



September 6, 2000

RECEIVED

SEP 8 2000

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Ms. Magalie Roman Salas
Secretary
Federal Communications Commission
445 12th St., S.W.
Washington, DC 20554

Re: Ultra-Wideband
ET Docket 98-153

Dear Ms. Salas:

I am writing this letter in support of the Notice of Proposed Rule Making on ultra-wideband (UWB) radio. Intelligent Automation, Incorporated (IAI) strongly recommends that the FCC approve the use of UWB.

IAI has been in business for 14 years, and now has 55 full time scientists working in advanced communications, distance learning, and applications of artificial intelligence. Our customers include NASA, DOD, Department of Education, DOC, as well as such companies as Raytheon, Lockheed Martin, and Westat.

When we initially became aware of UWB technology, we evaluated the technology with respect to its potential advantages and also with respect the regulatory restrictions which currently restrict its use. The benefits of the technology appeared substantial and achievable. With respect to the regulatory issues, IAI did many simulations of the effect of large numbers of UWB transmitters. Our purpose in doing these tests was to insure ourselves that we were not focusing on a technology which would not be approved for general use. Our simulations convinced us that even very large numbers of UWB transmitters will not make any material difference in other transmissions, any more than the millions of appliances which generate RF noise make in other transmissions. This is especially true given that with UWB, the few bands which are critical to safety, such as the ATC system, can be filtered out of the UWB transmitted signal whereas with normal appliances, that is not possible. Based on our evaluations we proceeded aggressively to develop UWB applications, confident that the regulations would be changed to allow use of UWB in the face of overwhelming benefits, and overwhelming evidence of the non-interference with current spectrum users.

No. of Copies rec'd 0+4
List A B C D E

We are actively working on several contracts related to Ultra-wideband.

- We have an ongoing contract with the Department of Commerce to develop a communication and tracking system for firefighters, police, and similar personnel. This system offers the ability to accurately track the motion of personnel with the same hardware as is used for high bandwidth communication with a small low power unit. This need has not been achievable by other technology, primarily because UWB can operate inside buildings whereas GPS related technology cannot.
- We have a similar contract from NASA to apply this technology to the next generation spacesuit so that the motions of an astronaut can be tracked, again with a small low power unit, with the same hardware also providing high bandwidth data communication such as video images. The new spacesuit mission plans include a mission to Mars where power is absolutely critical, as well as many other missions.
- We have a contract with the U.S. Army Simulation and Training Command to develop UWB for use in training exercises to track the motions of trainees and equipment. Our initial work shows that UWB position measurement is within 1 mm in position. With two antennas mounted on a weapon, the simulation system can measure the angle of that weapon it within .1 degree. For line of sight weapons, such as a conventional rifle, "laser tag" methods work well, but many weapons are not line of sight, including artillery, tanks, and new weapons such as the OICW. For training with these weapons, UWB offers the previously unachievable capability to track the aim point of the weapon in real time with enough accuracy to allow its integration into meaningful training exercises.
- IAI is working on a contract from the U.S. Army to apply UWB to the Grizzly Minefield Breaching Vehicle. The purpose of the UWB sensors is to provide accurate real-time measurement of the ground topology so that the Grizzly blade can be kept at the correct elevation. The advantage of UWB is that it can operate through obscurants or dense foliage, whereas laser based systems cannot.
- IAI has completed a contract with the U.S. Air Force to demonstrate the many advantages of UWB in phased array radar and in synthetic aperture radar. There are fundamental advantages to using UWB over conventional methods.

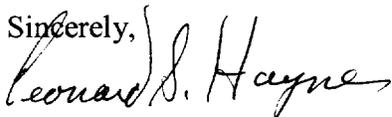
The above are examples of ongoing contracts. We are also evaluating many applications of UWB which are not currently active contracts. An example is using UWB as a vehicle sensor to enable better control of traffic flow. Because of the ultra low power of UWB sensors, we believe we can build a traffic flow sensor which will be able to generate its own power from road vibration, and the UWB signals will be able to both sense the traffic and transmit the data to the side of the road with a single unit. No wiring will be required in the road, and no battery replacement will be required. With the traffic problems becoming increasingly acute in many large cities all over the world, improved traffic flow is a high priority goal. UWB can provide very low purchase cost, low installation cost sensors. For IAI, this is ideally

synergistic with other work we are doing for the Federal Highway Administration in algorithms for traffic flow management which rely on real-time, accurate vehicle flow data.

Another area where IAI believes UWB can make an important contribution is in use of the Internet, and distance learning in schools. IAI has been deeply involved for many years in distance learning, including a major program funded by DARPA to evaluate distance learning in U.S. Dependent Schools on U.S. military bases abroad. A major impediment to meeting the goals of that program were that it proved to be very difficult, costly, and time consuming to wire the test schools so that high bandwidth access could be provided in classrooms. The school buildings were often concrete with no provision for future wiring, and running wires was very difficult. UWB provides the opportunity for a wireless LAN which could provide good access to each terminal without the cost or inflexibility of physical wiring. Other technology for achieving this goal does not have sufficient ability to penetrate walls so that it would be practical for a school wide LAN.

We urge the FCC to move forward rapidly with approval of UWB. Regulations should not, and ultimately cannot prevent the use of technology with obvious advantages over the prior art without a sound reason for those regulations. We do not believe there are any technically viable reasons for the current regulations. We also note that if the U.S. does not approve UWB, other countries will, and very likely at higher levels than are currently being considered by the FCC. If this occurs, the commercial opportunities opened up by the technology will be captured by non-U.S. companies, and when use of the technology grows in other countries, and there is no interference with any other transmissions, then eventually the U.S. will have no argument to continue its restrictions. The only long term result at that point of continuing the current restrictions will be lost opportunity.

Sincerely,

A handwritten signature in cursive script that reads "Leonard S. Haynes". The signature is written in black ink and is positioned to the right of the word "Sincerely,".

Leonard S. Haynes, Ph.D.
President