Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Navy										DATE: February 2011	
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*				R-1 ITEM NOMENCLATURE PE 0603542N: *Radiological Control*							
COST ($ in Millions)	**FY 2010**	**FY 2011**	**FY 2012 Base**	**FY 2012 OCO**	**FY 2012 Total**	**FY 2013**	**FY 2014**	**FY 2015**	**FY 2016**	**Cost To Complete**	**Total Cost**
Total Program Element	1.325	1.358	1.338	-	1.338	0.823	0.850	0.886	0.913	Continuing	Continuing
1830: *RADIAC Development*	1.325	1.358	1.338	-	1.338	0.823	0.850	0.886	0.913	Continuing	Continuing

A. Mission Description and Budget Item Justification

Mission: The Radiation Detection, Indication and Computation (RADIAC) Program is responsible for providing radiation monitoring instruments that detect and measure radiation in accordance with the provisions of Title 10 of the Code of Federal Regulations (10CFR). These instruments are used on all Navy, Coast Guard and Military Sealift Command vessels afloat and at every shore installation in order to ensure the safety of personnel and the environment. RADIACs are also required after an act of terrorism or war involving radiological or nuclear materials in order to enable continuity of warfighting ability.

Justification: Many RADIAC instruments and dosimetry systems are decades old and approaching the end of their useful lives. In some cases the equipment and replacement parts are no longer manufactured, making the equipment logistically unsupportable. In other cases, increasing failure rates due to age make replacements an economic efficiency improvement. In all cases a technology refresh will make both economic sense and provide increased operational capabilities.
Naval Nuclear Propulsion Program (NNPP): Instruments are developed to support the safe operation and maintenance of nuclear powered vessels and at nuclear maintenance facilities.
Non-NNPP: Instruments are developed to support other than NNPP end users, such as Explosive Ordnance Disposal, Weapons, Medical, Industrial Radiography and Training.
Visit, Board, Search & Seizure (VBSS): The Navy has been tasked to intercept and board vessels at sea to search for nuclear or radiological materials that could be used for terrorist attacks. These instruments would have different characteristics than those used for NNPP and non-NNPP purposes and prototypes must be developed and/or tested and evaluated.
The AN/PDR-65 Ship Board Monitoring System is obsolete and will be replaced. The IM-239/WDQ Air Particle Detector (APD) and the HD-732, HD-1150 and HD-1151 Air Particle Samplers (APS) are obsolete and will be replaced.

Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Navy	DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0603542N: *Radiological Control*

B. Program Change Summary ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	1.366	1.358	1.439	-	1.439
Current President's Budget	1.325	1.358	1.338	-	1.338
Total Adjustments	-0.041	-	-0.101	-	-0.101
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.038	-			
• Program Adjustments	-	-	-0.071	-	-0.071
• Section 219 Reprogramming	-0.003	-	-	-	-
• Rate/Misc Adjustments	-	-	-0.030	-	-0.030

Change Summary Explanation

Technical: Not applicable.

Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603542N: *Radiological Control*	PROJECT 1830: *RADIAC Development*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
1830: *RADIAC Development*	1.325	1.358	1.338	-	1.338	0.823	0.850	0.886	0.913	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

A. Mission Description and Budget Item Justification

Mission: The Radiation Detection, Indication and Computation (RADIAC) Program is responsible for providing radiation monitoring instruments that detect and measure radiation in accordance with the provisions of Title 10 of the Code of Federal Regulations (10CFR). These instruments are used on all vessels afloat and at every shore installation in order to ensure the safety of personnel and the environment. RADIACs are also required after an act of terrorism or war that involves nuclear material in order to enable continuing warfighting ability.

Justification: Many RADIAC instruments and dosimetry systems are decades old and approaching the end of their useful lives. In some cases the equipment and replacement parts are no longer manufactured, making the equipment logistically unsupportable. In other cases increasing failure rates due to age make replacements an economic efficiency
improvement. In all cases a technology refresh will make both economic sense and provide increased operational capabilities.
Naval Nuclear Propulsion Program (NNPP): Instruments are developed to support the safe operation and maintenance of nuclear powered vessels and at nuclear maintenance facilities.
Non-NNPP: Instruments are developed to support other than NNPP end users, such as Explosive Ordnance Disposal, Weapons, Medical, Industrial Radiography and Training.
Visit, Board, Search & Seizure (VBSS): The Navy has been tasked to intercept and board vessels at sea to search for nuclear or radiological materials that could be used for terrorist attacks. These instruments would have different characteristics than those used for NNPP and non-NNPP purposes and prototypes must be developed and/or tested and evaluated.
The AN/PDR-65 Ship Board Monitoring System is obsolete and will be replaced. The IM-239/WDQ Air Particle Detector (APD) and the HD-732, HD-1150 and HD-1151 Air Particle Samplers (APS) are obsolete and will be replaced.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2010	FY 2011	FY 2012
Title: Naval Academy Midshipman Summer Internship	0.015	0.015	0.015
Articles:	0	0	0
Description: Every summer a Midshipman is selected to conduct laboratory studies in support of the Naval Dosimetry System to research various responses and issues with thermoluminescent dosimetry. Funds pay for materials.			
FY 2010 Accomplishments: Accomplished study assigned by Naval Academy instructor.			
FY 2011 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2010	FY 2011	FY 2012
Accomplish study assigned by Naval Academy instructor. ***FY 2012 Plans:*** Accomplish study assigned by Naval Academy instructor.			
Title: Next Generation Air Particle Detector ***Articles:*** ***Description:*** The IM-239/WDQ Air Particle Detector (APD) is a 400-pound piece of installed equipment on nuclear powered ships that monitors emissions into the air from the ships' nuclear power plants. There are six on each Nimitiz class carrier and three on each submarine of all classes. The current version is approximately 30 years old and despite component upgrades, has reached the end of its useful life due to parts and technological obsolesence. Naval Reactors require a new version for the nuclear fleet. The RADIAC Program is working with the pre-eminent facility in this field in the U.S., the DoE Remote Sensing Laboratory at Nellis AFB, NV, to develop the new version. ***FY 2010 Accomplishments:*** Completed final three prototypes and issue them to Nuclear Propulsion Test Units for T&E. ***FY 2011 Plans:*** Based on T&E results, issue final specifications and solicit vendors to build prototypes and provide cost estimates for full production. Artifact quantities is an estimate that will be dependent upon the number of offerors, and/or the number of prototypes they propose to build. ***FY 2012 Plans:*** Select the winning prototype and prepare final specifications prior to production.	0.895 3	0.755 4	0.504 0
Title: Naval Nuclear Propulsion Program (NNPP) Survey Meter ***Articles:*** ***Description:*** A survey meter for NNPP must meet military specifications for shipboard use, to include high tolerances for exposure to characteristics such as shock, temperature, humidity and sea water. COTS survey meters, which in most cases might be adequate in the mentioned environmental regards for shore-based requirements, cannot meet military requirements. COTS equipment is evaluated for compliance with technical specifications, and for potential hardening for shipboard use. ***FY 2011 Plans:*** Solicit vendor prototypes for T&E. ***FY 2012 Plans:***	-	0.031 3	0.022 0

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2010	FY 2011	FY 2012
Test and evaluate commercial prototypes for suitability for Navy use.			
Title: Electronic Personal Dosimeter (EPD) Telemetry	0.139	0.054	0.045
Articles:	5	0	0
Description: Naval Reactors has requested the study of adding capabilities to the newly fielded Electronic Pocket Dosimeter (EPD). Besides its basic functionality for recording dose exposure, this instrument also has the ability to remotely monitor and report the radiation exposure of on-scene emergency responders. This feature has not been implemented in the Navy EPDs that were recently procured and fielded, but the USAF already makes extensive use of the same EPD, along with the extra hardware and software required for the purpose of keeping track of responders in emergencies in terms both of their accumulated exposure and precise location. A second application of the EPD telemetry capability is for radiological work. This would include workers wearing EPDs during high radiation level work, and EPDs being posted at locations where radiation level measurements are required in high radiation background areas. Posting of EPDs in such a situation would preclude having a technician enter the danger area with a survey meter to measure the radiation level. An example would be monitoring the radiation level of the pipe through which primary plant resin is being discharged from the ship. ***FY 2010 Accomplishments:*** Procured items for evaluation. Issue report and make recommendation. ***FY 2011 Plans:*** Test and evaluate different telemetry configurations. ***FY 2012 Plans:*** Complete testing of items and determine optimum EPD telemetry configuration.			
Title: Optically Stimulated Luminesence (OSL)	-	0.077	0.078
Articles:		0	0
Description: The need for dosimetry is a very significant consequence of working with or around ionizing radiation. The expensive infrastructure and investments by the Navy in its dosimetry program is evidence of the importance of a robust dosimetry system to the health and safety of the Navy's military and civilian personnel. As new and improved technologies appear, it is important to evaluate them for their potential to improve performance while reducing total operating costs. OSL is a relatively new technology where the benefits appear to be significant but have yet to be fully evaluated. This project's objective is to make			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2010	FY 2011	FY 2012
modest investments with the labor of a Navy Health Physicist to explore, in colloboration with a U.S. Army colleague interested in the same technology for Army use, the potential of the military application for OSL dosimetry. ***FY 2011 Plans:*** Coordinate with Defense Threat Reduction Agency (DTRA) and other services to establish common requirements. ***FY 2012 Plans:*** Research dosimetric properties of OSL material for suitability as a Navy dosimeter.			
Title: Speciality Survey Meters and Detectors ***Articles:*** ***Description:*** Develop replacements for obsolete equipment and develop new capabilities for specialized applications. These include: 1) a Radiological Affairs Support Program (RASP) survey meter 2) a neutron detector to replace the obsolete Self Indicating Casualty Dosimeter (SICD) 3) a uRem survey meter 4) a teletector. Articles are prototypes for T&E. ***FY 2010 Accomplishments:*** Completed T&E of RASP survey meter and uRem survey meter. Both items ready for transition to procurement. ***FY 2011 Plans:*** Develop replacement for Telector. Procure articles for T&E. ***FY 2012 Plans:*** Begin development of SICD, leveraging concurrent work in OSL dosimetry, and coordinate with other services to see if a common Casualty Dosimeter can satisfy Army, Navy, Marine Corps and Air Force requirements. This would be a Navy initiative coordinated by Defense Threat Reduction Agency (DTRA).	0.184 0	0.165 22	0.063 0
Title: Visit, Board, Search & Seizure (VBSS) ***Articles:*** ***Description:*** The VBSS mission of the Navy includes the requirement to be able to board ships and be able to detect and identify potential radiological or nuclear Weapons of Mass Destruction (WMD). Such a sensitive mission requires leading edge technology and capabilities to ensure success. The recently fielded AN/PDX-1 RADIAC Set contains several instruments that serve different purposes, perhaps the most significant item being the detector. Current technology dictates that the sensitivity	0.092 4	0.163 4	0.118 8

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2010	FY 2011	FY 2012
of the detector is directly proportional to the size of the detector element; i.e., the larger the detector, the more sensitive and capable it is. However, in VBSS there must be a tradeoff between size/weight and capability, since it is difficult and hazardous for boarding parties to carry a backpack-sized detector, along with their weapons and other gear, up a rope ladder to board a vessel on the high seas. This will be a continuing and growing effort to find smaller, lighter instruments with enhanced sensitivity, reach-back capability, and other enhancements to provide the Navy the best and most cost effective equipment possible for this critical mission. ***FY 2010 Accomplishments:*** Procured Radiological Search articles for evaluation. ***FY 2011 Plans:*** Procure Isotope Identifier articles for evaluation. ***FY 2012 Plans:*** Procure Radiological Search and Dosimetry articles for evaluation.			
Title: Neutron Electronic Personal Dosimeter ***Articles:*** ***Description:*** A neutron EPD will show real-time neutron accumulated doses in accelerator facilities producing high neutron yields. Currently, the DT-702 dosimeter is worn, but it must be processed at an off-site facility to obtain a dose report, which are not available for several weeks after exposure. With increased demand of accelerator facility use, the lag time between dose receipt and dose report poses increased risk to personnel safety. ***FY 2012 Plans:*** Evaluate COTS examples for neutron detection characteristics and suitability for use alongside the Navy's new Neutron Area Monitor.	-	-	0.046 0
Title: Neutron Area Monitor ***Articles:*** ***Description:*** Several facilities throughout the Navy, particularly accelerator facilities, produce significant neutron radiation fields. Having a monitor to provide instant readings on the neutron level provides data on high dose procedures and experiments. The current system requires environmental dosimeters to be used and sent out for processing, taking weeks to obtain results. Waiting on dosimeter results may cause excessive exposures to individuals because safe radiological boundaries may not be maintained where the radiation level is not known.	-	-	0.064 0

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2010	FY 2011	FY 2012
FY 2012 Plans: Survey affected facilities to determine specific neutron monitoring requirements.			
Title: Air Particle Sampler (APS) ***Articles:*** ***Description:*** Portable APS are used to sample for airborne radioactivity on board nuclear powered ships and in nuclear ship maintenance facilities in confined work areas where the installed Air Particle Detectors are ineffective. The current HD-732 (AC powered) and HD-1151 (DC powered) are obsolescent and will shortly be unsupportable. COTS equipment will be evaluated to replace the two current models, to include the feasability of finding an AC/DC unit that would simplify logistical support. ***FY 2012 Plans:*** Procure COTS models for evaluation to determine if they meet Navy requirements.	-	-	0.076 3
Title: Calibrators ***Articles:*** ***Description:*** Calibrators are the basic tool used to calibrate all Navy radiological detection equipment. Essentially they consist of a high energy radiological source (Cs-137) in a shielded container that is located in a specially constructed room, or "range." A technician places the instrument to be calibrated at a specific calibration point in the range and remotely operates the calibrator by raising the source out of its container so that it irradiates the object instrument. The instrument's response to the radiation is measured so that it can be calibrated to specific tolerances. The current suite of AN/UDM-1B calibrators is over 20 years old and the natural decay of the strength of the radioactive source over time restricts calibration effectiveness by limiting the scale of calibration points below American National Standards Institute (ANSI) requirements that are followed in accordance with Navy policy. Also due to the age of the calibrators, there are several parts no longer supported by the manufacturer, and a malfunctioning calibrator poses a very high risk. COTS equipment will be surveyed to find the best solution with which to equip the Navy's seven RADIAC Calibration Laboratories. ***FY 2012 Plans:*** Study state of the art COTS calibrators for suitability.	-	-	0.154 0
Title: Radiological Shipboard Defense Monitor ***Articles:*** ***Description:*** All surface combatants require an instrument to detect and measure radiolgoical activity in the event of a nuclear detonation in order for the ship can avoid the contamination and continue its mission. The AN/PDR-65, at over 40 years of age, was the instrument used for this purpose but is obsolete and has been de-fielded. An interim replacement has been fielded while	-	0.098 0	0.083 0

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2010	FY 2011	FY 2012
OPNAV finalizes updating the Cold War requirements under which the AN/PDR-65 was designed, in order to include radiological (terrorist dirty bomb) threats. The interim replacement is the IM-265 Survey Meter, which is already in the Navy inventory, but it was not designed for this requirement and cannot measure radiation external to the ship and is therefore not suitable as the permanent replacement. ***FY 2011 Plans:*** Update Fleet requirements and specifications from Cold War scenario to current threats. ***FY 2012 Plans:*** Begin study and analysis of replacement equipment and possibility of integration of a shipboard radiological warning system with a chemical and biological warning system.			
Title: Casualty Dosimeter ***Articles:*** ***Description:*** A Casualty Dosimeter is used for triage of casualties from a nuclear or radiological event. The current IM-270's useful life will expire in 2016 so a replacement must be found. ***FY 2012 Plans:*** Study alternatives, to include leveraging Army and Marine systems for Navy use.	-	-	0.070 0
Accomplishments/Planned Programs Subtotals	1.325	1.358	1.338

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
• OPN 2920: *RADIAC*	3.496	6.104	6.201	0.000	6.201	8.127	8.131	8.464	8.232	Continuing	Continuing

D. Acquisition Strategy

Development efforts are focused on evaluation, modification (as required to meet operational requirements) and adaptation of commercial-off-the-shelf (COTS) technology in order to minimize total ownership costs. To the maximum extent possible new contracts are targeted for fixed price efforts to control development cost.

E. Performance Metrics

Program Reviews

Exhibit R-3, RDT&E Project Cost Analysis: PB 2012 Navy		DATE: February 2011
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	WR	NSWC Carderock:West Bethesda, MD	11.390	0.442	Nov 2010	0.409	Nov 2011	-		0.409	0.000	12.241	11.390
		Subtotal	11.390	0.442		0.409		-		0.409	0.000	12.241	11.390

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Support	WR	US Naval Academy:Annapolis, MD	0.015	0.015	Mar 2011	0.015	Mar 2012	-		0.015	0.000	0.045	
Development Support	SS/CPIF	Univ. of Washington:Seattle, WA	1.157	-		-		-		-	0.000	1.157	
Development Support	WR	NSWC Carderock:West Bethesda, MD	3.582	-		-		-		-	Continuing	Continuing	Continuing
		Subtotal	4.754	0.015		0.015		-		0.015			

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Operational Test & Evaluation	WR	NSWC Carderock:West Bethesda,MD	0.950	-		0.102	Nov 2011	-		0.102	0.000	1.052	0.950
		Subtotal	0.950	-		0.102		-		0.102	0.000	1.052	0.950

Exhibit R-3, RDT&E Project Cost Analysis: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603542N: *Radiological Control*	PROJECT 1830: *RADIAC Development*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Engineering Support	C/FP	Orbis, Inc.,:Charleston, SC	2.239	0.287	Nov 2010	0.308	Feb 2012	-		0.308	Continuing	Continuing	Continuing
Labor (Researach Personnel)	MIPR	DoE, RSL,:Nellis AFB, NV	3.783	0.610	Nov 2010	0.499	Nov 2011	-		0.499	Continuing	Continuing	Continuing
Travel	Allot	NAVSEA:Washington, D.C.	0.369	0.004	Feb 2011	0.005	Mar 2012	-		0.005	Continuing	Continuing	Continuing
		Subtotal	6.391	0.901		0.812		-		0.812			

	Total Prior Years Cost	FY 2011		FY 2012 Base		FY 2012 OCO		FY 2012 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	23.485	1.358		1.338		-		1.338			

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0603542N: *Radiological Control*	**PROJECT** 1830: *RADIAC Development*

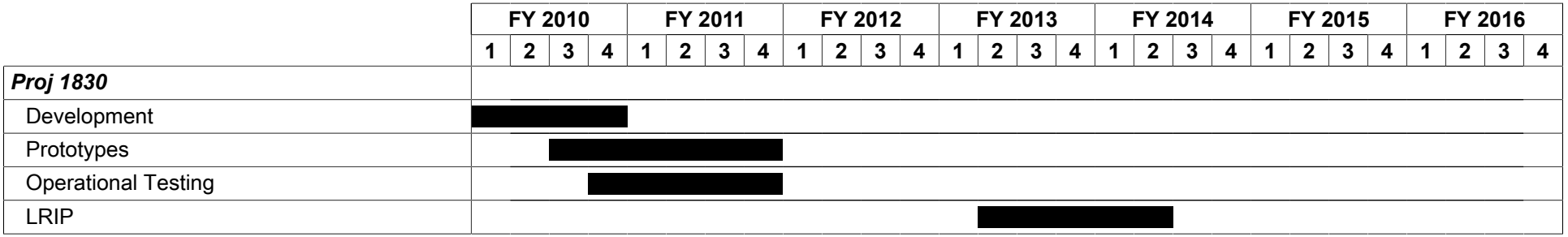

Exhibit R-4A, RDT&E Schedule Details: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0603542N: *Radiological Control*	**PROJECT** 1830: *RADIAC Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 1830				
Development	1	2010	4	2010
Prototypes	3	2010	4	2011
Operational Testing	4	2010	4	2011
LRIP	2	2013	2	2014