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| Exhibit R-2, RDT&E Budget Item Justification | Date: February 1999 |
| APPROPRIATION/BUDGET ACTIVITY RDT&E,N/5 | R-1 ITEM NOMENCLATURE New Design SSN Development/0604558N |

| COST (\$ in Millions) | FY 1998 | FY 1999 | FY 2000 | FY 2001 | FY 2002 | FY 2003 | FY 2004 | FY 2005 | Cost to Complete | Total Cost |
|--|---------|---------|---------|---------|---------|---------|---------|---------|------------------|------------|
| Total P.E. Cost | 299.5 | 230.3 | 241.5 | 204.1 | 162.0 | 153.9 | 149.7 | 158.0 | 136.8 | 2,863.8 |
| F1947/New Design SSN HM&E | 198.4 | 143.1 | 166.3 | 134.2 | 104.0 | 99.6 | 103.8 | 113.1 | 102.5 | 1,925.7 |
| F1950/New Design SSN Combat Systems Development | 89.8 | 70.2 | 75.2 | 69.9 | 58.0 | 54.3 | 45.9 | 44.9 | 34.3 | 909.8 |
| F2429/Enhanced Sonar Dome Demonstration/Validation | 3.8 | 7.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10.8 |
| F2430/Advanced Submarine Tactical Electronic Sys/Int. Mast | 7.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7.5 |
| F2644/NSSN Advance Technology Insertion | | 5.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.0 |
| F2645/NON-Propulsion Electronics System | | 5.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.0 |
| Quantity of RDT&E Articles & cost | | | | | | | | | | |

A. (U) Mission Description and Budget Item Justification: The U.S. Navy must maintain a submarine fleet that is of sufficient capability and numbers to defend American interests. The New Attack Submarine (New SSN) is being designed to fulfill this need. It will counter the potential threats of the next century in a multi-mission capable submarine that has the ability to provide covert, sustained combat presence in denied waters. The primary goal of the program is to develop an affordable yet capable submarine by evaluating a broad range of system and technology alternatives, and pursuing cost reduction, producibility improvement, and technical risk management. This Program Element (PE) provides the technology, prototype components, and systems engineering needed to design and construct the New SSN and build and its Command, Control, Communications, and Intelligence (C³I) System. This PE directly supports the following New SSN missions: (1) covert strike warfare; (2) anti-submarine warfare; (3) covert intelligence collection/surveillance, indication and warning, and electronic warfare; (4) anti-surface ship warfare; (5) special warfare; (6) mine warfare; and (7) battle group support.

(U) Project F2429: Plus up continues a FY97 special congressional interest item that includes B.F. Goodrich, Electric Boat and Naval Surface Weapons Center as participants. The line funds investigation into new manufacturing processes for a submarine bow SONAR dome.

(U) Project F2430: The congressional plus-up for Advance Submarine Tactical Electronic Combat System (ASTECS) and Integrated Electronic Support Measures (ESM) Mast (IEM) restored several highly desirable elements of the ASTECS/IEM programs to improve platform performance. These items were eliminated due to changing priorities. Improvements included enhancements to ship's radar intercept, emitter identification, and signal intercept capabilities.

(U) Project F2644: The Congressional Plus-Up provided additional funding to insert new technologies on the New SSN. With these funds, three technology insertions were initiated for New SSN specific development: High Frequency Remote Ahead Profiling; Total Ship Monitoring System (TSMS) Improvements; and Advanced Sail.

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(U) Project F2645: The congressional plus-up is for New SSN Non-Propulsion Electronics System (NPES) inter-system engineering and integration efforts.

B. (U) Program Change Summary

| | <u>FY 1998</u> | <u>FY 1999</u> | <u>FY 2000</u> |
|--|----------------|----------------|----------------|
| FY 1999 President's Budget: | 307.7 | 218.8 | 206.0 |
| Appropriated Value: | 323.1 | 235.8 | 0 |
| Adjustments to FY 1998/1999 Appropriated Value/ FY 1999 President's Budget: | | | |
| Undistributed Reductions/Adjustments | -23.6 | -5.5 | +35.5 |
| FY 2000 PRES Budget Submit: | 299.5 | 230.3 | 241.5 |

(U) Change Summary Explanation:

(U) F1947 Funding: The FY 1998 decrease of \$16.9M is attributed to Undistributed Adjustments (-\$6.8M) and othe minor reprogramming (-\$10.1M). The FY 1999 decrease of \$3.2M is attributed to a decrease to undistributed adjustments (-\$0.4M) and Contract Advisory and Assistance Services (-\$2.8M). The FY2000 increase of \$27.8M is attributed to increases of \$30.0M for New Attack Submarine (New SSN) and several minor program decreases (-\$2.2M).

(U) F1950 Funding: The FY 1998 decrease of \$6.0M is attributable to Undistributed Reductions (-\$2.9M), Contract Advisory and Assistant Services (-\$0.9M), SBIR (-\$2.2M). The FY1999 decrease of \$2.2M is attributed to undistributed adjustments (-\$0.2M) and Contract Advisory and Assistance Services (-\$2.0M).

The FY2000 increase of \$7.7M is attributed to New SSN C³I Combat System Development (+\$3.3) NWCF Rate Adjustments (+0.1M), New SSN C3I shortfall, undistributed adjustments (+\$5.1), undistributed adjustments (+\$0.1M) and Outsourcing reduction (-\$0.1M), Non-Pay inflation reduction (-\$0.8M).

(U) F2429 Funding: The FY1998 decrease of \$0.2M is attributable Undistributed Reductions (-\$0.1M) and SBIR (-\$0.1M) FY1999 Congressional add of \$5.0M and explanation below for reductions.

(U) F2430 Funding: The FY 1998 decrease of \$0.5M is attributable to Undistributed Reductions (-\$0.3M) and SBIR (-\$0.2M).

(U) F2644 Funding: FY1999 Congressional add of \$5.0M and explanation below for reductions.

(U) F2645 Funding: FY1999 Congressional add of \$5.0M and explanation below for reductions

Combination reduction of (-\$0.1M) in FY1999 for undistributed reductions under projects F2429, F2430, F2644 and F2645.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

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| Exhibit R-2a, RDT&E Project Justification | | Date: February 1999 |
| APPROPRIATION/BUDGET ACTIVITY RDT&E,N/5 | Program Element Name & No. New Design SSN Development/0604558N | Project Name and Number New Design SSN HM&E/F1947 |

| Cost (\$ in Millions) | FY 1998 | FY 1999 | FY 2000 | FY 2001 | FY 2002 | FY 2003 | FY 2004 | FY 2005 | Cost to Complete | Total Cost |
|---------------------------|---------|---------|---------|---------|---------|---------|---------|---------|------------------|------------|
| F1947/New Design SSN HM&E | 198.4 | 143.1 | 166.3 | 134.2 | 104.0 | 99.6 | 103.8 | 113.1 | 102.5 | 1925.7 |
| RDT&E Articles Qty | | | | | | | | | | |

A. (U) Mission Description and Budget Item Justification: (U) This project encompasses all the Hull, Mechanical and Electrical (HM&E) development efforts for the New Attack Submarine (New SSN). The traditional distinct phasing of the design process has been replaced with a continuous concurrent engineering process called Integrated Product and Process Development (IPPD). This process maintains the focus of multi-discipline teams consisting of Navy, shipbuilder and suppliers. Essential to achieve balanced New SSN platform capability, affordability, and flexibility in a low rate production environment. The thrust of these efforts will be to develop and apply multiple, advanced HM&E system technologies which are integrated into the design of the New SSN. The IPPD approach to technology innovation and ship integration will enable advances in military capability, while proactively controlling development and acquisition costs, and mitigating technical risks. New technologies are being transitioned from industry and Government research and development programs where doing so offers substantial performance and/or affordability payoffs. Leveraging existing technologies and vendor bases for components from SSN 688I, TRIDENT, and SEAWOLF helps minimize both cost and risk. Varying degrees of re-engineering of existing systems is required to adapt them to the new submarine's requirements. HM&E development supported a FY 1998 lead ship construction contract award.

(U) Program Accomplishment and Plans:

1. (U) FY 1998 Accomplishments:

- (U) (\$176.6M) Continued design, manufacturing, and qualification testing of prototype systems and components such as: ship service turbine generator (SSTG); weapons stowage, handling and launch systems; main thrust bearing; electromagnetic signature reduction; emergency diesel generator; non-Chlorofluorocarbon (CFC) air conditioning unit; gas discharge system; special hull treatments; thin line towed array handling system; integrated low pressure electrolyzer system; ship control system; hydraulic actuators and valves; and, reverse osmosis desalination unit. Completed testing of next generation design configuration scaled prototype propulsor on large scale vehicle and initiated design and manufacture of full scale propulsor. Continued shock qualification testing and analyses of various components. Continued system verification studies, tests, and analyses in support of ship design including signature, hydrodynamics, materials and survivability analyses and tests using a multitude of large and small scale test vehicles. Provided IPPD (Design/Build) team support at shipyards, Navy laboratories and in-house. Supported ship design and construction efforts with engineering evaluations and ship integration assessments for emergent ship design and systems development issues.
- (U) (\$7.2M) Continued effectiveness analyses and evaluations relating to force effectiveness. Conducted analysis in support of force effectiveness assessment and component performance tradeoffs. Maintained cost reducing approach to the New SSN construction through use of IPPD's concurrent engineering and design/build philosophy. Continued coordination of New SSN specification. Continued cost estimating and validation of cost reduction concepts for New SSN overall design development. Continued environmental compliance and pollution prevention efforts.

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Exhibit R-2a RDT&E Project Justification
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| Exhibit R-2a, RDT&E Project Justification | | Date: February 1999 |
| APPROPRIATION/BUDGET ACTIVITY RDT&E,N/5 | Program Element Name & No. New Design SSN Development/0604558N | Project Name and Number New Design SSN HM&E/F1947 |

- (U) (\$10.6M) Continued development of logistic support concept for Commercial-Off-the-Shelf (COTS) configuration items. Conducted Reliability, Maintainability, and Availability (RM&A) modeling analyses of New Attack Submarine (New SSN) systems, continued development of an onboard team trainer and Hull, Mechanical and Electrical (HM&E) trainers, and continued prototyping digital data environment that supports the Joint Computer-Aided Logistics System (JCALS) concepts.
- (U) (\$4.0M) Continued the development of the Test and Evaluation Master Plan (TEMP), Vulnerability Analysis Report (VAR) and Non-Propulsion Test Index (NPTI), provided Integrated Production and Process (IPPD) support to Commander Operational Test and Evaluation Force (COTF) operational assessments. Prepared test plans and schedules associated with developmental testing, shock, acoustic and launchers trials testing, weapons accuracy testing and technical evaluation. Conducted engineering evaluation of test results, Live Fire Test and Evaluation (LFT&E) modeling and analysis. Continued development of the total ship test plan in support of Developmental Test/Operational Test (DT/OT), DT/OT-IIA-IIF.

2. (U) FY 1999 Plan:

- (U) (\$119.9M) Continue design, manufacturing, and qualification testing of prototype technologies and components such as: ship service turbine generator (SSTG), weapons stowage, handling and launch systems; propulsor, main thrust bearing; electromagnetic signature reduction; special hull treatments; integrated low pressure electrolyzer system; ship control system; and, reverse osmosis desalination unit. Continue shock qualification testing and analyses of various components. Continue system verification studies, tests, and analyses in support of ship design including signature, hydrodynamics, materials, and survivability analyses and tests. Provide IPPD (Design/Build) team support at shipyards, Navy laboratories and in-house. Support ship design and construction efforts with engineering evaluations and ship integration assessments for emergent ship design and systems development issues. Initiate transitions from advanced Research and Development (R&D) projects and engineering developments of new technologies for potential insertion in the New SSN class.
- (U) (\$7.0M) Continue effectiveness analyses and evaluations relating to force effectiveness. Conduct analysis in support of force effectiveness assessment and component performance tradeoffs. Maintain cost reducing approach to New SSN construction through use of IPPD's concurrent engineering and design/build philosophy. Continue coordination of New SSN specification at the shipbuilder. Continue cost estimating and validation of cost reduction ideas for New SSN overall design development. Continue environmental compliance and pollution prevention efforts.
- (U) (\$9.2M) Continue development of: COTS support concepts, RM&A modeling analyses, development of trainers and prototyping a digital data environment that supports the Continuous Acquisition Life Cycle Support virtual enterprise concept.
- (U) (\$4.4M) Continue the development of the TEMP, VAR and NPTI. Plan and coordinate shipbuilder Test and Evaluation efforts. Provide IPPD support to COTF operational assessments. Prepare test plans, schedules and support associated with developmental testing, conduct Command and Control System Module Off-hull Test Series, Shock, Acoustic and Launchers Trials Testing, Weapons Accuracy Testing and Technical Evaluation. Conduct engineering evaluation of test results. Live Fire Test and Evaluation (LFT&E) modeling and analysis. Continue development of the total ship test plan in support of Developmental Test/Operational Test (DT/OT), DT/OT-IIA-IIF.

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Exhibit R-2a RDT&E Project Justification
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| Exhibit R-2a, RDT&E Project Justification | | Date: February 1999 |
| APPROPRIATION/BUDGET ACTIVITY RDT&E,N/5 | Program Element Name & No. New Design SSN Development/0604558N | Project Name and Number New Design SSN HM&E/F1947 |

- (U) (\$2.6M) Portion of Extramural Program is reserved for Small Business Innovation Research Assessment in accordance with 15 USC 638.

3. (U) FY 2000 Plan:

- (U) (\$145.705M) Continue design, manufacturing, and qualification testing of prototype technologies and components such as: ship service turbine generator (SSTG), weapons stowage, handling and launch systems; propulsor, main thrust bearing; electromagnetic signature reduction; special hull treatments; and ship control system. Continue shock qualification testing and analyses of various components. Continue system verification studies, tests, and analyses in support of ship design including signature, hydrodynamics, materials, and survivability analyses and tests. Provide Integrated Product and Process Development (IPPD) (Design/Build) team support at shipyards, Navy laboratories and in-house. Support ship design and construction efforts with engineering evaluations and ship integration assessments for emergent ship design and systems development issues. Continue transitions and engineering developments for new technology insertions into the New Attack Submarine (New SSN) class.
- (U) (\$4.895M) Continue effectiveness analyses and evaluations relating to force effectiveness. Conduct analysis in support of force effectiveness assessment and component performance tradeoffs. Maintain cost based approach to New SSN construction through use of IPPD's concurrent engineering philosophy. Continue coordination of New SSN specification at the shipbuilder. Continue cost estimating and validation of cost reduction ideas for New SSN overall design development. Continue environmental compliance and pollution prevention efforts.
- (U) (\$10.269M) Continue development of: Commercial-off-the-Shelf (COTS) support concepts, Reliability, Maintainability, and Availability (RM&A) modeling analyses, development of trainers and prototyping a digital data environment that supports the Continuous Acquisition Life Cycle Support virtual enterprise concept.
- (U) (\$5.474M) Continue the development of the Test and Evaluation Master Plan (TEMP), Vulnerability Analysis Report (VAR) and Non-Propulsion Test Index (NPTI). Plan and coordinate second shipbuilder Test and Evaluation efforts. Provide IPPD support to Commander Operational Test and Evaluation Force (COTF) operational assessments. Prepare test plans, schedules and support associated with developmental testing, conduct Command and Control System Off-hull Test Series, Shock, Acoustic and Launchers Trials Testing, Weapons Accuracy Testing and Technical Evaluation. Conduct engineering evaluation of test results. LFT&E modeling and analysis. Continue development of the total ship test plan in support of DT/OT-IIA-IIF.

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Exhibit R-2a RDT&E Project Justification
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B. (U) Other Program Funding Summary: (Dollars in Millions)

| | <u>FY 1998</u> <u>ACTUAL</u> | <u>FY 1999</u> <u>EST.</u> | <u>FY 2000</u> <u>EST.</u> | <u>FY 2001</u> <u>EST.</u> | <u>FY 2002</u> <u>EST.</u> | <u>FY 2003</u> <u>EST.</u> | <u>FY 2004</u> <u>EST.</u> | <u>FY 2005</u> <u>EST.</u> | <u>TO</u> <u>COMPLETE</u> | <u>TOTAL</u> <u>PROGRAM</u> |
|---|---------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|------------------------------|--------------------------------|
| (U) SCN Line 201300 PE: 0204281N | 2,510.0 | 1,995.5 | 748.5 | 1,659.3 | 2,090.3 | 1,888.4 | 2,251.6 | 2,566.8 | 42,310.5 | 59,587.0 |
| (U) SCN Line 201310 PE: 0204281N | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 589.2 |
| (U) O&M,N BA-1 AG/SAG Line Item 1D4D Subhead: HD4D | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14.6 | 0 | 14.6 |
| (U) O&M,N Line BA-3 Subhead: 3B1K | 0 | 0 | 0 | 0 | 2.8 | 4.7 | 4.1 | 3.7 | 8.3 | 23.6 |
| (U) OPN Line Item 1320 BA-1 Subhead: 81H5 | 0 | 0 | 0 | 0 | 13.2 | 1.6 | 0.03 | 0 | 0 | 14.83 |
| (U) OPN Line Item 2762 BA-2 Subhead: 82MB | 0 | 0 | 0 | 0 | 8.4 | 1.0 | 0 | 0 | 0 | 13.1 |
| (U) OPN Line Item 5661 BA-4 Subhead: 84TD | 0 | 0 | 0 | 0 | 3.7 | 0 | 3.1 | 0 | 0 | 6.8 |
| (U) OPN Line Item 542000 BA-4 Subhead: H4VB | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12.4 | 0 | 12.4 |
| (U) OPN BA-8 | 0 | 0 | 0 | 0 | 51.0 | 52.0 | 71.0 | 54.0 | 0 | 228.0 |

(U) Related RDT&E:

(U) PE 0603561N (Advanced Submarine System Development)

(U) PE 0603570N (Advanced Nuclear Power Systems)

(U) PE 0602121N (Surface Ship Technology)

C. (U) Acquisition Strategy: The New Attack Submarine (New SSN) Program has implemented Integrated Product and Process Development (IPPD). The New SSN Program Office has collocated the engineering and program management personnel necessary to plan and pursue total ship system design management and life cycle acquisition responsibilities. The traditional distinct phasing of the design process has been replaced with the continuous concurrent engineering IPPD process. The IPPD approach will also facilitate a smoother transition from design to manufacturing, and reduce the number of changes typically encountered during construction of the Lead and early follow ships. In September 1997, Congress passed a law allowing the two companies to team for production of the first four New Attack Submarines. Under the teaming agreement, Electric Boat remained the design yard for the New SSN and Newport News Shipyard became a part of the IPPD process.

D. (U) Schedule Profile: See attached.

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Exhibit R-2a RDT&E Project Justification
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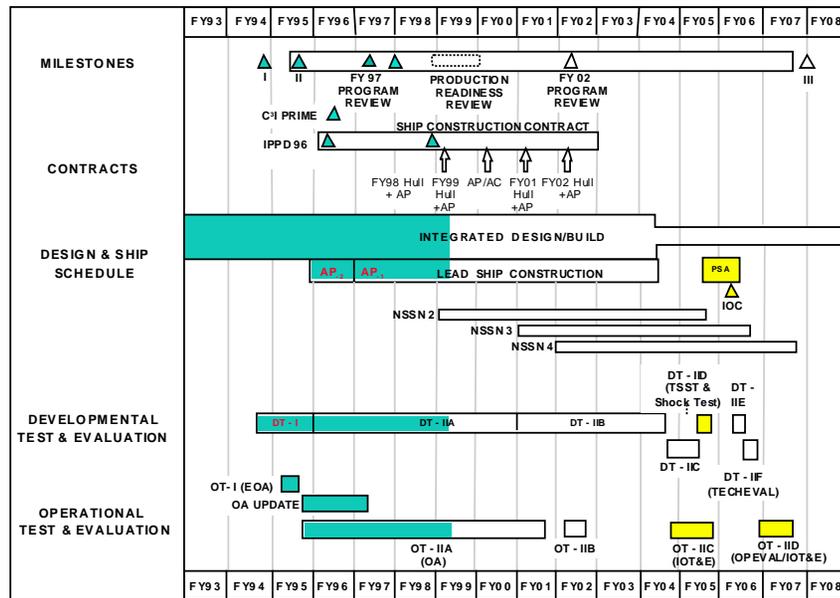
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Program Schedule



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Exhibit R-2a RDT&E Project Justification
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| Exhibit R-3 Cost Analysis | | Date: February 1999 |
| APPROPRIATION/BUDGET ACTIVITY RDT&E,N/5 | PROGRAM ELEMENT NAME AND NUMBER New Design SSN Development /0604558N | PROJECT NAME AND NUMBER New Design SSN HM&E/F1947 |

| Cost Categories (Tailor to WBS, or System/Item Requirements) | Contract Method & Type | Performing Activity & Location | Total PyYs Cost | FY99 Cost | FY99 Award Date | FY00 Cost | FY00 Award Date | FY01 Cost | FY01 Award Date | Cost To Complete | Total Cost | Target Value of Contract |
|--|------------------------------|--------------------------------------|-----------------------|--------------|-----------------------|--------------|-----------------------|--------------|-----------------------|------------------------|----------------|--------------------------------|
| Component Development | SS/CPFF | EB-2103 Groton, CT | 286.7 | 48.1 | Various | 32.6 | Various | | | 29.9 | 397.3 | 397.3 |
| Main Propulsion Complex Development | SS/CPFF | EB-4030 Groton, CT | 153.8 | 13.0 | Various | 37.7 | Various | | | 19.0 | 223.5 | 223.5 |
| Component Development | WR | NSWC- Carderock, MD | 246.0 | 32.1 | Nov-98 | 31.8 | Nov-99 | | | 143.6 | 453.5 | N/A |
| Component Development | WR | NAWC Orlando, FL | 7.0 | 6.2 | Nov-98 | 5.4 | Nov-99 | | | 15.3 | 33.9 | N/A |
| Component Development | WR | NUWC Newport, RI | 54.9 | 3.9 | Nov-98 | 4.3 | Nov-99 | | | 11.6 | 74.7 | N/A |
| Technology Insertion | Various | Miscellaneous | 3.0 | 6.4 | Various | 16.2 | Various | | | 105.0 | 130.6 | N/A |
| Component Development | Various | Miscellaneous | 176.3 | 21.3 | Various | 25.6 | Various | | | 55.6 | 278.8 | N/A |
| Subtotal Product Development | | | 927.7 | 131.0 | | 153.6 | | | | 380.0 | 1,592.3 | N/A |

Remarks:

Support Costs: Not applicable

Remarks:

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Exhibit R-3 RDT&E Project Cost Analysis
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| Exhibit R-3 Cost Analysis | | Date: February 1999 |
| APPROPRIATION/BUDGET ACTIVITY RDT&E,N/5 | PROGRAM ELEMENT NAME AND NUMBER New Design SSN Development /0604558N | PROJECT NAME AND NUMBER New Design SSN HM&E/F1947 |

| Cost Categories (Tailor to WBS or System/Item Requirements) | Contract Method & Type | Performing Activity & Location | Total PYs Cost | FY99 Cost | FY 99 Award Date | FY00 Cost | FY00 Award Date | FY01 Cost | FY01 Award Date | Cost To Complete | Total Cost | Target Value of Contract |
|---|------------------------------|--------------------------------------|----------------------|--------------|------------------------|--------------|-----------------------|--------------|-----------------------|---------------------|--------------|-----------------------------|
| Test & Evaluation | WR | NSWC- Carderock,MD | 1.2 | 0.7 | Nov98 | 1.3 | Nov99 | | | 135.7 | 138.9 | N/A |
| Test & Evaluation | WR | NUWC- Newport,RI | 3.7 | 1.6 | Nov98 | 1.7 | Nov99 | | | 44.4 | 51.4 | N/A |
| Test & Evaluation | C/CPAF | EG&G-C6411 Rockville,MD | 1.1 | 1.1 | Various | 1.1 | Various | | | 8.5 | 11.8 | 11.8 |
| Test & Evaluation | Various | Miscellaneous | 5.2 | 1.0 | Various | 1.1 | Various | | | 25.9 | 33.2 | N/A |
| Subtotal T&E | | | 11.2 | 4.4 | | 5.2 | | | | 214.5 | 235.3 | N/A |

Remarks:

| | | | | | | | | | | | | |
|--|---------|-----------------------------|-------------|------------|---------|------------|---------|--|--|-------------|-------------|-------------|
| Contractor Support Services | C/CPAF | EG&G-C6411 Rockville, MD | 4.0 | 6.2 | Various | 6.2 | Various | | | 29.9 | 46.3 | 46.3 |
| Contractor Support Services – Award Fee | C/CPAF | EG&G-C6411 Rockville, MD | 0.5 | 0.6 | Various | 0.7 | Various | | | 3.2 | 5.0 | 5.0 |
| Contractor Support Services | Various | Miscellaneous | 15.7 | 0.9 | Various | 0.6 | Various | | | 29.6 | 46.8 | 46.8 |
| Subtotal Management Services | | | 20.2 | 7.7 | | 7.5 | | | | 62.7 | 98.1 | 98.1 |

Remarks:

| | | | | | | | | | | | | |
|-------------------|--|--|--------------|--------------|--|--------------|--|--|--|--------------|----------------|------------|
| Total Cost | | | 959.1 | 143.1 | | 166.3 | | | | 657.2 | 1,925.7 | N/A |
|-------------------|--|--|--------------|--------------|--|--------------|--|--|--|--------------|----------------|------------|

| Cost (\$ in Millions) | FY 1998 | FY 1999 | FY 2000 | FY 2001 | FY 2002 | FY 2003 | FY 2004 | FY 2005 | Cost to Complete | Total Cost |
|-----------------------|---------|---------|---------|---------|---------|---------|---------|---------|------------------|------------|
|-----------------------|---------|---------|---------|---------|---------|---------|---------|---------|------------------|------------|

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Exhibit R-3 RDT&E Project Cost Analysis
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| | | | | | | | | | | |
|--|------|------|------|------|------|------|------|------|------|-------|
| F1950/New Design SSN Combat System Development | 89.8 | 70.2 | 75.2 | 69.9 | 58.0 | 54.3 | 45.9 | 44.9 | 34.3 | 909.8 |
| RDT&E Articles Qty | | | | | | | | | | |

A. (U) Mission Description and Budget Item Justification: (U) This project encompasses the top level systems development, tested integration into the ship of the New SSN C³I System (formerly referred to as Combat Systems), which includes multiple subsystems. The scope of the system is expanded from Sonar and Combat Control subsystems to include Electronics Support Measures (ESM), Exterior Communications, Submarine Regional Warfare System, Navigation, Total Ship Monitoring, Imaging, Tactical Acoustic Communications, Radar, Interior Communications, Tactical Support Devices, Fiber Optic Cable Subsystem, and Special Purpose Subsystems, such as Battle Force Team Trainer and others. New SSN specific development efforts including requirements definition, software, hardware development, software/hardware test, prototype production, and electronic integration as well as physical integration into the platform.

(U) New SSN implementation approach is based on Open System, Commercial-off-the -Shelf (COTS) Non-Developmental Items or subsystems. The program leverages on-going subsystems developments or developing new subsystems where needed to satisfy New SSN requirements. The recurring cost of New SSN C³I Systems is being reduced to meet the program's affordability goals. Modifications to many subsystems must be developed to: (1) reduce the shipbuilding and construction recurring costs through the use of COTS components; (2) use proven computer technologies to evolve to an Open System design; (3) enhance capabilities to support expanded operational requirements, reduced manning, and reduced shipboard component footprint.

(U) To meet the collective future threat, the submarine force must operate as effectively in littoral regions as it traditionally has in open ocean. Close coordination with surface battle groups and airborne units is essential to mission accomplishment. To meet the New SSN mission, the following capabilities are provided by the New SSN C³I System: (1) Passive and Active detection of multiple contacts, including early warning threat determination through processing and analysis of sensor data; (2) classification of sensor data for the purpose of identifying contacts; (3) localization (tracking) of contacts through target motion analysis; (4) preset, launch, and control of weapons and countermeasures; (5) improved communication and connectivity with other battle group elements, airborne units, and special operations forces; (6) incorporation of vertical launch system to enhance strike warfare; and (7) more effective covert surveillance through video imaging with onboard digital enhancement capabilities, and improved electronic warfare analysis capabilities.

(U) Accomplishments and Plans:

1. (U) FY 1998 Accomplishments:

- (U) (\$11.7M) System level development activities continued in the following areas: Structurally Integrated Enclosure (SIE) electronics integration; interface definition process; development of C³I System test and evaluation procedures to support integration testing and installation/test into the platform; and conduct system engineering functions such as requirements management, interface control and test and evaluation planning to support formal Developmental Test/Operational Test (DT/OT) events.

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Exhibit R-2a RDT&E Project Justification
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- (U) (\$69.6M) Continued Sonar, Combat Control, and Architecture (S/CC/A) subsystem development: continued detailed hardware/software development, logistics support, preparation for integration and test and procurement of test hardware and support to non-propulsion electronics intra-subsystem integration. Began inter-subsystem integration.
- (U) (\$8.5M) Continued development efforts to support unique requirements for other subsystems. Performed integration testing and problem resolution for the Electronic Support Measures (ESM) and Imaging subsystems at contractor's facility.

2. (U) FY 1999 Plan:

- (U) (\$11.0M) System level development activities continue in the following areas: Structurally Integrated Enclosure (SIE) electronic integration; development and validation of C³I System test and evaluation procedures to support integration testing and installation/test into the platform; and conduct system engineering functions such as requirements management, interface control, test and evaluation planning to support formal DT/OT; C³I Subsystem platform integration and external interface integration planning.
- (U) (\$53.5M) Continue S/CC/A subsystem development; complete hardware and software development; complete final critical design review; continue logistics support and the procurement of test hardware and support to non-propulsion electronics intra-subsystem integration.
- (U) (\$4.3M) Continue development efforts to support unique requirements for other subsystems. Deliver ESM and Imaging subsystem Engineering Development Model (EDM) to Technical Direction Agent for integration testing.
- (U) (\$1.4M) Portion of Extramural Program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2000 Plan:

- (U) (\$16.115M) System level development activities continue in the following areas: SIE electronic integration; development and validation of C³I System test and evaluation procedures to support integration testing and installation/test into the platform; and conduct system engineering functions such as requirements management, interface control, test and evaluation planning to support formal DT/OT; C³I Subsystem platform integration and external interface integration planning. Begin development of Post Shakedown Availability (PSA) deliveries of technology refreshment changes to C³I System/subsystems.
- (U) (\$57.598M) Complete S/CC/A subsystem preliminary product baseline development; complete initial phase of subsystem System Design Certification Testing (SDCT 1). Continue inter-subsystem integration in preparation for November 2000 delivery of the New Attack Submarine (New SSN) preliminary product baseline subsystem. Begin detailed S/CC/A engineering support to shipyard intra- and inter-subsystem integration. Begin development of Post Shakedown Availability (PSA) deliveries of technology refreshment changes to S/CC/A subsystems.

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- (U) (\$1.400M) Complete Electronic Support Measure (ESM) subsystem at sea testing and obtain MSIII production approval. Continue development efforts to support requirements for other subsystems.

B. (U) Other Program Funding Summary: (Dollars in Millions)

| | <u>FY 1998</u> <u>ACTUAL</u> | <u>FY 1999</u> <u>EST.</u> | <u>FY 2000</u> <u>EST.</u> | <u>FY 2001</u> <u>EST.</u> | <u>FY 2002</u> <u>EST.</u> | <u>FY 2003</u> <u>EST.</u> | <u>FY 2004</u> <u>EST.</u> | <u>FY 2005</u> <u>EST.</u> | <u>TO</u> <u>COMPLETE</u> | <u>TOTAL</u> <u>PROGRAM</u> |
|--|---------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|------------------------------|--------------------------------|
| (U) SCN Line 201300 PE: 0204281N | 2,510.0 | 1,995.5 | 748.5 | 1,659.3 | 2,090.3 | 1,888.4 | 2,251.6 | 2,566.8 | 42,310.5 | 59,587.0 |
| (U) SCN Line 201310 PE: 0204281N | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 589.2 |
| (U) O&M,N BA-1 AG/SAG Line Item 1D4D Subhead HD4D | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14.6 | 0 | 14.6 |
| (U) O&M,N Line BA-3 Subhead: 3B1K | 0 | 0 | 0 | 0 | 2.8 | 4.7 | 4.1 | 3.7 | 8.3 | 23.6 |
| (U) OPN Line Item 1320 BA-1 Subhead: 81H5 | 0 | 0 | 0 | 0 | 13.2 | 1.6 | 0.03 | 0 | 0 | 14.83 |
| (U) OPN Line Item 2762 BA-2 Subhead: 82MB | 0 | 0 | 0 | 0 | 8.4 | 1.0 | 0 | 0 | 0 | 9.4 |
| (U) OPN Line Item 542000 BA-4 Subhead H4VB | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12.4 | 0 | 12.4 |
| (U) OPN Line Item 5661 BA-4 Subhead: 84TD | 0 | 0 | 0 | 0 | 3.7 | 0 | 3.1 | 0 | 0 | 6.8 |
| (U) OPN BA-8 | | | | | 51.0 | 52.0 | 71.0 | 54.0 | 0 | 228.0 |

(U) Related RDT&E:

- (U) PE 0603504N (Advanced Submarine Combat Systems Development)
- (U) PE 0603561N (Advanced Submarine System Development)
- (U) PE 0603562N (Submarine Tactical Warfare Systems)
- (U) PE 0603570N (Advanced Nuclear Power Systems)
- (U) PE 0604503N (Submarine System Equipment Development)
- (U) PE 0604574N (Navy Tactical Computer Resources)
- (U) PE 0604777N (Navigation/ID Systems)
- (U) PE 0101226N (Submarine Acoustic Warfare Development)
- (U) PE 0604562N (Submarine Tactical Warfare System)
- (U) PE 0604524N (Submarine Combat System)

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C. (U) Acquisition Strategy: The New Attack Submarine (New SSN) Program has implemented Integrated Product and Process Development (IPPD). The New SSN Program Office has collocated the engineering and program management personnel necessary to plan and pursue total ship system design management and life cycle acquisition responsibilities. The traditional distinct phasing of the design process has been replaced with the continuous concurrent engineering IPPD process. The IPPD approach will also facilitate a smoother transition from design to manufacturing, and reduce the number of changes typically encountered during construction of the lead and early follow ships. In September 1997, Congress passed a law allowing the two companies to team for production of the first four New Attack Submarines. Under the teaming agreement, Electric Boat remained the design yard for the New SSN and Newport News Shipyard became a part of the IPPD process.

D (U) Schedule Profile: See attached.

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Exhibit R-2a RDT&E Project Justification
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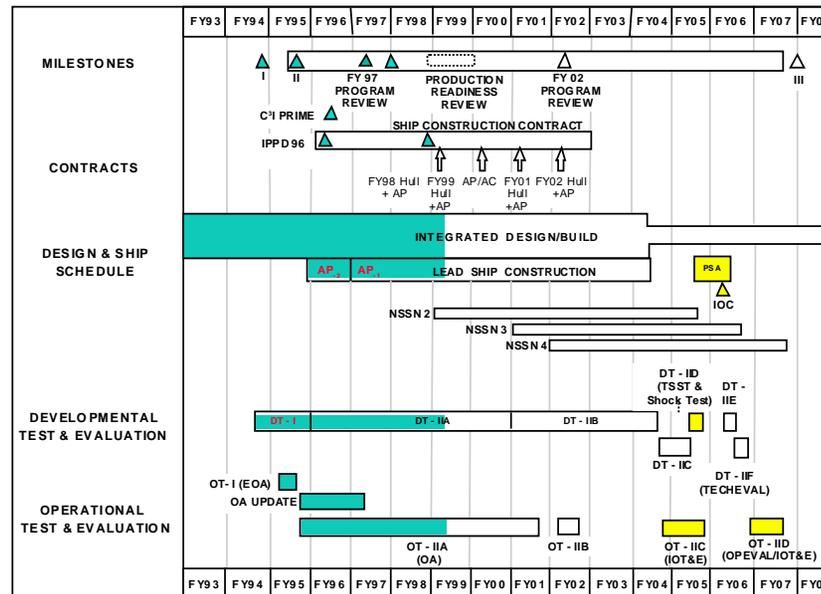
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| Exhibit R-2a, RDT&E Project Justification | | Date: February 1999 |
| APPROPRIATION/BUDGET ACTIVITY RDT&E,N/5 | Program Element Name & No. New Design SSN Development/0604558N | Project Name and Number New Design SSN Combat System Development/F1950 |



Program Schedule



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| Exhibit R-3 Cost Analysis | | Date: February 1999 |
| APPROPRIATION/BUDGET ACTIVITY RDT&E,N/5 | PROGRAM ELEMENT NAME AND NUMBER New Design SSN Development/0604558N | PROJECT NAME AND NUMBER New Design SSN Combat System Development/F1950 |

| C ³ I System Development | Contract Method & Type | Performing Activity & Location | Total PYs Cost | FY99 Cost | FY99 Award Date | FY00 Cost | FY00 Award Date | FY01 Cost | FY01 Award Date | Cost To Complete | Total Cost | Target Value of Contract |
|--|------------------------|-----------------------------------|----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|------------------|------------|--------------------------|
| C ³ I Prime Contract E&MD Total | C/CPAF | Lockheed Martin, Manassas, VA | 111.3 | 31.4 | Various | 36.6 | Various | | | 38.6 | 217.9 | 217.9 |
| C ³ I Prime Contract E&MD Award Fee | C/CPAF | Lockheed Martin, Manassas, VA | 5.6 | 1.9 | Various | 0.9 | Various | | | 1.1 | 9.5 | 9.5 |
| C ³ I Prime Contract Post Delivery | C/FFP | Lockheed Martin, Manassas, VA | | | | | | | | 44.6 | 44.6 | 44.6 |
| Advanced Display System (AN/UYQ-70) | SS/CPFF/CPIF | Lockheed Martin, St. Paul, MN | 18.0 | 1.1 | Jan-99 | 1.0 | Jan-00 | | | 5.1 | 25.2 | 25.2 |
| Multi-Purpose Processor | SS/CPIF | Digital Sys Resource Fairfax, VA | 41.4 | | | | | | | | 41.4 | 41.4 |
| Multi-Purpose Processor | SS/CPIF | Lockheed Martin, Manassas, VA | 1.8 | | | | | | | | 1.8 | 1.8 |
| Photonics | C/CPIF | Kollmorgen, Northhampton, MA | 21.5 | 0.5 | Nov-98 | | | | | | 22.0 | 22.0 |
| Non-Penetrating Periscope | C/CPIF | Kollmorgen, Northhampton, MA | 4.1 | | | | | | | | 4.1 | 4.1 |
| Electronic Support Measures | C/FFP | Lockheed Martin, Syracuse, NY | 36.3 | 0.4 | Dec-98 | | | | | | 36.7 | 36.7 |
| Platform Integration | SS/CPFF | Electric Boat Corp., Groton CT | 17.8 | 1.9 | Dec-98 | 1.4 | Dec-99 | | | 8.2 | 29.3 | 29.3 |
| Platform Integration | SS/CPFF | NNews Shipbuilding, Nnews, VA | 2.7 | | | | | | | | 2.7 | 2.7 |
| Integrated Electronic Mast | SS/CPIF | Goleta, Portsmouth, RI | 8.9 | | | | | | | | 8.9 | 8.9 |
| Tactical Simulator | SS/CPFF | Goleta, Portsmouth, RI | 2.8 | | | | | | | | 2.8 | 2.8 |
| High Frequency Sail Array | SS/CPFF | Applied Research, Austin, TX | 3.3 | | | | | | | | 3.3 | 3.3 |
| Navigation/Radar | SS/CPFF | Sperry Corp., Charlottesville, VA | 5.1 | 0.1 | Feb-99 | 0.1 | Feb-00 | | | 0.2 | 5.5 | 5.5 |
| Technology Refreshment | Various | TBD | | | | 0.9 | | | | 57.2 | 58.1 | N/A |
| System Engineering | N/A | NSWC, Carderock, MD | 2.6 | 0.5 | Nov-98 | 0.5 | Nov-99 | | | 3.1 | 6.7 | N/A |

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Exhibit R-3 RDT&E Project Cost Analysis
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| Exhibit R-3 Cost Analysis | | Date: February 1999 |
| APPROPRIATION/BUDGET ACTIVITY RDT&E,N/5 | PROGRAM ELEMENT NAME AND NUMBER New Design SSN Development/0604558N | PROJECT NAME AND NUMBER New Design SSN Combat System Development/F1950 |

| | | | | | | | | | | | | |
|--------------------------------------|---------|-------------------------------------|-------|------|---------|------|---------|--|--|-------|-------|-----|
| System Engineering | N/A | NSWC, Crane, IN | 2.1 | 0.3 | Nov-98 | 0.2 | Nov-99 | | | 1.0 | 3.6 | N/A |
| Open System Module | SS/CPFF | Unisys Corp./Loral, St. Paul, MN | 2.5 | | | | | | | | 2.5 | 2.5 |
| Technical Direction Agent | N/A | NUWC, Newport, RI | 120.6 | 12.7 | Various | 12.1 | Various | | | 72.1 | 217.5 | N/A |
| System Engineering | N/A | SSC, Charleston, SC | 2.3 | | | | | | | | 2.3 | N/A |
| System Engineering | N/A | SSC, San Diego, CA | 1.3 | 0.2 | Nov-98 | 0.2 | Nov-99 | | | 0.8 | 2.5 | N/A |
| System Engineering | N/A | NUWC, Keyport, WA | 1.5 | 0.4 | Nov 98 | 0.4 | Nov 99 | | | 2.1 | 4.4 | N/A |
| Miscellaneous | Various | Various | 18.3 | 10.7 | Various | 14.0 | Various | | | 53.5 | 96.5 | N/A |
| Subtotal Product Development | | | 431.8 | 62.1 | | 68.3 | | | | 287.6 | 849.8 | N/A |
| Remarks: | | | | | | | | | | | | |
| Support Costs: Not applicable | | | | | | | | | | | | |
| Remarks: | | | | | | | | | | | | |
| Test and Evaluation (T&E) | Various | Various | 0.8 | 1.4 | Various | 0.4 | Various | | | | 2.6 | N/A |
| Subtotal : Test and Evaluation (T&E) | | | 0.8 | 1.4 | | 0.4 | | | | | 2.6 | N/A |

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Exhibit R-3 RDT&E Project Cost Analysis
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| Exhibit R-3 Cost Analysis | | Date: February 1999 |
| APPROPRIATION/BUDGET ACTIVITY RDT&E,N/5 | PROGRAM ELEMENT NAME AND NUMBER New Design SSN Development/0604558N | PROJECT NAME AND NUMBER New Design SSN Combat System Development/F1950 |

Remark

| | Contract Method & Type | Performing Activity & Location | Total PYs Cost | FY99 Cost | FY99 Award Date | Fy00 Cost | FY00 Award Date | FY01 Cost | FY01 Award Date | Cost To Complete | Total Cost | Target Value of Contract |
|---|------------------------|---------------------------------------|----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|------------------|------------|--------------------------|
| Contract Support Services/Eng Tech Services | C/CPAF | EG&G, Rockville, MD | 4.3 | 4.6 | Various | 4.7 | Various | | | 9.0 | 22.6 | 22.6 |
| CSS/ETS Award Fee | C/CPFF | EG&G, Rockville, MD | 0.4 | 0.4 | Various | 0.4 | Various | | | 0.6 | 1.8 | 1.8 |
| Contract Support Services/Eng Tech Services | C/CPFF | EG&G, Rockville, MD | 8.9 | | | | | | | | 8.9 | 8.9 |
| Contract Support Services/Eng Tech Services | C/CPFF | SWL Inc., Vienna, VA | 5.7 | | | | | | | | 5.7 | 5.7 |
| Contract Support Services/Eng Tech Services | C/CPFF | American Systems Corp., Chantilly, VA | 2.1 | | | | | | | | 2.1 | 2.1 |
| Miscellaneous | Various | Various | 3.1 | 1.7 | Various | 1.4 | Various | | | 10.1 | 16.3 | 16.3 |
| Subtotal Management Services | | | 24.5 | 6.7 | | 6.5 | | | | 19.7 | 57.4 | 57.4 |

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Exhibit R-3 RDT&E Project Cost Analysis
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| | | | | | | | | | | | |
|----------|--|--|-------|------|--|------|--|--|-------|-------|-----|
| Remarks: | | | | | | | | | | | |
| | | | 457.1 | 70.2 | | 75.2 | | | 307.3 | 909.8 | N/A |

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Exhibit R-3 RDT&E Project Cost Analysis
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