       |            | -           |            | -                   | 0.000            | 0.050      | -                        |
| <b>Subtotal</b>  |                        |  | 0.774       | -   |            | -       |            | -                       |            | -           |            | -                   | 0.000            | 0.774      | N/A                      |
| <b>Project Cost Totals</b>                                     |                        |  | 24.474      | 3.564                                       |            | 5.406   |            | 4.762                   |            | -           |            | 4.762               | Continuing       | Continuing | N/A                      |
| <b>Remarks</b>   |                        |  |             |   |            |         |            |                         |            |             |            |                     |                  |            |                          |



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| <b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army |   | <b>Date:</b> February 2020                              |
| <b>Appropriation/Budget Activity</b><br>2040 / 4              | <b>R-1 Program Element (Number/Name)</b><br>PE 0603790A / NATO Research and Development | <b>Project (Number/Name)</b><br>691 / NATO Rsch & Devel |

Schedule Details

| Events | Start   |      | End     |      |
|--------|---------|------|---------|------|
|        | Quarter | Year | Quarter | Year |
| N/A    | 1       | 2017 | 4       | 2017 |