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Exhibit R-2, RDT&E Budget Item Justification	Date: February 1999
APPROPRIATION/BUDGET ACTIVITY 1319 / BA 4	R-1 ITEM NOMENCLATURE Conventional Munitions / 0603609N

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	36.870	40.596	34.309	31.318	29.791	30.307	30.882	38.160	Continuing	Continuing
K2299 Non-Nuclear Expendable Ordnance (NNEO)	1.732	2.287	1.360	.895	.959	.981	1.005	1.030	Continuing	Continuing
S0363 Insensitive Munitions Advanced Development	9.826	12.449	8.177	9.875	9.946	9.944	10.004	16.753	Continuing	Continuing
S2611 Env Safe Energetic Materials		.998								
K1821/U1821 Conventional Fuze/Warhead Package	21.351	24.862	24.772	20.548	18.886	19.382	19.873	20.377	Continuing	Continuing
K2393/U2393 Optical Correlator Tech.	3.961	0	0	0	0	0	0	0	0	3.961
Quantity of RDT&E Articles & cost										

A. Mission Description and Budget Item Justification

Non-Nuclear Expendable Ordnance (NNEO) (Project K2299): This item addresses improvements to Navy surface launched (2T) non-nuclear expendable ordnance. It supports transition of the Multi-Function Fuze from Engineering and Manufacturing Development (E&MD) to production

Insensitive Munitions Advanced Development (IMAD) (Project S0363): Most Navy munitions react violently when exposed to unplanned stimuli such as fire, shock and bullet impact, thus presenting a great hazard to ships, aircraft, and personnel. This IMAD program will provide, validate, and transition technology for explosives, propellants, and ordnance to enable production of munitions insensitive to unplanned stimuli with no reduction to combat performance.

Environmentally Safe Energetic Materials (Project S2611): This project will mature and demonstrate energetic materials and processes for explosives, propellants, and pyrotechnics which minimize or eliminate any adverse environmental impact normally associated with these materials in production and demilitarization. These new environmentally safe materials will meet insensitive munitions and system performance requirements while lowering the total ownership costs of the weapon systems.

Conventional Fuze/Warhead Package (Project U1821): The Navy requires improved lethality of air and surface launched ordnance to defeat advanced threats. Current specific requirements and initiatives to address them include: the ability to defeat anti-ship missiles attacking at extremely low altitudes by improving SPARROW Missile through the Missile Homing Improvement Program (MHIP) to counter deceptive countermeasures; demonstrate advance missile advance missile fuzing systems to defeat extremely low altitude and low observable targets with the Advance Threat Fuze; develop advanced integrated guidance /fuzing and warhead mass-focusing systems to increase lethality against current and emerging threats. This project will, in future years, also provide the vehicle to address emergent requirements by transitioning mature fuze and warhead technology from conceptual developments to engineering development with minimum technical and financial risk.

Optical Correlator Technology (Project U2393): The purpose of this effort is to enhance next generation Target Discrimination and Aimpoint selection performance.

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B. Program Change Summary:			
	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
FY 1999 President's Budget:	37.236	39.775	48.766
Appropriated Value:	38.390	40.775	
Adjustment to FY 1998 Appropriated Value/ FY 1999 President's Budget:			
a. SBIR reduction	-0.441		
b. Congressional undistributed reduction	-1.054		
c. Minor pricing adjustments	0.162	-0.179	0.041
d. Below threshold reprogramming	-0.187		
e. Congressional program increase		1.000	
f. PBD 606 Civilian pay rates			0.206
g. PBD 604 inflation			-0.498
h. PBD 426 working capitol			-0.099
i. N86 priority item offsets			-6.660
j. Insensitive munitions decrease			-4.600
k. Low expenditure rate			-2.847
FY 2000 President's Budget Submit:	36.870	40.596	34.309
Schedule: Not applicable.			
Technical: Not applicable			

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Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY 1319/4	Program Element Name & No. Convention Munitions/0603609N	Project Name and Number. Non-Nuclear Expendable Ordnance (NNEO) K2299

Cost (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost	1.732	2.287	1.360	.895	.959	.981	1.005	1.030	Continuing	Continuing
RDT&E Articles Qty										

A. Mission Description and Budget Item Justification:

This budget item addresses improvements to Navy surface launched (2T) non-nuclear expendable ordnance (NNEO) outside existing operational requirements. The commodities comprising 2T NNEO are: Major and medium caliber gun ammunition, small arms ammunition, other ship gun ammunition, pyrotechnics, and demolition items. There are no other RDT&E budget items supporting the 2T NNEO program. This project supports the Multi-function Fuze (MFF), Mk 2 Grenade proximity Fuze and Cargo Competent Fuzes. These fuzes will be used with 5"/54 gun ammunition.

FY 98 PLANS: (\$1.732) Multi- Function Fuze (MFF): Incorporate pre-planned product improvement programs to reduce fuze unit cost and increase producibility. P³I items include: new battery and semiconductor bridgewire.

FY 99 PLANS: (\$2.269) Multi-Function Fuze (MFF): Incorporate changes to the design of the fuze which reduces cost, increase producibility and improves performance. P³I items include: new battery and semiconductor bridgewire. Achieve Milestone III.
 (\$.018) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

FY 00 PLANS: (\$1.360) Multi-Function Fuze (MFF): Incorporate pre-planned product improvement programs to reduce fuze unit cost, increase producibility and performance. P³I items include: multi-plexing air mode and initial velocity sensor.

B. Other Program Funding Summary

1. (U) Related RDT&E: PE 0603795 (Naval Surface Fire Support)
2. (U) The 5"/54 Improved Conventional Munition projectile will be qualified with the MFF. MS III scheduled for 3Q FY 1999.

Procurement of Ammunition, Navy and Marine Corps (PANMC) 5"/54 Ammunition, BLIN 025000, Cost Code AC893 (Reno)

<u>FY1998</u>	<u>FY1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>To FY 2005</u>	<u>Total Complete</u>	<u>Cost</u>
0.0	11.0	6.2	8.8	9.0	9.3	9.4	9.5	TBD	TBD

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Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY 1319/4	Program Element Name & No. Convention Munitions/0603609N	Project Name and Number. Non-Nuclear Expendable Ordnance (NNEO) K2299

C. Acquisition Strategy: Award 5-Year (Multi-Year) Contract for MFF. As P³I are completed, they will be incorporated into the next production lot.

D. Schedule Profile

	FY 1998	FY 1999	FY 2000
Program Milestones		3Q MSIII 4Q IOC	
Engineering Milestones			
T&E Milestones		1Q TECHEVAL OPEVAL	1Q TECHEVAL P ³ I 1Q OPEVAL P ³ I
Contract Milestones		3Q PRODUCTION 3Q P ³ I	1Q PRODUCTION P ³ I

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Exhibit R-3 Cost Analysis		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY 1319/4	PROGRAM ELEMENT NAME AND NUMBER Conventional Munition/0603609N	PROJECT NAME AND NUMBER Non-Nuclear Expendable Ord (NNEO) K2299

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	WR	DAH	.254	.753	VAR	.241	VAR			CONT.	CONT.	N/A
	C/CPFF	ALLIANT	.322	.536	VAR	.094	VAR			CONT.	CONT.	N/A
	SS/CPFF	MOTOROLA	.300	.200	VAR	.150	VAR			CONT.	CONT.	N/A
Ancillary Hardware Development												
Systems Engineering												
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			.876	1.489		.485				CONT.	CONT.	N/A
Remarks:												
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support												
Remarks												

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Exhibit R-3 Cost Analysis		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY 1319/4	PROGRAM ELEMENT NAME AND NUMBER Conventional Munition/0603609N	PROJECT NAME AND NUMBER Non-Nuclear Expendable Ord (NNEO) K2299

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	DAH	.208	.150	VAR	.375	VAR			CONT.	CONT.	N/A
	WR	CHINA LAKE	.150	.200	VAR	.200	VAR			CONT.	CONT.	N/A
Operational Test & Evaluation	WR	COMOPTEVFOR	.400	.148	VAR	0						
Tooling												
GFE												
Subtotal T&E			.758	.498		.575				CONT.	CONT.	N/A
Remarks:												
Contractor Engineering Support												
Government Engineering Support	WR	DAH	.200	.200	11/ 98	.200	11/ 99			CONT.	CONT.	N/A
Program Management Support	WR	DAH	.054	.080	11/ 98	.080	11/99			CONT.	CONT.	N/A
Program Management Personnel												
Travel	WR	DAH	.010	.010	11/ 98	.010	11/99			CONT.	CONT.	N/A
Labor (Research Personnel)												
Overhead/MISC	WR	DAH	.010	.010	11/ 98	.010	11/ 99			CONT.	CONT.	N/A
Subtotal Management			.274	.300		.300				CONT.	CONT.	N/A
Remarks:												
Total Cost:			1.908	2.269		1.360				CONT.	CONT.	N/A

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Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E / BA4	Program Element Name & No. CONVENTIONAL MUNITIONS/0603609N	Project Name and Number. INSENSITIVE MUNITIONS ADVANCED DEVELOPMENT/S0363

Cost (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost	9.826	12.449	8.177	9.875	9.946	9.944	10.004	16.753	CONT	CONT
RDT&E Articles Qty										

A. (U) Mission Description and Budget Item Justification:
 Most Navy munitions react violently when exposed to unplanned stimuli such as fire, shock and bullet impact, thus presenting a great hazard to ships, aircraft and personnel. This program will provide, validate and transition technology to all new weapon developments and priority weapon systems and enable production of munitions insensitive to these stimuli with no reduction in combat performance. The Insensitive Munitions (IM) Advanced Development Program is the Navy's focused effort on propellants, propulsion units, explosives, warheads, fuzes and pyrotechnics to reduce the severity of cook-off and bullet/fragment impact reactions, minimizing the probability for sympathetic detonation, both in normal storage and in use, increasing ship survivability and satisfying performance and readiness requirements. Each technology area is divided into subtasks addressing specific munition/munition class IM deficiencies. Energetic materials producibility is demonstrated to assure national capability to produce and load munitions systems. The program is being closely coordinated with other Military Departments, NATO and allied countries to eliminate redundant efforts and maximize efficiency. A joint service IM requirement has been developed. Insensitive munitions are identified as a DoD critical technology requirement and considered as part of a weapon design per DoD 5000.2R.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) (\$1.239) Validated and assessed weapon systems POA&Ms for IM compliance. Compiled and analyzed weapon system, energetic material and generic technology IM test data.
- (U) (\$3.300) Demonstrated high explosives that showed improved IM characteristics while maintaining or improving operational performance. Completed scale-up of a castable CL-20 based explosive, and initiated performance and vulnerability testing. Continued qualification of improved underwater explosives. Continued development of enhanced blast and low cost metal accelerating explosives.
- (U) (\$4.400) Evaluated and demonstrated IM propellants and propulsion systems which provided improved or comparable performance to in-service systems and better IM characteristics. Combined candidate IM propellants and case concepts to demonstrate compliance with IM and performance requirements. Completed demonstration and evaluation of prototype IM advanced booster propulsion systems for large diameter, 13-inch or greater, rocket motors for surface missile systems (SMS). Demonstrated high stiffness composite motor cases

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APPROPRIATION/BUDGET ACTIVITY RDT&E / BA4	Program Element Name & No. CONVENTIONAL MUNITIONS/0603609N	Project Name and Number. INSENSITIVE MUNITIONS ADVANCED DEVELOPMENT/S0363

- (U) (\$0.887) Continued evaluation of IM ordnance concepts. Conducted system demonstrations of new high explosives combined with improved warhead and booster for potential application to JSOW unitary variant. Continued modeling application that reduced and enhanced IM warhead design and test efforts.
2. (U) FY 1999 PLAN:
- (U) (\$1.575) Validate and assess weapon systems POA&Ms for IM compliance. Compile and analyze weapon system, energetic material and generic technology IM test data.
 - (U) (\$4.200) Demonstrate high explosives that show improved IM characteristics while maintaining or improving operational performance. Demonstrate deformable high explosives for new Anti-Air-Warfare Warheads. Demonstrate internal blast explosive and high performance pressed metal accelerating explosives and begin qualification when warranted. Qualify an insensitive high bubble energy underwater explosive. Complete qualification of a castable CL-20 based explosive and low cost metal accelerating explosive.
 - (U) (\$1.075) Evaluate IM ordnance concepts. Conduct system demonstrations of new high explosives combined with improved warhead and booster designed to support technology transitions. Continue modeling applications that reduce and enhance IM warhead design and test efforts.
 - (U) (\$5.581) Evaluate and demonstrate IM propellants and propulsion systems which provide improved or comparable performance to in-service systems and better IM characteristics. Combine candidate IM propellants and case concepts to demonstrate compliance with IM and performance requirements. Initiate scale-up, performance and vulnerability testing of ADN based propellant. Demonstrate performance of super high-pressure composite case motor. Demonstrate insensitive high-energy booster propellants and motors.
 - (U) (\$0.018) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.
3. (U) FY 2000 PLAN:
- (\$1.450) Continue validation and assessment of weapon systems POA&Ms for IM compliance. Continue compilation and analysis of weapon system, energetic material and generic technology IM test data.
 - (U) (\$2.940) Demonstrate high explosives that show improved IM characteristics while maintaining or improving operational performance.

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Exhibit R-2a RDT&E Budget Item Justification
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Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E / BA4	Program Element Name & No. CONVENTIONAL MUNITIONS/0603609N	Project Name and Number. INSENSITIVE MUNITIONS ADVANCED DEVELOPMENT/S0363

Demonstrate high performance cast explosive. Initiate qualification of internal blast explosive, high performance pressed metal accelerating explosive and deformable explosive and transition to weapon systems. Begin qualification of high performance, low cost replacement for initiator explosives. Complete qualification of high performance booster explosive.

- (U) (\$1.000) Evaluate IM ordnance concepts. Conduct system demonstrations of new high explosives combined with improved warhead and booster designed to support technology transitions. Continue modeling applications that reduce and enhance IM warhead design and test efforts.
- (U) (\$2.787) Evaluate and demonstrate IM propellants and propulsion systems which provide improved or comparable performance to in-service systems and better IM characteristics. Combine candidate IM propellants and case concepts to demonstrate compliance with IM and performance requirements. Complete scale-up, performance and vulnerability testing of ADN based propellant. Demonstrate an insensitive, multi-mission, high performance rocket motor. Evaluate and demonstrate hybrid rocket motor concepts for IM compliance. Demonstrate high-pressure propellants in high-pressure composite motor cases.

B. (U) OTHER PROGRAM FUNDING SUMMARY: NOT APPLICABLE

(U) RELATED RDT&E:

- (U) PE 0601153N (Defense Research Sciences)
- (U) PE 0602111N (Surface/Aerospace Surveillance and Weapons Technology)
- (U) PE 0602314N (Undersea Surveillance and Weapons Technology)
- (U) PE 0602315N (MCM, Mining and Special Warfare Technology)
- (U) PE 0603216N (Aviation Survivability) Project W0592 Aircraft and Ordnance Safety
- (U) PE 0604603N (Unguided Conventional Air-launched Weapons)
- (U) Cooperative technology transfer efforts with all weapons project offices are in progress.

C. (U) ACQUISITION STRATEGY: NOT APPLICABLE

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Exhibit R-2a RDT&E Budget Item Justification
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Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E / BA4	Program Element Name & No. CONVENTIONAL MUNITIONS/0603609N	Project Name and Number. INSENSITIVE MUNITIONS ADVANCED DEVELOPMENT/S0363

D. (U) SCHEDULE PROFILE: NOT APPLICABLE

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Exhibit R-3 Cost Analysis		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY 1319/4	PROGRAM ELEMENT NAME AND NUMBER Conventional Munition/0603609N	PROJECT NAME AND NUMBER INSENSITIVE MUNITIONS ADVANCED DEVELOPMENT/S0363

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Technology Development	WR	VARIOUS	76.981	4.985	11/98	2.947	11/99			CONT	CONT	NA
Subtotal Product Development	WR	VARIOUS	76.981	4.985		2.947				CONT	CONT	NA
Remarks: Performing activities include: NSWC/DAHLGREN, NSWC/INDIAN HEAD, NAWC WP DIV/CHINA LAKE AND NSWC/CRANE												
Demonstration Test & Evaluation	WR	VARIOUS	91.415	5.900	11/98	3.780	11/99			CONT	CONT	NA
Subtotal T&E	WR	VARIOUS	91.415	5.900		3.780				CONT	CONT	NA
Remarks: Performing activities include: NSWC/DAHLGREN, NSWC/INDIAN HEAD, NAWC WP DIV/CHINA LAKE AND NSWC/CRANE												
Program Management Support	WR	NSCW/IH	23.867	1.539	11/98	1.425	11/99			CONT	CONT	NA
Travel	PD	NAVSEA Travel	.190	.025	10/98	.025	11/99			CONT	CONT	NA
Subtotal Management			24.057	1.564		1.450				CONT	CONT	NA
Remarks:												
Total Cost			192.453	12.449		8.177				CONT	CONT	NA

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Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E / BA4	Program Element Name & No. CONVENTIONAL MUNITIONS/0603609N	Project Name and Number. ENVIRONMENTALLY SAFE ENERGETIC MATERIALS/S2611

Cost (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost	0	.998	0	0	0	0	0	0	.998	.998
RDT&E Articles Qty										

A. (U) Mission Description and Budget Item Justification:
 The development, manufacture and demilitarization of energetic materials generate significant quantities of waste. The generation and subsequent disposal of this waste has come under increased scrutiny and regulation by Federal, State and local officials. Additionally, due to environmental compliance and waste disposal issues, the cost of energetic materials is rapidly increasing. New technologies, energetic materials and ingredients that minimize any adverse environmental impact are being developed within the Navy's science and technology initiatives. These technologies are commonly referred to as "green" energetic materials. The efforts under this project will provide, validate, and transition technology for explosives, propellants and pyrotechnics using materials and compositions that have low adverse environmental impact in production and demilitarization, will meet insensitive munitions requirements and will have no reduction to combat performance.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS: NOT APPLICABLE

2. (U) FY 1999 PLAN:
 - (U) (\$.980) Evaluate and demonstrate solventless processing of explosive molding powder. Demonstrate the recycle, recovery and reuse and of hydrolyzable rocket propellant formulations. Evaluate alternate low environmental impact explosive molecules to replace current nitramines. Evaluate and predict the environmental impact and associated life cycle costs for energetic materials and processes.
 - (U) (\$.018) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2000 PLAN: NOT APPLICABLE

B. (U) OTHER PROGRAM FUNDING SUMMARY: NOT APPLICABLE

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APPROPRIATION/BUDGET ACTIVITY RDT&E / BA4	Program Element Name & No. CONVENTIONAL MUNITIONS/0603609N	Project Name and Number. ENVIRONMENTALLY SAFE ENERGETIC MATERIALS/S2611

(U) RELATED RDT&E:

- (U) PE 0601153N (Defense Research Sciences)
- (U) PE 0602111N (Surface/Aerospace Surveillance and Weapons Technology)
- (U) PE 0602314N (Undersea Surveillance and Weapons Technology)
- (U) PE 0602315N (MCM, Mining and Special Warfare Technology)
- (U) PE 0603216N (Aviation Survivability) Project W0592 Aircraft and Ordnance Safety
- (U) PE 0604603N (Unguided Conventional Air-launched Weapons)

C. (U) ACQUISITION STRATEGY: NOT APPLICABLE

D. (U) SCHEDULE PROFILE: NOT APPLICABLE

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APPROPRIATION/BUDGET ACTIVITY 1319/4	PROGRAM ELEMENT NAME AND NUMBER Conventional Munition/0603609N	PROJECT NAME AND NUMBER ENVIRONMENTALLY SAFE ENERGETIC MATERIALS/S2611

Cost Categories (Tailor to WBS, or System/Item Requirements)	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
Technology Development	WR	VARIOUS	0	.445	2/99	0	NA	0	NA	.445	.445	NA
Subtotal Product Development	WR	VARIOUS	0	.445		0		0		.445	.445	NA
Remarks: Performing activities include: NSWC/DAHLGREN, NSWC/INDIAN HEAD, NAWC WP DIV/CHINA LAKE AND NSWC/CRANE												
Demonstration Test & Evaluation	WR	VARIOUS	0	.478	2/99	0	NA	0	NA	.478	.478	NA
Subtotal T&E	WR	VARIOUS	0	.478		0		0		.478	.478	NA
Remarks: Performing activities include: NSWC/DAHLGREN, NSWC/INDIAN HEAD, NAWC WP DIV/CHINA LAKE AND NSWC/CRANE												
Program Management Support	WR	NSCW/IH	0	.075	2/99	0	NA	0	NA	.075	.075	NA
Travel	PD	NAVSEA Travel	0	0	NA	0	NA	0	NA	0	0	NA
Subtotal Management			0	.075		0		0		.075	.075	NA
Remarks:												
Total Cost			0	.998		0		0		.998	.998	NA

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APPROPRIATION/BUDGET ACTIVITY RDT&E / BA4	Program Element Name & No. CONVENTIONAL MUNITIONS/0603609N	Project Name and Number. Conventional Fuze and Warhead Package (K1821/U1821)

Cost (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost	21.351	24.862	24.772	20.548	18.886	19.382	19.873	20.377	Continuing	Continuing
RDT&E Articles Qty										

A. Mission Description and Budget Item Justification

The Navy requires improved lethality of air and surface launched ordnance to defeat advanced threats. This is the only Navy 6.3B RDT&E program that addresses improvements in warhead and fuze technology to meet this requirement. This program is a significant vehicle for orderly planning and timely and effective transition of Navy 6.2 and 6.3A investments into E&MD missile/weapon systems. This program addresses increased lethality against current and emerging threats, is responsive to all mission areas -- anti-air, strike, defense suppression, theater defense and ship defense, and supports development of complete ordnance sections. The current, on-going projects address significant technology advancements for missile systems by developing: a mass focusing ordnance, maturing physical concepts to enhance anti-air kill probability, advanced ordnance with augmented overland cruise missile defense capability, strike ordnance with deep penetration payload, and advanced seeker technology. The program supports the full spectrum of missile advanced development and technology improvements, and in future years will continue to provide the vehicle to address emergent requirements by transitioning mature development efforts into weapon systems with minimal technical and financial risk.

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) (\$4.132) **DIRECTIONAL ORDNANCE SYSTEM:** Assembled demonstration hardware. Conducted system demonstration. Developed specifications, drawings, and design and test data reports. Prepared system demonstration report.
- (U) (\$.324) **ADVANCED STRIKE WARFARE HIGH VELOCITY PENETRATOR:** Initiated effort to demonstrate high velocity penetrating payload (warhead and fuze) for enhancing penetration of deeply buried targets.
- (U) (\$.671) **ORDNANCE COMPONENTS TECHNOLOGY:** Continued effort with customized S-A components. Continued very high energy density capacitors and high G fiber optic accelerometer efforts.
- (U) (\$8.217) **Advanced Seeker Technology:** Initiated advanced seeker technology development effort.
- (U) (\$8.007) **ADVANCE ORDNANCE SECTION (FORMERLY OVERALAND CRUISE MISSILE DEFENSE/DIRECT HIT):** Continued with warhead concept characterization studies, target interaction, lethality and vulnerability model updates for 15 selected targets, and conducted end-game effectiveness and evaluation studies. Continued with reactive material for ATD risk reduction efforts.

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2. (U) FY 1999 PLAN:

- (\$0.360) DIRECTIONAL ORDNANCE SYSTEM: Conduct quick look scaling design/test.
- (\$6.295) ADVANCED STRIKE WARFARE HIGH VELOCITY PENETRATOR: Continue with the effort to demonstrate the penetrating payload (warhead and fuze) for enhancing penetration of deeply buried targets.
- (\$1.100) ORDNANCE COMPONENT TECHNOLOGY: Complete efforts on high energy density capacitors and high G fiber optic accelerometer. Initiate efforts on near field contact sensors and enhanced low energy exploding foil initiator.
- (\$7.849) ADVANCED ORDNANCE SECTION: Complete interim down select to 3-4 warhead concepts variants. Incorporate updated fuze models, conduct critical experiments, perform fabrication/evaluation studies, perform end-game statistical assessments. Incorporate reactive fragments vulnerability models.
- (\$8.330) ADVANCED SEEKER TECHNOLOGY: Continue with advanced seeker technology development effort.
- (\$0.300) ADVANCED AIR TO AIR: Initiate advanced air to air development effort. Conduct value added studies.
- (\$0.628) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2000 PLAN:

- (\$1.210) ADVANCED STRIKE WARFARE HIGH VELOCITY PENETRATOR: Complete warhead case design and evaluation. Complete fuze/S-A evaluation and selection. Complete high explosive evaluation and selection. Conduct missile system demonstration of baseline concept (300lbs payload). Initiate 750lbs payload missile application and payload integration effort.
- (\$1.200) ORDNANCE COMPONENT TECHNOLOGY: Initiate efforts on delayed functioning exploding foil initiator (EFI) and identify friend or foe circuits (S-A/TDD)
- (\$5.045) ADVANCED ORDNANCE SECTION: Down select to 2 concepts. Conduct component and systems tests. Complete draft warhead/fuze performance requirements and draft systems specifications.
- (\$1.270) ADVANCED AIR TO AIR: Define ordnance system requirements and applicable technology to satisfy these requirements. Initiate prototype design and development.
- (U) (\$16.047) ADVANCED SEEKER TECHNOLOGY: Continue with advanced seeker technology effort.

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Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E / BA4	Program Element Name & No. CONVENTIONAL MUNITIONS/0603609N	Project Name and Number. Conventional Fuze and Warhead Package (K1821/U1821)

B. Other Program Funding Summary: Not applicable.

C. Acquisition Strategy: Not applicable.

D. Schedule Profile: Not Applicable.

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Exhibit R-3 Cost Analysis		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY 1319/4	PROGRAM ELEMENT NAME AND NUMBER Conventional Munition/0603609N	Conventional Fuze and Warhead Package / K1821/U1821

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Design and Analysis	WR	NSWC/DD	28.123	4.359	11/98	.618	11/99			Continuing	Cont.	N/A
	WR	NAWC/China Lake	55.042	4.463	11/98	.830	11/99			Continuing	Cont.	N/A
	CPAF	Motorola/Raytheon	4.474	2.800	12/98	1.900	12/99			.600	9.774	9.774
	PD	Office of Special Projects	7.751	7.130	12/98	13.104	12/99			Continuing	Cont.	N/A
Hardware Fabrication & Procurement	WR	NSWC/DD	5.000	.700	11/98	.700	11/99			Continuing	Cont.	N/A
	WR	NAWC/China Lake	6.500	.800	11/98	.800	11/99			Continuing	Cont.	N/A
	CPAF	Motorola/Raytheon	.300	.200	12/98	.100	12/99				.600	.600
	PD	Office of Special Projects	1.100	1.200	12/98	3.000	12/99			Continuing	Cont.	
Subtotal Product Development			108.290	21.652		21.052						10.374
Remarks:												
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support												
Remarks:												
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Demonstration Test & Evaluation	WR	NSWC/DD	10.447	1.500	11/98	2.000	11/99			Cont.	Cont.	
	WR	NAWC China Lake	10.482	1.500	11/98	1.500	11/99			Cont.	Cont.	
Subtotal T&E			20.929	3.000		3.500						
Remarks:												
Program Management Support	WR	NSWC/DD	1.899	.075	11/98	.075	11/99			Cont.	Cont.	
	WR	NAWC China Lake	3.135	.075	11/98	.075	11/99			Cont.	Cont.	

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Exhibit R-3 Cost Analysis		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY 1319/4	PROGRAM ELEMENT NAME AND NUMBER Conventional Munition/0603609N	Conventional Fuze and Warhead Package / K1821/U1821

	FPI	TMAI		.010	11/98	.020	11/99			Cont.	Cont.	
Travel	PD	NAVSEA Travel	.200	.050	11/98	.050	11/99			Cont.	Cont.	
Labor (Research Personnel)												
Overhead												
Subtotal Management			5.234	.210		.220						
Remarks:												
Total Cost			134.453	24.862		24.772						

Remarks: