

Good afternoon, Madam Chairwoman and Members of the Subcommittee...Mr. Lemnios...distinguished colleagues. My name is Regina Dugan, and I am the Director of DARPA. I am proud to be here. And I am clear about the weight of my responsibility.

Over the 50 years of its existence, DARPA has achievements ranging from the Internet to stealth...from GPS satellites to MEMS technology...from rockets to the M-16 rifle. We challenge existing perspectives, break glass, and make people excited and uncomfortable, sometimes with the same sentence. You might say that DARPA is the Nation's elite army of futuristic technogeeks. And this is our service to country.

The Agency's full testimony, submitted in support of our budget request, details DARPA's contributions to the current fight; our ongoing programs; and novel initiatives that address some of the most complex problems of our time.

When the country is at war, and we can contribute, it is our duty to do so. Indeed, the Agency has been involved in support to active conflicts since the Vietnam War. At any point in time, DARPA has technologies in all stages of development: from nascent idea to system ready for fielding. Recently, we accelerated fielding of systems to protect helicopters and ground vehicles in theater. Both capabilities promise to make it very dangerous to shoot at US Forces. I believe that the breadth, urgency, and technical demand of these activities focus our work. The authenticity of such engagement inspires greater genius. And it cannot be created in the abstract. My recent trip to Afghanistan illustrated this principle and reinforced our commitment.

We must balance this investment with our responsibilities to the next generation of warfighters. It was once considered inconceivable (or at least ill advised) to fly an aircraft without a pilot onboard. In the very near future, the United States Air Force will train more UAV pilots than conventional pilots, and today we talk about "blackening" the sky with such systems. The UAV capabilities deployed on the battlefield today started at DARPA in 1984. And what originally seemed impossible has now become routine.

This progression characterizes many of DARPA's advances: first impossible, then improbable, eventually inevitable. And we take on new, seemingly impossible challenges each year.

From hypersonic vehicle technology to tobacco plants used in vaccine production, which are related more than you might realize... because speed matters not only in global strike, but also in our response to a biological attack. **From nanoscale systems to quantum mechanical effects**, which are related by an impact far disproportionate to scale... single sheets of carbon that may enable radar systems with 10 – 15 times greater range. (That's a bit like having a really good right hook at the end of a 50-foot arm.) Or quantum effects that may at long last unlock the secrets of a bird's navigation capability or the canine's keen sense of smell. Perhaps there is a whole new world of synthetic sensing yet to be realized.

DARPA's commitment to the care of our military men and women is one way that we honor their commitment to the Nation. We have ongoing programs devoted to stopping blood loss, diagnosing and treating traumatic brain injury, and assessing those at risk for suicide. Advances in DARPA's prosthetics program have enabled artificial arms with the range and dexterity of a natural arm. I have spoken with amputees who were surprised by their own emotional response to feeling like a bilateral again... and the realization that what they once thought impossible, no longer seems improbable, but rather... inevitable.

And our commitment extends to the health of our S&T workforce. DARPA's STEM initiatives total over \$15M between 2010 and 2011. Such efforts include our Computer Science STEM Education program and, InSPIRE, which utilizes microsattellites inside the Space Station as a platform for student-led experiments. The latter program has graduated more than 80 students, from undergrads to PhDs, with noticeable impact as we have begun to see graduates among the top technical experts across all the major space industry primes.

Would you believe me if I told you that, in the words of researcher Zoran Popovich, we could put games into science rather than trying to put science into games? Believe. Last year, Wired Magazine reported a nail-biting, play-by-play of the battle between a 43-year-old Paris-based marketing manager and a 13-year-old American who were in fierce competition to solve... well... a protein folding puzzle. Since the launch of “Foldit” in May of 2008, over 120,000 have participated, and an average of 200 new users per day sign on to solve puzzles for science. Of the top 20 players, only 1 or 2 have advanced training in biochemistry. If you’ve ever tried to teach a student fractions, much less the fundamentals of protein folding, you can appreciate this amazing accomplishment.

Articulating present and past successes is a confidence builder. But we should avoid the error of self-congratulation. It is indulgent. The spectrum of challenges we face now and into the future is vast. We’ve got too much to do to rest on an outstanding reputation. **And so, as we look forward,** we intend to take on novel initiatives that challenge our conventional thinking and address some of the most difficult problems of our time.

One of the biggest challenges we face as a Nation is the decline in our ability to make things. Americans today consume more goods manufactured overseas than ever before ...and yet they are less likely to be employed in manufacturing than at any time in the last 100 years. We believe that this decline impacts the Nation’s ability to innovate... because, quite simply, “to innovate, we must make.” Importantly, this has potentially significant implications for defense, because to protect, we must produce. As such, we seek to synthesize and integrate our existing manufacturing efforts, which total approximately \$200 million per year, or \$1 billion over the next 5 years, so as to contribute alternative design and production methods for next-generation systems. We seek to create breakthroughs that allow the participation of thousands of designers rather than hundreds...and massive innovation, much like the breakthrough of the Internet enabled massive innovation in the communication and IT industries.

This massive innovation – in essence the democratization of innovation – has both risk and opportunity. We often talk about globalization as a world without boundaries. A sociologist will tell you otherwise. Namely, as long as humans are involved, there are boundaries. There are boundaries between men and women, between cultures and religions... What is different in a globalized world is that those boundaries, or edges, no longer conform to geographic lines on a map. Our ability to define these edges, from a technological and a policy perspective, has not yet evolved. Nowhere is this felt more acutely as an opportunity than in the global mindshare of democratized, crowd-sourced innovation. Nowhere is this felt more acutely as a threat than in the cyber world.

Whether you believe in a war metaphor or a law enforcement model for cyber, the goals of the response are common. At DARPA, we are assembling some of the best talent in the Nation to work on this problem, and we are committing significant resources. In 2010 and 2011, DARPA will invest over \$300M in cyber initiatives, and DARPA-developed technologies are already prevalent in both commercial and military use. As an example, DARPA technology now protects all DoD network connections to the internet against denial of service attacks. The Agency is at the center of many new capabilities, and our track record of success is solid.

This set of programs and ideas is almost overwhelming in scope and potential impact. But they are not ours alone. Rather, they are the result of a vibrant exchange among many. One of the Agency's strengths is its ability to build bridges between disparate communities and to uncover ideas in unexpected places. Over the last 8 months, we have renewed our commitment to this ethic.

We have aggressively engaged with three important constituencies: Universities, Industry, and the Services. Today, we are in active dialogue with more than 100 Universities as we redouble our commitment to the role of fundamental research in National Security. On January 26th and 27th of this year, DARPA held its inaugural Industry Summit. One hundred and nineteen (119) companies representing more than 10 business sectors and 31 states participated. Some of the best minds in the country

engaged in discussions regarding the impact of globalization on US National Security and competitiveness. And we have recharged our partnership with the Services by leveraging the perspective and subject matter expertise at DARPA to create new conceptual frameworks for complex issues such as global integrated ISR and tactical communications. When we do our job well, we challenge existing world views. This means transition will always be a struggle, but an appropriate framework allows it to be an informed struggle over how best to achieve the best capabilities for the Nation.

Getting our business practices right is part of the job. It is said that “Ambition is a dream with a V8 engine.” Our full testimony highlights recent efforts to fine-tune the engine. Included are our efforts to empower office directors and program managers, and the creation of two new offices. We have streamlined our decision making, improved execution, and created a pilot SBIR “EZ” contracting mechanism based on commercial best practices.

What was once impossible, then improbable, and then inevitable. This progression characterizes DARPA’s history, present, and future. The challenge serves as a timeless calling and source of wonder for the organization, for those in it, and for those near it.

DARPA is the Nation’s elite army of futuristic technogeeks. They are dreamers with V8 engines. This is their service to country.

On behalf of these dreamers, I thank you. DARPA’s success is in part owed to you...your support and confidence in our mission.

I would be happy to answer your questions.