

**Distinguished Achievement Award Winner AMTA Senior Advisor Michael Francis’  
acceptance Speech at the 2010 AMTA Symposium in Atlanta GA.**

I want to thank Jeff Guerrieri, the Awards Committee and the Board of Directors for this award. I am honored to receive the Distinguished Achievement Award from the AMTA. I want to thank my family for the support they have provided. I also wish to thank my past and present supervisors at NIST – Ray Baird, Andy Repjar, Dennis Friday, and Perry Wilson for their support. However, I also need to blame Perry for making me a manager. Hopefully that won’t be for too much longer! I thank my colleagues at NIST – Jeff, David Novotny, Katie MacReynolds, and especially Ron Wittmann, who have been frequent collaborators. I would be remiss if I did not thank those who were my mentors during my career at NIST – Carl Stubenrauch and especially Allen Newell. If I have made important contributions, most of the credit should go to the giants whose shoulders I stood on and upon whose foundation I was able to build.



Now is the time where I could brag about having made great accomplishments in my career. That would be exaggerating and would be very boring, especially for you. Instead, I would like to look to the future. What are the possibilities for our profession? Where is AMTA going? What are the opportunities?

You should take what I have to say with many grains of salt. My crystal ball can be pretty dirty sometimes! Thirty-five years ago, I expected that we would have landed a person on Mars by now and have had colonies on the moon. Just think of the radio astronomy we could be doing, if we had an observatory on the far side of the moon with a giant attenuator to filter our trash talk!

In the next ten years or so, I expect RFID applications to become quite common. I expect RFID to be used in inventory control, including for medical devices and pharmaceuticals. It may even become common in credit cards. The associated antennas are not high performance antennas and do not pose a challenge to our capabilities to measure antennas accurately. Instead, even if there is only a small sample of devices that is measured, there will be so many RFID devices that the challenge will be to measure these antenna systems rapidly.

In addition, there are challenges regarding interference, particularly for medical devices. For example, one would not want the RFID reader for the pill bottle to interfere with the EKG machine. Thus, one challenge will be - What is the best measurement method to use to determine the immunity of these devices to EM interference?

We should also not ignore the risk of identity theft that might be associated with RFID in credit cards.

I also expect there to be a continuing increase in the demand for bandwidth, especially for data applications. This will lead to broad band applications that cover multiple waveguide bands and applications at higher frequencies above 60 or even 100 GHz. Characterizing antennas or antenna systems over many waveguide bands can pose a challenge in setting up measurement systems that cover many bands accurately and in a reasonable time.

Climate monitoring will also lead to applications at higher frequencies up to as much as 1 THz. For example, the RF Fields Group at NIST has been mandated to develop measurement capability up to 500 GHz, beginning with the water vapor line at 183 GHz. These applications will pose challenges in antenna and probe alignment and positioning and in achieving adequate stable transmission powers.

These high frequencies will pose other measurement problems. Full pattern measurements will be necessary for some of these applications. Even obtaining accurate rotary joints at 183 GHz is not trivial. Much above that frequency, it will be necessary to consider fiber-optical methods, or even free-space optical methods for getting the signal to the receiver.

What about the AMTA? Many recent advances in technology have been made in Europe and Asia. I expect these trends to continue and eventually to see important contributions from South America and Africa, as well. In the last few years, AMTA has held regional events in Europe and Asia. I believe these events are beneficial to AMTA as an organization since it broadens our perspective and this makes us a more healthy organization. Extending these events beyond Europe and Asia will also lead to benefits for AMTA.

I believe the home for antenna and antenna related measurements will, for the foreseeable future, remain in AMTA.

Thank you again for this great honor.

In closing, I would like to invite you to Colorado for AMTA 2011, and the next exciting episode in the Adventures of Mr. AMTA!