State of the Undersea Warfare Industrial Base

Prepared by the
National Defense Industrial Association
Undersea Warfare Division (UWD)
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Undersea Warfare Division (UWD) Mission

- Promote the Exchange of Technical Information between Government & Industry and Expansion of R&D
- Serve as an Open Communications Conduit Between Government & Industry
- Advise Government & Industry on Policy, Acquisition and Planning
- Conduct Navy Sponsored "pro bono" studies using voluntary resources and participation by members
- Operate as an Independent Organization (i.e., No Government Contracts and not Representing Any Individual or Company)

Membership & Activity

- NDIA
  - Over 1500 Companies Represented & Participate in NDIA
  - More than 68,000 Individual Members are Enrolled in NDIA
- ~50 Industry Executives in UWD Leadership Role
- 2 Major High Value Annual Conferences at SECRET Level (~1500 annual attendees)
- Recognition Awards to Technical and Leadership Icons
- Annual Scholarship Awards for 3 Key Graduate Students
- Studies/Technical Committees: Sensors, C4 and Combat Systems, Aviation, Mine Warfare & Undersea Vehicles
- Executive Roundtable Sessions with Key Navy Leadership

Executive Summary

State of the Industry
Collaboration Strategy
Recommendations

Decades of Change

Past Focus on System Development & Acquisition	*Present Focus on Modernization & Sustainment*
•Develop Systems to customer Specified, Threat-driven Requirements •Customer Funded Technology and Development •Frequent Sole Source Contracts to Leverage Continuity, Mitigate Risk, Balance Industrial Base	•Anticipate Customer Needs; Adapt Products, Systems and Services •Business Invests Strategically to Intersect Needs •Competitive Bidding, Varied Selection Criteria, Follow-on Competed
•Growth Through DOD Acquisition Programs •Driven and Dominated by Specific USW System Procurements •Business Comprised of Large Programs with "Tiered" Participation •OEM Contractors Invested and Sustained Industrial Base Using Production and O&S •Homogeneous Business Model •Multiple Large Corporations with Major Development and Integration Facilities	•Survival Through FMS, Foreign Direct and Commercial Sales •Vertically Integrated Platform Procurements; System of System Developments •Few Large and a Variety of Small Programs •Separate Competitions for each program phase • Multiple Business Models – COTS, Rapid Tech Insertion, Continuous Upgrades •Platform-centric Large Business Developers; Some Facilities Migrated to Government Labs

UWD Report Reflects a Microcosm of the 2008 DSB Task Force Report on National Security Industrial Base

Industry Assessment

REQUIREMENTS	ASSESSMENT	Gaps & Overlaps, Need Early Involvement of Industry in Requirements Process, NMAWC & CNO Action Needed
BUDGETING		Multi-Sponsor/Platform/Mission, Funded Below Priority, Need Horizontal Integration and "Catch Up" … NOT "Bill Payer"
RESEARCH		Insufficient R&D $, Need to Leverage Labs and Industry Efforts - Synergistic Strategy, Need to Attract Innovation
TECHNOLOGY		COTS is NOT a Panacea, Sensors 'R Not COTS', OA is Imperative, Need Flexible Business Model
OPERATION & SUPPORT		Last at the Trough, Training Lacks "Realism", Marine Mammal Issues, Must Need Test Upgrades
VITALITY & CAPACITY		Intellectual Talent Pool Atrophy, Shrinking Base "Follows the $", Need Investment Incentive

PRIORITY

Lacking Focus, Priority and Funding We Rapidly Approach Mediocrity in USW

Collaboration Strategy

- Multiple USW Stakeholders … "Shared Responsibility"
  - OPNAV: Integrated Planning & Requirements
  - ASN/RDA: Acquisition & Oversight
  - NMAWC: Operations & Training
  - Industry: Provide the Capability
- NDIA UWD: Facilitate/Coordinate Industry Input
- As a "Team Sport" USW Needs a Partnering Approach to Requirements, Research, Development, and Acquisition

Should We Leverage Our NDIA Relationships into a "Partnership" to Help Facilitate & Integrate the Process?

Recommendations

- Assign the NDIA UWD Navy Liaison Officer to the Navy USW Cross Functional Board; Authorize the Sharing of Relevant Information with UWD Executive Leadership
- Formalize a UWD Relationship with NMAWC to Enable Direct Industry Support and Assistance to the Mission
- Consider a UWD Role in the USW Relationship with Principal Allied Navies & Industries
- Promote Scholarships & Incentives for Students in Technical College Degrees
- Utilize the Flexibility Incorporated in the National Security Personnel System to Recruit/Retain USW Expertise (e.g. form a "Community of Interest or Practice")

We Are Committed to US Navy USW Supremacy!

NATIONAL DEFENSE INDUSTRIAL ASSOCIATION

STRENGTH THROUGH INDUSTRY & TECHNOLOGY

QUESTIONS OR COMMENTS?

BACKUP SLIDES

Requirements
Budgeting
Research
Technology
Operations & Support
Vitality & Capacity
Studies

Requirements

- Reassess vs. Current Threats as part of QDR
- Multiple Adversaries Exploiting Ubiquitous Technology
  - Evolving Diesel Electric, Air-Independent and "Sixth-Gen" SSNs and Asymmetric Weapons Formidable
  - Legacy Capability Marginal and Cumulative Risk/Losses Huge
- Need Capability and Capacity to Hold any Player at Risk
- Modernization/Incremental Development Must be Requirements Driven
  - Comprehensive Requirements Needed or Required Capability Unachievable
  - "Step-Function" Increases Required to Meet Future Threats
- Industry Resources Can Help Fill Requirements Gap
  - Win, Win: Industry Investment Opportunities Clearer, More Direct Translation of Resources to Capability and Capacity
  - SECNAVNOTE 5000 Requires Industry Participation in the Requirements Process

Industry Partnership in Requirements Development Can Speed Capability Gap Closure

Budgeting

- Difficult to map "USW Capabilities" to PPBS, critical & unique USW capability should be fenced (e.g., like nuclear & submarine technology), must be traceable to requirements (i.e., S&T through Procurement)
- Flag & SES comments & public statements should materialize in the POM; USW investment does not match stated Fleet priority; although listed as a major capability gap, procurement and modernization are NOT increasing
- ASW roadmap under development, 2004 UUV being updated, MIW in place, CEBs on USW and Unmanned Systems bringing Visibility to Program and Related Funding Issues, need to map the actions to the recommendations and gaps
- Reprogramming, stretch, cancellation, delay have diluted investments, MIW programs continue to be bill payers, IOC's for unmanned sensors and vehicles slipping (e.g., ending MRUUV program IOC to 2016 … "15 years of promises") … Weapons?
- Need Same Programming Stability on USW as CNOs have put on Shipbuilding (albeit under debate by new administration)
- Multiple sponsors fund development and maintenance of duplicative capabilities across multiple platforms; stovepipes begin with R&D and sustain through SCN/OPN

Next QDR & POM Cycle Should be Viewed as an "Opportunity" instead of a "Challenge"

Research

- Diesel-electric/Littoral Threat Not Drawing High Enough Priority, The rest of the free world's USW R&D follows the US Navy's investment strategy
- The "1000 Ship Navy" Concept needs R&D in order to become a reality, could send a positive signal to allies and influence their investments accordingly
- Research for foundational or transformational work on ASW, mines, vehicles, weapons is marginal and incremental, Navy sponsored fundamental research on performance limiting components: sensors, transduction, etc. not widely accessible
- Navy pushing most R&D to Labs, Funds Disbursed Independently Across Labs, Academia, Contractors, Technology programs have been broken into smaller individual efforts, Overarching Strategy and Collaboration is Needed – Revisit the FNC Approach?
- Overlaps and gaps often found AFTER the money is spent
- S&T, disconnected from Fleet requirements, hampers transition to deliverable systems
- R&D in MIW is focused on countermeasures/defeat, what is our offensive mining capability?
- Intellectual capital will "draw down" as boomers retire, need incentives to excite GenY!

With Less Navy R&D Available, Synergy and Collaboration are Imperatives

Technology

- Tech insertion and modernization programs made significant performance improvements to legacy systems, however COTS has been a Blessing and a Curse!
  - Must be integrated as part of the system to take advantage of tech refresh and insertion paths with minimum reengineering
  - Product life cycles require different approach to obsolescence and support, business model may offer solutions & continuous upgrades pose training issues
  - Open Architecture standards key to upgradeable systems
- Some unique, critical USW technologies will never derive from COTS:
  - Certain critical USW components do not share parallel commercial markets, so procurement rates/cycles must be considered in planning
  - Savings from COTS hasn't been plowed into "Non-COTS" USW unique technologies, i.e., sensors and weapons
- Key R&D investments have yielded results; challenge is to transition the experiments and prototypes into capability in the near term. Some promising "on the shelf" sensor and platform technologies lack transition funding to realize potential

Open Architecture which supports COTS and Custom components is the key to affordable solutions

Operation & Support

- Training/certification process clearly not supporting path forward to reestablishing USW dominance
- Competition for Funds!
  - Review and refine roles for Labs, Program Offices and Industry
  - Need better balance in investment between acquisition and support
- Industry Must Adapt Business Models
  - Produce legacy or evolve legacy to maintain production
  - Profit on R&D, integration and support
  - "Value Added" Approach to "COTS Integration"
  - Leverage IR&D to discriminate core competencies while supporting life extensions
  - Build Congressional Constituencies within New Administration
- Requirements & Acquisition
  - Industry needs wider access and exposure to gaps in capabilities
  - SECNAVNOTE 5000 requires early industry participation in the process
- Headlines focus on daily issues … Success Based Schedules/Budgets have NO Tolerance for Risk
  - E.g., Marine Mammals Impact on R&D, Training and Operations

Must Find a Balanced Model which Stimulates Collaboration while Retaining a Competitive Field

Vitality & Capacity

- Downsized: Fewer Platforms, Fewer New Systems, Less R&D, Less Focused Investment Caused a Crucial Skills Shortfall and Reduced Long-term Capacity
- Lack of Congressional champion, sometimes we commit “industry fratricide” to achieve “company victory” … Perhaps we need a “USW Caucus?”
- Businesses Challenged to Sustain Critical Mass:
  - Consolidating, migrating to commercial and foreign markets
  - Use of COTS shifted some workload to non-USW industries
  - Sustaining and modernizing legacy systems to maintain production
  - ROS/ROI squeezed while trying to sustain R&D, integration and support
  - Use of congressional earmarks, even when not Navy’s top priority
- Skill Base and Intellectual Capital Atrophy
  - Need mentors to develop next generation of talent for design of non-COTS components: transducers, telemetry spatial/ spectral signal conditioning, etc.
  - USW industry not the first choice for some of the “best and brightest” innovators; overall trend in non foreign technical college degrees is unfavorable
  - Mid-grade talent gap remains as an artifact of the 1990’s
- Small Businesses are doing well in S&T, but the transition path may be a dead end

Diminishing Industrial Base, Perishable Skills, and Volatile Budgets

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STRENGTH THROUGH INDUSTRY & TECHNOLOGY

STUDIES

Studies Process

- Specific operational or technical issues requiring investigation
- Brings the full intellectual energy of industry-academia-laboratory-Navy to the issue
- Requires Navy sponsorship
  - Terms of Reference and Tasking Letter
  - Support for access to classified information
- Division assigns a Study Leader and seeks participation from the total community
- Periodic reviews with sponsors
- Final report and follow-on tasking

We Have Engaged Nearly ALL USW Stakeholder Commands and Delivered Numerous Relevant Reports

Recent Studies

- Mine Warfare Underwater IED Study
  - Sponsor: Naval Mine and ASW Command Status: Mid-term Briefing in Preparation
  - Impact: Investigating and Recommending application of military systems for use in ship channels and harbors to counter terrorist use of underwater IEDs
- ASW Common Tactical Picture
  - Sponsor: Chairman, ASW CFB Status: Complete – Final Briefings Being Scheduled
  - Impact: Developed and recommended a combined line-of-sight/non-satellite COMMS system with adequate bandwidth, security and timeliness for coordinated ASW OPS
- USW Distributed Netted Sensors
  - Sponsor: Director, Sea Shield Status: Sponsor brief: May 07
  - Impact: Concepts Briefed at '07 Clambake, Acoustical Society Conference and Included in NUWCNWC DNS Workshop and Fleet Wargame
- Littoral ASW Technology Trade-off Study for Self and Force Protection
  - Sponsor: Director, Sea Shield Status: Complete Final Brief: Sep 05
  - Impact: Sponsor concurred with recommendations for improved performance ASW systems for 3 operational scenarios; integrated into analytic effort for PR07 investment strategy
- Peer Review of FORCEnet Architecture and Standards
  - Sponsor: Commander, SPAWAR; Commander, USW NAVSEA Status: Complete Final Brief: Apr 2004
  - Impact: Input to evolving FORCEnet Architecture and Standards
- Open Architecture, Dual Commercial/Military Use of Large Displacement Unmanned Undersea Vehicles
  - Sponsor: PMS403 Status: Compete Final Brief: Feb 05
  - Impact: The study found that use of commercial UUVs without extensive modification would not meet unique military requirements
- Sonobuoy Receiver Digital Output Interface Study
  - Sponsor: PMA264 Status: Complete Final Brief: Apr 03
  - Impact: STANAG 4283 Annex C Revision 5 in January 2006
  - Impact: Interface adopted by P-8A, P-3C, and MH-60R Programs; Navy and NATO adopted a COTS digital architecture common across Maritime Patrol Aircraft and Helicopters with an estimated $160M cost avoidance

Completed Studies 2004-2007

- Aviation: Sonobuoy Receiver Digital Output Interface Study for PMA-264 (2002-2004) - Navy and NATO adopted a COTS digital architecture common across Maritime Patrol Aircraft and Helicopters with an estimated $160M cost avoidance
- Undersea Vehicles: UUV Open Architecture Study for PMS 403 (2005) - Determined that there was no viable business case for UUV dual-use; use of commercial UUVs without extensive modification would not meet unique military requirements
- Undersea Sensors: Distributed Netted Sensor Study for Director, ASW Cross Function Board, OPNAV N87 (2005-2007) - Concepts Briefed at '07 Clambake, Acoustical Society Conference and Included in NUWC/NWC DNS Workshop/Wargame
- FORCEnet Study – Comments provided to the Navy on industry perspective of proposed FORCEnet standards

Studies in Process 2007-2009

- C4I and Combat Systems: Communications Management in Support of an Anti-Submarine Warfare Common Tactical Picture for Director, Cross Function Board, OPNAV N87 (2007-2009) - Developed and recommended a combined line-of-sight/non-satellite COMMS system with adequate bandwidth, security and timeliness for coordinated ASW OPS

- Mine Warfare: Underwater IED Study for NMAWC (2007-2009) - Investigated and recommended application of military systems for use in ship channels and harbors to counter terrorist use of underwater IEDs

- State of Practice in Unmanned Systems Technology: The Unmanned Maritime Vehicles Program Manager chartered NDIA to support the next planned update of the UUV Master Plan by conducting a study to identify current "state of the practice" for UUV technology areas. The study team solicited input from across the undersea technology community and evaluated maturity levels of various technologies that could be used to support and enhance current UUV mission capabilities. The study research is complete and the study is undergoing final draft review.