



## DEPARTMENT OF THE NAVY

NAVAL SEA SYSTEMS COMMAND  
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IN REPLY REFER TO  
NAVSEAINST 5400.101  
Ser SEA 06/058  
21 July 2004

### NAVSEA INSTRUCTION 5400.101

From: Commander, Naval Sea Systems Command

Subj: DIRECTED ENERGY AND ELECTRIC WEAPONS PROGRAM OFFICE  
(PMS 405) CHARTER

Ref: (a) NAVSEA NOTICE 5400, Ser 09B/240, Subj: ESTABLISHMENT OF  
THE NAVY DIRECTED ENERGY WEAPONS PROGRAM OFFICE (PMS  
405), dated 4 Jan 02  
(b) NAVSEAINST 5400.1F, "Organizational Manual for NAVSEA  
Headquarters"

Encl: (1) Charter for the Directed Energy and Electric Weapons  
Program Office (PMS 405)

1. Purpose. To issue the charter for the Directed Energy and  
Electric Weapons Program Office (PMS 405).

#### 2. Discussion

a. The Naval Directed Energy and Electric Weapons Program  
Office (PMS 405) was re-established by the Chief of Naval  
Operations in 2002 to manage Directed Energy and Electric Weapons  
research, development, integration, and acquisition in the U. S.  
Navy. PMS 405 is the single Point of Contact (POC) for matters  
related to Directed Energy and Electric Weapons development and  
acquisition initiation for the Navy and for those matters being  
coordinated with other Federal agencies and military services.

b. The following programs, projects, efforts are currently  
being pursued by PMS 405:

- High Energy Laser (HEL)
  - Solid State Laser (SSL)
  - Free Electron Laser (FEL)
- Electromagnetic Launch (EML) Rail Gun
- High Power Microwave (HPM)
  - Non-Lethal Capabilities
  - Active Denial System (ADS)
  - Laser Guided Energy (LGE)
- Other Systems
  - Maritime Directed Energy Test Center (MDETC)
  - Maritime Domain Identification System (MDIS)
  - Other Classified Programs

3. Authority. Reference (a) authorized establishment of the Directed Energy and Electric Weapons Program Office PMS 405 as part of the Warfare Systems Engineering Directorate NAVSEA 06.

4. Action

a. PMS 405 is assigned management of Directed Energy and Electric Weapons research, development, integration, and acquisition for the U. S. Navy.

5. Certification. Enclosure (1) satisfies the chartering requirements of reference (b).



A. B. HICKS

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Distribution: (1 copy)

SNDL E3A NRL WASHINGTON DC  
C84 COMNAVSEASYS COM Shore Based Detachments (less C84J)  
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A1J1L PEO IWS  
A1J1M PEO LMW  
A1J1N PEO SUB  
A1J1P PEO SHIPS  
A1J1Q PEO CARRIERS  
NAVSEA All Hands

**CHARTER**  
FOR THE  
DIRECTED ENERGY AND ELECTRIC WEAPONS PROGRAM OFFICE  
PMS 405

Encl: (1) Primary Organizational Relationships  
(2) Program Management Organization

1. Purpose. This document covers the background, scope, authorities and responsibilities, and operating relationships for the Directed Energy and Electric Weapons Program Office.

2. Background

a. The objective of the United States Navy's Directed Energy and Electric Weapons Program is to develop and deploy weapon systems spanning the lethality spectrum that will protect U.S. interests. These systems will embody defensive capability in air, surface and subsurface platforms against a variety of threats including small boats, surface mines; high-speed, rapidly-maneuvering, sea-skimming cruise missiles, anti-air missiles; and exo-atmospheric threats such theater ballistic missiles. Today's dynamic battle-space requires enormous flexibility to engage a wide variety of targets across the full lethality range. In the Joint Mission Need Statement, "Family of Non-Lethal Capabilities Mission Need Statement (MNS)" of 18 October 2002, the Navy was challenged to develop "non-lethal capabilities for counter-personnel, counter-material and counter-capability". As a result of the growing Navy role in Missile Defense, new naval missions are emerging that require broad, measured, and flexible responses. Systems such as high energy lasers, high-power microwave, and other electrically powered weapons can deliver the necessary response effectively, safely, and in a cost efficient manner.

b. As early as the 1960's, the Department of Defense investigated the utility of laser technology. Initial activities focused on expanding these capabilities by increasing laser power and by applying beam directors. Throughout the development period, laser side-on illumination was demonstrated in the successful engagements of crossing targets in such tests as the Unified Navy Field Test Program (UNFTP), Airborne Laser Laboratory (ALL), SEALITE, and THEL.

c. It has long been known that by radiating digital electronics with microwave energy, one can disrupt their operation. At sufficiently high power densities, this disruption

Enclosure (1)

can result in temporary or permanent failure of electronic components. All the military services have investigated the utility of High Power Microwave (HPM) in both offensive and defensive roles. To effect significant damage using extremely high power, ultra-wide band radiation does not require prior knowledge of a system's susceptibility to particular frequencies. Additionally, lower power narrow-band electromagnetic radiation, specifically designed to operate at frequencies where the victim system is designed to receive, has also been exploited. Most recently, there has been interest in the using of HPM for non-lethal defense against personnel since short exposures to certain HPM frequencies can cause a rapid repelling response in persons without inflicting permanent injury. Recent advances in HPM source technology have made HPM weapons a reality for both friendly and enemy forces on today's battlefield.

d. Electromagnetically driven kinetic energy projectiles were first suggested in the 19<sup>th</sup> Century. However, this suggestion has only recently been made possible through technological advances. At velocities of a few kilometers per second, the kinetic energy of these projectiles far exceeds that of one driven by chemical propellant. These high velocity projectiles can be used both for indirect fire missions while supporting troops at great distances inland and for direct fire to dramatically reduce the "fly-out" time for the ship point-defense mission. Furthermore, electromagnetically driven weapons avoid the need to store potentially dangerous chemical explosive propellants onboard Navy warships, saving both space and weight, and reducing operational risk. Technical challenges remain in terms of barrel life and projectile design, but these issues are believed to be readily solvable given adequate funding.

e. Navy interest in directed energy and electric weapon systems was recently rekindled by world events; advances in electrically driven lasers, high power microwave sources, and electromagnetic gun technologies; and the pursuit of the electric drive ship concept. Navy interest has expanded from use against low flying, maneuvering subsonic threats to a full capability against supersonic, highly maneuverable anti-ship cruise missiles and ballistic missiles. The Navy is evaluating laser and high power microwave system effectiveness against asymmetric, low technology threats for which the directed energy weapon can provide a rapid response and deep magazine. Such targets include several potential terrorist threats such as small anti-armor missiles launched from land or watercraft, swarms of Jet Skis, small planes, UAVS, hang gliders, artillery or explosive laden craft. The Electromagnetic Launch (EML) Rail Gun will expand

the role of Naval gunfire support pushing the effective range to 250nm and beyond, and demonstrating a significant capability against hardened targets and armored vehicles.

f. Naval forces must be capable of sustained offensive and defensive actions against multi-dimensional threats while conducting sea control, assured access, power projection, or peacetime naval presence missions at sea, during harbor transits, at anchor, and when moored. Naval forces must be able to defend themselves with little or no warning, and have the capability of negating a massed, or multi-axis, highly maneuverable threat while minimizing or eliminating the potential for indiscriminate collateral damage. In addition, cruise missiles are increasing in sophistication and other threats are emerging that need to be countered by a "no minimum range" weapon system that features variable lethality, e.g., Ballistic Missile. The Directed Energy and Electric Weapons Program Office is the Navy's lead activity for developing and deploying such weaponry.

### 3. System Status

a. Future Naval Directed Energy and Electric Weapons are based on transformational technologies that complement the Electric Warship Development Program. The Naval transformation roadmap views transformation as a sustained, iterative and dynamic process that: develops and integrates new concepts, processes, technologies, and organizational designs; rebalances capabilities and forces; and seeks to ensure a "substantial margin of advantage" over potential enemies, while minimizing the chance for and consequence of, surprise. Transformation is not a definitive or unchanging blueprint; nor is it a silver bullet; something done to the force all at once. It is not accomplished in a short period of time nor is it just about systems or platforms. In this context, Directed Energy and Electric Weapons will slowly change the weaponry culture until it provides an enhanced self-defense and precision engagement capability that minimizes collateral damage. Directed Energy and Electric Weapons complement Sea Shield missile/point defense through the use of lasers and High Power Microwaves; Sea Strike by providing Time Sensitive Strike using the electro-magnetic gun; and Sea Basing enhanced Sea-borne Positioning of Joint assets by providing a 250 nautical mile (nm) capable electromagnetic launch rail gun. Based on the successes of our 2.1kW CW IR operation at Thomas Jefferson National Laboratory, the major upgrade to a 10-kW device underway, and further extension of the device to 100kW, the Free Electron Laser (FEL) must be considered a serious option for military directed energy weapon applications.

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4. Scope. The scope of PMS 405 programs includes the technology development, system design and engineering, testing and validation, and pre-production system development.

a. Primary PMS 405 efforts are directed towards High Energy Laser (HEL), Electromagnetic Launch (EML) Rail Gun, and High Power Microwave (HPM) weapon systems.

5. Roles and Responsibilities

a. PMS 405 is responsible for maintaining government programmatic and technical expertise in: a) high energy lasers; b) rail gun technology, i.e., electromagnetic launch rail gun; c) high power microwave devices (both narrow-band and ultra-wide band); and d) charged particle beams. PMS 405 has been further assigned to consolidate and focus the Navy's directed energy and electric weapons science and technology, and research and developments initiatives. This will be achieved through close coordination with Navy laboratories, federal research centers, academia, industry and other military organizations and our international coalition partners in evaluating proposed Directed Energy and Electric Weapons technologies, weapons, and related weapon systems for potential ship, aircraft, or submarine integration. Further PMS 405 is charged by the Navy with developing, maintaining, and executing directed energy weapons short and long range plans and roadmaps, and maintaining close coordination with the Naval Surface, Air, and Submarine communities; the Marine Corps; other services and agencies engaged in directed energy and electric weapon developments, requirements, and plans.

b. As the Program Manager for Directed Energy and Electric Weapons, PMS 405 shall:

(1) demonstrate the next generation of shipboard weapons and their components including: hypervelocity projectiles, particle beam weapons, high power microwave weapons, and high energy lasers;

(2) develop High Power Microwave (HPM) systems offering non-lethal repel capability, deterrent effects beyond the range of small arms fire, support in multiple track engagements and, continuous, pulsed, or swept modes of operation of the HPM system;

(3) establish contracts with Navy/industry/federal/university research facilities for directed energy weapon system engineering, construction of prototypes, and operational weaponry;

Enclosure (1)

(4) identify, manage, and monitor status of funds assigned for the execution of the Directed Energy and Electric Weapons Programs and the status of funds assigned separately to other organizations, agencies, and military services in support of Directed Energy and Electric Weapons activity in conjunction with designated authorities (OLA, SEA OOD) and support these offices by providing information to satisfy Congressional inquiries to Navy;

(5) serve as the central point of contact for the Fleet and other operational forces in all matters pertaining to Directed Energy and Electric Weapons programs;

(6) author and sign agreements with CNO sponsors, the Director of Cost and Operational Effectiveness Analysis (COEA), and other appropriate authorities to coordinate activities and establish mutual support;

(7) establish agreements and Memoranda of Understanding (MOUs) in support of Directed Energy and Electric Weapons technology advancements, provide and ensure centralized (PMS 405) and coordinated technical/management decisions by those internal Navy and external (Army, USAF, DOE);

(8) develop, coordinate, select, and manage engineering and acquisition plans for Directed Energy and Electric Weapon system experiments, range testing, alternative design concepts, pertinent components, safety of operation;

(9) coordinate with the Office of Naval Research (ONR) to expedite the transition of promising 6.2 and 6.3 projects by "maturing" the Directed Energy and Electric Weapons technologies and preparing the applicable project to successfully meet an Acquisition Milestone B.

c. As part of the "maturation process", PMS 405 will assemble a project team from core PMS 405 staff and field engineering activities. Approximately 6-12 months prior to the Milestone B Acquisition Review Board (ARB) decision, PMS 405 will have assigned, on a temporary basis, personnel from the appropriate organization(s) to successfully achieve a Milestone B decision. Subsequently, the staff temporarily assigned to PMS 405 will return with the project to their respective organizations. On delivery, the designated Program Office will assume acquisition management responsibility for the project.

- Coordinate with DARPA in support of high risk/high payoff projects
- Identify and pursue technologies in the commercial and foreign markets
- Maintain liaison with laboratories, industry and academia and exploit opportunities for collaboration and sharing of research and development efforts
- Participate with ONR in the Future Naval Capabilities Process
- Maintain close liaison with the staff of OSD A,T&I for the coordination of joint research and development opportunities with the other services.

6. Relationship to Chartering Authority. Enclosure (1) shows the primary organizational structure of PMS 405. Specifically:

a. PMS 405 reports organizationally to SEA 06. The Program Manager (PM), as directed by SEA 06, has full authority and responsibility for the overall management of each assigned program and is accountable to SEA 06 for the program's successful execution.

b. Military and Civilian Performance Monitoring Responsibilities. The PM shall prepare and sign fitness reports for all military personnel assigned full-time to the project office and execute performance ratings for civilian personnel assigned full-time to that office. He shall submit, at his discretion, concurrent fitness reports (or evaluations, as appropriate) on other officers (junior to him) and on other civilian employees working for him in matrix management under the authority of this charter.

#### 7. Operating Relationships

a. General. The PM will ensure that all necessary organizational interfaces, and related support requirements are identified and established, including agreements with program managers and functional organizations within and outside SEA 06.

b. Naval Sea Systems Command (NAVSEA). As the host Systems Command, NAVSEA will provide command leadership.

c. Other Organizational Components (i.e., Naval Systems Commands and their Shore Activities). The program will be supported by the various components of the Navy Warfare Centers,

and by the acquisition and logistics communities. Details of support arrangements will be documented in Statements of Work and written agreements between the PM and the respective organizations. Terms of agreement will be summarized in program planning documents.

d. Navy International Program Office (NIPO). International inquiries and exchanges of information for Directed Energy and Electric Weapons will be coordinated through the NIPO. The PM of Directed Energy and Electric Weapon systems will serve as the point of contact and technical expert for matters related to assigned programs, and make recommendations regarding the sharing of technical information and authority to execute foreign military sales.

e. Defense Contract Management Agency (DCMA). PMS 405 will establish a working relationship with DCMA for monitoring contractor adherence to contract requirements, including effective processes and procedures for performing contracted efforts.

f. Naval Security Group Command (NSG) and Office of Naval Intelligence (ONI). PMS 405 will coordinate with appropriate security agencies and commands to ensure efficient interface and integration of intelligence community requirements with on-board tactical equipment. NSG will be tasked to provide a Vulnerability Assessment (VA) and ONI will provide a separate Threat Assessment (TA).

8. Limitations of Authority. Limitations upon the Project Manager's delegated authority are in SECNAV Inst. 5000.2B.

#### 9. Staffing and Spaces

a. The Naval Directed Energy and Electric Weapons Program Office staffing and organization is shown in Enclosure (2).

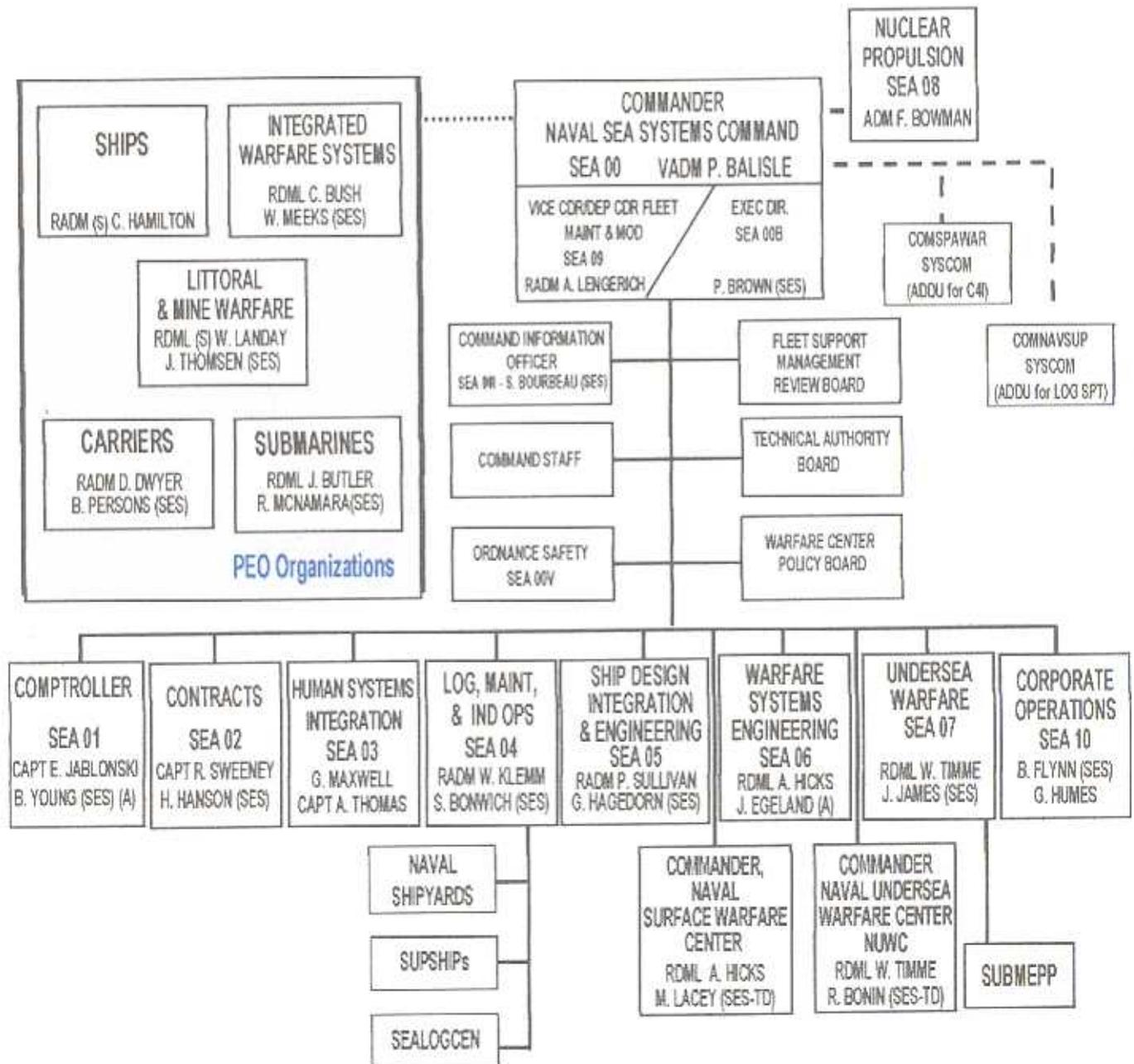
b. Initial staffing and spaces for the PMS 405 Program Office will be provided by SEA 06. As program planning and further staffing requirements evolve, the Program Manager will prepare and submit through SEA 06 periodically revised staffing requirements for the expected life of the program. Allocation for additional payroll authority will follow established procedures, given funding constraints and command priorities.

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10. Charter Review. This Charter will be reviewed annually to determine currency and if it has achieved its objectives. If the review indicates that the objectives have been or are about to be completed, a transition plan will be prepared to ensure the efficient transfer of resources and responsibilities. If the review indicates that the mission has changed or that an imbalance in resources has evolved, a plan will be developed and executed to bring these resources and the organization into alignment with the current mission of the Program Office. Should the review indicate significant out-of-date information exists, a change transmittal or revision will be issued immediately.



# Naval Sea Systems Command Leadership



20 April 2004

ENCLOSURE 1

PMS 405 Organization

