# Brainstorm: M2M Communications

**Brainstorm**: How does the future of the wireless industry affect M2M communications?

**Dr. Erez Manhaimer, VP of Marketing, Alvarion**

As the demand for M2M communication grows, the wireless industry provides a common, mature IP infrastructure that can be deployed cost effectively making it an enabler of M2M communications. IP infrastructure today is established already with commonalities, standardization and economies of scale – providing both availability and the right cost structure – that are the groundwork for significant growth of M2M applications. From business applications (generating new sources of revenue, optimizing use of resources to improve efficiency and profitability, extending the IT reach and assuring asset protection), to public service applications (public safety or video surveillance), consumer-based applications (smart homes), and mobile/nomadic applications (mobile workforce connectivity, location based applications, unmanned vehicle control), wireless infrastructure answers the need for all M2M applications with support for secured differentiated services.

The proliferation of M2M applications, particularly of bandwidth “hungry” applications, will require the wireless industry to develop technologies that will optimize bandwidth as more data will flow over the network. Network security and Quality of Service will also need to be addressed and may be key factors in the decision to rely on a public network vs. building a private network. The wireless industry must keep on top of all the standards of not only the IP network, but also the sensors and switches that make M2M possible, and all this while enabling any application, from any device, for any purpose. M2M is already here and with the right infrastructure, more applications will come.

**Bill Conley, Cellular and Proprietary RF Device Product Manager, B&B Electronics**

The big wireless players will be standards-based, like Cellular, Wi-Fi, Bluetooth and Zigbee. Consumers are demanding interoperability and ease of use. Proprietary systems are going to fall by the wayside, and the top-tier wireless standards will dominate M2M communications. We're going to see amazing growth in cellular M2M. Cellular wireless provides both mobility and global reach. The automotive and transport sectors have already taken advantage of this, pushing much of the growth in cellular M2M that we've seen so far. But other sectors, such as utilities, healthcare and security are expected to overtake them by 2020, using cellular connections for everything from smart metering to remote health monitoring. It's estimated that there will be 50 Billion connected cellular devices by 2020. Only 16 billion of them will be consumer devices. The rest will be used for cellular M2M. The wireless carriers will encourage this trend. Talk time has flattened out, and the wireless carriers know that cellular M2M networking will have to be one of their strategic growth markets. Cellular data plans are therefore becoming increasingly M2M-friendly. At the same time, integrated circuits are becoming smaller and smarter. They'll be designed to stay off the air when they have nothing valuable to report. Increasing the number of devices will not require a one-to-one increase in bandwidth. We're already seeing cellular M2M applications like automated machine operation, remote sensing and electronic payments. We're going to see many, many more.

**Richard Traherne, Head of the Wireless Division, Cambridge Consultants**

The majority of us in developed regions live in areas with good wireless coverage via cellular and other mainstream systems. So you could be forgiven for thinking it's just a matter of time before everyone is reliably connected, given the rate at which wireless is evolving around the globe. The reality is that mainstream technologies like cellular cover less than 10% of the globe, leaving great swathes of the planet untouched. But if the majority of those areas aren't populated, then surely that doesn't matter? However, there is a real growing need for robust and reliable M2M communications, whether it is for remote stations in deserts, marine vessels in the middle of the ocean, or truck drivers crossing continents, all of which require wireless connectivity far away from major centers of human habitation. With M2M poised to become a 50 billion device market, these growing connectivity needs set

the scene to introduce the often misunderstood and underestimated wireless technology that is low earth orbit (LEO) satellite. We work with a rising star in this area, Iridium Communications Inc, which is the owner of a unique satellite constellation providing 100% coverage of the earth. Its Short Burst Data (SBD) service provides reliable, two-way data communications around the world through a global network of 66 fully operational LEO satellites and accompanying ground infrastructure. The SBD service is ideal for M2M communications. Being an LEO system, the satellites are just 480 miles above the earth, which enables two-way, real-time, low-power voice and data communications services through small, reliable devices and applications that change the way organizations and people are able to operate. With more than 500,000 subscribers worldwide, this technology has already broken out of its niche historical markets to rapidly drive future innovations in M2M communications and other areas.

**Ashish Sharma, Chief Marketing Officer, FreeWave Technologies**

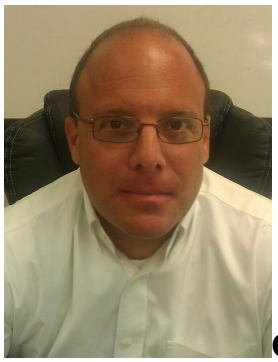
In the past, myths about security concerns and overall reliability issues with wireless technology had to be hurdled, but today, it is clear that wireless is here to stay. Wireless increasingly is becoming the top solution for M2M communications technology due to growing demand and innovation. In addition, people and companies will continue to have a large appetite for data and knowledge, and therefore will want more of it at a faster rate. This idea, in conjunction with increasing security standards and lowering the power consumption required to run wireless communication devices, will be key drivers of demand and innovation as well. More sophisticated ways of operating machines – specifically M2M communications – will continue to emerge in the wireless industry. Over the next several years, wireless M2M communications will definitely evolve and gain traction across both traditional and newer growth markets, such as the Smart Grid and the public utility infrastructure space. M2M communications are widely regarded as a strong growth opportunity not only by FreeWave, but by businesses that are recognizing that by wirelessly connecting machines, devices, sensors, equipment, etc. they can make their existing processes more productive and open entirely new ways of using data and information.

**Kris Pister, Ph.D., Chief Technologist, Linear Technology's**

**Dust Networks Product Group**
The future of the wireless industry is M2M communications. Cell phones and personal data communications are well established and will clearly continue to thrive and grow, but the vast majority of the radios deployed in the coming decades will be in M2M applications, connecting “things” (sensors and actuators in the physical world) to the cyber world through the Internet. Just as the number of microprocessors that you own dwarfs the number of screens and keyboards, soon the number of radios that you own will dwarf the number of cell phones and laptops.  Your car is filled with hundreds of sensors, and almost as many microprocessors. Your home and office are close behind. There is a natural evolution for all of these devices to find a common home on the Internet. Your heating and A/C, your lighting, your appliances, your sprinklers and pets—all of these will be monitored, controlled, and optimized to maximize your comfort, safety, and happiness, and to minimize your impact on the planet. The evolution of the wireless industry has given us semiconductor processes that are optimized for RF communications, and Moore's law has given us advanced processors that burn microwatts of power. These technologies come together with amazing efficiency in M2M communications, where IPv6 routers running 802.15.4E can run for 10 years on a AA battery, or essentially forever on energy harvested from the environment. The future of the wireless industry is M2M communication, with hundreds of billions of devices feeding their data to the Internet for a better, safer, more efficient world.

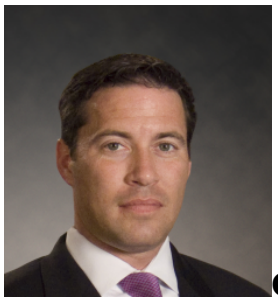
**Venkat Mattela, CEO, Redpine Signals**
Today, the wireless industry deploys multiple standards based on the need of underlying applications. With the rapid deployment of wireless equipment and terminals, wireless has become ubiquitous which paved the way for Machine to Machine (M2M) communications. Some of the key aspects of M2M which are connected with communication in general and the wireless industry in particular are: Future proofing; Since M2M devices are not expected to be replaced often, such as in mobile space, the wireless technology deployed is expected to be a standards based solution. This leads the way for all IP networks where the end-to-end communication becomes not only seamless but also secure as the security mechanisms can be borrowed from the proven networking world. In addition, the M2M market is ‘inch deep and mile wide’ – You will see the total volume comprising of thousands of small applications, each supporting limited volume but added together is expected to be a multi-billion unit market in few years. This poses a challenge of supporting customers cost-effectively. The wireless standard deployed needs to support the ecosystem with easy provisioning and minimal human intervention in the M2M chain. This is a paramount requirement for a successful M2M application. Many M2M devices will be battery powered. In addition to the power from the device intelligence side, the wireless communication part plays an

important role in system power budget planning. Future developments in ultra-low power wireless technologies play an important role and expand the realm of M2M devices across multiple applications. To realize the market size aspiration of M2M, innovations in the wireless industry plays a paramount role in the growth and sustainability of M2M market.



**Christopher D. Newton, President and CEO, Securus, Inc.**

The average smartphone has far more computing power than NASA used to coordinate the moon landing, and it takes up a lot less room. As the wireless industry grows, devices are becoming ever smaller and more efficient. Today, wireless coverage is almost everywhere, and data costs are shrinking. This enables consumers to do a lot more with technology for less money. The machine-to-machine revolution – the ability to connect devices via the cloud – will eventually allow consumers to perform any task currently done at home or in the office from anywhere in the world. Changes in bandwidth availability – from 2G to 4G and beyond – mean more and more sensors can be added to connect practically any device. This has profound implications for the way we live and work. It already enables consumers to stream video, send mobile medical alerts, safeguard valuables and keep track of seniors, children and loved ones with special needs. On the public safety side, police officers now have smartphones and laptops in their patrol calls to get immediate access to vital data. As bandwidth capabilities grow, the wireless industry will expand further, unleashing a new wave of truly exciting M2M innovations. We have only scratched the surface.



**Grant Seiffert, President, Telecommunications Industry Association (TIA)**

M2M communications is the latest example of how wireless networks are revolutionizing global business.  Around the world, industries—from health care to transportation—depend on broadband networks to employ endless innovations using this “Internet of Things”. Now is a critical time for the wireless industry as it prepares to handle the immense traffic generated by M2M. The Telecommunications Industry Association’s Market Review & Forecast predicts that M2M will be one of the fastest-growing components of the data services market.  By 2015, TIA expects the number of M2M connections to more than triple, with 50 billion devices connectable by 2020. There is no doubt that a bright future for the

wireless industry is essential for the success of M2M. But there are challenges that our industry must confront in order to handle M2M and ensure its global functionality. Usable spectrum has become a limiting factor in the growth of wireless technologies and deployment, and the growth of M2M will place even greater demand on networks that are nearing, or at, capacity. Telecommunications companies around the world need guidance as they optimize their networks to handle billions of these new devices. In response to these issues, TIA is developing a series of global industry standards. These standards will help networks ensure that M2M devices all over the world can effectively communicate with one another. TIA's TR-45 Wireless and Personal Communications Standards Committee is developing performance, compatibility, interoperability and service standards that provide the infrastructure for the reliable transport of M2M communications via wireless technology and networks. Meanwhile, TIA's TR-50 M2M Smart Device Communications Committee is crafting standards to ensure the secure transmission of information between smart devices and other devices and applications over both wireless and wired transport networks. This universal protocol will support smart devices used in numerous industries, while setting the stage for even more sectors to take advantage of the transformative power of M2M. The future success of the wireless industry is essential for M2M. That's why TIA is empowering wireless networks to carry M2M traffic and ensure that this new communications frontier can reach its full potential.

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