Navy Strategic Planning Process for Science and Technology Demonstrations

Transitioning R&D Advanced Technology Into the Fleet

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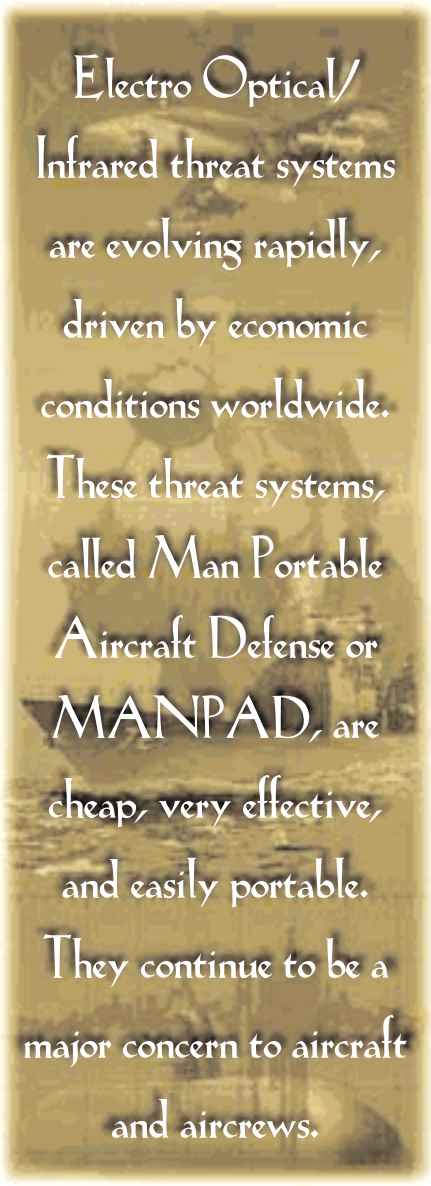
Effectively managing the research, development, testing, and delivery of integrated advanced technology self-protection systems that meet Fleet requirements to increase aircraft and aircrew survivability is a primary concern and priority for the U.S. Navy. Toward that end, the Strategic Planning Process for technology insertion is intended as a primary management tool. For purposes of this article, the process assumes a Program Manager Air (PMA) office in charge of managing and executing these efforts under the direction of the Program Executive Officer for Tactical Aircraft (TACAIR) within the NAVAIR community. Additionally, the planning process is focused toward projects that are not qualified for an Acquisition Category I (ACAT I) designation under DoD 5000 policy guidelines.

To aid the planning process, the ONR Commanding Officer has established Future Naval Capabilities (FNC) with technology "Spikes" to identify and link technology to requirements. To explain, FNCs are composed of 12 enabling capabilities called Spikes. The term Spikes comes from the process of identifying prioritized capabilities from a pool of technology investment. The pulling effect of these capabilities causes a ripple or Spike effect. Hence, the term Spikes. The 12 Spikes captured from the pulling process follow:



- Organic Mine Countermeasures
- Information Distribution
- Time Critical Strike
- Decision Support System
- Autonomous Operations
- Littoral Antisubmarine Warfare
- Total Ownership Cost Reduction
- Missile Defense
- Platform Protection
- Expeditionary Logistics
- Warfighter Protection
- Capable Manpower

Some characteristics of Spikes should include: significant technology options and operating concepts; significant or sufficient budget; definite milestones and objectives; deliverables; and well-defined demonstrations.

The FNCs are still in the development process and will not become active until Fiscal Year 2002.

An Innovative Approach

The Strategic Planning Process outlines a historical and proven method that addresses TACAIR platform protection requirements and could serve as a guideline for the Platform Protection Spike of the FNCs.

A proactive approach, the planning process provides a formal procedure for the selection of proposed advanced technology programs for urgent Fleet requirements. The data gathered as a re-

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sult of this process should be used to provide Fleet and operational input to Science and Technology (S&T) programs as well as set forth a road map to transition Research and Development (R&D) advanced technology into the Fleet. Since Advanced Technology Demonstrations and Concepts are non-ACAT, no formal procedures are established for incorporating these technologies into existing programs.

Strategic Planning Process is viewed as a "living" document that must be adapted and changed to meet demands dictated by an ever-changing acquisition environment. It provides the overall strategic-direction philosophy needed to manage cost-effective programs in today's environment of reduced resources, while at the same time serving as the road map to meet Fleet requirements for increased aircraft self-protection. It should be revisited and revised annually, or more frequently as required.

In major system/end item acquisition, the Requirements Generation System as described in Chairman, Joint Chiefs of Staff Instruction (CJCSI) 3170.01A sets forth a formal process that identifies Service deficiencies through a continuing evaluation process by reviewing the latest National Security Policy, National Military Strategy, Defense Planning Guidance, Commander in Chief Integrated Priority List, Joint Intelligence Guidance, and projected worldwide threats provided by the intelligence community. This information is then incorporated into a formal document called Mission Area Analysis (MAA).

The MAA identifies the operational and support tasks needed to meet mission objectives from a broad scale. The CJCSI also provides for Service requirements to be identified through a DoD component-generated Mission Need Analysis (MNA). The MNA evaluates Service deficiencies using a task-to-need methodology to identify mission needs and looks across DoD component boundaries for solutions. An integral part of the process consists of identifying opportunities to exploit technology breakthroughs, which provide new capabilities that address established needs, reduce ownership costs, or improve the effectiveness of current equipment and systems. The MNA also identifies the time-based nature of the need and the specific time frame the need is expected to exist.

Before a new program is initiated, both material and nonmaterial solutions are explored. An analysis of alternatives is also conducted. When a DoD component has determined that a material solution should be pursued, an MNS will then be prepared.

The problem with this formalized system is that it does not account for non-ACAT I system acquisitions. In the system acquisition environment, specifically aircraft self-protection systems, an urgent requirement is usually identified during operational mission scenarios, oftentimes as a result of a new or improved threat system being identified in the theater of operations. The requirement is urgent, and a solution is needed well before an MAA or an MNA is completed or an MNS is generated. Ideally, the new requirement was anticipated long before the operational forces needed the system, and an MNS has already been prepared and staffed. But as is often the case, the urgent requirement was not pre-determined, and a need exists to provide a solution well before the formal system described in CJCSI 3170.01A can react.

In such cases, the requirement is transmitted from the operational units through Operational Advisory Group meetings, technical seminars, the normal chain of command, or transmitted through a number of other direct contract avenues to either the Requirements Department of the Service or directly to the Acquisition Agency. At this point, the Acquisition Agency begins a process to expeditiously provide a solution to the urgent requirement.

One of the first actions involves reviewing current MNS to see if they have any applicability in a particular situation. Another step is to review ongoing research and development efforts to determine if they may offer a needed solution.

The road map for advanced technology programs depicted in Figure 1 provides a visual description of how programs and projects are driven by Fleet requirements, the interaction of programs and projects, as well as the transition path for the projects. Threat-driven Fleet requirements can be addressed in several ways such as Product Improvement

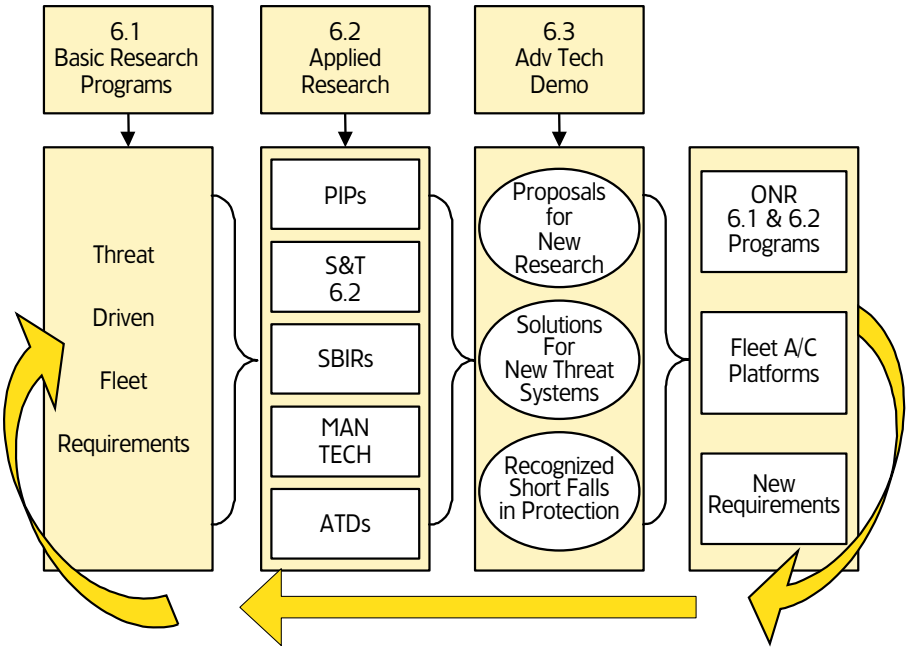

FIGURE 1. **Technology Road Map**

Programs, Mature 6.2 Research Projects, Small Business Innovative Research Programs, Manufacturing Technology Programs, and Advanced Technology Demonstrations. The results of those processes produce solutions for threat systems, proposals for new research, and identified shortfalls in protection. The solutions are then transitioned to Fleet platforms, the shortfalls are transitioned to new requirements, and the new proposals for research are transitioned to ONR for a new-start program.

Funding for science and technology programs has traditionally been divided into Basic Research and Applied Research. One of the criteria for selection of projects to progress from Basic Research to Applied Research is the consideration for transition to a platform, system, or technology insertion into an ongoing project.

Historically, the global arms market exports weapon systems to any nation that can pay for them, and both new as well as older threat systems are proliferated with increased speed. To keep pace, the U.S. S&T community maintains a continuing awareness through scientific investigation of emerging technology that could have military application. Defense scientists and engineers must understand the potential of emerging technologies and be poised to react rapidly to an innovative use of technology by potential adversaries. Advanced Development Programs, Advanced Technology Demonstrations, and other ongoing technology programs will speed consideration of alternative operational concepts for U.S. employment of new technology.

Moreover, Electro Optical/Infrared threat systems are evolving rapidly, driven by economic conditions worldwide. These threat systems, called Man Portable Aircraft Defense or MANPAD, are cheap, very effective, and easily portable. They continue to be a major concern to aircraft and aircrews. Multi-mode threat seekers are already operational and will continue to evolve and proliferate, rendering existing Countermeasures (CM) systems and employment techniques obsolete. Expendable CM technology is lagging far behind missile technology. Rapid advances in missile technology and historically long development cycles have combined to keep CM technology at least 10 years, or two generations, behind missile technology.

Radio Frequency threat systems, especially in the end game encounter, continue to be a significant threat to naval aircraft and aircrew. Current CM systems as well as threat warning systems are in need of upgrading, particularly for those aircraft that will not receive the ALE-50 and ALR-67 (V3) systems.

Strategic Goals

Several overriding goals must be considered prior to development of the planning process:

- The continuing need to enhance the survivability of Navy aircraft to perform and survive as an integral part of the Navy and Marine Force Structure.
- The evolution of threat systems, together with increased proliferation brought about by current world economic conditions, presents an overriding need for advanced technology R&D programs to continue current improvement of aircraft self-protection systems, and to expand the envelope of technology to meet emerging threat systems.
- The need to improve interface with Fleet operational units to ensure research, development, and testing programs that are focused to address Fleet requirements for increased aircraft survivability.
- The need to provide input to the S&T community to focus 6.1 and 6.2 projects to meet Fleet requirements.
- The need to improve interface between the Operational Fleet, acquisition professionals, and research scientists by better leveraging the capabilities of the Naval Science Assistance Program (NSAP).

Assumptions

The Strategic Planning Process is based on assumptions that form the parameters under which the Navy's plan was developed. Significant change or elimination of one, or all, of these assumptions could change the recommendations or priorities in the plan. Selection of advanced technology programs to address current and future threats should be based on the following overriding assumptions.

Survivability

Survivability of both Navy aircrews and aircraft will remain a high priority for successful mission accomplishment. In today's environment, as well as the battle area of the future, survivability against sophisticated threats that will be found in most Third World countries will require aircraft with equally sophisticated integrated aircraft self-protection systems.

Aircrew Workload Reduction

While the primary objective of aircraft survivability systems and equipment programs is to provide a high probability of

Needs Assessment/Requirements
- OAG deficiency
- Shortfall in protection
- Program-driven
- Platform requirement
- Technology insertion
- MNS/ORD requirement

Technology Evaluation
- Feasibility of the technology
- Maturity of the technology

Cost Analysis
- Risk assessment
- Military worth
- Cost benefit

Transition Path
- Product Improvement Program
- Platform requirement
- Technology insertion
- Ongoing program requirement

FIGURE 2. **Evaluation Criteria**

survival for the aircraft and its aircrew against the most sophisticated threats, a secondary, but equally important, objective is to reduce aircrew workload, so pilots and aircrew can concentrate on delivering weapons in the "end-game encounter."

Static Force Structure

The TACAIR Force Structure will remain unchanged.

Future Threat Systems

The unique mission profiles and operational scenarios for Navy aircraft and pilots will continue to place them in direct confrontation with current and future threat systems with no existing protection. The basic tactical warfare missions (interdiction, close air support, and air-to-air combat) will remain into the next millennium. However, technological advances in threat systems will most probably result in an ever-increasing arsenal of sophisticated surface-to-air and air-to-air weapons.

All indications suggest that air warfare will be characterized by a rich electronic countermeasures environment, improved target acquisition and classification capabilities through all-weather imagery, and around-the-clock continuous operations.

Navy Electronic Warfare S&T programs must continue to address shortfalls in aircraft protection from current and advanced threat systems. Moreover, S&T programs must also look to focus efforts on future threat systems and begin to initiate R&D efforts to address those threats.

Unnique Environmental Requirements

The Navy will continue to have unique environmental requirements such as carrier suitability, Hazards of Electro-Magnetic Radiation to Ordnance, Electro-Magnetic Capability, and other at-sea operational restrictions that must be considered when joint programs with other Services are explored.

Approach

This planning process is a four-step proactive approach. Each step is interlaced and continuously ongoing. For example, gathering data to determine requirements for new advanced technology CM systems is a daily process, every single day of the year.

Step One – Gathering Data/ Assessment of Requirements

Step One is a continuous assessment of the current levels of aircraft protection compared to threat systems already fielded or in near-term development. As part of Step One, an assessment of operational requirement documents on file or in process is accomplished and results in a list of shortfalls in aircraft protection for which no documented requirement exists.

Also conducted in Step One are the data gathering efforts to obtain Fleet requirements for solutions to shortfalls in threat protection. The data gathering efforts include attending the Operational Advisory Group (OAG); directly interacting with the NSAP and Fleet personnel, including Air Component to the Atlantic Fleet, Air Component to the Pacific Fleet, and Air and Rescue Force. It also includes interacting with Naval Surface Warfare Weapons Center and Fleet units, including representatives from appropriate PMAs and N-88.

Information concerning available technology will be obtained through interaction with ONR; contact with Department of Defense laboratories; attendance at 6.1 and 6.2 reviews; involvement in industry independent research and development through meetings with industry representatives; seeking out *Congressional Business Daily* sources; and finally, by attending technical conferences and symposia such as Infrared Information Symposium, Joint Electronic Warfare Committee, and Advanced Technology Electronic Defense Systems.

Step Two – Needs/ Requirement Analysis

The information gathered in Step One will produce a raw data list of requirements, shortfalls, and current technologies. In Step Two, the list of shortfalls will be analyzed by the PMA and compared with input from the Fleet, as well as technical organizations. The product of this step will be a listing of shortfalls in aircraft threat protection that are reinforced by a requirement from the Fleet. The PMA list is to be published in priority order. In this step, the data will be analyzed and interpreted for identification of needs vs. available technologies. Upon completion of the comparison, a list of needs will be generated, representing the initial version of a requirements list. The analysis will consider urgency of need so that the list will be presented in a prioritized chronology.

Step Three – Evaluation Criteria

During Step Three, a review of current S&T programs will be made to determine their application for possible so-

lutions to the shortfalls identified in Step Two as well as the potential for transition into 6.3. In addition, during this step the scientific feasibility/maturity of the programs will also be reviewed to determine any potential for transition into 6.3. The product of this phase is the comparison of current S&T programs with Fleet requirements to determine if shortfalls are addressed by current R&D efforts. Step Three also involves a thorough evaluation of the requirements list generated in the previous phase to determine the viability of the recommended projects.

Figure 2 illustrates the evaluation criteria. Based on the results of the evaluation, a prioritized requirements list should be generated for use in the implementation phase of the plan.

Step Four – Transition/ Implementation

Finally, Step Four will be the implementation and utilization of the data produced in the first three steps. Action in this step will be focused on the utilization of the requirements list generated in Step Three. Small Business Innovative Research and Manufacturing Technology lists will be monitored, and inputs will be provided on a prioritized basis. Recommendations will be made to N-88 for funding S&T projects; likewise, recommendations will be made to ONR for future project selection. Attendance at the annual ONR reviews will be critical. Ongoing programs will be monitored with a view toward providing technology insertion, as appropriate. In addition, platform interface will be conducted not only to ensure that information generated by the plan is made available to appropriate PMAs, but also to coordinate efforts in meeting requirements.

Increased Emphasis

A shrinking DoD budget will place increased, rather than decreased, emphasis on development programs to meet threat system shortfalls. To date, there is simply not enough funding to explore every project in 6.1 and 6.2 R&D programs, and there remains an urgent need to focus S&T programs to meet shortfalls in protection of naval aircraft and aircrews.

Moreover, significant shortfalls exist in aircraft protection against certain threats currently fielded, and that gap is increasing. Near-term solutions will narrow the gap, but it is essential for S&T programs to remain focused on addressing current shortfalls and the evolution of advanced threat systems.

In addition to catching up with currently fielded threats, the Navy must look ahead to the next generation and anticipate advances in missile technology. Imaging seekers represent the next logical step, and several have already reached Introduction of Operating Capability or are being deployed. As imaging and other seeker technologies are identified, S&T programs to counter them must already be underway.

Editor's Note: The author welcomes questions or comments on this article. Contact him at **EvansVJ@navair.navy.mil**.

Petty Officer Takes the Boards

Sgt. Kenneth E. Lowery II, USA

The Defense Systems Management College recently held its first Enlisted Person of the Quarter board of the new millennium. When the smoke cleared, Navy Petty Officer 2nd Class Robin W. Kelsick stood alone. Kelsick is an interior communications electrician who has been stationed here at DSMC for approximately three years.

Kelsick first heard about the board about two weeks before it convened. Although the boards were right around the corner, he persevered and studied whenever possible partly due to the support of his unit.

"They were extremely supportive," said Kelsick. "It helped me to relax to know I could count on them for the time I needed."

Kelsick also gleaned knowledge from his peers to aid in his studies.

"I talked to people who went up prior to me and they gave me pointers."

The Enlisted Person of the Quarter board, precursor to the Enlisted Person of the Year board, is designed to allow enlisted personnel to rise to the occasion and shine above their respective peers. The board consists of a chairman and a panel of senior noncommissioned officers who ask a series of job-related, Service-related, and current events questions. The panel also observes each servicemember for posture, uniform appearance, and overall military bearing.

"[The board] lets us recognize our outstanding personnel," said Navy Master Chief Scott Russell, Senior Enlisted Advisor, DSMC. "It puts them in the running for the Enlisted Person of the Year program."

Besides a certificate of commendation from the DSMC Commandant, Kelsick also walked away with a $25 gift certificate redeemable at the post exchange; a $25 check from the Noncommissioned Officers Association (NCOA); an NCOA certificate of award for Petty Officer of the Quarter; and an NCOA certificate of award for Sailor of the Quarter.

"I'm leaning more toward doing my twenty [years in service]," he said. Kelsick also remarked that he would be taking his examination for promotion in September.

For all those considering following in his footsteps, Kelsick offers this advice.

"Work hard and be good at what you do. Help out, and volunteer in the community."

Editor's Note: Lowery is a staff writer for *Program Manager* magazine.

DSMC Commandant Air Force Brig. Gen. Frank Anderson Jr., presents DSMC's first Enlisted Person of the Quarter award of the new millennium to Navy Petty Officer 2nd Class Robin W. Kelsick. The award was presented June 23 at Scott Hall, DSMC main campus, Fort Belvoir, Va.

Photo by Richard Mattox