Welcome to the ILA's 29th Annual Convention and Technical Symposium

"Reality and Radionavigation"
Opening Address

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Ladies and gentlemen, as President of the International Loran Association and Convention Chairman, I would like to extend my warmest welcome to the ILA's 29th Annual Convention and Technical Symposium. I do not like platitudes, so I am going to skip the standard verbiage often presented in an opening address. After all, I am a lame duck President - and approximately the same age as President Clinton - which grants me some latitude in what I can say. So let me begin this meeting by offering my views on a few issues, and by providing a bit more information about myself, so you will understand my perspective.

I am first and foremost a man of simple pleasures - a pragmatist, a realist. You can verify that by looking closely at this picture of my wife, my dog, and my dog's mother. Note the natural, bucolic setting I often enjoy -- it is replete with grass, a wooden building, sunlight, and a cheap plastic chair. So I am figuratively a man of the earth - with no pun intended with regard to the relative location of Loran and GPS transmitters.

Obviously I am someone with an interest in Loran, but I am also a businessman and president of a high tech company specializing in radio frequency or RF equipment. Businessmen, particularly those in the RF business, must be pragmatists because they depend on products working in the real world - we must deal with what is, not what ifs. Otherwise - to misquote Gertrude Stein a bit - there is no business there.

In addition, I am a US citizen and taxpayer with interests in the global economy and its citizens. As a sentient citizen of the world, my pragmatism has grown with age and experience. I am only certain that we live in an imperfect world, and that the sources of tomorrow's imperfections will differ from today's.

So I would like to offer a few opinions as a pragmatist, as a realist, to begin this meeting. I hope these views will prove informative, frame some important issues, and stimulate discussion during our three days in Washington.

In reality, US radionavigation policy is set here - through Congressional funding decisions.

The first view I would like to offer is on US radionavigation policy. I would claim that the US national policy is explicitly *not* a sole means GPS policy, but rather one based on a GPS and terrestrial system mix. I make this statement for one primary reason: Congress does not want a national sole-means system, and Congress controls funding in the US. That is to say, regardless of what is published in the FRP or what agency officials publicly declare, if Congress passes a law funding non-GPS systems, *Congress has essentially established a national, non sole-means policy*.

How can I make such a claim? Well, first recall that Congress has provided approximately $50 million for Loran upgrades and research and development over the last five years, including the Fiscal Year 2001 Loran upgrade budget, which was recently signed into law at $25 million. Importantly, Congress supplied those monies when agencies and departments were generally *not* requesting such funding. Throughout those years, I am proud to report the ILA has found extremely strong, bipartisan Loran support in Congress, and all indications are that Loran support will continue in the future. In other words, Congress views Loran as a *national* issue and a *safety* issue - not as a political or departmental issue - and that view will not change with a new Congress.

I can also make this claim because Congress is *supposed* to act in the national interest. It is their charter, and they take that role seriously. Whereas agencies or departments might have their own agendas and fight their own internecine battles over budgets and technologies, Congress takes the greater view and makes decisions from a national perspective. The bottom line is that Congress funds the departments and agencies, and sets many of their funding priorities.

Furthermore, the most recent $25 million Congressional investment in Loran infrastructure will likely mean that decommissioning Loran would cost more than finishing system upgrades now underway. Moreover, future operations and maintenance costs for the US Loran system will likely drop to below $15 million annually, a figure that represents *less than twenty-five thousandths of one percent* of the DOT's FY2001 budget of $58 billion. Given these rather striking numbers, Congress views Loran as an incredibly cost effective insurance policy for the national transportation and telecommunications infrastructure and for citizen safety, particularly in our unstable world. And I will note that the recent unrest in the Middle East, and the terrorist attack on the USS Cole, only heighten Congressional awareness of such issues.

What I am saying here is that Congress can and will take a pragmatic and aggressive approach to important national issues like GPS and Loran policy. They have done so for years, and give every indication of continuing this approach.

"Radios are Great - but Not Perfect!"

- 2.4 GHz, frequency-hopping, spread spectrum radios (transceivers)
- Designed to operate reliably in high interference environments
- 250 milliwatt transmit power provides up to 15 mile data link
- In other words, Locus' radios are wonderful - of course!
- But Locus' radios are also - alas - imperfect! (*fortunately, so are the competitors - at least if they are honest about it*)
- Why? Because radios will occasionally not work in customer site conditions that neither the customer nor the supplier can control or anticipate. That is RF life.

The second opinion I would like to offer stems from my role as a producer of RF products that operate in the 2.4 GHz band, just above where GPS operates. Here, I would claim that *no RF system will ever operate perfectly*, and that is pretty much what is often asked or expected out of GPS. That is to say, I strongly support GPS and absolutely agree it should be our primary system. But I will also say GPS will never perform perfectly, even with all its proposed augmentations in place.

The problem is we cannot foresee how any RF system will be used or the environment in which it will operate. In product development - my business - you first need extremely detailed engineering specifications regarding system performance, environmental conditions, etc. before designing an RF system. But regardless of the time, money, and brilliance expended in the specification and development efforts, they will always come up short. I don't know any clairvoyant people, otherwise, I probably would have invested in them rather than Loran. But my point is - who could have predicted people would use GPS in cities or under trees when the system was conceived, and who could have envisioned Ultra Wide Band technology and interference, spectrum allocation disputes, interference from TV transmitters, unusual solar conditions, or the availability of handheld jammers? Of course the retrospective, practical answer is that no one could make such predictions. But the critical issues are whether we recognize the soundness of that answer, and whether *today's decisions are based on that recognition*. And I say that even if a sole-means approach is *limited to a single* application, be it aviation or timing or whatever. Regardless of what augmentations are added to GPS or any other single system, a sole-means system will *never* be perfect (which is essentially the expectation) because no one can envision the real life radio environment that the future holds.

Question: Should the US infrastructure be based solely on one RF System?

- Private and commercial aviation 
- Private and commercial marine 
- Private and commercial car/truck 
- Train systems 
- Cellular phone systems and associated emergency/911 calls 
- E-commerce and banking through the Internet 
- Power grids 
- The list goes on …..

Answer: NO! Particularly when a national complement/backup is available for all these applications, and more, at $15M/year.

The third view I would offer is as a US citizen and taxpayer, and I pose one question. Do I want my government to place a growing dependence on a sole-means RF system that pervades virtually every aspect of our national infrastructure, and to ignore complementary systems, even though a technology like Loran is remarkably cost-effective, multimodal, and enhances GPS performance? My answer is a resounding no. I want my government to take a real-life, national perspective with regard to the health and protection of the US infrastructure and US citizens, and the use of taxes (i.e. my money) for those purposes. And thankfully, Congress is filled with pragmatists from both parties, and they are setting US policy.

OTHER PRACTICAL QUESTIONS

- Would the US base its national infrastructure on a sole-means system controlled by another country? Unquestionably not! But then - why would we expect other nations to do so?
- When other systems are put in place, what will their real capabilities be? What sort of RF environment will these systems - and other new technologies - create for GPS and its augmentations?

Question: "Will my radio work in 2007? Can I bet my life on it?"

Answer: "This is a difficult question - it's cloudy in there!
For another $20 I will look harder."

The final opinion I would offer is a slightly broader version of the last. I find it astounding that the US could expect any other country to accept a sole-means system controlled by the US, particularly given the economic, legal, political, and other concerns associated with such issues. To arrive at this view, I simply put myself in the obverse situation. For example, would the US accept a sole-means system put up by France or Japan, and then base our national infrastructure on it? Is the US so chauvinistic to expect others to accept such a condition when we would not?

A FINAL OPINION

- Eliminate dependence on things we cannot control (e.g. the future RF environment).
- Prepare for the future by developing *hybrid* systems that simultaneously offer:
  - enhanced system reliability and performance,
  - regional control and independence,
  - inexpensive operation and multimodal funtionality.
- Prepare for the future with Loran. Loran has the attributes necessary to complement satellite systems now - and in the future. We don't need a crystal ball to see that.

And so I believe Galileo might well be on the horizon. But even if it is not, other systems certainly are. And what sort of radio environment will they create for WAAS and LAAS and new GPS satellites, and what other new technologies will develop and further complicate that radio environment? Of course the answer is - we really do not know. Consequently, we really do not know how well the GPS system will perform in the future, regardless of our capabilities or best intentions.

So there are some comments from someone who claims to be a realist. Let me conclude by stating we have a new Congress in Washington, and I suspect they are just as practical as their predecessors regarding critical infrastructure protection and GPS vulnerabilities. These Congressmen and women have to be pragmatists to get where they are, and it is virtually impossible to have them accept the argument that one technology will work perfectly all the time, or that one technology should be the sole foundation of our national infrastructure. After all, these people have floppy disks and backup power supplies on their computers, life vests in their boats, and emergency brakes on their cars.

So the *real* US radionavigation policy will continue to be a non-sole means policy, and as a pragmatist, businessman, and US citizen, I believe that will not change in my lifetime. And as a citizen of the world who frequently depends on the critical infrastructure of other nations, I hope no nation ever adopts a sole-means policy - regardless of the technology or who controls it.

Again, let me extend my warmest welcome to the first ILA meeting of the new millenium. I believe you will find the next three days interesting and informative, and thank you for joining us.