

Chief of Naval Operations

Adm. Gary Roughead delivers remarks at the

Naval STEM Forum

June 16, 2011

Thank you very much and thanks for being here, it is good to join you today although I have to admit I probably could have stayed out in the lobby and played with all the toys all morning and maybe have had Nevin [Rear Adm. Nevin Carr, Chief of Naval Research] pinch hit for me. It really is rewarding and impressive to see so many of you here. I understand that yesterday there was an even larger turn out because I think it's key for that type of attendance for a conference which I would consider the first of its kind and one that I would hope is the first of many. I would like to thank all of the educators who are here for your interest, for your involvement. For you shape the young minds of the future. I mean that sincerely but I also will be in a very good place when I tell my teacher-wife that I acknowledged all the educators here. And I would also like to thank all of those who are here that are in public service, because I know that your involvement and your commitment to the many initiatives and your ideas that spawn the new initiatives are done in your spare time. I know you have other demands and other things you would like to do but your commitment to the young people of our country is strong and I thank you for doing that. But I think in both cases, the educators who are here and our great public servants represent a group of Americans who really have a long view for our country. And I am thankful that you do that and that we have experts in the field. I would also just like to comment on some of the folks that I had the privilege of meeting in the lobby this morning. I was struck, and I don't think it's just a relative thing, but I was struck with their youth and their enthusiasm which I think should give each and every one of us encouragement for the future.

I regularly have the opportunity to speak about sea power in our country and what it means for our country. But this conference, I think, is unique in that it is firmly focused on what Americans can expect from their naval forces tomorrow, five years from now, a generation from now, because it gets right to the heart of what makes our Navy the greatest the world has ever known -- and that's our people.

In my mind, there are no subjects more fundamental to the future of sea power than innovation and the diversity of thought that our talented, motivated Sailors and Navy civilians bring to the work that we do. Science, technology, engineering and math (STEM) are critical elements of both innovation and diversity for our Navy and our nation to continue thriving, as the Commander-in-Chief mentioned in his State Of The Union Address, when he said that the rules of the working world have fundamentally changed. And so what we're doing here, what you're doing here, as we're out and about is representative of that rule change that we're experiencing.

Since long before the time of ironclads in our country, the Navy has always prided itself on being an institution where innovative thought marked the only constant. From sail to coal to nuclear power, we in the Navy have been innovators. This year we celebrate the centennial of naval aviation, 100 years of dynamic technological change with sweeping operational impacts – to the point where we cannot envision exercising sea power without operating aircraft from ships at sea. From flying early aircraft off the decks of modified cruisers, to jet aircraft from angled decks, to using electromagnetic energy to launch fighters from our forthcoming Ford-class aircraft carriers, like the one we recently named in honor of President John F. Kennedy the other week, we in the Navy have always been innovators. And this is only speaking of aviation.

The Navy has been finding new ways to maintain its operational advantages in multiple domains throughout our history, most recently in the realm of cyberspace. Yet at a time when our high-technology requirements

for continued dominance in the information age have become acute, we are poorly positioned with regard to the intellectual capital required to maintain our uniquely American technological advantages. The educational trends that we see are menacing, and I know we are all aware of them or we wouldn't be here, but the ones that strike me most paint a picture of long-term challenges that won't be able to overcome if the choices we make to navigate our present budget environment don't prioritize STEM education and outreach. We've made great strides in recognizing that we need to get active in promoting STEM awareness and now we need to be clear-eyed about what it will take over time to realize the naval STEM workforce goals SECNAV discussed yesterday.

It is not just a question of funding, but also of making the funds effective with comprehensive, mutually supportive, and coordinated initiatives. The Navy's commitment to smart approaches in STEM education and outreach will determine how well we bring in the people we need to replace the 30% of defense science and technology professionals expected to retire by 2020, or the roughly 6,000 engineers and naval architects affiliated with our Naval Sea Systems Command alone who will be eligible to retire in just three years time. The extent to which our initiatives raise greater interest in STEM among eighth graders, or increase the number of Americans pursuing – and, I would also say, completing – undergraduate STEM degrees, will determine whether we put ourselves on the sustainable path we in the Navy will need. Because the current trends we see promise to impact both our pool of professional scientists and engineers developing the future force, as well as the Sailors of the future who we expect to operate increasingly complex systems in an information age Navy.

Since 1946, the Office of Naval Research and the wider science and engineering community represented here have contributed mightily to our efforts to build the future fleet by providing the technological advantage our Navy needs. And those contributions are rather exceptional today.

While 51 percent of the United States patents awarded last year went to foreign companies, the Institute of Electrical and Electronics Engineers recently ranked the U.S. Navy's patent portfolio as the strongest among all government organizations in the world. ONR has supported over 50 Nobel prize-winning scientists. It has also launched the productive careers of more than 500 scientists and engineers since its Young Investigators Program started in 1985. We will continue to rely on work like that to maintain our advantage in a demanding future security environment; one where technical proliferation is deepening and where challenges which span the spectrum of warfare - from improvised devices in the physical domain to viruses in the cyber domain. All of those new innovations really face low barriers to entry, imposing greater costs for us to counter than for potential adversaries to develop.

I often say that I never want any of our Sailors in a fair fight. STEM and diversity are important for the new ideas they bring to how we maintain our technical edge. They directly improve the solutions reaching our Sailors, and strengthen the teams at sea who employ those solutions to great operational effect. We know this implicitly, and we see the need to generate STEM interest in as big a pool of potential applicants as possible, yet we continue to find there are young people in America who are unaware of what we do. They have not been exposed to the Navy and, critically, what professional interests they can pursue with us that would help their fellow Americans and carry all the benefits of service in that process.

A few months ago I was in Texas visiting a pretty remarkable high school with a fascinating educational model. It's only about 200 miles from one of our affiliate research universities and I had the opportunity to meet a young woman who was taking me around the school. I have to admit I thought she was a member of the faculty for most of the visit and then I found out she was junior in high school. She had the interest, poise and the maturity of someone well beyond her years. But the most remarkable thing for me was, at one point, she turned to me and said 'can I be an engineer in the Navy?' And that really caused me to think about how

much work we have to do to let young people know what the options are, that there really are opportunities for bright, technically-oriented young men and women in our country who really care about the future. But it's also important that we do it at a time when they can begin to lay the foundations to pursue their dreams.

Again, I'd like to thank ONR for having brought all of us together in this forum, but our STEM education and outreach programs, as many of you know, come from various elements of our Navy. In 2010, we funded over \$75million for 180 Navy STEM programs nation-wide, and as you heard yesterday, the Department of the Navy is going to expand on that. Some of these initiatives, like NAVSEA's Naval Engineering Education Center (NEEC), partner our surface and undersea warfare centers with leading university engineering programs for project-based education to develop graduates with relevant hands-on experience in the near term. Some of our warfare technical directors are in Norfolk this week for the NEEC Annual Conference, where student teams present their projects in areas like energy conservation, nanosensors and acoustics, and at the same time they'll have an opportunity to see the Navy that we have in that area and to be able to look into the opportunities that they have in the future. Others, like the Summer STEM Academy we will open this summer on the Philadelphia Naval Yard, leverage engineering and medical experts within our Navy as mentors for junior and high school students considering more advanced STEM pursuits in the medium term. And others still, such as the learning centers the Navy opened in Los Angeles and New York City last fall in partnership with the non-profit organization Iridescent, expose a broad range of students in grades K-12 to what is possible in the long term with a strong background in science and technology. Our Systems Commands – NAVSEA, as mentioned, but also our Space and Naval Warfare Systems and Naval Air Systems Commands – have reached tens of thousands of students and thousands of educators through volunteer hours, summer camps and engineering challenge events.

Yet there is indeed more room for wider participation, for more coordination between our various initiatives, for new partnerships, and for better methods to assess what types of outreach really build the interest and sustained contact with promising young students. While always important, measurable output objectives are essential in the present budget environment if we are serious about preserving our commitment to addressing the needs that we have identified. This is why I applaud the interest and potential for leadership on STEM education and outreach displayed by each of you and your colleagues who were here yesterday, and why I'm confident that your energy and commitment to unearthing the best practices among our various activities will begin to deliver exponentially improved results.

In all of the efforts, I look at the work of a vibrant American science & engineering community that are tackling tough challenges in naval warfare, and I see the future flexibility of our Navy preserved through the diligence and ingenuity of great patriots. You've keyed in on an urgent and important strategic question that we must not allow to go unanswered. The value of our Navy to the defense of our nation and the prosperity of future generations cannot be overstated. The value of your efforts will rightfully gain more prominence as others in the country come to realize exactly who has stood up and sought to answer the questions at hand.

Whether or not the young people that we reach with the initiatives under consideration here elect to enter naval service, the passion you have for the promotion of STEM education will serve Americans well, and will ensure the Navy of tomorrow defends the interests of a nation that is justified in its optimism for the future. I thank you for what you do, I thank you for what you've done, and I thank you for the interest that you have to take us into the future and I look forward to any questions that you may have. Thank you very much.