Captain David A. Gove, USN

Originally from Newport, Rhode Island, Captain Gove entered the U.S. Naval Academy in 1971 and was commissioned in 1975. In 1996, he earned his Master of Science degree in Engineering Management from the Catholic University of America and completed Harvard Business School's Advanced Management Program (AMP151).

Captain Gove's previous sea duty included division officer assignments on USS SAM RAYBURN (SSBN 635) from 1976 to 1980 followed by a tour as Navigator/Operations Officer on USS FLYING FISH (SSN 673) from 1981 until 1984. He served as Executive Officer on USS BATON ROUGE (SSN 689) and TOPEKA (SSN 754) Precommissioning Unit in 1987 and 1988.

While Commanding Officer of USS LOUISVILLE (SSN 724) from September 1991 until January 1994, Captain Gove's crew won the 1992 Battle Efficiency "E" as well as a Joint Meritorious Unit Award and a Navy Meritorious Unit Commendation for a Battle Group Deployment to the Indian Ocean and the Arabian Gulf. In 1992 and 1993, Captain Gove was the COMSUBPAC nominee for the Naval Submarine League's "RADM Jack N. Darby Award" for inspirational leadership and excellence of command.

Shore assignments included an exchange tour with the Royal Navy's Submarine Tactics and Weapons Group in Faslane, Scotland from 1984 to 1986 and the staff of the Deputy Chief of Naval Operations (Manpower, Personnel, and Training) as Nuclear/Submarine Officer Program Manager in 1989 and 1990. After command of LOUISVILLE, Captain Gove served as Deputy Commander, Submarine Squadron THREE in San Diego followed by assignment to OPNAV as Executive Assistant to the Director, Submarine Warfare Division (N87) and a tour as Special Assistant (Legislative Matters) to the Chief of Naval Personnel.

Captain Gove relieved as Commander, Submarine Development Squadron TWELVE in July 1997.

His personal awards include three Legions of Merit, the Meritorious Service Medal, three Navy Commendation Medals, and three Navy Achievement Medals in addition to various unit awards.

The Development Squadron—1999 and the New Millennium

CAPT David A. Gove, USN
Commander Submarine Development Squadron TWELVE

I am deeply honored to be speaking to you today as the current SUBDEVRON 12 Commander. Right up front, I would like to express my personal thanks and appreciation to Admiral DeMars, Dr. Bill Browning, and hardworking Team New London for having the vision and tenacity to pull this wonderful event together and allowing us to celebrate this important occasion in such a superb, memorable manner. I am also especially pleased that we have with us such a strong contingent from the Royal Navy and the German Submarine Flotilla in town for the Symposium. Welcome!

The context in which I found myself when I relieved was one of great change as exciting new technologies were being applied to several challenging tactical and operational issues. There was, and is still today, a huge amount going on in areas like Undersea Superiority, submarine connectivity, weapons enhancements for littoral operations, and internal C4I, as well as information management and data fusion techniques for new Tactical Decision Aids.

Naturally, as I thought about the success of DEVRON 12 for the past decades under the very capable leadership of my predecessors, I wondered if I would measure up in today's environment, as they did in theirs. If you haven't yet done so, I invite you to stop by and visit Building 3, and take a look at the gallery of former commanders in the passageway. Quite literally, some amazing heroes have served before me. Their accomplishments are legendary and some of the histories and reflections of former commanders are absolutely fascinating to a young pup like myself.

Today

Today, the DEVRON is continuing its strong heritage as a CNO designated center of excellence for tactical development. Over the next few minutes, I would like to try and paint a picture of just some of the areas we have been working on during the final two years of DEVRON's first half-century. Then, I'll touch on where I think we can best contribute as we enter the next millennium and our second 50 years of tactical development excellence.

WATERFRONT PERSPECTIVE

From the waterfront perspective, one of the most significant aspects of my DEVRON 12 operational commander "hat" has been an excellent new capability entering the Submarine Force. The day after I relieved, USS SEAWOLF was commissioned into the Atlantic Fleet and DEVRON 12. *Wow!* Talk about getting a front row seat to the future! Watching CDR Mike Conner, and his crew, take SEAWOLF through her paces during shakedown in '97 and '98 was sensational stuff.

While the majority of the testing was system-oriented, we exploited every opportunity to incorporate tactical development. This included sub-on-sub exercises against 688 class SSNs and Trident class SSBNs. As a result of this initiative, we refined tactics for approach and attack, which combined long range TB-29 detection with high speed covert closure, target hand over to Wide Aperture Array and Large Diameter Spherical Array, and culminated in covert torpedo attack using the SEAWOLF''s quiet launcher system.

Other SEAWOLF initiatives included high-speed tracking and refinement of under-ice sonar and ship-control systems. This incredible submarine brings a new level of speed, stealth, sensors, and firepower to the submarine tactical arena. A true multi-mission platform, she combines the best sensors with the fastest, quietest submarine in our history. And, don't forget, she can load 50 Tomahawk missiles in the torpedo room, launch eight weapons every four hours, and since almost no tube maintenance is required between shots, SEAWOLF can reload and be back on station in a matter of days.

TACDEV PERSPECTIVE

The TACDEV Mission of DEVRON 12 today is little changed from years past. This latter portion of our mission reminds me of a humorous story, which helps capture the often dynamic and interactive relationships we have with some of the groups we work with in getting the best possible product to the fleet. The context of an engineer developing useful tactical decision aid or display software for the fleet might apply…

> A man is flying in a hot air balloon and realizes he is lost. He reduces height and spots a man down below. He lowers the balloon further and shouts, "Excuse me, can you help me? I promised my friend I would meet him half an hour ago, but I don't know where I am." The man below says, "Yes. You are in a hot air balloon, hovering approximately 30 feet above this field. You are between 40 and 42 degrees N. latitude, and between 58 and 60 degrees W. longitude."
>
> "You must be an engineer," says the balloonist.
>
> "I am." replies the man. "How did you know?"
>
> "Well," says the balloonist, "everything you have told me is technically correct, but I

> have no idea what to make of your information, and the fact is I am still lost." The man below says, "You must be a manager."
>
> "I am," replies the balloonist, "but how did you know?"
>
> "Well," says the man, "you don't know where you are, or where you are going. You have made a promise, which you have no idea how to keep, and you expect me to solve your problem. The fact is you are in the exact same position you were in before we met, but now it is somehow my fault."

But, we'll keep working with our contractors to get it right …

These are definitely exciting times in the world of ASW, and Undersea Superiority remains a key focus of my staff in 1999. This is a very big job and a hard problem—and getting tougher. Proliferation of advanced quieting techniques and advanced sensor and combat system technologies are essentially changing the nature of submarine warfare. Today's modern nuclear submarines, and sophisticated diesel submarines operating around the world in the littorals, are being detected at much shorter ranges than that for which our legacy sonar and combat control systems were designed. We are working hard to develop improved tactics for close range encounters against these quite capable adversaries. Although fundamentals remain similar, the capabilities of our adversaries continue to evolve, which keeps us moving fast.

We have made tremendous technical and programmatic progress in the design and production of sensors and processors. And, we are exploring vulnerabilities, and opportunities, over the entire acoustic spectrum. We are working to develop new tactics to exploit passive ranging algorithms and narrowband processors capable of better processing discrete and diffuse narrowband energy. We are investigating the trade-offs associated with high gain, longer aperture towed arrays, like the TB-29, and shorter aperture, bearing-stabilized hull mounted sensors at both close and long ranges.

The sonar system built to deal with these challenges has been a great success story. The Acoustic Rapid Commercial-Off-the-Shelf Insertion, or ARCI sonar system, now called the AN/BQQ-10, will eventually replace legacy sonar systems installed on LOS ANGELES and OHIO class submarines. The upgrade is divided into four phases, addressing towed array processing improvements, hull mounted array improvements, and active improvements in our 688Is. Software upgrades are scheduled on a 12 to 18 month periodicity through Advanced Processor Builds. However, the short turnaround time on introducing new equipment and capabilities presents new challenges for DEVRON 12 and our training community—that of getting out timely tactical guidance and effective training to optimize operation of these new systems by our Sailors.

LOUISVILLE, configured with ARCI Phase I, recently completed a deployment. The CO remarked, "Overall the tactical performance of ARCI was outstanding and displayed unlimited potential." A second ship, also configured with ARCI Phase I, deployed this spring, and more than a dozen SSNs are scheduled to receive ARCI Phase 2 over the next 12 months. In light of these and other operational successes, we have very high hopes for these systems for the future.

In active systems we are closely involved in the tactical development of onboard HF and MF systems, which includes areas from secure modes of transmission to aspect determination and classification on the basis of a single pulse. DEVRON 12 has a leading role in the development of operational concepts and the tactics required for submarine participation in multi-static operations.

Significant advances have been made in non-acoustic detection of submarines, other than by visual or radar means. We continue to work closely with the UK to progress this technology in terms of both exploitation and to mitigate potential vulnerabilities from our own submarines.

New technology, improved computer processing, and high resolution digital bathymetry, have come together to enable a much better handle on tactical oceanography and gain a clearer understanding of what we don't know. Working closely with NAVOCEANO and METCOM, SUBDEVRON 12 has taken the lead in several important areas.

On ALEXANDRIA, we have coordinated the installation of a terrific new capability called Submarine Tactical Environmental Display System or STEDS. This system provides real time collection and display of water column parameters such as temperature, density, and salinity in a variety of formats for much easier tactical application. We will be working closely with Commander Don Gerry and ALEXANDRIA to fully exploit STEDS potential. Based on early returns, I would also expect that we will be working with the Advanced Systems Technology Office to accomplish a STEDS-type backfit to the 688 fleet. Ultimately, the plan is for the system to be integrated into ARCI (IV) and would be compatible for use on the VIRGINIA Class.

MEMPHIS, our R & D submarine commanded by Mark Breor, recently returned from a deployment in the Caribbean followed by a short turn around deployment up under the ice to test, among other tasks, a new technology called a Universal Gravity Module or UGM. This system measures local gravity and compares it to highly accurate digital gravity maps to determine ship's position. So far, this promising capability looks like a viable alternative to GPS positioning in some applications. A second feature of UGM is a terrain estimation display, which measures local gravity gradients to give a "picture" of the ocean bottom several nautical miles around own ship.

Finally, two new products, Modular Oceanographic Data Assimilation System (MODAS) and REACT, Rapid Environmental Assessment Chart, Tactical, now give us a better means to transfer real-time and near real-time METOC products to the Force, including via the Battle Group Information Exchange System (BGXIS) or the Joint Deployable Intelligence Support System (JDISS).

The Submarine Force is a full participant in network centric warfare, and DEVRON 12 is taking an active role in developing concepts and refining tactics to take advantage of the newest C4I and IT-21 hardware that is being installed on deploying submarines. Improved external communications systems that include Internet-like connectivity to the outside world, combined with an internal tactical network, have greatly expanded the ability of the submarine to receive and manage data and information.

One recent focus has been to develop concepts to support network centric undersea warfare that will leverage the future ability of the submarine to be in full communication with the battle group while operating at speed and depth conducting its Undersea Warfare mission. Working together with Naval War Development Command's Maritime Battle Center, we have demonstrated this concept, along with supporting advanced tactical decision aids, in recently completed Fleet Battle Experiment Echo. For the first time, the operational commander could more easily see and understand the tactical situation of his forces—including taking full advantage of "negative" search information to develop probability density maps for hostile submarine positions.

The Submarine Force has also entered the digital imagery age as digital photographic capability is inserted in our submarines through the Periscope Video Upgrade, or PERIVU, program. When

combined with the IT-21 capability being installed on our submarines, sending real-time imagery to the operational commander becomes feasible for the first time.

Our legacy Combat Control and weapons systems were designed for deliberate attacks in the 5-10 KYD range and were characterized by low bearing rates with relatively rich broadband and tonal signatures. Today's reactive engagements are often characterized by high bearing rates at very short ranges which easily "filter out" sonar data as an adversary rapidly moves through the beams. Additionally, the combat control system's ability to rapidly develop a deterministic fire control solution on a small amount of data is poor in these situations. Even when a weapon is launched, it can have few opportunities for detection because of the close range or poor placement.

Representatives from the Type Commanders, DEVRON 12, and the Naval Undersea Warfare Center in Newport have come together to conduct a "System Review" that looks at this type of engagement from energy at the array to weapon homing on the target. This group is chartered with identifying weaknesses in the system and making recommendations for improvements to both legacy and future systems, maximizing probability of hit on the target submarine while also maximizing own ship survival in the close encounter.

As you're all aware, our strike mission continues to grow. Lessons learned from firing units in CENTCOM and the Adriatic are being quickly evaluated and rolled back into tactical guidance. Current operations in the Mediterranean require shooters to be more flexible than ever to support short notice tasking with a "call for fire" mode of operation vice a traditional large salvo, coordinated strike.

I previously mentioned the Acoustic COTS insertion program for Sonar. There is a similar program for the Combat System in the CCS MK2 block 1C combat system upgrade. Two of our submarines, ALEXANDRIA in DEVRON 12 and CHARLOTTE in the Pacific, have been outfitted with the development test model, CCS MK2 Block 1A/B, for this improvement. The legacy combat system has been enhanced with a fiber optic network that has permitted the testing of several programs for inclusion in the Block 1C program. This network allows display and manipulation of data from the legacy Control Display Consoles over several different processors in the ship. No longer are we tethered to a single computer limited by proprietary code and costly, lengthy updates.

Two years ago, CHARLOTTE deployed to WESTPAC with the BLOCK 1A/B system and several developmental programs. One significant problem was that she had on the order of 32 computer monitors in the control room. Recently, AUGUSTA deployed with 23 separate monitors in her control room. As I am sure you can appreciate, managing all the information presented on these displays is a challenge for even our most proficient crews.

Admittedly we still have a long way to go, but we are making progress in achieving digital convergence and coherent information presentation to improve tactical decision making by the CO and OOD. ALEXANDRIA will deploy later this year with only 12 monitors in her control room and be without paper plots. More importantly, most of the command level data can be shared equally on eight of these monitors, and displays are available for use in the CO Stateroom and the Wardroom. In addition, she will be the first to deploy with the Command Tactical Information Management System (CTIMS), which brings three major improvements to the submarine control room:

- First, it has an automated Contact Evaluation Plot, which can be annotated like the normal paper plot, but has all main frame and COTS sonar data automatically plotted on the display.

- Second, it has a FUSION Plot. This tool is used to fuse the environmental data, contact data, operating areas, and navigational constraints onto a single display to help the OOD and CO gain a clearer understanding of the tactical picture. ALEXANDRIA uses the fusion plot as a replacement for our traditional NAVPLOT overlay and manually maintained intelligence plot.

- Finally, it allows full-screen display and manipulation of the Submarine Fleet Mission Program Library (SFMPL) Geographic and Time Frequency plots.

To enhance the power of this program, two vertical flat panel displays are mounted in the Control Room, one forward and one aft. ALEXANDRIA places the FUSION plot on the forward flat panel so that the OOD can keep the overall tactical picture close at hand. The AFT flat panel is used to display the Contact Evaluation Plot. In the place of the Starboard MK-19 plotter, there are two horizontal flat panels on which the time frequency and geoplots are manipulated and displayed. One excellent feature is that any display can be presented and manipulated from the workstations, thus our Plot Coordinators and Junior Officers of the Deck can fully coordinate and observe all plots. Although still under development, we look forward to the lessons to be learned from her upcoming deployment.

Future

As for the future, in my view, sonar, combat control and tactical decision aids *must* seamlessly communicate via a common Local Area Network in the near term, and be totally fused in the longer term. TDA displays and capability should be accessible at all workstations in Sonar and Control and eventually, TDA functionality should be migrated to the Sonar and Combat Control Systems as part of the Advance Processor Builds of ARCI and Advance Tactical Builds for Combat Control. Incorporation of new technologies or software upgrades made to any one system should be transparent to other systems connected on the LAN and computer processing should be optimized to accomplish tasking via easy access to information computed or contained on other machines. As these systems evolve, they must be integrated to work together to enable the Commanding Officer to successfully locate and engage a target.

One concept for what I would call an “ideal” system might operate as follows. The Sonar Operator runs a performance prediction and search plan for a periodic update—using real time MODAS or REACT inputs. This search plan, once approved, automatically provides the operator with the sonar system lineup that is tailored for the contact of interest. The performance prediction is simultaneously sent to the combat control system to update weapon characteristic settings. Bathymetry is updated for use by TMA algorithms. A tactical display is updated to show new detection and counter-detection displays around own ship. The track plan for the next 24 hours is established using an “option reduction” algorithm or equivalent, and the display is updated to show which areas have been searched.

When a contact is gained, instantaneous data is sent from Sonar for use by the TMA algorithms and manual solution methods. A contact Area of Uncertainty is generated based on the algorithms and displayed on the 2-D or 3-D tactical plot. A probability of kill display is included that assesses weapon performance against the AOU for the contact. As the solutions converge, a confidence factor of potential weapon success is displayed, and when solution AOU is sized such that it falls within the acoustic cone of the weapon, the Commanding Officer should receive an alert. The weapon is fired to search out the AOU vice a corrected intercept to a single, deterministic solution.

There is considerable debate related to this issue. The challenge, of course, is how to properly relate the uncertainty in our acoustic models, intermittent contact on the target of interest, the

scarcity of our historical data, the imperfections in the performance models of our sensors, and the real time changes in the environment into a picture that helps the CO position the ship. However, I think we should aggressively use any opportunity to develop TDAs that truly deal with the really hard decisions that will mean victory or defeat in combat. In follow—on development, displays should include Rules of Engagement support and help the CO deal with the confusion caused by the attack: a picture of the target, my weapons, his weapons; my CMs and decoys; his CMs and decoys; other threats; his likely evasion options; my likely evasions options, salvo options, fight or flee decision options, and the like.

I participate in a forum called the Future Studies Group that works to help develop Submarine Force concepts and goals necessary to enhance submarine superiority with emphasis on revolutionary capabilities. To benefit from innovative processes in government and industry, the FSG interacts with "innovation centers of excellence" and the bright, young junior officers aboard our submarines today. Areas the FSG has been working on over the last six months include concepts for dramatically increased submarine payload; where we might be headed in the areas of Intelligence, surveillance, and reconnaissance; and we're just getting started on submarine connectivity.

On the technology side, there is some really exciting stuff coming down the road. The nation, Navy, and Submarine Force are on the verge of dramatic breakthroughs in microelectronics, computer networks, and communications-breakthroughs enabled by fields like nanotechnology, which is associated with structures that are precise to within a few atoms or molecules; research on nuclear isomer explosives, which can tap the conventional energy potential of the nucleus itself. Proliferation of these and sister technologies will significantly change, or even revolutionize, the capabilities of weapon systems and their supporting C4ISR infrastructure throughout the world. Nanotechnology will allow for the design of computers that are much smaller, remarkably faster, and consume far less power than anything available today. Large screen displays will be much thinner, more reliable and more capable. It will make possible the design of sensors that are several orders of magnitude more sensitive and will enable the integration of multiple sensors into weapons far smarter and more capable than today.

Over the next couple of decades, I see DEVRON 12's role in furthering submarine tactical capabilities continuing on several fronts:

- First, in an environment of increasingly constrained resources, our participation as a tactical development coordinator and partner will continue to be absolutely vital as our relationships evolve. We very much need to leverage the efforts of organizations like the Future Studies Group; COMSUBPAC and SUBDEVRON 5 out West; the Naval Warfare Development Command and the Surface Warfare Development Group here in the East. We also need to continue our long cooperation with our NATO allies at the Maritime Warfare Center in England and the German Submarine Flotilla at Eckenforde, as well as regional partners in WESTPAC, to get the most out of precious submarine assets used for tactical development and enhanced coordinated operations.

- Second, I can not over-emphasize the importance of having operational SSNs assigned to Submarine Development Squadron 12. This continues to carry great weight with other Tactical Development organizations and is critical in keeping guys like me grounded in reality regarding what it really takes to operate our submarines at sea effectively, safely, and securely. I am aggressive in using my assigned submarines to get new technology to sea quickly, evaluate new ideas and tactics, and whenever possible, participate in exercises. That being said, between last December and this July, we will have had five out of six

DEVRON 12 SSNs returning from or leaving on major deployments. The preparation to get these boats and crews ready for deployment, along with the lessons learned and experiences they bring back after using the tactics, software, and technology on the front line, is definitely a very large dose of reality for me and my staff. In my opinion, that frank interaction and exchanging of ideas is, at best, hampered, and at worst, simply not possible without operational boats assigned.

- And third, we are standing on the edge of incredible leaps in technology over the next couple of decades and even bigger changes, but less clearly defined, beyond that. New products and capabilities will enable new levels of performance in weapons systems, sensors, information management, stealth, and operational readiness that we are just beginning to imagine today. We need to continue embracing new approaches and aggressively insert new technology into our VIRGINIA Class and beyond as well as drive modernization of our 688 workhorses. The DEVRON 12 of the future, for its part, will need to be open minded, innovative, agile, connected, and tenacious if we are to make the most of new opportunities for different missions, operational flexibility, and collaborative participation in joint and naval submarine warfare during the next century.

Serving as Commander, Submarine Development Squadron 12 has been an honor and tremendously enlightening. This job has *opened* my eyes to what was accomplished in the past, and what can be achieved in the future. It has *watered* my eyes with the quality of enthusiastic professionalism, commitment, and competence of a truly superb staff—active duty, reserve detachment, and talented contractors alike. I, for one, am really excited about the possibilities we have before us today and in the years to come. *It is definitely a great time to be a submariner!*