Combat Power and Energy Systems Overarching Integrated Product Team (CPES OIPT) Charter

Signature _____

Date 2/18/15

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Program Executive Officer Ships

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Date 2/4/15

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Combat Power and Energy Systems (CPES) Overarching Integrated Product Team (OIPT) Charter

PURPOSE

Power and energy are limited resources that must be managed and may need to be directed to meet specific warfighting missions instead of accomplishing all missions simultaneously.

This charter establishes the Combat Power and Energy Systems (CPES) Overarching Integrated Product Team (OIPT) mission, products and reporting relationships. The CPES OIPT provides streamlined stakeholder communication and actionable recommendations to COMNAVSEA through the Electric Ships Office Executive Steering Group (ESG) regarding common, affordable, technically viable electric power system solutions that integrate with and support advanced high energy mission systems for all surface ships.

The purpose of the OIPT is two-fold:

1. Today's Navy and Tomorrow's Navy: Provide a path to ship integration for high power/energy weapons and sensors for both existing and future ships by coordinating efforts and resources
2. Navy After Next: Provide a path for identification, development and demonstration of technologies leading to a fully integrated power and energy system (IPES)

Both items above are required to support a flexible and complete strategy for providing shipboard power for current and future high energy weapons and sensor mission systems.

BACKGROUND

The Naval Power System Technology Development Roadmap, signed by COMNAVSEA in early 2013, concludes that future high energy weapons and sensors require electrical energy storage to operate effectively and to mitigate the negative effects on other ship systems. Without a focused effort to develop common solutions for similar issues, each high energy mission system will develop unique approaches, resulting in adverse size, weight, cost, complexity, and maintenance impacts to the integrated ship platform and its overall performance. The CPES OIPT will recommend common approaches to this near term challenge.

An integrated power and energy system (IPES) is focused on future ship designs. The latest US Navy Shipbuilding Plan states that in 2030 the Navy intends to procure a future surface combatant to meet the anticipated threat environment. Significant technical challenges exist in providing adequate power and energy to meet mission needs at the density required to meet the displacement goals. Technology advances in electrical systems may be required to field an integrated power and energy system for this future warship, but many of the required technology products are not yet completely mature. The current state-of-the-art for IPES components and sub-systems does not achieve the required power and density goals. In

addition, the power system would have to be validated for operation with mission loads and integrated with advanced control systems and thermal management systems.

This OIPT was established by the ESG to streamline and focus ship integration efforts for high power and energy mission systems as well as fully integrated power and energy systems for future ships, develop an integrated vision, share lessons learned, seek common solutions, leverage investments, and coordinate schedules and resources for seamless ship integration.

The CPES OIPT is co-chaired by PEO Ships and SEA 05, and the membership consists of senior representatives across the requirements, acquisition, engineering and S&T communities. Members are noted in Enclosure (1). The CPES OIPT was established by the Electric Ships Office Executive Steering Group (ESG). PMS 320 serves as the CPES OIPT Secretary.

VISION

The unified vision of the CPES OIPT is to articulate technical architectures and interfaces for integrated power and energy systems for surface ships and to foster development of shared ship to mission load interface requirements by identifying electrical, thermal, and other commonality opportunities for near-term and future high energy, high power weapons and sensors. This will enable sharing single ship resources, ensure cross platform common solutions and support recommending common requirements to achieve this commonality across platforms.

MISSION

The CPES OIPT coordinates, facilitates, and endorses potential common solutions to enable shared ship system utilization to support advanced mission systems. This OIPT incorporates senior stakeholders from the three interrelated processes required to provide force structure (requirements, planning/budgeting, and acquisition), the SYSCOM community that provides technical authority, and the S&T community that develops technologies to enable future capabilities. For future mission systems, affordable CPES require stakeholder collaboration to achieve capability and affordability goals. These solutions require compromise, global optimization instead of specific system sub-optimization, and a new unified vision. The CPES OIPT has visibility across the Enterprise, and through prioritization, coordination, and oversight provided by the ESG, enables the efficient and timely implementation of high power weapons and sensors.

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SCOPE

The scope of the CPES OIPT includes ship integration efforts such as potential power, energy, control, cooling, and other ship system requirements necessary to introduce the following ship and mission systems:

1. Lasers, especially SSL-TM
2. Electro Magnetic Railgun (EMRG)
3. Future radar systems
4. SEWIP, Block III
5. Other evolving weapons and sensors
6. Integrated Power and Energy Systems for future ships (IPES)

REPORTING RELATIONSHIPS

The CPES OIPT was established by the Electric Ships Office ESG. The CPES OIPT regularly reports to the ESG, highlighting progress and presenting issues to be addressed (and potentially resolved) by the ESG. The CPES OIPT uses a subordinate Steering Group for day-to-day leadership, direction, tasking, etc. OIPT and Steering Group members are noted in enclosure (1). A group of Working IPTs (WIPTs) provide detailed coordination of OIPT products and recommendations. The list of WIPTs is in enclosure (1); WIPTs may be added or removed as appropriate to support the workload. A Program Manager and Technical Director support the Steering Group and provide real-time coordination and guidance to the WIPTs, coordinating with WIPT Leads to ensure compatibility and consistency across WIPTs.

PRODUCTS

The CPES OIPT scope includes ship power, energy and support system technical architectures. These architectures will serve as guidelines for interfaces, roadmaps, and technology gap evaluations. Key items for the OIPT to consider as potential products include:

- Technology Product Maturity: estimating the Technology Readiness Level (TRL) of proposed technologies for use in power, energy and support system architectures and concepts.
- Land Based Testing/Full Scale Advanced Development: development of a land based facility to demonstrate technologies, enable integration at various levels, and support technology development, testing and down select.
- Technology Product Dependencies: identification and management of key dependencies, such as the development of required advanced system controls.

- Advanced Analyses and Design Tools: identification additional tools required, coordination with ongoing advanced tool development, and notional implementation plans.

Specific products anticipated to be developed by the CPES OIPT include:

1. Develop and present consolidated and prioritized requirements for modifications and potential upgrades to electric power and other ship systems to address gaps found between current shipboard electrical systems and planned mission system upgrades.
2. A set of standard ship interfaces based on planned shipboard requirements for the advanced sensors and weapons noted above.
3. Control system requirements to enable the distribution of electrical power (with sufficient quality of service) where and when it is needed, especially in support of advanced mission systems as well as installed ship systems. The latest NAVSEA requirements for Cyber Security should be incorporated in the design of the control system.
4. The CPES OIPT products will inform the Naval Power Systems Technology Development Roadmap (NPS TDR) and provide budget granularity to the NPS TDR for the planned transition of technologies into various ship classes.

FUNDING

There is no additional funding designated for the CPES OIPT unless requested and approved by the ESG and provided by an appropriate sponsor.

CHARTER REVIEW

This charter will be reviewed in 18 months by the ESG.

Enclosure 1. OIPT Members, Steering Group Members, and WIPTs

CPES OIPT Members	CPES OIPT Ad Hoc Members
PEO Ships and SEA 05 (co-chairs)	PEO Carriers
PEO IWS	PEO LCS
DASN RDT&E	PEO Submarines
OPNAV N45, N95, N96, N98	NSWC (CD, DD, NAVSSES)
CNR	SEA 01
SEA 08	SEA 02
PEO C4I	SEA 06
Secretary: PMS 320	

CPES OIPT Steering Group
SEA 05Z, SEA 05H, SEA 05D, SEA 05T
PEO IWS C
OPNAV N95, N96, N98 representatives
PEO Ships S&T/PEO LCS S&T
ONR 33/ONR 35
PMS 320

CPES OIPT Working IPTs (WIPTs)
Requirements and CONOPS
Mission System "Load" Characterization
Power Systems Technical Architecture
Ship Systems Engineering and Platform Integration
Design Tools
Business Operations and Costing