Luncheon Speech
RADM Kenneth Venuto, Director of Operations Policy
Delivered to the International Loran Association (ILA)

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Good afternoon ladies and gentlemen. I am very pleased to be with you today at the International Loran Association luncheon. I thank you for your kind invitation to address you at this, your twenty-ninth annual meeting here in Washington, DC.

As you just heard, I work in the operations and policy side of Loran-C in the US Coast Guard. However, we, the operators of Loran-C, need to maintain a good working relationship with our engineering staff in order to provide the high level of service to which our users have grown accustomed. A brief story illustrates exactly how well we operators and our engineers understand each other.

A man is flying in a hot air balloon one day and realizes he is hopelessly lost. He reduces his altitude and spots a man on the ground below. He lowers the balloon still further and shouts, "excuse me, can you tell me where I am?" The man below said, "yes, you're in a hot air balloon, hovering 30 feet above this field. "You must be an engineer," said the balloonist. "I am," replied the man. "how did you know?" "Well," said the balloonist, "everything you have told me is technically correct, but it's of absolutely no use to anyone." The engineer said, "you must be one of those management people." "I am," replied the balloonist, "but how did you know?" "Well," said the engineer, "you don't know where you are or where you're going, but you are able to find an engineer to blame it on."

Over the years, the Coast Guard has enjoyed a productive working relationship with the world Loran community and the ILA. Indeed, the Coast Guard and the Loran community have labored diligently for a long time now to develop Loran-C into the premier electronic navigation and precise timing service that it is today. Of course, you already know that. It is part of history. It is a history of which many of you and many of my fellow Coast Guard men and women who have been a part of the Loran community over the years are justifiably proud, but I am sure that you do not want me to provide a history lesson today. Rather, the question uppermost in your thoughts is: "What about the future? How long will the United States of America operate Loran-C?"

The quick answer to your questions about the future of Loran is really not all that quick or, depending on where you sit, all that satisfactory. Simply put, the 1999 Federal Radionavigation Plan allows for the short-term operation of Loran-C while the US government evaluates the long-term need for the system. As a representative of the agency charged with continuing to operate and maintain the Loran system, I will not attempt to define what "short term" and "long term" actually mean, because as the operator of Loran, I would also like to find out. As much as you and the good people in the Coast Guard Loran-C program would like to hear something more definite, that is all there is to say at present. Likewise, I am sure that the question of how the government will evaluate the long-term need for Loran-C is also of great interest to you and I will address that a little later in my remarks. For now, however, allow me to speak of what we do know and what we are actually doing.

As I began to prepare for today's address, I reviewed the remarks made two years ago to the ILA by one of my predecessors, Rear Admiral Jim Hull, and it became clear to me, or so I thought, that I would have an equally difficult task in addressing this group, given the current state of Loran-C policy in the US government. However, as my staff quickly pointed out to me, that is most definitely not the case. There is plenty of good news in Loran-C and plenty of good things to talk about.

I'll begin with funding. Since 1997, Congress has been appropriating money to the FAA for the express purpose of upgrading and modernizing Loran-C. With the Congressional appropriation of 10 million dollars in fiscal year 2000, Loran entered a new era of modernization. This era is continuing in 2001 with an additional 25 million dollars from Congress in the recently signed Department of Transportation Appropriation Bill. These funds are over and above the annual operating funds appropriated to the Coast Guard. So, you may ask, why is that good news? What is all of that money doing for Loran-C?

To be sure, I could spend all afternoon describing all of the accomplishments of the Coast Guard and FAA in upgrading and modernizing Loran-C. Instead, let me provide you with a few examples that should serve to paint the picture. Much of the United States' Loran-C infrastructure is comprised of 1960's and 1970's technology and nowhere was that more apparent than at the remote receiver sites that we use to monitor and control our Loran-C stations. Until very recently, these primary chain monitor sites contained two standard equipment racks full of old technology. How old? After the meetings adjourn this afternoon, go to the Smithsonian National Museum of American History and look for the PDP-8 computer in the basement. That computer was the best that 1965 computing technology had to offer, and we were using it well into this year. Not any more. All of our primary chain monitor sites are now equipped with modern, state-of-the-art equipment built around a new receiver designed and built by Locus, the LRS-IIID. That receiver is the heart of the monitor sites now, taking the place of two PDP-8 computers and a separate Loran monitor receiver. These new monitor site equipment suites will improve the reliability of Loran-C and help drive maintenance costs down.

When Coast Guard personnel think of Loran and old technology, their thoughts immediately turn to the largest and most expensive part of the system, the transmitters. Specifically, we think of the 12 Loran stations, 11 US and 1 Canadian, where aging vacuum tube type transmitters have been faithfully putting Loran pulses on the air for years, and years, . . ., and years. Think about that for a minute. It is the 21st century, and Coast Guard electronics technicians are still trouble-shooting and replacing tubes in these transmitters in much the same manner as repairmen did in our families' television sets when we were children over 40 years ago. As I speak, there is a published request for proposals on the street that is a big step forward in our efforts to replace those remaining vacuum tube transmitters. We have high hopes that the competitive procurement process will yield a modern, solid state transmitter to relieve the venerable FPN-44's and 45's now in service.

In modernizing Loran in the United States, the list goes on and on. The timing references for each Loran station, the Cesium beam oscillators, have all been replaced with brand new, state-of-the-art units. Work is underway on technology to fully automate our Loran stations. Indeed, Loran station Jupiter inlet Florida has been operating unmanned since April 2nd of this year. It is serving as an operational proof of concept where we are testing the technology that will one day lead to the automation of all of our stations. In addition to these shining examples, Loran modernization funding is being used to lay the ground work for even more improvements, from civil engineering work to support installation of new transmitters, to the timing and frequency equipment needed to control the next generation of Loran-C.

I mentioned earlier that I would talk about how the administration is evaluating the United States need for Loran-C in the future. In addressing that issue, an obvious question is: "what is Loran capable of doing for the nation?" Our colleagues at the Federal Aviation Administration are diligently working with industry, government, and academic institution partners on several aviation initiatives to help answer that question. They are currently exploring, in partnership with the Coast Guard, a new aviation Loran antenna that eliminates a detrimental effect called precipitation static - rain or snow hitting an aircraft has heretofore generated electrical noise that drowned out the Loran signal, just when you needed it most. The magnetic, or H-field antenna, which saw successful service for so many years in Omega aviation receivers, holds great promise for removing precipitation static from the picture for Loran receivers. Another exciting project is a new type of Loran receiver that may well revolutionize the way Loran is used for navigation. Recall that current Loran receivers look at Loran on a chain-by-chain basis, using the signals from only one chain at a time to generate a navigation solution. The new receiver is aptly named the "all-in-view" receiver because that is the way it works, using all of the Loran signals it receives, regardless of which chain they originate from, to determine a navigation solution. Much work needs to be done to make these exciting ideas a reality, but they seem well within reach.

We are even looking to push Loran-C beyond its traditional role as a navigation and timing source. In conjunction with the FAA and industry partners, work is underway to develop an advanced data communication capability for Loran that, without adversely affecting its current navigation and timing functionality, will potentially allow transmission of Wide Area Augmentation System (WAAS) corrections or GPS integrity information throughout the national airspace system, including those remote areas of Alaska at the edges of the WAAS geostationary satellites' footprints. Again, much work needs to be done on this, but initial tests have yielded promising results, and we believe that we can make it work.

While the Coast Guard modernization and FAA evaluation efforts in Loran are on-going, the US government as a whole is looking at its infrastructure, including radionavigation systems. We are asking questions such as "where are we vulnerable?" And "how can we reduce or eliminate those vulnerabilities?" With regard to radionavigation, questions are being asked about reliance on the global positioning system as a sole means of electronic navigation. Is it vulnerable to interference, both intentional and unintentional? If so, how can we eliminate or at least mitigate the effects of that vulnerability? The jury is still out on those questions so I won't speculate on possible answers. Suffice it to say that when the assessment is complete, it will have implications for the future of Loran in the United States.

There is more to the discussion of Loran's place in the United States' radionavigation infrastructure than the vulnerabilities of GPS or any other system. To explain that, let me speak to this from a mariner's perspective for a minute. Beginning with my formal education at the US Coast Guard Academy, one basic, overarching concept has been repeatedly emphasized by the Coast Guard both for its own sailors and the US maritime community as a whole, specifically: "the prudent mariner will not rely solely on any single aid to navigation...." Rather, we admonish all mariners, including our own sailors, to use all available means to help ensure safety on the waterways. This guiding principle fosters within the maritime community, a healthy skepticism of reliance on any single electronic system, no matter how close to one hundred percent its availability and reliability numbers may be. Does this mean that the Coast Guard's statement that the GPS and differential GPS combination alone will meet our electronic navigation requirements is imprudent? Given the excellent system of floating and fixed aids to navigation available in our nation's waterways, we think not. Does this mean that Loran definitely does not have a place in marine navigation? The answer to that is also a qualified no. Why do I say that? By way of explanation, permit me to speculate for a few minutes on the future of marine navigation.

I am not telling you something you don't already know when I say that we are in the midst of an information technology revolution. We who are concerned with the field of marine navigation cannot afford to view this revolution as we would a political revolution on another continent. It is here . . . in our world . . . right now, and it will continue to play an ever-larger role in the maritime community much as it has been doing in our professional and personal lives for some time. Information technology is already making its presence felt on the bridges of our ships in the form of advanced electronic charting systems that integrate navigation information from a variety of sources - not the least of which are radionavigation systems. These systems will become more and more tightly integrated with other information sources both internal and external to the vessel. They will come to mean as much to the masters of seagoing vessels as flight management systems currently mean to the pilots of modern aircraft. Indeed, the United States' marine transportation system, which seeks to become the most technologically advanced system in the world for moving goods and people, will both rely upon and require advanced integrated systems on the vessels that use it. The challenge for the Loran community in all of this is to focus on these broad concepts as a guide to the future - to focus on how Loran may fit into these integrated information systems that drive the way we do business. The answer lies much more in that concept than anywhere else. Improved accuracy, availability, stability, and added capabilities are all laudable pursuits, but in the end, if Loran continues as a part of the United States radionavigation plan, it will do so as a component of one or more overarching systems.

I would like to share one final thought with you today. That is Loran-C's contribution to radionavigation as a whole. For more than fifty years, Loran has served as a shining example of technical excellence in radionavigation. This technical excellence has been driven by great people and great organizations. In the history book of Loran in the United States and abroad, certain names appear again and again, having

achieved the status of legend. Several companies have emerged over the decades as go-to sources of radionavigation technology, the forerunners of what we now call industry partners. But the world of radionavigation in the 21st century has expanded well beyond the limits of Loran. One only need look to the sky at the GPS satellite constellation and on the ground at the GPS augmentation systems to see that. I believe that Loran's success has had a great deal to do with what the field of radionavigation as a whole has become. More importantly, I believe that our continued devotion to excellence in the Loran community can help point the way to a successful future for radionavigation both here in the United States and in the world as a whole, no matter where that future may lie.

Thank you.

Biography.

Rear Admiral Kenneth T. Venuto became the Director of Operations Policy for the United States Coast Guard in May 2000. In this capacity, he is responsible for management oversight of a wide range of programs supporting the Coast Guard's five strategic goals of maritime safety, mobility, maritime security, protection of natural resources, and national defense.

He graduated with high honors from the Coast Guard Academy in 1973 with a Bachelor of Science Degree in Economics. He earned a Masters Degree in Business Administration from the University of Massachusetts at Amherst in 1978, and was a distinguished graduate of the National War College in 1994. His personal awards include two Legions of Merit, three Meritorious Service Medals, four Coast Guard Commendation Medals, and a Coast Guard Achievement Medal.