FY 2002 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: June 2001

BUDGET ACTIVITY: 2 PROGRAM ELEMENT: 0602114N
PROGRAM ELEMENT TITLE: Power Projection Applied Research
(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE
	**	**	66,322

**The Science and Technology Program Elements (PEs) were restructured in FY 2002. The work described in FY 2000 and FY 2001 were funded in PEs 0602111N, 0602122N, 0602232N, 0602233N, and 0602234N.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project addresses the technology issues involving the Navy's capability to project naval power on the broad seas and in the littoral regions. In particular the technology developed in this project will support Navy power projection requirements related to fleet defense and protection of naval assets in the littoral area, naval strike operations against critical shore targets, and support for Naval expeditionary forces ashore. The fleet defense and protection thrust includes technology development related to Air Superiority, Ship based defense, and Unmanned Air Vehicles (UAV's) which is part of the Autonomous Operations (AO) Future Naval Capabilities (FNC). The Expeditionary support work includes Naval Fire Support (NFS), Surveillance and Global Positioning System (GPS), Unmanned Ground Vehicles (UGV's) research, and Unmanned Undersea Vehicles (UUV). The Naval Strike thrust includes technology related to the Time Critical Strike (TCS) FNC, precision strike, and UAV's.

(U) Due to the number of efforts in the PE, the programs described are representative of the work included in the PE.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is budgeted within the APPLIED RESEARCH, Budget Activity because it investigates technical advances with possible applications toward solution of specific Naval problems, short of a major development effort.

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(U) PROGRAMS PLANS AND ACCOMPLISHMENTS:

(U) Fleet Defense & Air Dominance: The focus of this thrust is on those technologies that will support defense of the fleet in the littoral area and to provide for air dominance in all of the operating areas that Naval forces will operate in the future. Technology areas include: advanced Air-to-Air (A-A) missile seeker and propulsion technologies, Infrared focal plane arrays (IRFPA) for target detection, advanced warhead and fuzzes for use against high speed maneuvering threats, Radio Frequency (RF) photonics to increase bandwidth and reduce size/weight of phased array detectors, radar detection technology in clutter, and advanced Counter-Counter Measure (CCM) techniques for improved missile performance.

	FY00	FY01	FY02 $9,820
Initiate	• Network centric air dominance weapon concepts • Next Generation Dual range Air to Air (A-A) missile concept • Terminal defense concepts for Asymmetric threats	• Physics based lethality prediction for reactive warheads • 8 to 12 um transmitting fibers • Air and sea dominance Technology payoff analyses	• Air and sea dominance weapons technology development.
Continue	• All aspect A-A Radar Seeker based on surface wave missile body. • Counter-Counter Measure (CCM) techniques against Pyrophoric countermeasures. • Point target against ground clutter Infrared (IR) seeker database. • Advanced rocket propulsion technology development. Also known as Integrated High Performance Rocket Propulsion Technology (IHPRPT) program. • Advanced propellant formulation and ingredient research • Temporal sea glint clutter rejection signal processing • Short pulse laser target	• Network centric air dominance weapon • CCM techniques against Pyrophoric countermeasures. • Point target against ground clutter IR seeker database. • Advanced rocket propulsion technology development (IHPRPT). • Advanced propellant formulation and ingredient research • Short pulse laser target detection fuse • High Speed modulators, Multi-spectral IRFPAs	• Physics based lethality prediction for reactive warheads • 8-12 um transmitting fiber • CCM techniques against Pyrophoric countermeasures. • Point target against ground clutter IR seeker database. • Network-centric air dominance weapon. • Advanced rocket propulsion technology development. • Advanced propellant formulation and ingredient research • Multispectral IRFPAs

	detection fuse • Integrated aimed warhead development • Cumulative damage lethality projection. • High Speed modulators, Multi-spectral IRFPAs • Mid IR Quantum Wall (QW) and fiber lasers, photonic transmitters and receivers		
Complete	• Fixed aimed ordnance lethality assessment • Environmentally Adaptive Sensitivity Time Control for Multi-Function Radar for ship defense. • Widebandwidth RF seeker • 3 to 5 um transmitting fibers	• All aspect A-A Radar Seeker • Next Generation Dual range A-A missile • Terminal defense concepts for Asymmetric threats • Temporal Sun Glint Clutter rejection signal processing • Integrated aimed warhead development • Cumulative damage lethality prediction • Mid IR QW and fiber lasers, photonic transmitters and receivers	• Short pulse laser target detection fuse • High speed modulators • Air and sea dominance Technology payoff analyses

FY 2002 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: May 2001

BUDGET ACTIVITY: 2 PROGRAM ELEMENT: 0602114N
PROGRAM ELEMENT TITLE: Power Projection Applied Research

(U) Naval Precision Strike Operations: The focus of this thrust is on those technologies that will support Naval Precision Strike Operations and provide the Navy of the future the ability to quickly locate, target, and strike critical targets ashore. Some of the technologies employed to support the Navy strike capability include: Unmanned Air Vehicles (UAV) to locate, identify, and target critical enemy resources and weapons, rapid targeting technologies to enable rapid employment of long range precision strike weapons, smart/high speed weapons to support the attack of time critical targets, and improved explosives with energetic capabilities that will inflict greater damage against the target.

	FY00	FY01	FY02 $34,642
Initiate	• Concepts for selective effects based munitions • Develop advanced propulsion techniques for surface launched weapons • Active combustion control techniques for advanced weapons • Cook off model validation study • Navy unique propulsion concepts for UAV operations from surface fleet • UAV mission planning, monitoring control prototype • Define requirements and integrate Radiation hardened codes into database; develop modeling codes for solid propellant boost motors ignition and flight performance; develop Computational Fluid Development (CFD) software for flight performance prediction	• Weapon performance analyses to counter moving targets.	• Development of system and associated sensor processing to enable adaptation and independent actions • Development of secure jam resistant communications links and architecture for networking and multi-vehicle ops. • UAV signature management, ballistic hardening, modular payload, and hybrid-electric power preliminary development • UAV propulsion and power technology development for Navy UAV. • Selective effects weapons components • Prototype aircraft based weapon control data link

Continue	• Advanced sensor, optics, and circuit design based on insect physiology. • Phased array radio frequency (RF) seeker antenna based on Micro Electrical Mechanical Systems (MEMS) phase shifters • Automatic weaponeering tool for real time strike ops • Configurable Automatic Target Recognition (ATR) and Target recognition prediction algorithm for Laser Radar terminal homing seeker • Advanced database structure for precision guided munitions • High Energy Density Materials (HEDM) weaponization • Survivable Explosive penetration • High speed weapon system integration, airframe design, advanced control system research, ordnance investigation, and heat transfer technology investigation.	• Coordination with other agencies in the development of joint UAV Technology Goals and leveraging of technology investments • Concepts for selective effects based munitions • Develop advanced propulsion techniques for surface launched weapons • Active combustion control techniques for advanced weapons • Navy unique propulsion concepts for UAV operations from surface fleet • UAV mission planning, monitoring control prototype • Advanced sensor, optics, and circuit design based on insect physiology. • Phased array RF seeker antenna based on MEMS phase shifters • Automatic weaponeering tool for real time strike ops • Configurable ATR and Target recognition prediction algorithm for Laser Radar terminal homing seeker • High Energy Density Materials weaponization • Survivable Explosive penetration • High speed weapon system integration, airframe design,	• Coordination with other agencies in the development of joint UAV Technology Goals and leveraging of technology investments • Develop advanced propulsion techniques for surface launched weapons • Active combustion control techniques for advanced weapons • Navy unique propulsion concepts for UAV operations from surface fleet • Advanced sensor, optics, and circuit design based on insect physiology. • Phased array RF seeker antenna based on MEMS phase shifters • Configurable ATR and Target recognition prediction algorithm for Laser Radar terminal homing seeker • High speed weapon system integration, airframe design, advanced control system research, ordnance investigation, and heat transfer technology investigation. • High Energy Density Materials weaponization • Survivable Explosive penetration • UAV mission planning, monitoring control prototype • Define requirements and integrate radiation hardened codes into database; develop modeling codes

		advanced control system research, ordnance investigation, and heat transfer technology investigation. • Define requirements and integrate Radiation hardened codes into database; develop modeling codes for solid propellant boost motors ignition and flight performance; develop CFD software for flight performance prediction	for solid propellant boost motors ignition and flight performance; develop CFD software for flight performance prediction High speed multimode ordnance
Complete	• Define UAV Autonomous operations program plan leveraging technologies from industry, government and academia. • Target recognition image processing for Laser Radar seeker • RF seeker clutter resistant Target Detection Device (TDD) • Mission responsive ordnance (MRO) concepts analysis • Counter flow Thrust Vector control (TVC)	• Advanced database structure for precision guided munitions • Cook off model validation study	• Concepts for selective effects based munitions • **Automatic weaponeering tool for real time strike ops**

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(U) Support for Naval Expeditionary forces ashore: This focus of this thrust is on those technologies that will support Expeditionary operations of marines operating in the littoral areas. Some of the technologies developed in this thrust include: advanced gun launched seekers and propulsion techniques that will provide more accurate Naval Fire Support (NFS) at longer ranges, micro UAV and Unmanned Ground Vehicles (UGV) development to provide improved surveillance/targeting support to marines on the ground, and improved explosive formulations that will greater lethality against NFS type targets.

	FY00	FY01	FY02 $21,860
Initiate	• Develop advanced propulsion techniques for surface launched weapons • Tactical Micro UAV for battlefield surveillance	• Mission responsive warhead for advanced gun system	• Initiate multi-vehicle undersea search and survey and communication link development • Unmanned Ground Vehicles (UGVs) signature management, ballistic hardening, mobility and payload modularity development • Development of Enhanced Targeting and Locating System (ETALS) targeting gyro mechanism
Continue	• Signal processing to provide protection from Global Positioning System (GPS) jamming • Real time tactical target location and coordinate extraction • Gun launched low cost seeker • Energetic gun propulsion technologies • Precise projectile guidance • Automated image and video analysis for tactical UAVs • Micro UAV Flight control development for autonomous	• Signal processing to provide protection from GPS jamming • Energetic gun propulsion technologies • Precise projectile guidance • Real-time tactical target location and coordinate extraction • Automated image and video analysis for tactical UAVs • Micro UAV Flight control development for autonomous operations • Development of UUV technologies for autonomy, ISR	• Signal processing to provide protection from GPS jamming • Real time tactical target location and coordinate extraction • Energetic gun propulsion technologies • Precise projectile guidance • Automated image and video analysis for tactical UAVs • Micro UAV Flight control development for autonomous operations • Development of UUV technologies for autonomy, ISR sensors, and

	operations • Development of Unmanned Underwater Vehicle (UUV) technologies for autonomy, Intelligence Surveillance and Reconnaissance (ISR) sensors, and data fusion. • Research into UUV technologies for group and network behavior, Vehicle communications, standard communication and navigation protocols for UUVs.	sensors, and data fusion. • Research into UUV technologies for group and network behavior, Vehicle communications, standard communication and navigation protocols for UUVs.	data fusion. • Research into UUV technologies for group and network behavior, Vehicle communications, standard communication and navigation protocols for UUVs.
Complete	• Advanced gun launched rocket propellant • Variable output explosive • Explosive response modeling • Gun launched rocket propulsion technologies • Aircraft launched expendable Micro UAV	• Gun launched low cost seeker • Advanced propulsion techniques for surface launched weapons • Tactical Micro UAV for battlefield surveillance.	

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(U) PROGRAM CHANGE SUMMARY:

	FY 2000	FY 2001	FY 2002
FY 2001 President's Budget			0
Adjustments from FY 2001 President's Budget:			
Program Restructure			66,527
Minor Program Adjustment			-82
Non-Pay Inflation			+81
NWCF Adjustment			-204
FY 2002 President's Submission	**	**	66,322

**The Science and Technology Program Elements (PEs) were restructured in FY 2002. The work described in FY 2000 and FY 2001 were funded in PEs 0602111N, 0602122N, 0602232N, 0602233N, and 0602234N.
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(U) CHANGE SUMMARY EXPLANATION:
(U) Funding: FY02: Not Applicable.
(U) Schedule: Not Applicable.

(U) OTHER PROGRAM FUNDING SUMMARY: The Navy’s 6.1 program contributes to this effort.
(U) RELATED RDT&E: This P.E. adheres to Defense S&T Reliance agreements with oversight provided by the JDL.
(U) PE 0602203F (Aerospace Propulsion)
(U) PE 0602302F (Rocket Propulsion and Astronautics Technology)
(U) PE 0602303A (Missile Technology)
(U) PE 0602601F (Advanced Weapons)
(U) PE 0602602F (Conventional Munitions)
(U) PE 0602618A (Ballistics Technology)
(U) PE 0602624A (Weapons and Munitions Technology)
(U) PE 0603004A (Weapons and Munitions Advanced Technology)
(U) PE 0603216F (Aerospace Propulsion and Power Technology)
(U) PE 0603790D (NATO Research and Development)
(U) This is in accordance with the ongoing Reliance joint planning processes.
(U) NAVY RELATED RDT&E:
(U) PE 0601152N (In-house Independent Lab Research)
(U) PE 0601153N (Defense Research Sciences)
(U) PE 0602123N (Force Protection Applied Research)
(U) PE 0602235N (Common Picture Applied Research)
(U) PE 0602131M (Marine Corps Landing Force Technology)

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(U) PE 0603114N (Power Projection Advanced Technology)
(U) PE 0603640M (Marine Corps Advanced Technology Demonstration)
(U) NON NAVY RELATED RDT&E:
(U) PE 0603763E (Marine Technology)
(U) PE 0603739E (Advanced Electronics Technologies)
(U) PE 0602702E (Tactical Technology)
(U) PE 0602173C (Support Technologies – Applied Research)

(U) SCHEDULE PROFILE: Not applicable.