

## Creative Disruption: Harnessing Innovation for Strategic Effect

Center for Strategic and International Studies

Opening Remarks – Dr. Will Roper, Director Strategic Capabilities Office

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World War II was a period of revolutionary innovation in military capability, even though the science and technology underpinning it was relatively static until the creation of the atomic bomb. In a war where both sides had comparable capabilities, advantages were gained by imagining new ways of combining or repurposing old systems, and the results were often game-changing. Some great examples surround the Allies' destruction of the Nazi V3 super gun. It was designed to finish what the V1 missile and V2 rocket had started—bombarding London from occupied France—but doing it with artillery instead. At the time, powder artillery was not capable of ranging the required 100 miles, but rather than wait for a fundamentally new technology—like the electromagnetic railguns we are developing today—the Nazis reimagined how powder guns could be built: incorporating propellant at multiple locations along the barrel rather than a single, rearward one. The extra boost made a super gun achievable using existing technology, and to protect it, the Nazis constructed a massive underground bunker—bombing from the air would not succeed for the Allies. But both the U.K. and U.S. had ingenious responses by repurposing two of the stalwart workhorses of the war: for the Brits, the heavy bomb; for the Americans, the heavy bomber. The Brits modified traditional heavy bombs to make them detonate underground, creating the first-ever bunker buster. The Americans used early television cameras and radio to remotely pilot an explosive-laden bomber, creating a progenitor of modern day drones. It was the British

“earthquake bomb” that ultimately destroyed the V3 and saved London, and over 70 years later, super guns, bunker busters, and drones are still very relevant military concepts.

This back-and-forth evolution of the military playbook was really a struggle for surprise—both sides seeking to transcend predictability and undercut opponents’ assumptions. The resulting confluence of strategy, concept development, and tactical employment was fast, agile, and continually creative because the surprises it birthed were short-lived: once demonstrated, countermeasures were soon to follow, so the next big thing had to already be in development. We owe a great debt to the men and women who won that war—we can also learn a valuable lesson from them about how to maintain our military dominance in a world where the technology playing field is leveling.

We’re all aware that our leap-ahead, Cold-War-era technology—things like stealth, satellite navigation, and precision weapons—have been on display during decades of operations in the Middle East and around the world. This has given other nations time to watch, learn, copy, and exploit perceived vulnerabilities. Whether you call it “anti-access/areas denial” capability or another name, these developments hope to undercut trillions of dollars of past U.S. investment, but buried within their foundation are assumptions about what our current military systems will and will not do. But if we take inspiration from the story of overcoming the V3, disruptive capabilities can be rapidly achieved with current systems if we free ourselves from conventional thinking and cumbersome processes.

As you may have heard from Secretaries Carter and Work, my office is partnering with the Services to do this kind of innovation: combining hypersonic projectiles with howitzers to make missile defense super guns; modifying Navy interceptors to destroy ships while defending our own; making unmanned Fourth-Generation fighters the avatars of manned Fifth-Generation systems; and many, many more. These examples—super guns, modified weapons, and unconventional drones—show that pages from World War II history are still worth dog-earring today. But we're also writing new chapters too: swarming microdrones, autonomous boats, 3D-printed systems, big-data-enabled sensing, and deep learning just to name a few. We find exciting possibilities in all facets of our military, but not surprisingly, there are also new challenges that we must overcome.

The first involves technology origination. In the past, new technologies—like the early television in the World War II drone—were used on the battlefield before in people's homes; in the future, this will not be the case. Though the technology organizations of the Department have amazing leap-aheads in store, many technologies that will change national security—like the ubiquitous drones, big data, and deep learning I mentioned earlier—will be first developed by and for commercial markets, which means any military can use them. The Defense Department will have to become fast adaptors—vice solely developers—of technology to avoid being left behind. I am sure we will discuss this more today.

The second challenge involves deterrence. While repurposing systems to win World War II, deterrence was not a consideration by default: for us, it is and an important one. This means we must choose what surprises to reveal and protect to balance between deterring future conflicts and

winning them if necessary. This will be a complex multi-variate calculus, but one we must master to live in a future shaped by us and not for us.

Though these challenges are not insignificant, I have hope we will overcome them. I'm hopeful, in general, because we have nonpareil strengths on our side: a highly-creative society, high-tech industrial base, and highly-adept military personnel. So, like our forebears, it's time to channel these strengths with MacGyver- and Q-like ingenuity, regain a sense of urgency, and remind ourselves that when you have the greatest military on earth, you also have the greatest starting block for military innovation and surprise. Thank you.