

WCA Monthly Meeting

Martin Hanssmann, Millennial Net

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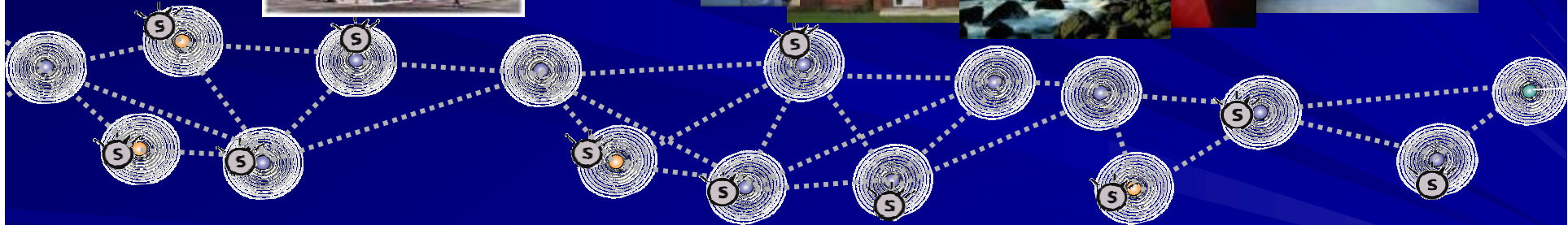
Millennium Net

Ultra low power

Highly scalable

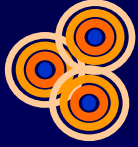
Self organizing/administering

Wireless sensor network system



- Founded in 2000 by researchers from MIT
- Patented sensor networking technology
- More than a dozen sensor networking innovation awards
- Based in Burlington, MA.


Millennial Net



Millennial Net Industry Experience

- over 140 customers, 20,000 nodes

- **Cost Savings (Wire Replacement)**

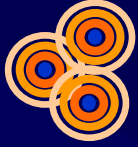
- **Building Automation**
- **Facility Management**

- **Game Changers (New Markets)**

- **Energy Management**
- **Asset Monitoring**
- **Asset Health**
- **Asset Management**
- **Asset Tracking**
- **Environmental Monitoring**



Industrial Automation
- Best 5 Year CAGR Forecast
Game Changing Applications

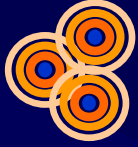


Increased Expectations as Industrial Applications mature

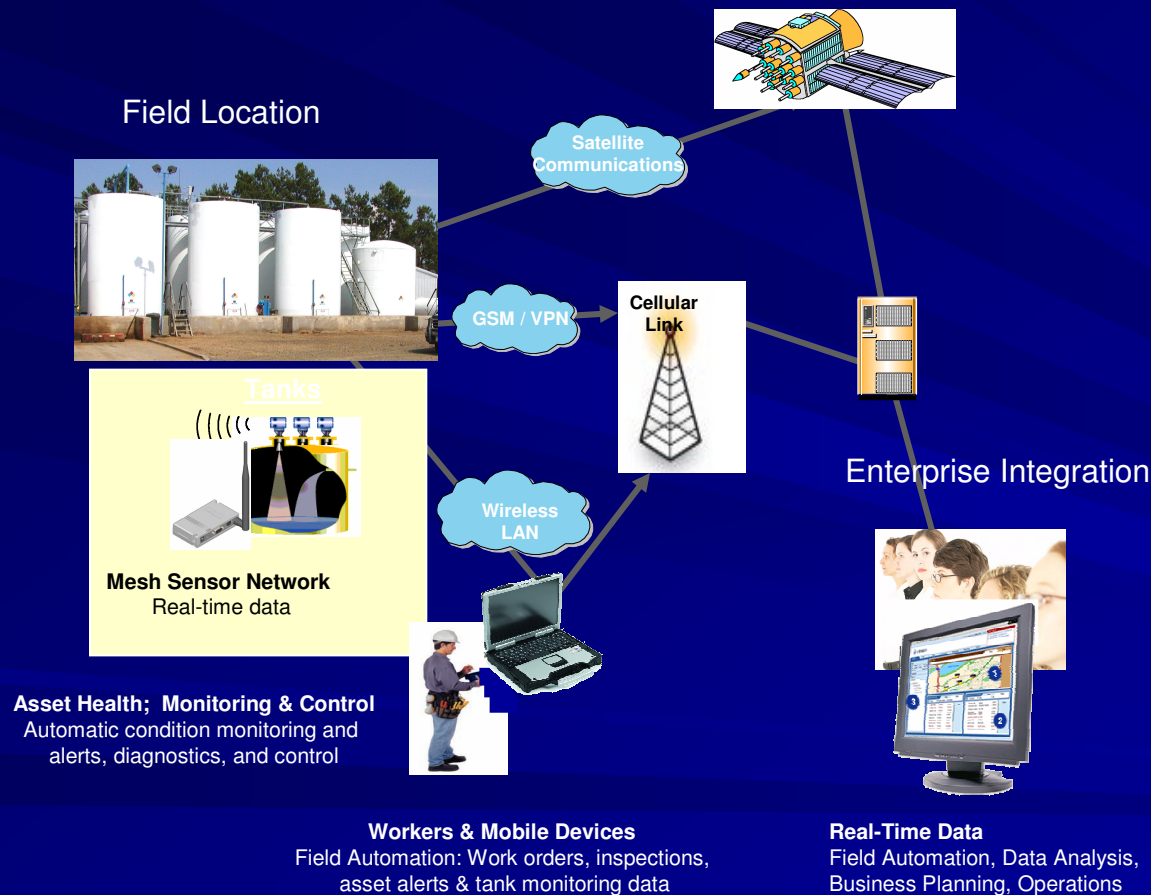
- Solutions need the power of “AND”, not “OR”

- + **Range**
 - + **>500 ft Distance**; Network Maintains a 1% PER or Less
- + **Reliability**
 - + **>999**. The ability to communicate upstream **and** downstream within the network with a predictable probability, minimum latency, variable duty cycles
- + **Scalability**
 - + **100+ Nodes**. How well the network maintains reliability as the number of nodes increases. Function of protocol design, including the need to globally synchronize time or routes and the complexity of recovery from network modifications.
- + **Security**
 - + **Inter/Intra Mesh**. Use of frequency changes, encryption, and user level access control to secure network communications.
- + **Ease of Use**
 - + **Interoperability at the Enterprise level**. Ease of installation, maintenance and integration to common sensors and common enterprise elements.
- + **Low Power**
 - + **1-3 years – end nodes/routers**. The ability to run extended periods of time on battery power with minimum latency (time between hops).

MeshScape system allows customers to easily meet different requirements within the solution. It can be used for wider range of applications.



Business Value is driven by the Solution; - inherently requires a broad level of capability



Often multiple “conflicting” requirements within single solution

For example: Salt Water Disposal Site Asset Optimization Solution

1) Remote Monitoring (Tank Levels, Well Pressures)

Reliability (1/sec – 1/day)

Low power

Range

2) Control applications (Pump Input Pressure)

Reliability (bi-directional reliability)

Low power

Low latency

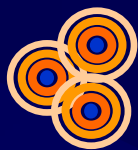
3) Asset Health monitoring / Tracking (Trucks, Pumps)

Low power

Mobility

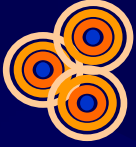
Scalability


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MN fifth generation technology uniquely meets the needs:

- **Bi-directional Communication**
 - Equally reliable in both directions
 - Minimum latency
- **Unique Power Management**
 - Advanced approach minimizes synchronization overhead
 - Dramatically improves response time (latency of < 1 sec/hop)
 - Allows true event driven applications without power penalty
 - Scales to large networks
- **Range Agility**
 - Software selectable from 50' to 1500'
- **Enterprise Connectivity**
 - Integration to .Net 2.0 Framework
 - Windows-based configuration and maintenance
 - Configuration and events stored in SQL database
 - Simplified reporting and configuration
- **Sensor Connectivity**
 - Off-the-shelf support for common sensors
 - 4-20 mA (2,3,4 wire), RS 232/485, 16 bit A/D, Digital I/O
 - Sensor level Enterprise Support
 - End-to-end communication and configuration
 - Supports intelligent application development at the sensor level



Millennial Net Summary

❑ **Solution Focused**

- Can **solve real business problems**
- Proven, Cost effective



❑ **Network Robustness**

- Can **ensure reliable data transmission** in a dynamic environment.



❑ **Power Efficiency**

- Can run for **years** on a single battery or be completely **energy independent**



❑ **Network Responsiveness**

- Can **quickly adapt itself** to the change to mobile or new sensors



❑ **Solution Scalability**

- Can **scale to 100s of nodes** with minimal overhead



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Thank You