Commander, U.S. Pacific Fleet
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It's great to see so many familiar faces out there, including Admiral Macke, General Bob Shea, General Bob Wood, Secretary Grimes, AFCEA Hawaii President Cory Lindo, Chairperson Cynthia Pacheco and the entire AFCEA Hawaii team.

And a special shout-out to the ROTC and JROTC cadets here. About a hundred years ago I started out as an NJROTC cadet in high school in Florida, so I'm really inspired to see you here at this conference.

As I start my remarks today … uh-oh, looks like I'm missing my remarks.

Mike, can you bring me the backup copy?

(A UAV flies from the side of the room to the lectern to deliver a speech to Admiral Harris.)

Ladies and gentlemen, a demonstration of our new UASDS — or Unmanned Aerial Speech Delivery System.

Mike Elliot is the pilot of the quad copter and he works on the Pacific Fleet team in our plans and policy shop. Thanks Mike.

Ladies and gentlemen, there's a high demand for the innovative use of new and existing technology. Now I admit, there probably won't be much demand for a speech-delivering UAV, but there are companies out there looking to use them to deliver books, packages, even a pizza to your front doorstep. Getting into the Christmas season, I understand one restaurant is flying around mistletoe to get their customers in the mood. So if you see a UAV hovering over your head, better pucker up — or get the heck out of the way!

Commercial use of UAVs may seem risky, an unconventional idea doomed to fail, but stranger things have found their way into the mainstream market.

Back in 1903, Orville and Wilbur took a huge risk building a flying machine out of bicycle parts, yet look where we are now. This year marks the 100th anniversary of commercial aviation. Now jet aircraft carry millions of passengers to their destinations every day, and some of those parts are not made by the lowest bidder, but some are made by a 3-D printer.

There was plenty of risk in 1939 when Igor Sikorsky built a flying machine that had to be chained to the ground so it wouldn't flip over and kill him when he first tried to hover it. His factory workers called it "Igor's nightmare." Today we call it a helicopter.

Now, even as I speak, we've got USS Fort Worth, one of our newest Littoral Combat Ships, heading toward the Western Pacific. She's deploying with an MH-60R helicopter and a

FireScout, an unmanned helicopter, the first time that a combined squadron configuration has deployed to this part of the world.

Sometimes an unconventional idea can change the world, and that's something we're good at doing here in America.

After all, we worked and reworked aircraft design until we broke the sound barrier and we built the first transistors and microchips and put a personal computer on everyone's desktop. Back in the '60s and '70s we launched a satellite constellation into orbit and today my car's navigation system uses it to tell me where to go.

Though I have to admit I don't use it that much, as my wife Bruni still likes to tell me when and where to turn.

And of course it was Americans who pioneered liquid fuel rocketry and perfected it. Since then, we've sent men to the moon, and now, with the flight of the Orion, not the P-3 Orion I've come to know and love, but NASA's new big rocket they just launched, this generation of Americans has taken one giant leap closer to sending people to Mars.

No doubt innovative Americans have been pushing the boundaries in every field of science and technology since our nation's founding.

And with your help, we're evolving technology and equipment to meet our needs in the Navy as well, especially as we rebalance to the Indo-Asia-Pacific and we contend with the challenges we see coming up in the decades ahead.

We're installing CANES, the Consolidated Afloat Network and Enterprise Service, on our platforms, consolidating legacy networks into an integrated platform with increased capability for defense and security.

And we're implementing JIE, Joint Information Environment, a shared IT infrastructure and a common set of enterprise services all under a single security architecture that will integrate the Mission Partner Environment rapidly and securely.

We also have the ICITE, the Intelligence Community Information Technology Enterprise, which is enabling intelligence information sharing and fusing, based on a common computing environment and will bridge to JIE.

The theme of this conference is "Assured Interoperability," and that's not lost on me. When collaborating with our allies, cross-domain interoperability is a key enabler. For all the functionality in our world, we want to be able to share that functionality, in a secure way, with our allies and partners, when needed.

We need an innovative, low-cost, reliable, and secure cross-domain solutions — now. And those terms aren't mutually exclusive. They don't need to be unnecessarily expensive. One of you out there ought to be able to figure that out for us.

We're deploying new platforms and equipment too, most of it deployed first right here to the Pacific. We've just commissioned USS *America*, a new class of amphibious assault ship.

There is also the new DDG-1000, where all three *Zumwalt*-class destroyers will be based in the Pacific.

We're developing the rail gun for use as an offensive and defensive weapon.

And we're encouraged by the ongoing test of our Laser Weapon System or LaWS out in the Persian Gulf. It's a directed-energy weapon installed on USS *Ponce*. CNO Greenert visited the *Ponce* for a demonstration and said if he could miniaturize it, he'd put it on every ship. And I'll add to that by saying the price tags got to be miniaturized too.

No doubt our Navy has benefited from America's pioneering innovations — we certainly know that. But so does everyone else.

Maybe that's why our competitors have always sought to obtain American intellectual property, legally and illegally. No doubt it's easier to copy than it is to create. That's why we've got to put such an emphasis on protecting what we've got. We've got to make sure it's protected from those who would steal it, as they try to catch up, to close the technology gap on us.

For years our nation has maintained a significant edge in research and development. I think that's due in part to our pioneering spirit, to our freedom as a society to explore new ideas, and also the strength of our higher education programs.

No doubt that's why, during the 2012–2013 school year, we saw a record number of international students attending our universities: nearly 820,000. Fully 49 percent of those students were from three specific nations, China, India, and South Korea, with China leading the way with nearly 235,000 students.

But here's the rub. According to a recent article I read, more than 80 percent of emerging technical talent is being developed in Asia. China and India have more honor students than we have students.

And all this right at the time when the stakes are at their highest. The competition out there is fierce today — not just in our schools, not just in our businesses, but in the battle environment — and our nation's armed forces are looking to develop and evolve technology to meet our needs now, and to meet our needs in the future.

Of course, that might be easier said than done, because we've had a different focus lately. For more than 10 years our nation has been engaged in two wars that have demanded our concentrated effort and attention. Meanwhile, many potential adversaries have taken that time to modernize their capabilities across the full spectrum of conflict. Traditionally we have always counted on our overmatch in capability and capacity to offset challenges of distance and initiative in those areas where strife is most likely.

According to the vice chairman of the Joint Chiefs of Staff, Admiral Sandy Winnefeld, "that overmatch is now in jeopardy." And that's got my attention, because like I told the U.S. Senate

committee just last week at my confirmation hearing, I believe America should always bring a gun to a knife fight — not a butter knife.

I believe the best way to do this is to play to our strengths, American ingenuity and innovation. By turning our best and brightest loose, there's no challenge we can't meet. In fact, our Department of Defense has recently started a "New Defense Innovation" initiative, to get at that.

Now we understand today's fiscal realities and the budgetary constraints we're bound to contend with. We won't be able to just throw money at a problem. We need to think about it and come up with innovative solutions that are cost effective and that have the greatest potential to yield results.

The DoD's long-range research and development plan is intended to find and field breakthroughs in key technologies, including robotics, miniaturization and advanced manufacturing techniques such as 3-D printing.

I know leaders like many of you have been working hard on developing solutions to the challenges we face, but right now I am calling for a renewed effort by industry and academia to join me in focusing on innovative technologies.

So, with the gauntlet thrown down, so to speak, let me talk about some of the innovations we're testing right now.

Let me introduce Senior Chief Will Casillas.

(Senior Chief Casillas walks on stage wearing "smart glasses" and starts demonstrating his work on an electronic assembly that can be seen by the audience on the big screens.)

Senior Chief Casillas is demonstrating one such advancement, called augmented reality, and how our technicians today are able to leverage this technology. What you're seeing on these screens is what he's seeing as he approaches an electronic assembly. Here the augmented reality system is essentially overlaying the tech manual right on top of the electronic assembly, guiding Senior Chief through his maintenance routine.

Augmented reality is already helping us train our technicians. In some cases, an apprentice tradesman, for instance a welder, pipefitter or a machinist, can perform tasks at the level of a journeyman, and a journeyman can perform at the level of a master. This could allow the Navy to reduce training pipeline costs in terms of both dollars and time, especially for skills that are needed infrequently, such as when we're working on legacy equipment.

Augmented reality may also improve our decision-making and teamwork by providing information in a format that is easier to understand, precisely when the operator needs it. Imagine the ability for our watch standers to put on a pair of smart glasses and fuse all data from their sensors into a heads-up display. Now every watch stander can be a fighter pilot without leaving their desk.

And I, for one, see a lot of potential in this type of technology.

Thank you, Senior Chief, for that demonstration.

Of course you can also get a lot of help from the Internet these days as well. Recently I found a YouTube video on how to change a tire on a pickup truck. Now I know what you're thinking, how hard can it be to change a tire? Well, in this model pickup, it's almost impossible to get to the spare without knowing how to beforehand.

Online there are dozens of these homemade YouTube videos that walk you through the process step-by-step on how to remove that tire.

The cool part is that you can kind of figure out which video is best by finding the one with the most views. For me, I'm going to choose the video with 435,000 views over the one with 40,000.

The real value here though is not just in learning how to change a tire. It lies in the technology's ability to harness the collective "wisdom of crowds" multiplying the ingenuity of one enterprising individual to help others up the learning curve.

I know our Sailors are pretty ingenious as well — they're as innovative and tech savvy. How can we harness all the experience and talent that resides with our Sailors to better the entire fleet?

Well, some of them have signed up to be part of the CNO's disruptive thinking group known as the Rapid Innovation Cell or CRIC and doing it on their free time. So that's a start. But how else can we leverage our Sailors to get things done in the Navy better, faster, cheaper? I'm looking for ideas, and I think I've come to the right place to find them.

Is there a way we can further leverage the "wisdom of the crowd" other than our own Sailors? I think so. An obvious way is to evolve the technology that already exists to meet our needs, and we're starting to do that.

So let me show you something.

(Admiral Harris holds up military remote control box.)

This is a MILSPEC remote control box to operate one of our periscopes in a nuclear submarine. Not bad huh? With the interface box it weighs about 10 pounds. Of course that feels closer to a hundred after holding it for an hour or so, but submarines don't have much gym equipment onboard, so it doubles as a barbell.

And it's cheap. We got this one for an incredibly low, introductory rate of only $120,000. Good stuff.

Now take a look at this.

(Admiral Harris holds up a common home video game controller.)

It's a common video game controller you can buy off the Internet for $9.99. It weighs a whopping 10 ounces, light enough that even my pencil-thin arms can hold it for an hour.

And the really cool thing, we've adapted this *(common video game controller)* to replace this *(military remote control box)*. Wouldn't it be great if we could use more of this type of equipment in the DoD today?

I think so.

But it can't be a slow process, not like we're seeing with these 3-D printers. We're just now getting serious about this technology for goodness sakes, and that's been around since the '80s.

I understand our Coast Guard brothers and sisters have 3-D printers on their ships used for printing spare parts. The other day I read that NASA did its first 3-D printing on the International Space Station. The technology's come a long way. There are companies printing highly complex fuel nozzles, with dozens of moving parts, for jet engines.

Where's my 3-D printer? Well, there's certainly a demand for them in the Navy, I can tell you that, but we're still waiting.

Adapting technology for our own uses is important to us, and it's a trend that's not going to end anytime soon.

You know, I had asked my aide to put a bottle of water up here and I don't see it.

(Admiral Harris points to the bottle of water on a table across the dais.)

Ahh, there it is. Jay-Ryan, can you bring that bottle to me?

(A robot controlled by student Jay-Ryan DiGap grabs the bottle of water off the table, travels across the dais to the lectern and hands it to Admiral Harris.)

Pretty cool, huh?

They call this robot "the mule" and it's controlled by local student Jay-Ryan DiGap. It was developed by students at Leilehua High School as part of their after-school robotics program. With the mentorship of Harmony Paz and Chris Kawabata, they've integrated robotics into the school curriculum. I know that's no small feat, and I salute both of you for your efforts to advance STEM (Science, Technology, Engineering & Math) education in our schools.

Maybe you've had an opportunity to check out their exhibit upstairs, but if not, come up here and check out "the mule" when where done. One thing I want you to notice is the controller Jay-Ryan is using — the same common video game controller.

Thank you, Jay-Ryan. And thank you, Ms. Paz and Mr. Kawabata.

Through STEM education programs like this, we are developing the next generation of innovative problem-solvers, and I know as I look at these young people that our future is in good hands.

This year, the Navy-sponsored an international competition during our Rim of the Pacific exercise, where Sailors from RIMPAC, youngsters from schools across the state of Hawaii and competitors from all over the world came to put their robots to the test.

While they were busy testing their performance at the convention center, we had Marines testing LS3, another robotic mule, this one big enough to carry 400 pounds of equipment for our Marines as they move forces in the field. You probably saw that on the local news back in July. It looked just like any other headless horse trotting along the beach.

Robotics is here to stay and its usefulness in our line of work can't be overstated. The technological advances we're making today are what will give us the edge in the battle environment of tomorrow. But there are still hurdles that we've got to get over to get the maximum use out of it.

Take for instance all the high-tech personal electronic devices we have access to. What do you have on you right now? A cell phone, an MP3 player, perhaps a tablet, or how about one of those newfangled watches with Wi-Fi?

It's powerful technology that we live with, that we work with, and that we take for granted. But did you know that at my headquarters, in fact, most places in the Navy today, I can't use most of that technology? It's simply not allowed in the buildings where I work. There's a real tension between innovative new technologies and our security concerns regarding those technologies, and rightfully so.

Today, our Personal Electronic Devices have still and video cameras, voice recording capabilities and the ability to send that data around the world. Of course, we've got information that we have to keep closely guarded. Bringing these things together, in the same room, involves risk. And truly assessing that risk, especially considering how fast technology evolves, and how complicated it is, and how many different types there are, requires a lot of brain power. It's easier to make a blanket policy that prohibits all of it.

Yet there's so much value in the technology that it seems we're missing out on some real capability we could be using to do our jobs better. Real capability that our adversaries, such as ISIL, are using. So what's the solution to that?

The Commercial Solutions for Classified process enables commercial components to be used in layered solutions to protect classified information. The National Security Agency is using it now, providing the architecture, component criteria, and configuration of the solution to meet IA requirements. Is that the solution? Is it a new device? Is it a new set of rules or a new mindset?

Innovation is more than just the next cool widget. It's also about a different way of thinking, a new mindset, a cultural trait that becomes part of the way we do business.

Today we need to leverage technology in ways that can give us an edge in the battle environment, but we also need to evolve our mindset regarding the technology we can use.

A lot of us might cringe at the idea of eating a hamburger freshly squeezed from the business end of a 3-D printing machine, especially if you're a Luddite like me. But would our young Sailors eat it? Maybe — it would make things a lot easier in the galleys of our ships if they would.

Do we start issuing what I call WODs, Wearable Optical Devices, to help our watch standers on the watch floor, even if that means Wi-Fi in classified spaces? Maybe — even I'd embrace that idea. After all, I used WODs when I spoke at AFCEA West last February.

Do we start phasing out emails and workstations for text messaging and tablets? Maybe — they're already saying that's where things are headed.

Whatever the future may yield, it's up to us to help bring it to fruition. Technology provides us the means to do things in a way that saves us time, saves us dollars, and decreases risk across the board. But we have to be willing to change from the way we're used to doing business, breaking paradigms and reinventing the workplace.

We need industry to continue to develop innovative technologies we can use now and in the future. We need our Sailors to continue finding new ways to apply that technology and we need DoD leaders to create organizations that are agile and willing to embrace the new innovations that we can use in the battle environment.

Nolan Bushnell, the founder of Atari Games, once said, "Everyone who's ever taken a shower has had a brilliant idea. It's the person who gets out of the shower, dries off and does something about it who makes all the difference."

So, as I conclude my remarks, I want to encourage all of you to shower often, dry off and do something with those ideas.

Today, the strength of our nation depends on the synergy between those brave men and women of our armed forces who volunteer to defend the nation and our partners in industry, who come up with the innovative technologies we need in the battle environment — industry partners like you.

I truly thank you for all you do on a daily basis to help ensure our military and our nation remain ready to fight tonight and win.

Thank you.