Clarke: Welcome to Pritzker Military Presents featuring a discussion with Vice Admiral Philip Hart Cullom, Deputy Chief of Naval Operations for Fleet Readiness and Logistics. I’m your host Ken Clarke, and this program is coming to you from the Pritzker Military Museum and Library in downtown Chicago, and it’s presented in partnership with the Chicago Navy Memorial Foundation. This program and hundreds more are available on demand at PritzkerMilitary.org. In Vice Admiral Cullom's thirty-six years of service in the US Navy he has held command positions at sea and ashore. At sea Cullom participated in numerous exercises and counternarcotic patrols as well as operations in Desert Storm and Southern Watch. During the Kosovo Crisis he commanded the USS Mitscher deploying to the Mediterranean, Adriatic, and North Seas. As commander Amphibious Squadron 3 he served as sea combat commander for the Frist Expeditionary Strike Group in support of Operations Iraqi Freedom and Enduring Freedom. Ashore he has served in technical, staff, policy, and strategy positions as shift engineer and staff training officer of the A1W nuclear prototype at the Idaho National Engineering Laboratory, special assistant to CNOSs executive panel, and branch head for strategy and policy. Flag assignments ashore include navy staff positions as director of Deep Blue, the strategy and policy division, fleet readiness division, and most recently director energy environmental readiness division on the navy staff. A highly decorated officer, Cullom's personal awards include the Defense Superior Service Medal, Legion of Merit, Defense Meritorious Service Medal, Navy Meritorious Service Medal, and the Navy and Marine Corps Accommodation Medal, among others. In March 2012 he assumed his current duties as deputy chief of naval operations for fleet readiness and logistics. A native of Flossmoor, Illinois, Vice Admiral Cullom graduated with distinction from the US Naval Academy with a bachelor's degree in physics. He also holds a master's degree in business administration with distinction from Harvard Business School. Please join me in welcoming to the Pritzker Military Museum and Library Vice Admiral Philip Cullom. Welcome, Admiral. Thank you for being here. I appreciate it.

(Applause)

Cullom: Thank you very much.

Clarke: Before we get into the details of this conversation I want to start by knowing a little bit more about you so that our audience can understand, you know, where you come from and what your perspectives are. And you've had an incredibly impressive career. And so that all started somewhere. It pretty much started with your decision to join the navy. So what were you thinking when you joined the navy?

Cullom: That's probably what, I think, my family thought, what was I thinking. But to tell you the truth it actually started with my family. My uncle was in WWII, a radioman, and he did destroyer escort duty up in the North Atlantic with the Coast Guard. The Coast Guard during WWII was actually part of the navy, and so they were doing wartime patrols. And so growing up I would hear stories that he would share with me about what it was like to be able to take those--escorting those ships across the Atlantic to Europe and back and as well into the Mediterranean. Additionally my aunt was in the first class of female officers in the navy. And she served at COMINCH, the headquarters in Washington D.C. working for Admiral King. And in fact I think she may have been the
first female naval officer that Admiral King ever saw. So again, hearing the stories about those--their experiences during the war. My dad was a P-51 pilot in the army air corps I ended up for one reason or another ended up in the navy, I guess 'cause we had a corn field next to the house growing up--and it's changed a lot from what I understand, Flossmoor these days--but we literally had a corn field. When you see the waving of the corn you kind of get the idea it's a little bit like water. And it's a long way away from Flossmoor, so maybe that--then Chicago, so maybe that's it. Or maybe it was the trips down to Navy Pier and seeing the submarine, the Guppy class submarine, down here and seeing the ships down here and seeing water in the lake; that gets you to dream about what it might be like to serve your country in a special way. And so that began the voyage thirty-seven years ago.

Clarke: So has it been what you thought it would be, or has it been more?

Cullom: I would say it's probably been more by a factor of ten. I've never--I never thought that I would get the opportunity to sail on every ocean in the world, to be up in the arctic, to go down around South America and see the stars at night off the cape, to be in the Mediterranean or the pacific or the Arabian Gulf. It's just very special to go to these different places, experience the cultures, meet the people, and then understand why their lives are different and how we potentially can be able to do things that help them and preserve the stability on the oceans, which is largely what the navy does.

Clarke: I'm assuming you didn't get to where you are by yourself. You had your family behind you, and your probably had some people that have made a major impact in your life. Would you share about one or two of your mentors and kind of what they did for you?

Cullom: Certainly. You know, I think that when you serve in the navy we talk about shipmates a lot, and we travel in a lot of ships. And sometimes it's actually a physical ship painted gray and gets underway, but sometimes the shipmates are mentorship, sometimes it's friendship, sometimes it's leadership--those ships. And those are very important to, I think, to our development in the navy. And so yes, I've certainly had a lot of mentors, even from the early time of going to the academy. The senior dental officer took me under his wing and were my sponsors at the academy. Captain Peterson. Captain Day right here in--still lives in Flossmoor--was an inspiration along the way as well and has kept in touch with me for thirty-seven years. As well, different captains that I served with and sometimes shipmates themselves, my peers, and even the sailors that work for me were also an inspiration. And you learn from them, they learn from you, and they help you get through hard times, and what we always know about shipmates is that that's how you work together as a team--there's no I in Team--and that that is something you take away for the rest of your life. So I remember every ship, and I certainly remember the teams that we had on all those ships whether it be as a division or as, later, as second in command of a ship or operations officer of a ship or captain of the ship or the strike group commander.

Clarke: Do you have a particular episode that stands out to you that was either trying or triumphant? Does that--you've gone back to the, kind of, the well of reflection and said, "Boy that really--that really was the thing that helped me."

Cullom: Well, I think there are--I'm sure every person you've ever had sit here in the military, whether it's army, navy, air force, or marines, probably have a lot of defining moments in their career. I think we've all had a few of those. It's hard to always pick out one or two because there are often so many that are formative. But certainly I can think back to some that were particularly challenging. During the first part of Operation Iraqi Freedom I had ships that were in the upper part of the Northern Arabian Gulf. I worried about my sailors a lot up there. We were tasked with a mission to go up to a city called Umm Qasr, and I was supposed to take one of the larger ships up there. No American
ship had been up there since well before Saddam was ever in power. And we didn’t know what the water was like. We didn’t know how much water there was under the keel. There were ships that had been sunk in the river going up to Umm Qasr. So you’re faced with that decision. You can send somebody else up. You can send another subordinate commander or captain of their ship. But as the commodore in charge of several of those ships, you lead by example. And so that leadership by example is to go with them. You don’t know what’s gonna happen. You could run aground, you could have people shoot at you, all of the above—you could hit a mine. And all of those were distinct possibilities. And so the challenge was to lead by example, to be there with them so if something happens, you’re the accountable person, and you’re the person that's in charge and making the decisions.

Clarke: So it was a successful mission?

Cullom: At the end of the day it was. We got back safely, and we were able to complete the mission as we needed to. But there were plenty of others that I can point to along the way.

Clarke: So let me share a thought with you. Admiral Stavridis, our friend here, wrote a book called The Accidental Admiral. And basically what he did—he says in that book is that he was gonna leave the navy, somebody talked him into staying, and then his career kind of took off. And, but he doesn't attribute a lot of only his hard work to how he got to where he was. How do you feel about that notion about your career and the career of all of us, really, in life?

Cullom: I'm smiling so much because I know Admiral Stavridis very well. I actually served with him when I was working for the chief of naval operations, the executive panel. You read part of that in the biography. And I knew him when he was a lieutenant commander; I was a very young lieutenant at the time. Frankly I kind of knew—when he was a lieutenant commander I said, "If that guy doesn't end up as an admiral, then—then there's something really wrong." Of course he did and obviously did it extraordinarily well. But it's I think also because he is so warm and engaging and always bring the best out of people and always wants to understand another person's point of view. So I would probably agree with him too that there are some, if you will, accidents. That he got talked out of it, and I would suggest a lot of us got talked out of decisions that we would have made. My intention at the very beginning was to serve honorably and serve my five years, and then be done. That didn’t seem to work out very well at thirty-seven. So I think there are a lot of accidents along the way, but I think there are opportunities, and people can help you with those opportunities. And I've found that throughout the navy there are always people to help. But you had to be able to dream, you had to be able to vision, but there were always people to get more out of you then you ever thought you could get out of yourself.

Clarke: Something that I don't know if a lot of people think about, but we try to help them think about it, is that when one person serves in a family, he's really--or she's really taking their entire family with them on that adventure. So what has your service meant to your family, and how have they coped with your service if you will?

Cullom: Well, as I kind of relayed at the very beginning, certainly there was navy and navy coast guard experience in my family, so they kind of knew what I was probably bound for and what I was getting myself into. Now later in life and my wife is in the navy. She's an eye doctor in the navy. And my sister is also-- was also in the navy. She’s retired. She was a physician in the navy. So there's a lot of history if you will of that. But there’s huge commitment as much for the service member as there is for--in many ways it's more for the families then it is even for the service member. And you have to do it together as a team. When you have a spouse that understands that it certainly makes it much easier. It's very challenging because we go away for long periods of time. And in
the old days you send a letter and then you hope that X number of weeks it would get delivered to them. And then you would hope you would get mail back depending on where the ship was and the mail calls were very important. Obviously with the way things are today and the instant demand for information things are very different. But it still is no easier when something goes wrong at home, and you’re stuck out there halfway around the world and in twelve time zones away.

Clarke: Probably a sailor relies on their shipmates at that point.
Cullom: They do, very much so. And its amazing how a lot of times even the families themselves also rely upon each other. And so they draw strength from each other because they’re part of that extended family, too.

Clarke: How aware officially is the navy of that whole family situation?

Cullom: Oh, I would say we have certainly lived that for two hundred years, from the first time that sailors put to sea they knew that their families were back home, and in those days they got nothing in terms of letters. It would be months before they got some indications as to how their families were doing or if there were problems or if there were births or deaths or whatever. And it's certainly much easier today. But I think we're very attuned to that, and we are on deployment cycles that are six months or nine months.

We try to keep them to that reasonable level of six to seven to eight months as we can.

Clarke: So let's shift gears a little bit. On thing I've noticed about flag officers, no matter the service branch, you all are kind of a smart bunch of people. You—you’re a Harvard grad, and I've never really been able to stump a visiting admiral—or even, you know, you get up into the upper ranks of officers for any of the service branches—on military history stuff. Usually they stump me. People know their books, they know their resources, they know their history. Is this just an ethos in the military, and if so how come, maybe, the public doesn’t really understand how important that education is and that knowledge is?

Cullom: It certainly is. It absolutely is part of our ethos. And I think part of it—Mark Twain actually said it very well, 'cause he said, "History doesn't repeat itself, but it sure does rhyme." And I would say that for a military leader to go into a theater of operations and not understand the history of that nation or the nations that are involved, to not understand the culture of the people that are involved, you would probably be making the wrong decisions. And that's certainly been true in any theater I've been in is that the history of what brings those nations into conflict, or what are the things that can resolve those conflicts are always about the history. So studying that history, being aware of it, to be able to incorporate that into the way in which you deal with those other nations and other navies—'cause we do a lot of navy-to-navy interactions with other navies—is particularly important.

Clarke: Is there a particular history that you kind of carry with you that you find yourself reflecting on and saying, "Yeah, that's a really important one. I should keep that in mind"?

Cullom: Absolutely. And there are a couple of—and we use the phrase sea stories in the navy—but sea stories, there's an element of truth and maybe some stretching of that in the retelling of it. But the histories that are really important—and they are very truthful histories—are about the things of the six frigates, the first six ships that the navy—that the navy built. Pretty amazing ships, and they incorporated every bit of Yankee ingenuity if you will to build those ships. They could sail faster than any other ships of the line of the day—two knots faster, in some cases. Now that's a lot in the age of sail to be able to go two knots faster. Two knots faster meant that you could be able to, instead of trading broadsides, and whenever you did that many people died, if you could be able to come in faster than them and then cross the T, as they said, then you could rake fire down upon the other ship, and you could destroy them with them only having one or two cannons to bring to bear on you. So we built those six ships with that ability to be two
knots faster, and therefore they were very capable during the War of 1812 when they were needed very much. But that's one example. Another one that is a historical story that I think, to me I think is very important for the United States Navy, but it's not a US Navy story. It's a Royal Navy Story, and it's the Battle of Trafalgar and Lord Nelson. To me, we have gleaned all of the--those lessons that he fought at Trafalgar, we've tried to bring those into the United States Navy and the way in which we fight today. There's the story about the last signal flags that Lord Nelson put up on the signal hoist. And there's some debate as to exactly which flags they were, but as the story goes that supposedly what he put up is "England confides that every man will do his duty." Now you may say, "Well, that's a rather strange thing. He didn't give a tactical formation, he didn't tell part of his force to try to--to edge out the other, the French or the Spanish forces." Essentially "England confides every man will do his duty" was go out there and do what I trained you to do. Because he used to have these dinners where he would talk with all his commanders, impart his philosophy so that they would completely understand how he wanted them to fight, he would understand how they were likely to fight, they would be able to agree upon things, you know, months and day--weeks, days, and months before they would ever get into an engagement. And he did that in preparation for over a year before he actually fought the battle of Trafalgar. The interesting thing is is that he also combined that with then teaching his sailors how to fire twice as fast as the French or the Spanish. And as a result of the combination of those things he was able to overpower a force that was remarkably larger than his because they were more agile, they were more flexible, and they were frankly more able to win and prevail in a case like that. To me that's what we've tried to bring into the United States Navy. We call it a combined warfare concept. Bottom line, that is--what that really amounts to is when I was the commodore and I was the C Combat commander in Northern Iraq, my admiral and I used to have a lot of discussions about how we were going to--to fight. And he knew exactly what I was gonna do, and he let me go do those things. and so that independence and that independent ability to be able to do things up to a point and yet still have a command structure goes all the way back to the history of Trafalgar.

Clarke: That's very interesting. I was talking to an 82nd Airborne guy who jumped into Normandy, and he talked about the, you know, the ability for the unit to survive no matter what the leadership happened so that everybody knew what to do. So it sounds like it just permeates our military so that people know what to do to a point.

Cullom: Very much. And folks like Ike and Patton, certainly they were students, great students of history as well on land. And those lessons that they brought to the battlefields were very important.

Clarke: So I think I know the answer to this question, but I'm gonna ask it anyways. And I want an example of how the navy's doing this. How important is this history and heritage to the navy officially?

Cullom: Wow. I would say that the history and heritage in terms of today, you know, how does that manifest itself, some of it's in our uniform itself. The uniform that we wear is actually almost a duplicate of the Royal Navy's uniform. But yet that uniform has gone through many changes. We don't have epaulettles up here. Those are--those have certainly changed. One can get frozen in history if all you do is think that you will--you have to do exactly what we did in the historical past. But I think again what we've learned from our history is that our agility and flexibility and things that are uniquely American--the fact that we all come from very different parts of the world, that we bring those--the best of those things to America and our culture--those are those things that make us more agile. Agile in thought, agile in action.

Clarke: Well, let me pivot off you a little bit if you don’t mind. When a civilian encounters you and asks about your uniform, what do you tell them? As far as like what is all this
stuff. I mean, obviously your resume is on your chest, but you have different markings on your sleeves that would be carried in the army in a different place on your uniform. Tell me what's going on here.
Cullom: Well, and it's interesting that sometimes folks from different services, we have a hard time necessarily reading the other services' uniform items because we do keep changing some of those, although probably in the navy we've changed ours a little bit less than the other services in some measure. But yes, our rank for the navy is down here, for the army and the air force is up here. But as a general officer they put stars up here. For us, we have a big broad stripe that means a flag officer. And these are for rear admiral and then vice admiral. But yes, the resume is generally speaking up here, so you can pretty much know anywhere I've been in thirty-seven years just by looking at the different campaign medals and ribbons and such. And then the others are different places I was stationed. I was stationed at the White House. This is for White House duty. And then this is for the Joint Chiefs of Staff. This is a command pin, and this means I'm a surface warfare officer, so I drive ships.
Clarke: What about for, say, in Chicago on Michigan Avenue on the weekend you'll see sailors in their whites, and they'll have a hat on, and they'll have I guess a bib in the back. What is the history of that uniform?
Cullom: As you might imagine--
Clarke: A flap. It's not really a bib.
Cullom: Yes.
Clarke: Sorry.
Cullom: We call that uniform the Cracker Jack uniform. I'm sure because you've seen the Cracker Jack boxes out there, and on the Cracker Jack box is something that looks remarkably like the sailors that you see in downtown Chicago. And in fact it is. It's the same uniform to the--except maybe some of the materials. The materials we try to refine those and update those from what we had back fifty or a hundred years ago. So they wear much better these days. But the bib in back actually survives from sailing days when sailors tended to wear long hair and they had a ponytail, and the ponytail--rather than flopping around as they were trying to climb the rigging they would put tar in their ponytail. Well, instead of having that tar mess up their uniform they had a bib if you will that went down the back so that they could take that off and wash that and not have to wash their whole uniform. So that's--and the pants with the bellbottoms, that's in case they fell in the water with those that they could quickly get their pants off and be able to inflate them to be able to--so that they could have some way to survive in the water.
Clarke: Fascinating.
Cullom: Just as I came into town today and we were out at the airport commemorating the 75th anniversary of Butch O'Hare and his mission, that for which he was awarded the Congressional Medal of Honor. And many, many people came up and thanked me for my service. Many of them were veterans, and I turned around and thanked them for their service. I hope that you continue, and the folks from Chicago are extraordinarily good at this, to thank those young sailors for joining the navy, or any service member for that matter that they happen to see at O'Hare or Midway or whatever. We have some of the best and brightest sailors we have ever had in the navy today. I remember right after 9/11, and I was on board a ship, and I had this very young--but a little bit older than the average sailor at the time--come up to me, and he was doing IT, so information technology. And I asked him, I said, "So, Petty Officer Smith, you were probably doing something before you joined the navy." He said, "Well, yes, sir I was." And I said, "Well, tell me your story," 'cause when you hear their story every one of them is remarkable and unique. He was in New York City on 9/11. He was working for one of the firms down on Wall Street doing IT and earning a very good salary. And when the buildings came
down, the thing he did the next morning was walk into a recruiter's office and say, "What can I do?" And he joined the navy. And that's the kind of caliber of people that we have in the navy today. It's about selfless service, and I can tell you it's repeated thousands and thousands and thousands of times over. They are so, so good today.

Clarke: I would say Naval Station Great Lakes is a genetic part of the life and blood of Chicago. I--there's a certain amount of it you have to know it's there. But there's--it's just an incredible part of who we are as a city that really translates into all different ways. So it's a neat thing to have the sailors down here. It's a neat thing to have the commander of the base be so involved with us downtown and around the community. And so I see the same thing. In talking about the excellence of the sailors in our navy, command is an important part of it. And so they--you require them to be excellent, but they require you to be excellent. It's a pretty much a two way street I would say. So talk to me a little bit about the importance of command and the great responsibility that it is on the person who holds it.

Cullom: Probably the best way to do that is actually with a story--a sea story. And this is one from my days as a--the captain of a ship, the USS Mitscher. The sailors on the ship I was always very proud of from the first day I walked onboard, but I knew that they were very good at their job. So it was an incredibly good war-fighting team. But as you said, they looked to the captain for both leadership, but they also looked to the captain for example. And you know walking in from the moment you say, "I relieve you sir," and then the other person says, "I stand relieved," that at that moment that you inherit this mantel of responsibility. And it's very different than the mantle of responsibility in most of the private sector, I would imagine, in that the leadership that you have to exhibit there is life-and-death leadership. You know that when you are going into a theater, you know that before you go you have to train those people. Well the training that we go through is not easy. It takes months to do a lot of that. And some of it is very repetitive, some of it's pretty challenging and hard, and it means weeks away from their families even before they go on the deployment itself. You hone those skills. Some of it is very, very technical when you get into the different kinds of warfare that we do and launching of missiles and the operation of guns and things like that. But I will tell you that you know that you--when you go to sea and those lines come in and the ship goes to sea, that as the captain you have the responsibility not just for their sailors, but you owe that responsibility to their mothers, their fathers, their sisters, their brothers, and their husbands and wives that they come back. And so when you go into a war-fighting theater like we did in the Northern Arabian Gulf and things happen and you know that your people are potentially at risk you know that some of the decisions you make and the responsibility you have that sometimes you have to ask them to do very, very tough and challenging things, but you're never gonna ask them to do something that you yourself would not do and that you have to show that at levels of command that you're willing to be there right alongside. And that's how a team can be able to do what I would say are the extraordinary things. And we see that repeated over and over again all the way back from the Revolutionary War to the wars that we're still engaged in today.

Clarke: What does command mean to you personally?

Cullom: To me it means that responsibility for the sailors under which--who serve with me. With me, not under me, and the responsibility to those families. And I think it's also about the--what it means to do a mission for the nation on behalf of our country. And many of them are very hard, again, and challenging, but when we are tasked with doing those we have to be able to do the unthinkable sometimes. And that's--you can go back to the Butch O'Hare story where he did the unthinkable if you will, to give his own life,
which he ultimately did in that second skirmish that he was involved. And the first time he shot down five enemy aircraft. The thing that I challenged my crew probably day three that I was on—when I was in command, I asked them to tell me what they stood for. I said, "The only thing, it has to do--the words have to spell out the name of the ship, but you have to describe it." Well, I got inputs from seamen apprentices, seamen chiefs, young junior officers, midgrade officers, one from myself I guess--I'll give myself one. But you know what? The best one came from a first class quartermaster, QM1 Strickland, from a small town in West Virginia. And he put it in the CO suggestion box, and I had a rule that anything that was in the CO suggestion box I had to see in twenty-four hours and we had to do something about, and I would talk to the whole crew about it. Well, he wrote on a piece of paper, "Why don't we call it the declaration?" I didn't even know what he was talking about at first, so then my master chief at the time goes, "Well, I think maybe he's talking about that challenge you gave us, sir." So I said, "Let's get Strickland up here," and I couldn't leave the bridge at the time so we called him up to the bridge, and he came in. And as he came in he was nineteen years in the navy, very sage first class petty officer. And I still remember how he came out of the charter room. And he came out, he does this, and he's hiking up his trousers, and he goes, "Yes, sir, what can I do for you?" And I said, "QM1 Strickland, you said you want to call this, you know, the declaration." And he goes, "Yes, sir, we pledge our lives, our fortunes, and our sacred honor. Isn't that what we do every day on this ship?" And to this day it still gives me goose bumps because in one word, he had captured the fighting spirit of that ship. So we called it the declaration, wrote it down, we actually put it on parchment paper, and the day we left on that deployment for Kosovo--we had family members onboard 'cause we were doing a family day cruise. We had just taken our load of supplies and everything that we needed. So we were on the forecastle, and I thought, "Declaration, it's on parchment. What did those people who declared independence do? They signed their names to it." So I grabbed a pen, I signed it, gave it to my second in command, he signed it. And then within a matter of minutes there were about a hundred and something signatures. Within a couple of days there were hundreds. To this day that parchments till resides on the mess decks, the heart and soul of every ship, with hundreds of other names of people who have joined that ships sense. And it was the fighting spirit of the ship, that came from the sailors themselves with just a little inspiration.

Clarke: Okay, lets get into what you do now and today, and let's, if you don't mind, explaining a little bit. So in your current role you serve as Deputy Chief of naval operations for fleet readiness and logistics. And for the rest of us, what does that mean?

Cullom: As you would presume from the name I look at the readiness of the entire navy, so that's ships, planes, submarines, tactical vehicles, any navy sailor anywhere around the world, how ready are they to go do their jobs. Now to me that was the dream job to have coming back from a--from the fleet as a carrier strike group commander, to actually then be able to help an ensure that those who are left at that we call the pointy end of the spear to be able to have the resources that they need. What we do back in Washington D.C. working for the chief of naval operations Admiral Richardson, John Richardson, is that we do the man, train, and equip to make sure that every sailor has exactly what they need out there. Now sometimes we don't quite get it right but we try to get it as right as we can so that again those families can be sure that we have properly prepared and trained out people when they go forward. I will tell you it is challenging to try to make sure that we get all those right things, and particularly budgets have been challenging, in some measure because trying to get the stability of budgets has been--and continue resolutions that we have been in has been challenging. So we evaluate that all the time, and we make sure that we are looking ahead to see how much we're
gonna need in years to come. And there's a bit of prognostication if you will, some projection that you have to do with that. So there's always a bit of Kentucky windage that you're worried that do you get it right or do you not. So you're constantly looking back historically to make sure that what you thought you did you is what you actually are getting, and then whether or not you’re still able to prepare the ships, not only the ships that are going forward and the squadrons of aircraft that are going forward and the special operators that go forward, but also that those who may have to go if something else comes up that's more dangerous, that they too are ready. So that's one part of it. Now the other part, logistics, as you might well imagine, is all the bullets, beans, and supplies that has to get out to those ships at sea. As you imagine when we stay out at sea for long periods of time, which we do, sometimes months at a time at sea, you have to have everything brought to you. You’re fuel, you have to have the fuel brought to you from a replenishment ship. You have to have your spar parts brought to you. You have to have virtually any accouterment that you would just take for granted going into, you know, your local grocery store, your local hardware store, you have to wither have that on board or you have to be able to have that flown out to you. Again you get into how much do you need to have onboard. If you don't have it onboard, where are you gonna have? If it breaks, how are you gonna get it fixed? Do you have those in various places so there's supply chain management, which a lot of people in the private sector deal with everyday as well, but there are other perhaps less easily quantifiable things. We're not worried about profit and loss, we're worried about making sure that they have the weapons that they need to haves should they need that, the fuel if they need to have so they can operate when they need to and render humanitarian assistance or disaster relief or have the supplies to be able to do that for people that are in need. And so there's an aspect of it to that. But the world is changing very rapidly, and so me of the navy no longer necessarily goes to sea. Some of it is in terms of the lighting bolts, if you will, the information that is going, like, to your cellphone that comes through the cellphone tower from somewhere else. Well, we have those exact same communication challenges at sea. Those are a part of the important part of how the navy can do its thing, as opposed to back in WWII when the ships left they went over the horizon, and they were kind of alone and unafraid, and you brought everything to them. Today operations sometimes start, end, and are even conducted on the shore. I do the man, train, and equip for all of the navy installations, all of our fleet concentration areas to also include the recruit training at the Great Lakes to make sure that they have what they need to conduct that training, and to make sure that the operations and the training of people, our sailors and whether they be on ships or planes that they are doing all the maintenance work fixing all of our ships. The shipyards, the depots, the aviation depots, that they are also properly supplied.

Clarke: So does your office get into, say, you need twelve engines sent out to the Carl Vinson, and dealing with those logistics and sourcing them and making sure that the companies are providing them to you. Or are you at a higher level than that?

Cullom: We're at a higher level than that. The fleets, the numbered fleet commanders and the big fleet commanders--fleet forces command, a four-star, and/or the pacific fleet commander, also a four-star--they actually conduct the operations themselves. So they’re the ones directing those things. Our responsibility is to make sure that we've prepared and built the things that they’re gonna need, make sure we're watching the repairs that are ongoing in those depots or in those shipyards to make sure that they get back out there so those fleet commanders have those things, those assets to be able to use.
Clarke: Got it. Do you have a specific kind of tangible example that you can use that's been published in the recent past that you can share a story about kind of exemplifying of what you do? I'm not looking for qualified information here or classified information.

Cullom: No, of course not. I would tell you is that in addition to just, right--I'm sure the first part of what I just said sounded like just doing the--collecting up the amount of dollars that you're gonna need to go buy this, that, or whatever or making sure that you have the engines going through the depots and things like that. But it's a little bit broader than that too because there's also policy involved in that and frankly there's also technology involved in that, trying to make sure that we get the right technologies brought together. And again that's where things are changing very dramatically, the information world. The petabytes of data, ones and zeros that are out there, along with the physical things that we have, and the navy is very heavy in terms of the ships and the planes, the tens--an aircraft carrier is a hundred thousand tons. The destroyer, USS Mitscher that I was in command of, that's almost nine thousand tons of steel and other medals and radars and other systems. Well, in order to be able to sustain those into the future, then you have to look at what kinds of things, what kinds of technologies are you gonna bring together to meld that physical and digital world into how it's gonna work in the future, and I think that the very nature of that is changing dramatically. So one example of how it's changing is additive manufacturing, free-printing if you will, and that's one of the really neat journeys that I've been on for about the last year or so, is to be able to reinvent the navy given very limited resources, what things could we do that would allow us to reinvent the navy that we have and get a great deal more out of it. I resource all the ships, those supply ships that bring the fuel, that bring the spare parts, bring the ammunition. Well, a lot of times they in the past used to bring the ammunition and then they would sit at anchor. Well, there's actually a lot of things you can do with those ships. You can put flight decks on them; you can change the configuration of them. You can actually turn them into staging bases that you can use around the world to give you much greater utility and flexibility. Just like with additive manufacturing instead of having to have the parts built and purchased long in advance, we have a vision of being able to fundamentally change that so that the supply chain is no longer about just optimizing that supply chain of parts going from here to here, but actually being able to build them as you go. And I actually kind of brought one of those with me here. This thing right here is, it's called a nacelle. It's from a V-22, which are those tilt-rotor type of aircraft, so it's kinda like a helicopter, kinda like a plane. This is a--what they call a flight-critical part. And although a lot of companies have done a lot of 3D printing, they have done things like nozzles, winglets, and things like that that are all 3D printed, but a flight--truly flight-critical part is if that flight-critical part breaks then the plane crashes. Well this nacelle is what actually changes the engines from this to this, so if that breaks the plane goes down. So obviously very critical. We 3D printed that. That's in titanium, and it's been a journey to get to that point. We started working on this, the head of naval air systems command and I put out a challenge out there of how quickly could we be able to make this part so that every time we 3D printed it, that we would know it would work so you didn't have to send it through what they call destructive testing and non-destructive testing and, you know, sit there and figure out whether or not it's gonna break and bend and whatever. In the old days when you machined this, all sorts of stresses would occur in this, and so fundamentally you would have to do what they call kneeling--you have to do things to it to actually make it much stronger, and even then it still had some problems in it. When you make this out--these days, when you 3D print this today you're doing micro-welding so there's no stresses, or very few stresses involved in it as long as it's printed properly. And some of the challenges are being able to print that properly, whether it's the digital thread itself or it's the certification of that
part, or it's in the printers themselves. Well, I'll tell you, we got this idea to do this actually from work that doctors on their own at Walter Reed Medical Center were doing on their own. They had wounded warriors come in that needed cranial reconstructions. That is a very delicate, difficult operation, often times takes ten hours with the patient on the operating room table opened up, where they would bring in the stainless steel part, and it wouldn't quite fit. They would have to take it out, reconfigure it, bring it back in. and you can imagine that ten hours under anesthesia is not a productive thing, a good thing. The doctors said nuts with that—an old phrase from a commander many years ago—and decided they were gonna fix that problem. So they knew they had 3D imaging in the MRIs and the CAT scans. They coupled that with CAD/CAM manufacturing software. They went out and found a printer--cost 1.6 or 1.5 million dollars to be able to print in titanium. And voila, when they printed out what they needed it worked first time, every time, the ten-hour operation took one hour. They did this all on their own. They convinced somebody up there to, you know, Walter Reed to spend the money to get this printer. What's the value of that? Priceless. But that knowledge, those people we had talk with our aviation people—so this is where knowledge can get shared in new and unique ways—my vision with this is that we'll never have to look over our shoulder for that ship that's gonna bring the spare parts or bring the fuel. We will have a self-sustaining ship much like the USS Enterprise of the 23rd century in Star Trek. Let's have the USS Enterprise of the 21st century that doesn't have to look over its shoulder for months and months at a time. So that's the vision that we have of where we're gonna go with this. But to me that's a reinvention of things. And you know what the interesting thing is? The best ideas aren't gonna come from me; they're gonna come from people like the doctors at Walter Reed or they're gonna come from sailors on the deckplates. So I've been running some Shark Tank events where I get a bunch of sailors to propose ideas. They have to bring those ideas in front of a board of very qualified engineers and others that pick them apart both from a business perspective as well as from the engineering perspective. One of the things that has emerged out of that process came from a second class petty officer on the USS Truman. And she had an idea of building a plastic part, and that plastic part would be able to fix the walkie-talkies that were always breaking because the antenna would break off. Well, those are very expensive walkie-talkies 'cause of the kind of communications that go through them. Bottom line, we can't afford to have two thousand dollars wasted every time one of those antennas breaks off. She came up with that idea, and that now is being—we're replicating that around the navy to save thousands and thousands of dollars, all because she had the guts, all because she had the courage and the fearless idea. So that's one of the things that I've kind of tried to replicate around the navy is that fearless ideas will ignite bold innovation throughout the navy. And that's bottom-up innovation. Tom Freidman talks about bottom-up and top-down, that bottom-up innovation is very chaotic sometimes because it may not be exactly what we need, but it's really smart. Top-down innovation often times is just the opposite of that. It's very orderly, but it may not be as smart. So what we're trying to do with these Shark Tanks is meet somewhere in the middle and find both orderly and smart to take us to a new place.

Clarke: So somewhat like the declaration you're applying to this.

Cullom: I guess so. You learn your lessons many years--

Clarke: --Yeah. That's an amazing story, and the fact that this is flight-critical and you printed this. So something like this--

Cullom: And it flew back in July of 2016. It's already flown.

Clarke: I'm not even gonna ask how long it takes to print something like that. It's (laughs)--

Cullom: Not as long as you think, actually.
Clarke: It's pretty amazing. And I can only imagine the number of parts you are sending through printing.

Cullom: Well it takes a while to do this because you have to be able to either create the digital thread, and so that's a part of our partnership that we are trying to continue to improve, is the partnership with the industry in different ways. But that's a reinvention of in some measure, of the industry itself because there's IP involved in that. How do we share that IP? How do we properly be able to compensate the companies for the IP if we're gonna be able to print out that part. We don't want to really get into the business of printing it if we really don't need to. But for some parts that are high failure parts or ones that we need more than others, we are gonna probably want to be able to print those things out in the intermediate maintenance facility onboard the aircraft carrier.

Clarke: That's amazing. So there's really no limit to what it can do, it's just a matter of how much you're gonna do it.

Cullom: Exactly. I will tell you that we haven't stopped just to--you know, I'm trying to print out parts, because the challenge of being able to be self-sufficient out there is much bigger than that. For instance we have lots of weapons that we have. Right now we're still using weapons that aren't too dissimilar in many ways--a naval gun is still like a naval gun from the War of 1812. Not quite as dumb as those. They're much smarter. They're rifled, and they have high explosives in the top end of it. But what we're trying to do is to move past that. If we can be able to move to a time when we use laser weapons systems, rail guns, things like that. I can 3D print a rail gun round, and then what I need for my weapon is just the energy to be able to launch that. So then the real thing I need is just energy, and we're working on that too. We've been watching a lot of interesting developments in the energy world, and I think there's a--and I along the way inherited a lot of interesting--in addition to running the Shark Tanks and co-leading task force innovation, I also have run task force energy for a number of years. And to me it's all about increasing the capability for our young men and women that are out there halfway around the world. If I can allow them to have reach, endurance, range things like that. If I can improve how tough they are because they don't have to worry about who's gonna resupply those bullets to them, and if I can allow them to be more responsive--because in addition to 3D printing this, I can 3D print on demand the specific kind of drone they want to fly. Exactly the drone that they need that day. That's a fundamentally different way to think and the way to operate than we have for two hundred years.

Clarke: When you think of navy readiness or just readiness of our armed services in general, there's a lot going on in the world. We have--China's on the ascent with its navy, India's doing a lot of stuff, the Russians, and this, that, and the other. It presents kind of a different challenge for the navy than we've seen for a while, since at least since WWII. And so how are you talking about that? Because I guess my question is also kind of a comment if you will. I've heard a lot of people say, "oh, look, the navy's too small, you're losing ships, this, that, and the other." But then again you also hear information like we're doing, you know, two Virginia class attack subs a year, which is an uptick not a downtick. So it seems like things are in flux. Is that true? And if it is true, how do you access readiness going forward?

Cullom: Yeah. I'm not sure I'd exactly say it's true to exactly the question you asked. So let me either rephrase the question or give you a different answer. The world is a more dangerous place today by far. I think we all--we look out there, and it's not getting simpler. It's not getting quieter. The globalization that we thought was happening is becoming much more challenging to even understand what's happening with that. Information flows at the speed of light, and that information is as much of a, if you will, sometimes a weapon as anything else. Again that changes the nature of how we need to look at is it just about the number of ships, planes, submarines. I will tell you it is in some
ways, because in order to be able to be present to reassure our friends and allies around the world, you have to be able to be there. If you're not there you're kind of not relevant. And a ship takes a finite time to get from one place to another. Now that said, there is more to it than that because if we're looking at the whole compendium of ways that you can be able to—remember the two-knot story and crossing the T? I would tell you that part of that today of that hyper—I would call it the hyper-velocity information change, that's what's actually part of that two knots. So how do we take advantage of that—take advantage of, again, what we inherently, I think, here in the United States and frankly with our friends and allies—we've been doing a lot of partnering with some of our allied navies on different things to get to not just interoperability but to actual integration with them and to be able to operate in kind of fundamentally different ways again than we have in the past. And that means 3D printing some of their stuff, them printing some of our stuff, and being able to share those things back and forth. So again that's hyper-velocity changing of the digital along with the physical and melding the two of those things together in a very different way.

Clarke: So as much as things change, they kind of stay the same. We had the Great White Fleet go out and showcase American innovation back in the day. And you're doing much of the same thing down to 3D printing and things like that.

Cullom: It is. It's pretty similar. And in fact actually during that Great White Fleet, that was—the big thing that they were showcasing then was going from coal to oil. Well, we're going from steel to digital, and you can see that's a pretty profound kind of change. But the more we look at the cycles of that and reducing how long it takes—and that was the job that I had of being the director Deep Blue was all about being able to, right after 9/11, to be able to bring new systems—some cases they were still in research and development or science and technology, but people had a good idea. You know, like seawater to fuel, or, you know, who knows. And we have a professor, that—she's a chemist, Dr. Heather Willauer—that has actually figured how to turn seawater into fuel. Hydrogens out of the H2O and carbon out of the atmosphere of the water, and you build long chain carbons, and voila, you've got your fuel. Those are the kind of, just, black swan changes as they call them that will be profound changes for us that will give us two knots of advantage.

Clarke: So my somewhat confusing question to you is gauging readiness from a logistical point of view and from a—just an absolute beans-and-bullets and all that, point of view seems to be somewhat of a difficult thing to gage. So how do you—how do you do it? I mean, how do you in your mind—what's the philosophy behind it?

Cullom: It's a combination of readiness today and readiness tomorrow. Now readiness today is—you can figure out if you have buckets of money and you pour them into different things: more parts, more people, train them more, more flying hours so they have fuel to fly, more fuel to be able to operate and steam, to train, or to actually go out and operate. You can have a readier navy today. But the navy we have today versus the navy we will need in the future are different things. So if that's all you do and you're not thinking about your rainy days, so then that kind of gets into the—how are you hedging. And so a little bit of our program with the Shark Tanks and things like that is a little bit of like a hedge fund way to look at how do we figure out how to mitigate risks in the future, pending how others-- other nations, other developments out there, missile systems that others are developing, that we have to then be able to figure out how we're gonna have a ship be able to ensure that the world stays safe. To be able to make sure that with a laser or a this or a that, that that missile never gets to where it's supposed to go.

Clarke: I want to thank you for your service, and I want to thank you very much for being here at the Pritzker Military Museum and Library. It's been a wonderful conversation. (Applause)
Clarke: Thank you to Vice Admiral Cullom for visiting the Pritzker Military Museum and Library and to the Chicago Navy Memorial Foundation for supporting this program. To learn more about the US Navy, visit Navy.mil. To learn more about the Museum and Library, visit in person or online at PritzkerMilitary.org. Thank you, and please join us next time on *Pritzker Military Presents*.

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(Theme music)

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(Theme music)

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