

August 2012

News and Ideas for your

Wireless Developments

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Large Carrier M2M Communications is Changing the Wireless Landscape

Machine-to-Machine communications, or M2M, is all about large carriers seeking to capture low data rate machine applications using their nearly ubiquitous cellular networks. The users of low data-rate applications, such as SCADA, remote control, alarm systems, vehicle tracking, etc. are only able to support single and low double digit monthly bills for their communications services before it pays to develop a private wireless network. So why would carriers want to pursue M2M when the average revenue per cellular subscriber today is approximately \$56 and climbing?

The answer has to do with the number of devices, penetration levels and the value of a bit.

- Cell phone penetration has exceeded one device per user in almost all other OECD countries and is slowing.
- The number of potential devices is many times that of the world's population.
- The revenue per bit for an industrial user is up to 100x that of a retail user and data use is trending up.

Putting these facts together leads to an impressive revenue opportunity for the carriers. The promise of M2M for users is a reduction in the capital costs associated with wireless networks and a low risk pay-as-you-grow business case. The threat of M2M is to small equipment providers who may see many of their traditional customers migrate from private to carrier-based wireless networks.

Tech-Knows can help you resolve the big question for your application: Carrier M2M or your own Private Network?

Learn more about M2M on our YouTube channel at <http://tinyurl.com/cnbuff7>

LTE & WiMAX - Two Views

Typical Wireless Equipment Vendor

The name of the game is Capitalism, and usually those with the most capital win. If your company is supplying LTE equipment to the carriers, then you are a happy camper these days. But if you are a small radio supplier, you might be worried. Over the next decade public safety agencies are going to add rapid deployment video, high speed data down load and sophisticated situation

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Application User

If you are a power utility or a public safety agency you have been using the same wireless data technology for decades – Narrow Band FSK, or one of its derivatives such as FFSK, or GMSK. While the rest of the world has seen orders of magnitude increases in data speeds, you have been stuck in the world of the 80's. That is about the change, a lot.

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LTE & WiMAX - Two Views continued from page 1

Equipment Vendor

awareness and command and control tools. These are applications that can easily be supported by the 5 to 20 MHz of LTE or WiMAX systems, but not the few kHz of bandwidth available today to most Public Safety radio systems.

The situation is the same in the Utility market with Canada allocating 30 MHz in the 1800 MHz band and USA utilities likely to have access to part of the 700 MHz band alongside the public safety agencies. This is scary stuff if your business is wireless voice and low bit-rate data radio devices. Your customers probably intend to stay loyal since they know your equipment works well, but when the bulk of their needs are met by a WiMAX or LTE system the will to maintain a low-bandwidth system will fall victim to a budget manager.

So what can one do?

- Enter the cash cow phase?
- Change markets (where)?
- Upgrade your technology
- Change your products so they work with and enhance the LTE or WiMAX systems?

Clearly the latter two are the way to go – and even better if done in tandem. A good solution is one that bridges your own technologies to WiMAX or LTE. Examples of this strategy might be:

- Mobile Push to talk gateway to the LTE
- Sensor network gateway to WiMAX
- Pt-Pt extensions beyond the LTE or WiMAX coverage

If you are selling into a market that will soon be using WiMax or LTE and you need a way to compete please contact us to arrange a free consultation.

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To learn more about LTE try IEEE Comsoc training <http://www.comsoc.org/training>

Wireless User

The 20 MHz wide 700 MHz public safety network in the USA and the 30 MHz wide 1800 MHz power utility band in Canada are soon rolling out.

WiMAX Sample Specifications

Bandwidth: 1.75 to 15 MHz
 Spectral efficiency:
 Up to 5bps/Hz
 (2x2 MIMO)
 CNIR Range:
 BPSK (1/2) 13.9 dB
 QAM64 (3/4) 31.4 dB

We are familiar with public safety video, having designed one of the (if not the very) first commercially available battery-powered portable wireless video surveillance systems. This was hard to do with the narrow spectrum available at the time. LTE/WiMax will bring many benefits: higher video rates, easier deployment, and fewer coverage issues.

The change to a public safety infra-structure changes some key things:

- Everything in the system becomes a mobile.
- Everything is IP based.
- Bandwidths are large (Mbps vs kbps).
- Setting up a command post wireless system becomes easier.

The advent of the standards-based changeable wireless modem card (Sierra Wireless, Novatel, Jasper, etc.) will support deployment of upgradeable systems. Each decision made is no longer a 20 year decision. As the technology advances your system can move with the times.

So what are the negatives?

- New technology always does old things in new ways, so training will be needed and resistance will occur.
- Deployment is always slower than we want or expect, so there will be several years of maintaining both narrowband and broadband equipment.
- It will take time to discover and simplify the key applications for this increased bandwidth.

With time these new broadband technologies, will greatly enhance the value of wireless to your organization.

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To explore your new broadband wireless options contact us at info@tech-knows.com

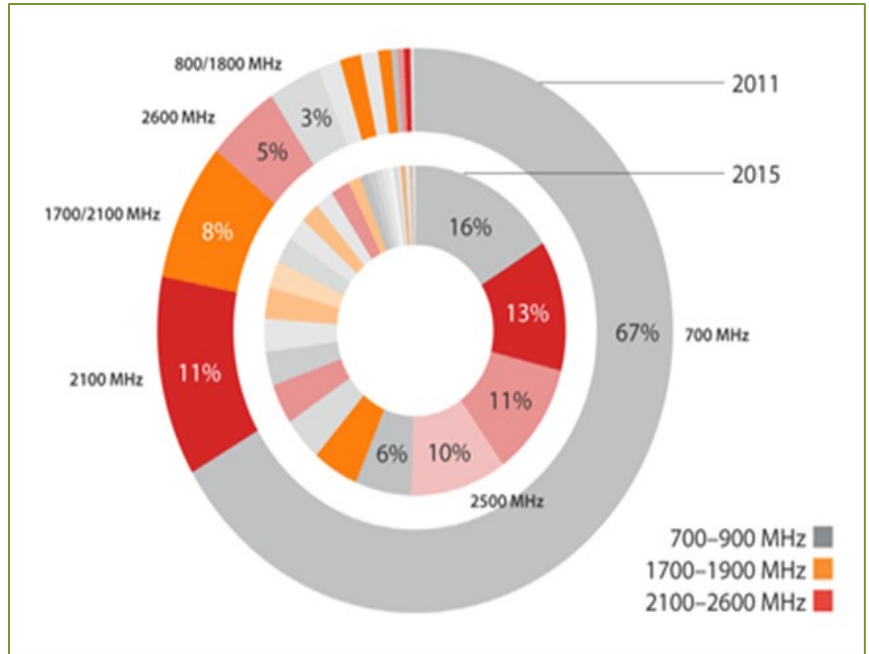
M2M - Internal Antennas and Spectrum

Many M2M device and application designers prefer the internal antenna approach. Internal antennas are inherently robust, protected from the elements, harsh atmosphere of an industrial environment and permit cleaning of external surfaces without worry of antenna damage.

For those considering very high burst rates or large data file movements LTE looks promising, but if you are looking for a global solution you will need to accommodate multiple frequency bands, which is easy if you use an external antenna, but potentially challenging if you wish to use an internal antenna.

Today complex antenna shapes can meet your needs for dual-band or tri-band operation. Modern simulation tools and good design practice make this an affordable option. Designs need to take into account your choice of case plastic, thicknesses, and design tolerances.

Please contact Tech-Knows if you need a multi-band antenna designed for your application.



LTE Spectrum Around the World

Source: 'Global LTE Network Forecasts and Assumptions – One Year On'; Wireless Intelligence (December 2011)

M2M Wireless Information

Major M2M Module Suppliers

<http://www.sierrawireless.com/>

<http://www.digi.com/>

<http://www.telit.com>

<http://www.janus-rc.com/>

<http://www.nvtl.com>

Development Kits

<http://www.m2m.com/>

<http://shop.intrinsyc.com/>

Resources from the Tech-Knows.com Web Page

Wireless Acronyms - <http://tinyurl.com/ck5xjfa>
<http://tech-knows.com/resource-page/wireless-resources/wireless-acronyms/>

Wireless Glossary – <http://tinyurl.com/clhxxvw>
<http://tech-knows.com/resource-page/wireless-resources/wireless-glossary/>

M2M Introduction Video - <http://tinyurl.com/cnbuff7>

Database of PTCRB Certified M2M Products

<http://tinyurl.com/8us5ej9>

<http://www.ptcrb.com>

For Canadian Companies
<http://www.wavefrontac.com>

Wavefront is a not-for-profit National Centre of Excellence accelerating the growth and success of wireless companies in Canada by connecting them with critical resources, partners and opportunities.

Verizon M2M Data Pricing <http://tinyurl.com/dyrc9vk>

http://businessportals.verizonwireless.com/international/GlobalData/rates_coverage.html

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We're on YouTube!

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About Tech-Knows

Tech-Knows Services Inc. is a company focused on wireless development founded by Lee Vishloff, a 30 year technology veteran and Professional Engineer.

Tech-Knows Services' partners and associates cover every aspect of wireless design from data networking, software, DSP, RF through to mechanical and industrial design.

We live to design and implement new wireless systems and products.

E-mail or call us to schedule a free consultation about your wireless system.

For a light-hearted look at procrastination see:

<http://www.structuredprocrastination.com>

Tech No's – Ideas to keep you out of trouble
The Most Common Project Delay

Question: What is the single most common project delay?

Answer: Not starting in a timely manner.

Anybody who has worked in technology for any length of time is familiar with this problem. A lost day is a lost day, whether it's at the beginning of a project or at the end, but often with that long period ahead of us that sense of urgency is not present at the beginning..

This lost time costs you time in the market, which costs you money. End of project panic also costs you money as resource efficiency gives way to getting things out the door anyway possible.

The causes of delayed starts are many, but here are a few:

- There are too many unknowns.
- The staffing is not yet available.
- The budget is not firm.

While these may all be valid, I think the major cause is **procrastination**.

The four factors contributing to procrastination are:

1. How confident a person is of completing a particular task successfully;
2. How easily distracted an individual is;
3. How boring or unpleasant the task is;
4. How immediate the reward for completion will be.

So if we think about the beginning of a development project we can see how these four factors come into play.

At the beginning of a project the reward is a long way off, so #4 applies for sure.

Factors #1, #2 & #4 interact if personnel are coming off of one project and onto another. Clean up duties from a previous project are easy to justify as distractions. Such duties are also almost always well defined ("Just one more design change to fix a low priority bug – honest!"), so the

confidence level is high, and the reward for completion is immediate.

Usually boredom (factor #3) is not a problem at the beginning of a project, but there is one unpleasant task that often stalls out, specification completion.

The completion of specifications can be a tough job for a young designer, who just wants to get on with designing the next great gizmo or system. If your design is software only and uses Agile, then you should not have #3 to deal with, but if it's a system using hardware, or a chip design then completing that hundred page spec is an unpleasant task, that must be done - now.

Two common items that slow specification completion include:

- The difficulty in turning features into spec.s the designers can use.
- Fear of mistakes or omissions by either the writer(s) or reviewer(s)

If you wish to get your projects up and running quickly being aware of the causes of procrastination can help you reduce this delay.

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If you're project or company suffers from slow project starts you might consider bringing in a consultant at the beginning of the project to get the ball rolling. The right consultant will:

1. Be confident in completing the fuzzy front end tasks.
2. Be undistracted by other duties.
3. Not find the spec. details unpleasant, it's a lot of what they deal with.
4. Enjoy an immediate reward of getting the team launched.

Getting through that fuzzy front end is something I have done a lot of. If you want to stop losing days at the front end of your projects contact Tech-Knows.

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