

**Dr. Lawrence J. Cavaiola**  
**Presentation**  
**IFPA-Fletcher Conference**

**DR. LAWRENCE J. CAVAIOLA:** Well, good afternoon, everyone. Let me say, first off, it's a pleasure to be here this afternoon, to have an opportunity to address this audience, and to share a few thoughts with you. I guess fundamentally, if you want to put a title on what I'd like to share with you this afternoon, it's what I consider to be the importance that the maritime strategy -- among all the things it has to do -- to inform adequately and clearly the kinds of investment decisions that our naval services face in the future. And please be aware that, throughout my comments this afternoon, I may refer in shorthand to the navy or naval service, but I'm really being inclusive here of the navy, the Marine Corps and, in most instances, the Coast Guard, as well.

So, I thought maybe I'd start by telling you what I've read this summer, just for something a little different. Three books, kind of interesting. The first one is *To Rule the Waves*, by Arthur Herman. I don't know how many of you may have read this book, but it's fascinating, and I think it's very instructive for today's situation. We have some of our Royal Navy colleagues with us this afternoon, and I have to say that in all the study I've had of naval history and all that, this book really put a point on the importance of strategic thinking, however it may have come about for the Royal Navy.

I think Herman's thesis is basically that the Royal Navy sort of led the way for Britain in terms of its political, economic, industrial growth -- arguably, beginning the process of globalization -- and really held sway for three hundred years, in terms of the way things were done in the real world for all that time. So, I think there are a few things there to think about which I'll come back and talk about in a moment.

The second book is called, *Six Frigates: The Epic History of the Founding of the U. S. Navy*, by Ian Toll. Now, for those of you who are sort of Washington political appropriations junkies, I mean, this book has got it all. How did these first six ships

come about, when the fledgling nation decided it needed a navy? You know, what did we do about it? And I think what you will find in the book is that, if you think the political fights today are difficult, between parties and between factions and regions, and all that, they were nothing compared to what happened back in 1794.

We had a great design. The design for these ships was developed by a Quaker, a fellow named Humphries, who'd never developed a warship, never designed a warship in his life. But he came up with these designs for the forty-four-gun frigates that were fast, heavily armed, and exactly suited to what this nation needed at the time. But in order to get them built, it was a horrible fight in the Congress to do it. And reminiscent, or actually I should say, in a prescient mode to what we deal with today, the appropriations wouldn't be forthcoming unless the ships were built in six different ship yards, so, you know, here we go.

The third and final one is a book called *Monitor*, which had come out a couple of years ago, by a fellow named James DeKay. And this is the story of John Erickson's twenty-year battle to get his iron-clad ship built by the U. S. Navy. You know, Erickson fought against the bureaucracy of the time. He had a lot of innovations. He fought the contracting barons, he fought the design barons. The design barons in the Navy decided the ship should have a mast and sails, even though it was steam powered, had a screw propeller, a rotating turret, all of these innovations that actually had been tested along the way. And what Erickson was doing was trying to put them all together.

So, under the heading of "The More Things Change, the More They Stay the Same," what did I conclude from my beach reading this summer? Well, the first is that, like the Royal Navy and Great Britain that supported its navy, there is great importance in having a maritime strategy, not only for military purposes, but in the larger sense for political and economic purposes. If we think about our maritime strategy strictly in military terms, I think we're really underestimating its importance. It really has to support this much broader set of goals for our country. And, again, the strategy has to inform, and it has to support, decisions about what to buy and when to buy it. You know, the six frigates that

we talked about earlier, they were very well suited for the kinds of things that had to be done, everything from dealing with, you might say, not just peer competitors, but competitors that were well-advanced, relative to the U. S. navy. In addition, they had to engage in what we would today call asymmetric warfare, in dealing with the Barbary pirates. So you had to develop a ship-building program that could deal with both of these kinds of threats, simultaneously. And obviously, given my background on the Hill, it's not enough just to develop great ship designs and a great program, but you have to sell it to the Congress. And you have to deal with that. That's the real world. It has to be sellable on the Hill. And even if it took, "Build them in six ship yards," that's what it took.

And, finally, it's important to strike the right balance between innovations with requirements and fleet demands. The Monitor had lots of new technologies for its day, but most of these, as I said, seem to have been tried out in advance before they were put on the ship and integrated. So, under today's terms, we would have developed these technologies, and then had some integration issues to overcome. But what many people don't realize is, that when they decided to build the ship, they built the Monitor in a hundred and eight days. So, once the stuff is there, and you can put it together, you can move quickly, if you have the will to do it.

So let's bring this down to the present day. What I would submit to you is that there are three big issues that I believe the maritime strategy has to address and get right in some way in order for the Navy to be successful in the future. So let me outline what those three issues are in my view, and these are in no specific order.

The first one is what I would call the balance between blue, green, and brown water. Again, there's that word balance. We're always looking at balancing competing goods here. All three of these things are good things to do. We talked earlier about opportunities. I think the Navy, in particular, the naval service has an historic opportunity to assist our country in shaping the direction things will go in the future. I think as a nation we've come to realize in the past few years the importance of working with other

countries on an ongoing basis. Not only from a cooperative security standpoint, but also fostering better governance, the rule of law, these sorts of things, which are all extremely important to us as a nation, in the broadest sense to our national security.

And I think the Navy has a really strong role to play there. For example, look at some of the ongoing initiatives, at SOUTHCOM, where they are working on some of the ideas on using global fleet stations. You have the deployment of the USNS Comfort right now. These sorts of things, I think, need to be thought through as to how much are we really going to do in the future. AFRICOM is, I think, another example of that. What will AFRICOM be? What will the balance be within AFRICOM, between the military part of AFRICOM and, you might say, the political-economic part of AFRICOM? And I know those debates are going on right now, but there's tremendous opportunity here, and I would submit to you that the naval services, from the military standpoint, have a tremendous role to play, but we've got to get the balance right. Don't forget that it wasn't that many years ago that we were standing here talking about a fleet response plan, where we were basically focused, largely, on putting a high premium on reserving war-fighting capability, and much less of a premium on operating forward on a day-to-day basis.

So, that's part of the equation. At the same time, we have to deal with the potential for a peer competitor, as we call it, like a resurgent Russia, that's fueled by \$80-a-barrel oil, as well as other countries around the world, who also have oil money and other sources of capability.

So, around this, there are some very, very important acquisition decisions that have to be taken in the next few years. These involve how many and what type of submarines, aviation-capable platforms, surface combatants, amphibious ships, expeditionary warfare systems, their complementary combat systems, and all of the various other command and control systems that go with that. We have to be careful not to swing the pendulum too far, either way. But we can't develop a maritime strategy that doesn't inform us as to what and how much to develop and buy. We can't have a strategy that simply says, "It's

all good.” There have to be some decisions made, there have to be some priorities indicated, as to where that balance should be struck.

That brings me to the second issue, which is how the concept of sea-basing is put into practice and, of course, the attendant decisions that come from that. There are lots of policy issues that are embedded in this, in the first instance, in terms of what kind of forcible entry capability you want to bring from the sea, which centers on which services are going to participate and how much long-term, sustainable combat power that you want to bring from the sea. So you have, on the one hand, direct combat power, logistics, and sustainability and who’s going to play from these sea-based platforms. What are the service roles going to be? That’s part of that. The Department of the Navy, the Army and, to some extent, the Air Force are all in this as well.

We can’t lose sight of the equities of the Marine Corps here. The Marine Corps retains very important roles in terms of expeditionary warfare, expeditionary strike. What is the congruence between sea-basing, expeditionary strike groups and their dependence on carrier strike groups? And how do you fit in the Marine Corps lift requirements into all of this. So these are important decisions that have to be made. Resources. Who’s going to pay for it? If we look at a joint sea-basing capability, is all of that money going to flow out of the Navy’s coffers, or is that money going to come from some place else, i.e., a national type program?

We need to get the “sinews” right, too. Getting the big stuff is important, obviously. MPFF, the maritime pre-position ship of the future, the kinds of amphibious ships, are the main decision drivers. But getting all of the pieces that make it work together is equally important. Some of this is hardware -- its connectors, and those sorts of things. But a lot of it is training and doctrine. A lot of it is stuff that we really have to pay attention to in terms of how we’re going to make it work. And, again, dealing with all the services on this is going to be quite important. So, suffice to say, this one is huge, it’s a big deal and, again, I would submit to you that the maritime strategy should inform this.

And third, and not least, I would suggest to you that the Navy has to get its arms around what its role is in missile defense. Missile defense, as a national-level program, is still fraught with a lot of uncertainties, including the national architectures, the roles of the combatant commanders, the funding sources, the service roles and missions, and politics with a capital "P." So this is, for those of you who are students of operations research, this is decision-making under uncertainty, writ large, when you look at it from the Navy's perspective.

Now, what makes this really interesting is that, depending on what role the Navy either assumes for itself or gets foisted on it, so to speak, there are huge resource implications here. This is big dollar stuff. You know, we're talking about missiles that are very expensive. I'll let Dan speak to that, if he likes, but some of the missiles we're talking about here are quite expensive. They're very sophisticated. Some of them are huge, like the Kinetic Energy Interceptor, if that were to be put to sea, as well as systems, new radars, ballistic missile command and control systems, and people.

People are really important here -- getting the right people to operate and acquire this stuff. I think the Navy's a bit behind the power curve here when it comes to having enough people who are trained adequately in these areas, and not least, to serve on the combatant commanders' staffs.

And ships. The Navy has decided that it's going to start building CGX in 2011, which is very, very soon. The CGX decision is really crucial, and it hinges on what's the Navy's role here? What's the Navy going to do? Because, in some instances, the actual design of the ship, as I understand it, is integral with how expansive a ballistic missile defense mission the Navy's going to take on. We need to have a better idea of what we need to accelerate now, in terms of programs and developments, so that they can intercept the ship-building program in time. We don't want to rely on seven simultaneous miracles that have to come to pass in order to build this ship. And, by the way, the shipbuilders are counting on CGX to keep their complex surface combatant lines open and operating.

So, again, just quickly. I think the main point here is that, in all the things that a maritime strategy needs to do, I would suggest to you that the strategy must adequately inform investment decisions, and it really has to be strong in that regard.. Thanks very much for your attention.

### **Q&A for Entire Panel**

**DOMBROWSKI:** Well, I think that was the first set of presentations that raised a whole lot of issues that I'm sure there's many questions on, so I'd like to open the floor to start. And please identify yourself and where you're from, and if you have a particular person you want to identify, direct your question to. Please, from the floor, in the middle, in the yellow tie. I'm sorry.

**TONY LEGWRICK:** Hi. Tony Legwrick (?), former classmate of Robbie, if that's worth anything. I was intrigued by Mr. Ferren's ideas, particularly as a game changer, so the question is really for my compadre, Admiral Landay. If you're in the game changing business, are you investing, at the S&T level, in 6-1, 6-2, in ideas like Mr. Ferren's here, that would have potential, as a game changer?

**ADMIRAL LANDAY:** We think so, yes. The question, of course, is what are the other potential game-changing ideas that maybe you haven't invested in so, as I say, we are actively looking for ideas and technology solutions and, you know, my job is really to be that naval incubator of ideas. To try to take ideas, such as Bran's, and others, and start walking them down the path. In fact, we were in Bran's place three or four weeks ago, looking at a number of technologies coming out of there, where they were funding specifically that approach-- I probably can't say because I'm still trying to make sure I understand it. But I do think that those are exactly the kinds of areas where we are, in fact, taking a look at the whole concept of sensors, and how you think about sensors-- Is really an area that we're all taking a very hard look at. So, I would say, "Yes, I think we are," but, again, there's probably other ones out there, as well, that we're not, and it's generally because we haven't found them yet.

**LEGWRICK:** Thanks. While I've got the mike, a second question, if I might. Of the notion that there's the "We, them," and it's government and it's not government, and this sort of an opportunity to comment. I'd suggest that there are actually three parties out there. The "We" is actually two. There are those who were in acquisition. There are those who were not in acquisition. And then there is industry. Each of us has been painted differently. And then, would you think about, for a moment, and comment on the fact that we have a great enthusiasm for the non-acquisition guys to be in charge, and if they are in charge, they'll fix it. If you would comment.

**DUMBROWSKI:** Does anybody have a comment on the second question?

**A:** Tony, I'll comment. Number one, if there's only three, we're lucky. Number two is, I don't know about a lot of, and I don't resonate with a lot of fever around the non-acquisition guys. I think it's fairly clear; we have issues in the acquisition world that have to be cleaned up and have to relate. You can read the Washington Post any day and see a new announcement. So, my whole message is, we have to work together, whether you're on the waterfront, you're in the Pentagon, or you're in the Washington Navy Yard, to make these things work together. And you can't just write an over-arching document that says, you know, my "Hope is not a strategy" comment. It's got to have some meat to it.

**DUMBROWSKI:** I saw Robbie Harris next, and I'm catching eyes.

**ROBBIE HARRIS:** Robbie Harris, classmates of Tony and Larry Cavaiola. A question for Admiral Landay. Sir, what's this strategy, this new strategy, you've rolled out? How do you align the S&T community, and its priorities, with this new strategy, and how do you fold industry into that?

**ADMIRAL LANDAY:** Well, from a science and technology community answer, first, it's exactly what our mission and our goal is. We've just recently kind of, in advance of this strategy, and we'll update once this latest version of the maritime strategy comes out, we particularly focused on what were driving the requirements and investments we were

making in science and technology. And what we found, as we looked at it last time, is there were a lot of different inputs and masters, if you will, that we were trying to satisfy. And we made a decision, in this last strategy, which I think prepares us very well to walk this maritime strategy, to say, "It's really only three customers for me." It's the CNO, the Commandant, and the Secretary of the Navy.

The CNO, the Commandant, and the Secretary of the Navy, will figure out the role of the navy and the Marine Corps, and the joint fight, the national security policy, the maritime strategy. That's what we're paying them to do, and I'm going to believe they do it pretty well.

What we're going to do is align the science and technology strategy to those key elements that they believe are important, and really is the vision for the navy and the Marine Corps. So our current strategy is aligned very specifically, based on inputs from Sea Power 21, the Palm 08 Naval Strategic Plan, Marine Corps 21, Marine Corps S&T Strategy, Enterprise S&T Strategies. When this strategy rolls out, one of the tasks that we already have in place is to go take a look at where the strategy wants to drive us, and do a connection to where we're going.

Our goal, we think-- You know, it would be kind of a check for us-- Is that we should, quite frankly, in most cases, try to be out ahead of the strategy. And so, hopefully, what we're going to find is that many of the areas that the strategy wants to go in, we've already started some work in those areas. And it's more a matter of a reallocation of resources to further emphasize other areas. But, absolutely, for us to be effective to that, we have got align ourselves strategy. And that's what really prompted my comments, or my points and my comment, is that that strategy really is going to have a significant impact in the whole way that we think about science and technology. And I think we're well equipped to do that. We've spent the last year taking a hard look at many of these issue, just internally, to kind of prepare ourselves for whatever comes out of the strategy. And I guess I forgot what the second part was.

**Q:** ...(inaudible)

**ADMIRAL LANDAY:** I think, again, one of the key things that we've tried to do, from a naval S&T perspective, is-- I don't think in the past we did a great job of trying to explain to people where we wanted to go. Where we thought science and technology should go, in support of the CNO, and the Commandant, and the Secretary. So, you had to kind of figure it out yourselves. And sometimes you did it well, and sometimes you didn't, because we weren't really doing a good job of telling you. In our current strategy, we're trying to be very open, and saying, "This is what's important to us. This is where we're making our investment in science and technology. This is how we see those investments furthering the navy and the Marine Corps, consistent with where they want to go. And if you think we've got it wrong, we'd love to have that dialogue with you. The kind of discussion that we're trying to have with industry, you know-- The folks up here and others-- Is really one that says, "Here's what the vision is, as we see it. Where does the defense industry see it?" Because we contend we don't have the market on all good thought. So we very much want to sit down and collectively decide where we think we need to go, from a science and technology for both of us.

But the starting position is, I have to lay out and say, "This is where I'm going. If you agree with it, great. Let's do it together. If you disagree with it, then come in and let's have a discussion of it. And I think in the past we probably have not done that as well as we could have, and that's very much-- And we'll do the same thing I think the strategy. When it comes out, we'll have a discussion with ourselves, and everybody else, of whether we're aligned. If we don't think we're aligned, where we think we need to change, and we will promulgate that, and say, "This is where we're going now, and let's have a discussion if you think we've got it wrong."

**SMITH:** Could I comment on that? Because I think there may be a difference in the way the government looks, and the way industry looks. When we do planning for investments and, please, any of my colleagues jump in, but in my world, we develop the strategy, and then we target our investments to fulfill the strategy. We don't develop the technologies,

those kind-- We don't invest to develop the technologies and then say, where can that take us? That's how we used to do it. Because we used to go to guys like Bill Landay and say, "I got this great black box, and you need to figure out how to use it."

But, over the years, as we've gone through this consolidation, etc., we started (?) to change the mode and tried to set up the strategy as the driver to where you place your investments. And that might be a difference now in how we work at a disconnect, in trying to make the collaboration.

**LANDAY:** If I could jump in. I don't think that's necessarily different than the approach that we're taking. There's a fundamental of it, is at least in the navy, we've made a commitment that we're going to have a significant investment in basic research. So we need to invest in basic research. There are pieces of this where you're trying to advance the technology, maybe in advance of the strategy. Because, in some cases, you're trying to help the navy understand that, through some possible uses of technology, it may influence your strategy. But other than in some of those basic research investments, that's exactly what we've been certainly trying to do in the last year. It really is about the vision of the CNO, and the Commandant, and the Secretary, and where they want to take the navy and the Marine Corps, and then what is our contribution as part of that to get us there. We're a piece of it. But I agree with you, Dan. I mean, that's exactly right, and that's why we felt it was important to articulate it, so that not only did we understand it ourselves, but the navy and marine corps understood it, industry understood it, and if people thought we had it wrong, we could then recalibrate ourselves. So, I think we're very much consistent with ...(inaudible)

**A:** Could be.

**DUMBROWSKI:** Another question from the floor? At the risk of delaying Bob Pfaltzgraff's closing, I will take my prerogative as chair, since we have a couple of minutes left, and just ask two general questions. I guess one prompted by Dan Smith's comments, and you raise the issue of systems engineering. I've heard that talk both at

dinners, and lunch, and around the corridors. What I'd like to ask you, and this is an academic perspective remember, is who should do the systems engineering for many of these programs? Is this an industry function, is this a government function, is it an SSFFIBC function, or is it some admixture? Because, it seems to me, there are delicate choices there, with big implications for how successful we are in the long run.

The second question is prompted by Bran Ferren, but I guess it's also more general. Is-- You propose sort of an alternative way of actually looking at the entire problem of acquiring the sensors necessary to implement the strategy in the long run. To me, and this is a non-expert, the traditional-- You haven't answered some of the traditional objections. For example, about the security questions associated with that, the question of the proprietary. How do you make money under such a system? Now I know this, in the GPS world, and in the Internet world. Some of these things have been solved, and some haven't. And I wonder if you could address those and, at least if you see where I'm coming from, or anybody else in the audience. So, with that, I'll get off the stage and let you answer, and then I'd like to have a round of applause for the panel and their excellent work at the end of the day. Then I'll turn it over to Bob Pfaltzgraff. So, please, if anybody has any thoughts they'd like to share.

**A:** I guess, since I fostered the question, and as I copied it down, the question was, "Who should do the system engineering?" And my simple answer is, "We should." Because it's not as simple as saying, "The lab should...." Or, "Industry should...." Or "Small industry should...." Because if you get down to that level of question, you've already failed to system engineer the problem. And you've got to system engineer the problem from the top. And I'm talking about system engineering much more as a thought process and a methodology, than a guy who comes out of MIT with a system engineering degree. Or a guy who comes out of any other university, or a guy who comes up through the fleet and gets all of his navy schools and does all this stuff, and may make the best system engineer in the world. But he didn't get the degree that he needed to be called an engineer. So it's a whole different thought process we need to put in this. I mean, that's my take on that question.

**A:** I'd reinforce that, in another odd Lockheed-Raytheon agreement.

**A:** When we talk, we agree a lot.

**A:** Where we fail, where we get into trouble, is when we don't work the system engineering assets. Let's mention a multi-faceted problem. All right? When we fail, it's when we don't engage as a "we" in the engineering of whatever it is we're trying to do. One party has more responsibility than is warranted, or what have you. So I fully endorse what Dan said about "It's a 'we'" and I don't think you can break it down.

**FERREN:** Relative to the questions of security, mandating labeling doesn't change anything about security because you either can control the access or not, just the way you have in the past. What I would argue is, when you start believing in network effects, you want to share and you wish to share, providing you have controls in place. The notion is the netted data gives you those controls to basically say, "You have access to this. You don't have access to this."

But that's not fixed. It's dynamic. So, for instance, in time of war, you might flip a war switch, and all the rules change, based upon a pre-determined set of conditions, or such. So, on one level, security doesn't change. Two, if you look at the business of intelligence and communications, the points of the other speakers, there is no line anymore between open source, etc. The vision of all sources is how you have to look at everything and, as a result, the ability to play well in an all-source environment directly affects your ability to extract value from it. And, clearly, if you have this notion of ubiquitous labeling, and opportunistic, agent-based functions that can work against that, that makes that better.

Finally, I would argue, if we start thinking, every time you are responsible for a sensor system, of what is the queue, what is the load factor, meaning what contribution does your sensor make, not just to solving your problem, but to the greater good. And, in fact, you fund against that, so that the funding profile's in a truly joint basis, or directly tied to

the metrics that say, “This is the contribution it makes.” Doesn’t preclude you from being able to have your own stove pipe that connects to nobody, but don’t expect a lot of help in paying for it.

At the same time that the other sensor, which satisfies what you need to do. You say, by the way, this is a missile defense sensor, so at a certain moment when we’re using it for that, nobody has access to it, go away, we’re doing our job, great. But in exchange for that, the rest of the time, you all can use it to drive down the costs of your program and drive up the national capability, and the global capability. I would argue that there’s a very strong economic model behind it, as well as, frankly, to the points of how do you get new little companies, and other folks, involved. You end up with an open standard which anyone can invent against and apply. The government, the entities involved, still has ultimate control. They can flip the switches to make it available, share it or not, and I would argue the experience from the commercial world, and now in the intelligence community, dictates that there’s an enormous pressure to share, because the perception is that there are enormous benefits to do that.

**DUMBROWSKI:** Thank you very much. Without further ado, please join me in giving a hand to our panelists, and I guess I give you Doctor Bob Pfaltzgraff of Fletcher School and IFPA.