

2111 WILSON BOULEVARD, SUITE 400
ARLINGTON, VA 22201-3061
(703) 522-1820 • (703) 522-1885 FAX
WWW.NDIA.ORG

November 7, 2011

Office of the Secretary of the Navy
1000 Navy Pentagon
Washington, DC 20350-1000

SUBJECT: 2011 Report on the Undersea Warfare Industrial Base

Dear Secretary Mabus,

As prescribed by the bylaws and charter of the National Defense Industrial Association (NDIA) - Undersea Warfare Division (UWD) enclosed please find a report summarizing the state of the undersea warfare (*USW*) industrial base. As you know, this mission area covers a wide range of stakeholders, including the mine, submarine, anti-submarine, surveillance, *intelligence and oceanographic* communities across aviation, surface, subsurface, and shore domains.

Although the UWD charter and bylaws prescribe the inclusion of studies performed during the period in our annual report to you, an issue has pre-empted study activity during the period since our last report. Unless this issue is resolved to re-enable collaboration, the government will no longer benefit from our industry wide studies which address key capabilities and technologies. We are actively engaged in the resolution of this issue with the expectation of a timely and effective outcome.

Having personally participated in meetings and conferences of the NDIA UWD, I am confident it will continue performing a strong liaison role between government and defense industry to enhance collaboration as we build and support the capability for our naval forces.

Very respectfully,



Lawrence P. Farrell, Jr.
Lieutenant General, USAF (Ret)
President and CEO

NATIONAL DEFENSE INDUSTRIAL ASSOCIATION (NDIA)

State of the Undersea Warfare Industry

Biennial Report

NDIA Undersea Warfare Division

11/7/2011

This unclassified report is submitted the Secretary of the Navy in accordance with the charter and bylaws of the Undersea Warfare Division of the National Defense Industrial Association.

State of the Undersea Warfare Industry

Summary & Recommendations

As prescribed by the bylaws and charter of the National Defense Industrial Association (NDIA) Undersea Warfare Division (UWD), this report addresses the state of the United States' undersea warfare (USW) industrial base. This mission area covers a wide range of stakeholders, including the mine, submarine, anti-submarine, surveillance, intelligence and oceanographic communities across aviation, surface, subsurface, and shore domains. This current assessment of the USW industrial base is consistent with previous NDIA UWD biennial reports, i.e., we continue over a decade long struggle to sustain an industry critical mass in the face of Navy budget challenges. Since the Budget Control Act of 2011 brings new uncertainty to every facet of how the government will invest and spend its resources, and "nothing is off the table," we cannot predict, yet expect USW funding to be negatively impacted. This assessment drives our recommendations as we enter the next decade in a fiscally constrained environment:

- Sustain the force structure procurements, e.g., LCS, DDG-51, P-8, MH-60R/S, and SSN production to preserve the vital critical mass for major platforms.
- Ensure funding of the Ohio SSBN replacement program as a vital element of national security and the nuclear shipbuilding capability.
- Set expectations for future industrial capability and communicate this to the stakeholders, including how the acquisition strategies and policies will be utilized to sustain key technologies in a budget constrained environment.
- Develop a sensor and weapons roadmap similar to the work by OPNAV N2/N6 on updating the unmanned undersea vehicles and systems roadmaps to help focus industry investment on those technologies intended for operational employment.
- Implement an acquisition process to enable rapid employment and deployment of technologies which might enable high risk, high payoff potential, e.g., revisit some of the capability demonstrations and experiments done under PBD-753 and DARPA sponsorship to determine if a "good enough" solution can be achieved for an incremental investment.
- Leverage funding initiatives like the Innovative Research Fund (implemented by the Navy Rapid Innovation Fund) to target promising USW technologies and accelerate the transition of small business innovative research programs.
- Ensure balance of R&D funding across government, academia, and industry.
- Resolve the OCI issue of NDIA providing pro bono studies to Navy constituents.

The NDIA UWD stands ready to engage and support the US Navy on these recommendations to preserve and strengthen the USW industrial base. Our leadership team covers a diverse range of industries that are key stakeholders in the USW business and mission. Together we can meet the challenges of capability and affordability in an era of uncertainty.

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Assessment

NDIA compiles an annual agenda of “Top Issues” which are published and distributed to key government leaders. This situational report and a continuing declining investment trend are consistent with these issues and a number of industrial base studies, performed within DoD and by private organizations.

In 2003 we reported the state of the USW industry as:

- **Fighting for Survival:** Consolidating; migrating to commercial and foreign opportunities; continuing to evolve legacy systems to maintain production; Commercial off the Shelf (COTS) reducing production opportunities; trying to survive on research and development (R&D), integration and support; depending on Congressional plus-ups.
- **Losing Skill Base and Intellectual Capital:** Designers for non-COTS components (transducers, telemetry, spatial/spectral signal conditioning, etc.) growing scarce; USW industry losing the best and brightest to better opportunities.
- **Reacting to a Downsized Market:** Fewer platforms; fewer new systems; less R&D and focused investment.

In our 2009 assessment we noted that the effects of these issues and their continuing negative trends were also consistent with the findings of the July 2008 Defense Science Board (DSB) Task Force Report on the National Security Industrial Base. With the exception that Congressional plus-ups have become essentially inconsequential to the USW industrial base, little else has changed through 2011.

In May 2011 testimony before the Emerging Threats and Capabilities Subcommittee of the Senate Armed Services Committee, Mr. Norman R. Augustine provided his perspective on the “State of the Defense Industrial Base.” Our assessment is consistent with several of his comments that are relevant to the USW industrial base:

- “Return to the practice of the 1960’s, promoted by Dave Packard, to build prototypes of advanced systems – even though most of them may never be procured for operational use. This preserves the nation’s critical engineering design teams and advances the state of the art at a relatively low cost.”
 - This approach will also enable the evaluation of revolutionary changes that may otherwise be stymied in an “evolutionary, incremental” methodology.
 - Recent acquisition guidance embraces this practice, including that some procurements are requiring a robust demonstration with capital assets prior to source selection. As a result, there is a higher expectation of industry investment in advance of a committed return, which may eventually drive overhead expenses higher or potentially reduce competition if the pre-award

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expenses are too high. This could be mitigated by government funding or subsidizing competing prototypes.

- “Make it extremely demanding to begin new engineering development programs—and equally demanding to change or stop them.”
 - This has been recommended in many reports and assessments and is addressed in the recently promulgated “pass/gate” process. This approach could help focus investments earlier in the process, e.g., in the areas of sensors and weapons technologies where the assessment of future deployment, employment, and support costs could be assessed as part of the authorization and “pass/gate” processes.
- “Invest in manufacturing *process* technology, much as manufacturing *product* technology has been supported in the past, with a focus on flexible, low-rate production.”
 - Due to the relatively small number of USW unique platforms, sensors, and weapons, very few systems reach the procurement quantities where economies of scale become significant, so this approach should be considered in both competitive and follow-on procurements.
 - USW has reaped the benefit of commercial electronics, yet this has been a one way street, i.e., there is little or no focused investment in the fast paced digital technology toward unique and discriminating USW innovations.

In September 2011, the Center for Strategic and Budgetary Assessments (CSBA), an independent, nonpartisan policy research institute published a report on the Defense Industrial Base; the following comments derived from that report are directly applicable to the USW industry:

- Overall US defense procurement has dropped by 50% during the period 1986-2007 with no analogous change to the industrial base strategy.
- There is no country to which the US might turn for help if the USW industry were “de-capitalized” through a sustained reduction of physical and human infrastructure; unlike the scenario where the US was able to help recover the UK Astute submarine program, we will not be able to surge in time of need without sustained investment.
- Low rate initial production (LRIP) quantities for major acquisitions are not of sufficient quantity to achieve learning curve savings by a single prime contractor, nor do most business cases warrant multiple sources within affordability constraints, resulting in “winner take all” procurements with a built in single point control (or failure).
- The USW industrial base is not considered a “sacred cow” and is only briefly mentioned in a list of the top sectors recommended by a committee in the early 2000 time frame and did not survive its prioritization when chopped up the chain through the then Joint Chiefs of Staff.

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- Efforts and initiatives which assume that industry has discretionary controls as in a “free” market are not consistent with the reality that the government is both the buyer and regulator.

The lack of a focused investment strategy in USW technology advancements since the end of the Cold War has resulted in a gradual disengagement of many companies from this market and subsequently a reduced involvement and “day-to-day” focus of their senior executives, engineers, and technologists. The USW industry has struggled to sustain a critical mass of personnel with the necessary, unique technical and domain knowledge; the talent pool has not been replenishing the retiring “grey beards.” The “best and brightest” talent will follow the money in the current market of portable and transportable labor. Additionally, we have not been investing in the breakthrough technologies to provide “step-function” increases in capability against diesel electric submarines or advanced and stealthy mines. Instead, the focus has been on near-term spiral/incremental development programs to insert and refresh legacy platforms. This trend allows our adversaries an affordable path to become more threatening. The perception that the US does not have an imminent or credible USW threat adds to and drives the business decision making process away from USW. Communication of USW threats as a National priority is essential as we continue this era of fiscal constraint. Without clear communication, industry will either not invest or invest small amounts to “stay in the game.” The latter option becomes less likely as industry’s internal research and development dollars continue to be challenged. Small poorly focused projects tend to keep people busy, whereas large laser focused projects tend to achieve results. In Mr. Augustine’s congressional testimony, he reflected on a similar dilemma following the collapse of the Warsaw Pact that precipitated “a massive structural reengineering of the defense industrial base.” Capability gaps should naturally focus the research and development investments. A focused USW research and development program that invests in the USW industrial base throughout the development cycle will clearly define the business opportunities in the USW marketplace. With this clarity and a vision of success, industry leaders will invest in technology and people, realizing that an internal research and development program with a clear and well defined statement of objectives is far more likely to achieve measureable success than multiple small projects. Initiatives like the Innovative Research Fund (implemented by the Navy into the Rapid Innovation Fund), even though not specifically targeting USW R&D, could provide augmented funding, especially to facilitate the transition of small business innovative research programs.

Achieving a balance between the levels of industry, academia and government involvement in the development, production and support of military systems is a key to sustaining defense superiority. Although certain functions are “inherently governmental,” we must ensure that industry capability does not suffer a critical failure

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as a result of unwarranted “in-sourcing,” i.e., if the government takes on a growing proportion of effort, then the private sector industrial base will continue to contract. Government leaders who are responsible to integrate and coordinate acquisition across a wide range of stakeholders must exert guidance and oversight to buffer the natural tendency to fund and execute the research and development programs within the government labs and academia. This includes not only research and development but low rate production and depot level work. As summarized by Mr. Augustine, “government must strengthen the ability to serve as an intelligent buyer...but have the government itself engineer or manufacture only those items that the private sector is incapable of – or unwilling to – provide.”

The business environment and climate has also become challenging, since the USW industry is essentially a monopsony. As procurement packages get larger or more complex, approval within companies (particularly publicly traded corporations) gets higher due to the potential for shareholder/investor risk. Stockholders, boards of directors, and SEC regulations require company executives to evaluate risk in context of shareholder value. Those procurements which are potentially able to singularly impact the company financial performance will also be scrutinized publicly when disclosed in quarterly/annual reports. Source selection processes, behaviors, and outcomes will become "precedents" in the ongoing fiscally constrained environment. The procurement process can restrict dialogue and information sharing for industry to make informed pursuit and bid decisions:

- Factors which entice or dissuade an industry "pursue/bid decision" include: assessment of a level playing field (or adequate time to improve position vs. competitors, e.g., facilities, equipment, staffing, investments); confidence in the POR, funding, stability; perceived value to the warfighter; relevance to overall company mission/technology; ROI (measured differently by different companies); perceived past performance and relationship with customers/stakeholders.
- Scenarios which trigger "no interest/no bid" decisions include: perception of incumbent advantage; RFP/documents clarity/quality; cost to bid; investment need vs. expectation; risk/reward assessment (terms & returns); warranty, acceptance, and payment terms.
- BAAs and other “shopping for input” and good ideas without IP protection will likely receive few or guarded responses.
- Implications that “industry investments in experiments will pay off” with no tie to a POR are not credible the first time a major expenditure with success results in no return.

The November 2011 NDIA UWD assessment of the USW industrial base is a snapshot of the above situation and trends:

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- Force structure investments and production of key USW platforms has slowed the atrophy in major capital facilities, e.g., the Littoral Combat Ship (LCS), DDG-51 Destroyer, P-8 Poseidon Aircraft, MH-60R Seahawk Helicopter, and Virginia Class Submarine, and Ohio SSBN replacement programs are as significant to the USW industrial base as they are to force structure.
- Investments in modernization of existing platforms, weapons, and sensors is at a minimally sustaining level which strains the ability for industry to predict favorable or stable returns.
- Industry consolidation is a natural outcome of constrained or declining resources; this trend is expected to continue having a negative impact on both the physical and intellectual capital, i.e., little or no “bench strength.”
- Few, if any, businesses can survive with a “US USW only” focus; this dilutes both critical mass and targeted investments. As a consequence, the number of senior industry executives who spent their careers in USW is also declining.
- Survival tactics in this challenging budget and market environment often create barriers between government, academia, and industry. In some areas, R&D funding has shifted almost exclusively to government laboratories’ in-house efforts.
- Effects of government budget constraints across a wider base are now beginning to impact future USW dependencies and capabilities, e.g., NASA will no longer carry the investment burden for submarine launched ballistic missile technologies, and the overall reduction of S&T funds will diminish leverage into USW applicable technologies.
- Utilization of commercial electronics products to provide cost/performance benefits has diluted the revenue stream that companies previously accrued as a USW prime contractor, consequently removing the related incremental investment potential. Since this technology is available worldwide and the algorithm work is published in international journals, the US performance edge may be waning.
- Procurement process delays (e.g., multiple RFP iterations and lengthy evaluation cycles) are more frequent and dilute industry bid and investment resources.
- Organizational conflict of interest regulations and their recent stringent interpretations by the Navy legal staff have restricted NDIA’s ability to engage early in studies that might otherwise provide a forum for collaboration.

The mission of the NDIA UWD is: “To promote the exchange between government and industry of technical information and expansion of research and development in areas related to Undersea Warfare. To this end, the UWD will serve as a communications conduit by providing a variety of ways for both government and industry to act in concert to solve problems, identify affordable solutions, meet specific requirements, and support both government and industry with advice on undersea warfare policies and acquisition planning.” We stand ready to carry on this mission in support of USW.