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**Joint Test and Evaluation (JT&E) Nomination
for Fiscal Year (FY) 2013**

**Joint Protection of High-Value Units during Maritime Escort
(J-PHUME)**

7 December 2012

Lead Sponsor: US Naval Submarine Warfare Center
Operational Endorsers: USNORTHCOM, USPACOM
Joint Test Product Transition Lead: US Navy/N3

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2. Problem Background and Explanation

Maritime threats to America's national and economic security and military/defense posture are broad and diverse. As outlined in the President's 2005 *National Strategy for Maritime Security* and the US Coast Guard's 2007 *Strategy for Maritime Safety, Security, and Stewardship*, these threats and challenges are neither bi-polar nor symmetric and require innovative and far-reaching solutions. In the broadest sense, this is a Joint, inter-agency and national need that must be addressed in a comprehensive manner, well before the first weapon detonates in a vital harbor.

The nation's economy and all US Armed Services depend upon the unfettered movement of warships, naval logistics and auxiliary ships, and commercial vessels in peacetime, crisis and conflict. It is not even necessary to *sink* a logistics replenishment ship to stop overseas ground forces from being able to execute their mission; simply preventing maritime access can work just as well because a terrorist can stop multiple assets via this approach. Also, recent classified assessments of a terrorist underwater IED attack against four oil ports on the US Gulf and West Coasts indicate that the direct and indirect economic impacts on America's economy would approach \$800 billion.

2.a The Nature and Origin of the Problem

Since the October 2000 attack on the USS COLE in Yemen, US military attention and analysis have focused almost entirely on defeating the surface threat from small surface craft loaded with high explosives within the context of Anti-Terrorism/Force Protection (AT/FP) operations. And, within CONUS, the Navy and Coast Guard have collaborated on providing a protective escort for High-Value Units (HVUs).

However, the asymmetric underwater threat is not addressed by such escort procedures and not until very recently has the threat been addressed at all. Analysis, war games and exercises have been conducted recently; but, while focused on the underwater dimension of the threat, they have been disjointed and uncoordinated. Al Qaeda is the principal focus of US concern about international terrorism. The organization has explicitly defined its ideological and operational agenda against the US military, and it undoubtedly understands the vital role of international sea lanes.

In early 2002, Moroccan security forces arrested three Saudi Arabian citizens after they attempted to buy rigid-hull/ inflatable boats with some \$10,000 USD in their pockets. Admitting Al Qaeda connections, the three said their mission was to use speedboats packed with explosives to attack US and Royal Navy warships transiting the Strait of Gibraltar. This, along with the sinking of the Sri Lankan naval logistics vessel INVINCIBLE by suicide of an underwater combat swimmer (May 2008), underscores the global dimensions of the terrorist threat to US government ships.

The potential of attacks akin to the COLE dramatically emphasizes US adversaries' understanding of the challenges they can pose to the good order and security of the maritime domain. The US Navy has been singled out for special attention, evidenced by attacks on

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several warships, such as the suicide attack against the coastal patrol boat FIREBOLT in the Northern Arabian Gulf in April 2004 and the Katyusha rocket attacks against the amphibious assault ship KEARSARGE and tank landing ship ASHLAND in Aqaba, Jordan in August 2005. Al Qaeda has also directly targeted the worldwide Maritime Transportation System (MTS). The attack off the coast of Yemen on the French-registered tanker LIMBURG, loaded with some 400,000 barrels of crude oil, underscores the threat. Using only a small boat packed with explosives, Al Qaeda managed to rip a large hole in the double-steel hull, causing more than 90,000 barrels of oil to spill into the Gulf of Aden.

The range of credible underwater weapons available to terrorists, and capable of being deployed from a variety of platforms, is significant. They include: limpet mines, underwater improvised explosive devices (U-IEDs), special attack charges, traditional naval bottom and moored/floating buoyant mines, and non-kinetic devices capable of disabling vessel propulsion and steering capability.

2.b What Inhibits The Warfighter From Accomplishing the Mission

US commanders responsible for naval and maritime security must have at their disposal a range of capabilities to defeat threats to vulnerable HVUs transiting key ports, waterways and chokepoints—a multidimensional vulnerability that is not adequately addressed in current Joint, Navy, or Coast Guard TTPs. Capability has been developed to escort and protect vessels from surface attack by explosive-packed small boats and weapons fired from approaching surface vessels. However, capability for detection and deterrence of an asymmetric attack from underwater has not been developed, except for some specific anti-swimmer systems. The primary limitation has been failure to allocate resources to put in place existing systems and to develop procedures to detect and deter underwater threats.

There are guidance documents that exist at the Joint (Join Publication 3-07.2, “Joint Tactics, Techniques and Procedures for Anti-Terrorism”), Department of Defense (DODD 2000.12), Navy and Coast Guard levels that address anti-terrorism and security issues in CONUS and overseas, as well as the threat of surface attacks. The Coast Guard has even begun development of TTPs addressing specifically surface/subsurface swimmer threats within designated security zones. However, not one of these documents focuses on underwater threats, nor have Joint or Inter-Agency activities included efforts focused on development of procedures for coordinated surface/subsurface search, detection, and deterrence.

The Security and Accountability for Every Port Act (SAFE Port Act) (2006) put in place requirements to strengthen and extend port security. In October 2007 the GAO concluded, “Federal...agencies face resource constraints and other challenges trying to meet the SAFE Port Act’s requirements to expand these activities. For example, the Coast Guard faces budget constraints in trying to expand its current command centers and include other agencies at the centers.” Of note, the SAFE Act is silent on underwater threats. Further, the scale of security protection effort required is beyond the capability of the Coast Guard, as Dana Goward, the USCG Maritime Domain Awareness Director, noted in July 2008: “The Coast Guard cannot maintain port security alone because the USCG forces available for the job are small in comparison to the challenge. The entire uniformed component of the US

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Coast Guard can fit into Nationals Park [baseball stadium] and still have extra seating for people who want to see the ballgame. We are a relatively small and widely scattered organization.”

2.c Address for Whom This a Problem

The safe transit of strategic military significant vessels is a critical facet of the US military strength and power projection. Indeed, this is a problem for every Joint Combatant Commander and Maritime Operational Centers (MOC) personnel. The vessels requiring protection include:

- Militarily significant warships
- Navy/Maritime Administration sealift and Navy/Army prepositioned vessels, as well as commercial vessels under US Transportation Command/Military Sealift
- Command (USTRANSCOM/MSC) charter
- Humanitarian-response ships (e.g., the Navy’s hospital ships), and
- High-value commercial shipping

The lack of underwater threat detection systems, absence of identification, response, and engagement systems, and non-existent TTPs compromise the safe transit of any and all HVUs. Beyond the four DOD Armed Services and the fifth Armed Service, the Coast Guard in DHS, many other inter-agency departments and activities rely on a secure maritime sealift and power projection. The SAFE Act and other public Law require cooperation among these agencies, and among a broad array of law enforcement agencies as well, to achieve improved port security.

2.d Address Who Says This is a Problem

The President of the United States. Executive Order 13273 found the terrorist attacks of September 11, 2001 to have endangered the security of the United States. The EO specifically defines the Coast Guard’s authorities for CONUS counter-terrorism port security and amends Federal regulations relating to the safeguarding of vessels, harbors, ports and waterfront facilities of the United States. Operational Commanders for all five DOD/DHS Armed Services have acknowledged that the asymmetric threat exists in the air, surface and subsurface domains.

The Commander, US Northern Command. Addressing a Port Security Conference in November 2011, General Smith stated, “Situational awareness in the maritime domain is a real challenge for us.... You don’t have to be a significant player in order to have a big effect, and you can look at the USS COLE in the Port of Aden as an example.... It’s important for us to close the gap in our maritime vulnerabilities and we have to do that only through partnership among the many players. And we’re trying to create an integrated picture of our waterways with many of our interagency stakeholders....”

Department of Homeland Security. In testimony before the Senate, H. Doe, Director, Homeland Security explained: “The nation’s 361 seaports are the gateway for more than 80 percent of our foreign trade. A successful waterway attack would shut down the nation’s

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maritime commerce and port operations just as the air attack of 9/11 shut down the nation's commercial air industry for days.”

2.e Why This is a Joint Problem

The secure transit of HVUs is a critical Joint national security, homeland defense, and military concern. This is NOT just a “Navy problem” in 21st Century geo-logistics; maritime logistics support is an essential prerequisite to sustaining force and power projection for every Service and allied partners world-wide. Mission planning and execution are conducted by multiple services and agencies. A breakdown in this support means a severe reduction of operations. Hence, lack of success in countering this threat could result in consequences unacceptable to national command authorities—loss of strategic assets, inability to meet deployment timelines, loss of confidence in the Maritime Transportation System, and/or impacts on foreign diplomacy strategies.

Likewise, from a national security perspective, terrorist attacks against US merchant shipping present a distinct possibility of disruption of the U.S economy—clearly a Joint homeland defense concern. Today, some high-level requirements and procedures exist for dealing with maritime terrorist threats, but all are focused almost exclusively on ‘traditional’ concepts of maritime strategy, force projection, and maritime security. A sampling of existing task responsibilities can be easily found. The following elements, for example, can be found in published Universal Joint Task Lists (UJTLs); the text in parentheses indicates the J-PHUME supporting effort with regard to the stated Task requirement, to the degree J-PHUME focus on maritime port security applies:

- ST 6.2.6 . Establish Security Procedures for Theater Forces and Means. (TTP will provide measures to protect forces from surprise, hostile observation, detection, interference, espionage, and sabotage)
- ST 8.4.2 . Assist in Combating Terrorism. (TTP will help identify effective protective measures to reduce the probability of a successful terrorist attack against theater high value assets, and identify those defensive measures (antiterrorism) used to reduce vulnerability of individuals and property to terrorist acts, through limited response and containment by local military forces)
- OP 1.2.6. Conduct Defensive Operations in the Joint Operations Area. (TTP will assist in countering the enemy's initiative, to defeat an enemy attack and to aid in preventing the achievement of enemy objectives against HVUs)
- OP 1.4.4. Conduct Maritime Interception. (TTP will help prevent the movement of underwater threats within a nation or specified area. This TTP would synchronize the tactical tasks which include the detection, classification, intercept, stopping, diverting or redirecting of maritime vessels suspected of having the potential to commit terrorist acts)
- OP 2.5.3. Provide Near Real-Time Intelligence for the Joint Operations Area Planners and Decision Makers. (TTP will aid in ensuring near real-time (defined as within 5 seconds to 5 minutes) reporting of potential or actual threat to HVUs)

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3. Proposed Problem Statement

US commanders responsible for naval and maritime security do not have adequate tactics, techniques and procedures (TTP) to detect, interdict and defeat underwater threats to maritime High-Value Units transiting strategic waterways.

High-Value Units include, but are not limited to, aircraft carriers, surface combatants, SSBNs, and Strategic Sealift ships as well as other potentially targeted commercial vessels. Transit of strategic waterways includes normal travel through shipping lanes, port entry and exit, and passage through chokepoints such as the Strait of Hormuz or the Suez Canal.

4. Scope, Focus, and Limitations

4.a Test Scope

The J-PHUME test scope is limited to exploring methods to detect, interdict, and defeat the underwater improvised explosive device (U-IED) threat to HVUs. A draft Underwater – Improvised Explosive Device Threat TTP exists and is expected to be published by 31 May 2013), published by XXX. These TTP will need to be integrated with existing surface HVU escort TTPs and processes. In some cases the surface TTPs may need to be expanded or modified to address the U-IED threat. The Joint Test is designed to prove the implementation of an effective TTP that addresses the protection of HVUs and escorts against U-IED threats.

4.b. Test Focus

The test will focus on protection against U-IED threats during escort and HVU transit of chokepoints and HVU port operations. The proposed test will be conducted in US waterways and ports. Based upon preliminary input from subject matter experts, any TTP developed to address a U-IED threat in US ports and waterways will be extensible to any port or waterway in which US escort operations would occur worldwide.

4.c Test Limitations

The range of effectiveness in threat mitigation will be constrained by availability of existing underwater search, detection, and tracking systems having capability to find the threats that now exist. Integration of developed TTP with existing or modified surface threat TTP will be constrained by the degree of interagency coordination and the ability of communications and C2 systems to be adapted to provide coordinated escort operations. In addition, the monitoring requirements are such that underwater and surface threat neutralization must be coordinated because the same watch stander may often have responsibility for both.

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5. Purpose of the Proposed Test

5.a Purpose of the Proposed Test

The purpose of J-PHUME is to develop and test TTPs to detect, interdict and defeat U-IED threats to maritime High-Value Units transiting strategic waterways.

5.b Traceability between Purpose and Problem Statement

J-PHUME will provide TTP for detection, interdiction, and defeat of U-IED threats to HVUs transiting strategic waterways as the primary product. These TTP will allow US commanders responsible for naval and maritime security to better protect aircraft carriers, surface combatants, SSBNs, and Strategic Sealift ships as well as other potentially targeted commercial vessels as they transit of strategic waterways.

5.c Achieving Results within Scope of the Proposed Test

J-PHUME will adhere to a rigorous test schedule, test concept, and manage test resources while focusing on data collection that address the test issues (problem). The first test will be a risk reduction event to verify the data collection methods. The next will be a mini test to validate the changes in the TTP. The final test will be a test of the completed TTP to verify its effectiveness through the same data collection conducted on the first two tests.

5.d Identify specific expected benefits to the joint warfighter

What is the improved operational capability? The development of this TTP will enhance the nation's ability to protect our ships both civilian and military
Who will benefit? Marines, Navy and Coast guard will benefit from the development of this TTP.

6. Test Article and Development Timeline

6.a Test Article

The test article for the J-PHUME Joint Test is the soon-to-be-published Underwater – Improvised Explosive Device Threat TTP published by XXX. Anticipated publication date is on or about 31 May 2013.

6.b Resources Needed to Develop the Test Article

No specific resources are required for test article development.

6.c Initial Plan and Timeline

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The proposed test plan and timeline will include development of the test article(s), including meetings, writing groups, and needed development of test article(s)

7. Related Efforts

7.ab Some aspects of the domestic underwater battle space have been examined in related efforts, but in a fragmented, piecemeal manner. There has been no direct effort to address the transit elements of Maritime Mobility (MSC, pre-positioned vessels under the Army, Air Force and Marine Corps operational supplies, SPOD operations, strategic HVUs, enabling Power Projection as well as sea-based Strategic Missile Defense) or point defense during MOL (Military Out Load) operations.

Of these related efforts, the predominant portions have focused solely on protection of moored assets. The Naval Submarine Medical Research Lab (NSMRL) has engaged in human bio-effects studies related to diver detection and deterrence efforts. Navy force protection efforts to date have focused on almost entirely on protecting HVUs while in port moored or berthed. This includes the Navy's Anti-terrorism Afloat and shore facilities protection efforts. The NMAWC is the lead federal agent for mine countermeasures activities, but the efforts have focused primarily on response to mining threats, and not prevention before an escort passes or point defense processes.

An Integrated Anti-Swimmer (IAS) System exists and is in use. However, it was not designed to support HVU underway operations. It is a deployable system, with limited range capability. By existing CONOPS, IAS is scheduled on a case-by-case basis for a surveillance assignment. The Coast Guard's Underwater Port Security Working Group, comprised of program offices and both Operational Area Commanders, directed IAS System deployment to selected Maritime Safety and Security Teams (MSSTs). Development of IAS support infrastructure (system transport, storage, and maintenance) is currently ongoing.

8. Test Concept

8.a Proposed Test Concept

As J-PHUME will tests recently developed TTP, the current plan is to employ a test-fix-test methodology. This methodology will be used to thoroughly analyze the results of the first test event in order to make improvements to the TTP. This improved TTP will then be tested and the results will be analyzed to ensure deficiencies identified in the earlier test event are corrected.

8.b Proposed Test Events

J-PHUME intends to use a three-phase approach:

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- Phase 1. Conduct a risk assessment to verify the ability to collect the desired data, and revise the initial U-IED threat TTP as necessary (into version 1A) based on observations during the RRE.
- Phase 2. Conduct a limited test (mini-test) the initial TTP (version 1A) from phase 1, evaluate the test results, and refine the TTP (into version 2).
- Phase 3. Test the full, refined TTP (version 2), evaluate the test results, and refine the TTP (into version 3).

8.c Potential Test Sites

Test events are envisioned to be carried out in two representative locations (Groton, Connecticut and Concord, California) to ensure TTP commonality and effectiveness across the range of topographic, hydrographic, and bathymetric conditions under which CONUS HVU transits occur. Other CONUS ports will be identified as backup venues.

The anticipated test events will be conducted using existing joint escorts as test beds. For example, the current HVU transits and SSBN transit escorts in Groton. The proposed test and evaluation efforts can be executed as part of regular operations and training exercises without significant impact on operational tempo. The Kings Bay GA and Bangor WA naval bases have been the Navy and Coast Guard test beds for escort mission surface threat TTP development efforts to date; the experience and expertise resident at those locations and Groton will be leveraged in the J-PHUME effort. They provide a realistic mission with significant operational forces dedicated to the mission permanently assigned in these locations.

9. Test Product

9.a. Primary Test Product

The primary test product will be tested and revised U-IED threat TTP. The goal is to improve the Escort Commander's ability to protect HVUs from U-IED attack by providing, for the first time, TTP that guides detection and interdiction of underwater threats in CONUS ports, restricted waterways, and chokepoints.

In addition, this Joint test is expected to provide the following reusable outputs to assist future testing, war gaming and training efforts for systems and tactics designed to protect HVUs transiting into and out of ports:

- Well defined and prioritized target scenarios for testing and war gaming
- A validated modeling and simulation approach to support testing and analysis
- To include validated Red Cell (Special Forces), Blue Cell (Service Force Protection, Law Enforcement), and technology (systems and sensors) modeling
- A validated war gaming approach to support both training and testing
- A matrix of underwater response technology available to support TTP increments
- Identified technology gaps to support the protection of transiting HVU against underwater threats

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9.b. Anticipated Product Owner

It is envisioned that the TTP will be adopted by:

- United State Navy (USN)
- United States Marine Corps (USMC)
- United States Coast Guard (USCG)

And will be incorporated into the following Service documents:

- USN Tactics, Techniques, and Procedures 3-20.6.29M
- USMC Warfighting Publication 3-35.8
- USCG Commandant Instruction M3120.18

9.c. Expected Benefit to Joint Warfighter

One expected benefit of the U-IED threat TTP is the extensibility to transit any port, restricted waterway, or chokepoint within and outside the US. Additionally, tested and validated TTPs will reduce the learning curve and assure that maritime forces and mobility assets can establish and maintain effective deterrence in littoral and port environments. The capability to counter both underwater and surface threats simultaneously will give the Joint commander and supported/supporting commands important options and will enhance the success of joint force operations critical to overall mission success. The effect will be to deny access to enemy forces, improve engagement capability and assure mission success.

9.d. Improved Operational Capability

The desired operational outcome is that force protection forces will position, maneuver and execute to counter U-IED threats in a manner integrated with current and future response to surface and air threats. The warfighting benefits include:

- Warfighters and installation commanders will have tested, validated and documented TTP with clearly defined actions for the JFC to integrate underwater tactical efforts with current surface force protection TTP.
- A prioritization of mission needs that focuses training and testing efforts to insure a proper well-tuned implementation of the TTP.
- A broad spectrum of response that addresses a portion of the asymmetric underwater threat and the technology matrix to support that response.
- Improved modeling and simulation validity with field exercise data.

The TTP will also support the following Joint Functional Areas and Joint Capability Areas:

- Interoperability
- Force Protection
- Joint Access and Denial Operations

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- Operational Access, Freedom of Navigation
- Joint Maritime/Littoral Control Operations

The Joint Maritime/Littoral Operations Joint Capability Areas contribute directly to the Joint Capability Areas of Force Application and Force Protection. By improving the survivability and sustainability of Joint force and commercial HVU assets in the face of asymmetric underwater maritime threats in key CONUS and selected OCONUS ports, waterways and constricted passages, J-PHUME developed TTP will support Joint Commander and supported/supporting commanders in gaining and maintaining assured access in the maritime-security battle space. The proposed J-PHUME addresses one of the major gaps in current TTP. Integrating underwater TTP seamlessly with current TTPs, originally developed to address only surface threats, will create new over-arching TTP implementations.

10. Government Personnel

10.a Proposed Feasibility Study Director

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10.b Government Subject Matter Expertise

The effort will be under the joint authority of the NSMRL and RDC. There are anticipated to be several Navy organizations jointly participating in the program to one degree or another. These include Joint Forces Staff College, Naval Warfare Development Command, and Naval War College (for war gaming expertise). The following NAVSEA labs can be called upon to provide technical expertise and support: NUWC Newport, NSWC Dahlgren, NSWC PC, and NSWC Crane.

11. Joint Feasibility Study Costs

11.a Contractor Staffing

Position/Skill Set	Hours	Cost
Task Manager/Senior Engineer	.5 FTE	\$120K
AT/FP Analyst	.5 FTE	\$120K
ORSA	.5 FTE	\$120K
Multi-source Integration/Operations	.5 FTE	\$120K
Systems Engineer	.5 FTE	\$100K

11.b Travel Costs

Government Travel	\$25K
Contractor Travel	\$40K

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11.c Other Anticipated Costs

Presently no other anticipated costs are expected.

12. Sponsorship, Endorsement, and Transition Letters are Appended

The J-PHUME Joint test is sponsored by the US Naval Submarine Warfare Center.

Endorsement letters have been obtained from USNORTHCOM and USPACOM. Additional endorsement letters are being worked for:

- USSOUTHCOM
- USTRANSCOM
- Commander COMNAVSUBFOR
- US Marine Corps
- Pacific Area Commander/Commander Maritime Defense Zone Pacific

Currently, the US Navy/N3 has provided a product transition letter stating they will take responsibility for transitioning the test product after joint test closedown. Additionally, test product transition letters are being worked for USMC and USCG.