

## John J. Mikulsky, Chief Operating Officer and Executive Vice President, Endwave Corporation

**Q:** *Mobile WiMAX is a near certainty. Is your company addressing this potentially immense market? If so, how?*

**A:** There seems to be little doubt that mobile broadband will be a big opportunity. Recent market studies indicate that 3G subscribers now represent over 10% of the total cellular subscriber base and the penetration of broadband into homes is growing rapidly. Some 50 million of the 110 million US households are reported to have broadband connections. Demand is there, however the question is exactly what form it will take...3G, WiFi hot spots or WiMAX networks. Our best guess is that all three will have a place in this market. A key element of all these approaches is the method by which backhaul from the wireless access point to the internet is accomplished. Microwave radios are an increasingly cost-effective backhaul method and, since we have a major market position in supplying the "microwave engines" (more accurately, the transmit-receive subsystems) used in these radios, we believe that

this will be a significant growth opportunity for Endwave.

**Q:** *What is your view of short- and long-term opportunities in the defense sector?*

**A:** As a result of the high cost of the Iraq and Afghanistan actions, we have seen some instances of delays in procurement for some US defense programs that have tempered our growth this year in this area. Nonetheless, we see these delays as temporary in nature, and still believe the long-term outlook in defense electronics is very positive. Today's armed conflicts are not so much about sheer fire power as they are about knowing where the enemy is and maintaining excellent communications within your combat group...in short, "seeing and talking". Microwave technologies are key elements in serving these needs, with examples including IED detection systems and advanced sensors that enable surveillance and strike capability for unmanned aerial vehicles. High resolution radars can now find an individual intruder penetrating a

secured perimeter. Microwave cameras and portals can penetrate clothing and determine if someone is carrying a weapon or explosive. Microwave imagers can see through sand and dust to guide landings in desert areas. Broadband satellite links can beam detailed battlefield imagery virtually anywhere so commanders have real time views of resource deployments and locations of the enemy. Communication systems can provide rapid deployment of information networks anywhere in the world. Going forward, I believe we will see the continued production of today's fielded systems, but more interestingly, the development of far more capable systems. Private and government funding has supported the fundamental research for these systems and seems like their time has come.

**Q:** *What do you feel are the greatest opportunities for microwave manufacturers in the commercial markets?*

**A:** We believe it is wireless telecom and datacom in all its forms. It seems as though the world's appetite for both wireless connectivity and mobile broadband data access is almost insatiable. More importantly, this is real demand from real customers, not the hopes, dreams and hype that the "bubble" was built on.

**Q:** *Would you agree that China has the potential to be the biggest international market for our industry's products?*

**A:** While China will definitely be a large market, I would tend to focus more on Asia as a whole, with nearly 60% of the world's population, than a single country. As importantly, the emerging economies of Asia are seeing unprecedented growth rates and there is a palpable level of energy and excitement driving this rapid economic development. This growth will require enormous investments in infrastructure throughout the region and telecommunications systems, including their respective microwave elements, will be a big part of this infrastructure. The business potential is obvious.

The more pressing question for most companies is how to participate in this growth. Finding the right opportunities, engaging with the right partners, introducing intellectual



property in a protected manner, finding synergies with the region's low cost manufacturing capabilities and accommodating cultural differences are all elements of this process. While the opportunities are large, it certainly will not be a "business as usual" scenario and significant care, effort and investment will be required. Interestingly, the timing of the IEEE MTT-S show near the Pan-Asian market in Honolulu in June 2007, will provide microwave companies a unique opportunity to capture some critical information and prospects. And Endwave will be there.

**Q:** *What do you feel are the most significant advances that occurred in the microwave industry during 2006?*

**A:** For me, it is not so much pinpointing individual advances as it is noting the overall maturation of the industry and the continual march of improvements in all parts of the field. A walk down the aisles of the MTT exhibition in San Francisco or the EuMW exhibition in Manchester reveals advancements of all sorts. At the core, are new semiconductor device capabilities and more cost-effective foundries to produce them throughout the globe. Enhanced design software that allows engineers to better simulate physical systems rather than repeated cycles of "cut and try". New generations of test equipment that enhance measurement capabilities, speed data collection and provide far more lucid display and analysis of results. Also, there are advances in passive and packaging components that reduce size, weight and cost. The combination of all these factors now allow us to produce devices and systems that were simply unimaginable a few years ago. ♦