WiMAX in Mining Operations
Agenda

- Introduction to Proxim
- What is WiMAX and why all the excitement?
- WiMAX Applications
- Targeted solutions for the mining market
Introduction To Proxim

- Manufacturer of Broadband Wireless Systems to enterprises and service providers

- End-to-end solutions including WiMAX, Wireless Mesh, Wi-Fi MMW and Point-to-Point True Differentiator

- 235,000 customers

- 1.5 M units in the field

- Deployments across Americas, Europe, Middle East, Africa and Asia Pacific

- Over 130 US wireless Patents
What is WiMAX?

- Worldwide Interoperability for Microwave Access

- “WiMAX is a standards-based technology enabling the delivery of last mile wireless broadband access as an alternative to cable and DSL “
  - Source: The WiMAX Forum

- WiMAX is based on IEEE 802.16-2004 (fixed) and IEEE 802.16e-2005 (mobile)

- WiMAX provides fixed, nomadic, portable and, soon, mobile wireless broadband connectivity without the need for line-of-sight.
Why WiMAX?

- WiMAX has gained significant traction as a last mile access solution
  - High performance
  - Cheaper to deploy than wired solutions
  - Service Provider acceptance
- Optimal for point to multipoint backhauling with QoS and bandwidth control
- Future products will support mobility and small form factor
  - Laptop, personal and mobile electronics
- IP-centric: designed to carry data
- VOIP is readily handled
WiMAX - Market Trends

- Worldwide WiMAX users projected to grow from 180,000 in 2006 to 84.8 million in 2011 (over 100% CAGR) \(^1\)
- PtMP equipment sales are expected to reach $3.5b by 2010\(^2\)
- Mobile WiMAX uptake is dependant on advances in silicon to low cost low power handheld devices

\(^1\)Source: Gartner Dataquest Nov. 2006 Worldwide WiMAX forecast.

\(^2\)Source: SkyLight Research
What about Wi-Fi®?

- Wi-Fi has been in widespread use for a long time, but has many disadvantages for use outdoors
  - Originally designed for indoor use with distances of only a few hundred feet
  - Even with boosted signals through high gain antennas and amplifiers other issues surface
    - Contention based access causes excessive collisions (hidden node)
    - No Quality of Service for SLA’s
    - Poor security options
- Wi-Fi is great but it just wasn’t designed for long distance outdoor operation
- Wi-Fi Mesh overcomes many of these deficiencies as we will discuss later
WiMAX Applications
Real Mining Projects

• Applications briefs: Please pick them up!!!
  - Diamond Mine Lesotho: video surveillance, LAN, VOIP, communications and vehicle tracking
  - Coal Mine in South Africa to monitor walking draglines: data monitoring, GPS and video surveillance
  - African Rainbow Mines: vehicle tracking, data and VOIP
  - Nexen in the oilfields of Yemen: video security and surveillance, SCADA remote monitoring and maintenance and Internet access to personnel

• Additional mining projects in US, Canada, China, Malaysia, Argentina and Brazil
• Chances are pretty good that we have tackled your data needs and environmental conditions
Last Mile Applications in Mining

- Connecting remote building
- Connecting remote machinery
- Video security and surveillance **HOT**
- Send and receive data (and voice) from wherever you need
- Solar power is available
- Typical distances are 1-5 miles with line-of-sight but much longer distances are possible
Backhaul Applications in Mining

- Connecting two or more wired or unwired LANs
- Other WiMAX Base stations as relay points
- Wi-Fi Access Points
- Wi-Fi Mesh Access Points
- Network cameras for surveillance
- Imagine it like an Ethernet switch
- Typical distances beyond 10 miles are real with line of sight
Sample WiMAX Applications for Mining

Real-time gathering of all critical information
Real time control of devices from remote locations
Video security and surveillance
Internet access for personnel
Vehicle/asset/personnel tracking

Results

Increased safety
Increased productivity
Increased profits and ROI
Increased efficiency
Increased equipment life
Increased operating knowledge throughout the organization
So What’s the Catch???

- WiMAX is perfect for large scale remote communications systems required by the mining industry so where is the gotcha???

SPECTRUM

WiMAX is focused on carriers operating in licensed bands: 3.5 GHz, 2.5 GHz, etc.

Often not practical for a single use operation: licenses are expensive!

License free options exist but still immature

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WiMAX Performance and more using license free bands

A combination of pre-WiMAX and Wi-Fi products operating in the license free bands

- **Tsunami MP.11**
  - WiMAX like capabilities in unlicensed 5GHz and 2.4GHz bands
  - Pre IEEE 802.16e roaming and a large installation base

- **MeshMAX™**
  - A 3-radio solution supporting both WiMAX and Wi-Fi mesh and is software upgradeable to IEEE 802.16e
  - Single integrated unit, zero footprint
  - Frequencies supported-WiMAX:
    - 3.3/3.6 GHz (licensed) and 5.1/5.8 GHz (unlicensed, coming soon)
    - Mesh: 2.4 GHz and 5.1 - 5.8 GHz
Pre-WiMAX in License Free Bands

- Tsunami MP.11 offers great range (20 miles) and throughput (up to 30 Mbps) operating in the 4.9-5.8 GHz, 2.4 GHz and soon, 900 MHz LICENSE FREE BANDS
- Provides WiMAX benefits and performance today (without requiring a license)
  - OFDM
  - Active Dynamic Polling
  - AES and other encryption options
  - QoS
  - Roaming and seamless handoffs at speeds up to 200 km/h Sub 40 ms handoffs
  - CSMA/CA listen before talk required for unlicensed bands
  - DFS (Dynamic Frequency Selection)
- More than 100,000 units deployed: several multi-thousand units networks
- One box solution that can be solar powered
- Includes NAT, DHCP Client/Server/Relay, SU-to-SU filtering, routing (RIP)
Adding Wi-Fi Mesh

Mesh AP

WiMAX SU

Residential

Business

Shop

5 GHz

Mesh

2.4 GHz

Mobility

MP.11 Distribution

5 GHz

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Things to think about

- Wireless is NOT one-size-fits-all
- WiMAX and pre-WiMAX equipment should be the first consideration for large scale outdoor data communication projects
- Don’t overlook Wi-Fi: outdoor ruggedized solutions: MESH
  - Great low cost solution
  - Over 300 Million units in the field
  - Not optimal for heavy video or mission critical applications
- Point-to-Point Microwave
  - Distances up to 100 miles with line of sight (up to 30 typical)
  - Fresnel zone and curvature of the earth may be limits
- Millimeter Links
  - True gigabit ethernet speeds
  - Limited range: plan on ½ mile but can be longer in drier areas
- Your data needs will explode: PLAN AHEAD
Thank you for your participation!