Delivering Industrial Strength Wireless

Yokogawa User Conference

Agenda

- Industrial wireless industries and Yokogawa's users
- Industrial Wireless today … and where it is going
  - Why an industrial wireless infrastructure is needed
  - Value drivers & inhibitors for wireless infrastructure
  - Real-world examples at LCRA
  - Visionary thoughts on possible applications
- Historical analogies between Industrial Wireless and HMI-SCADA and HART

Top Five Industries and Applications

- Top Five Industries
  - Oil and Gas
  - Primary Metals
  - Electric Power
  - Food and Beverage
  - Water/Wastewater

- Top Five Applications
  - Tank Level Monitoring
  - Overhead Crane Controls
  - Temperature Monitoring
  - Flow Meter Monitoring
  - Conveyor Monitoring

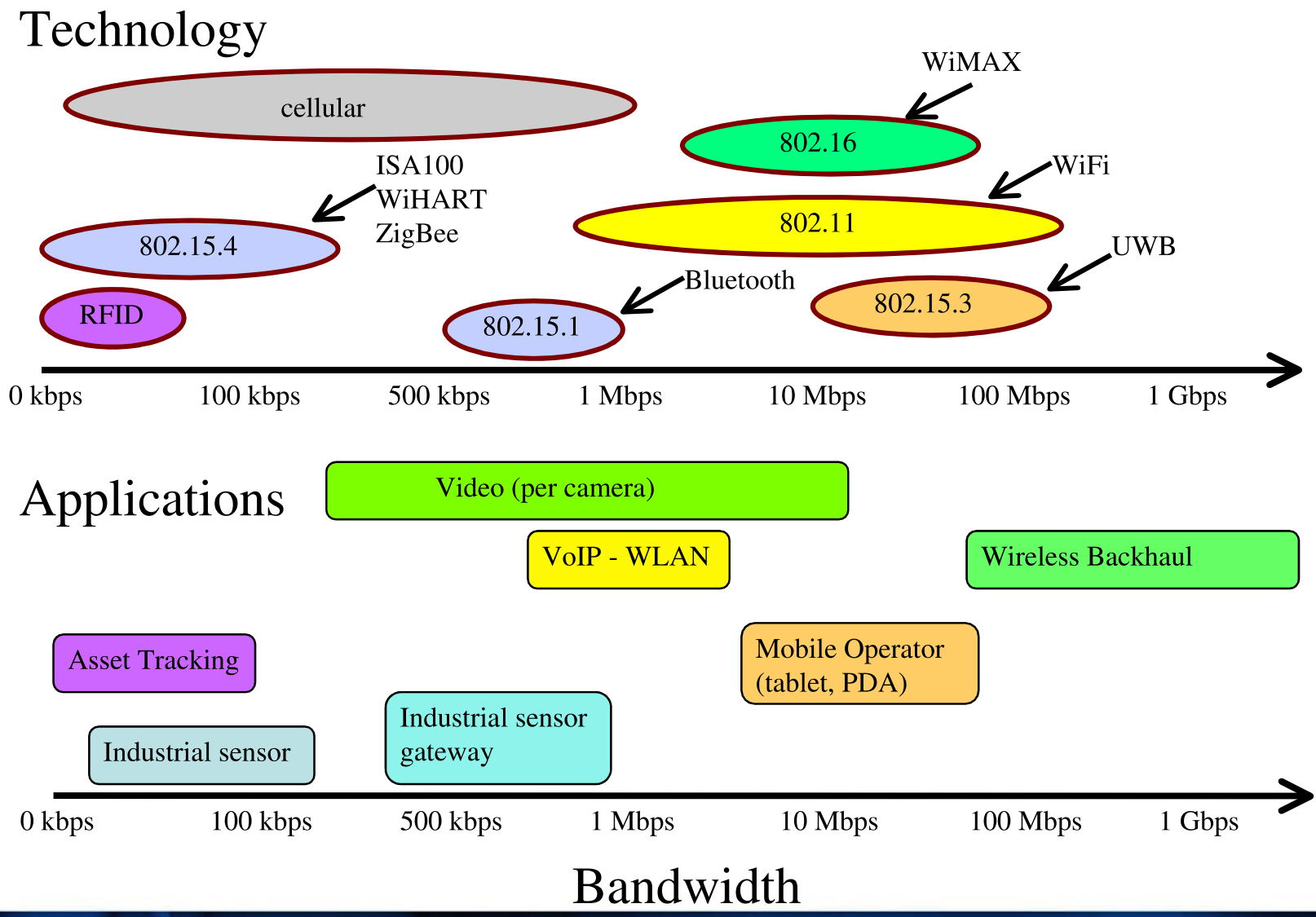
Yokogawa matches up well to support these wireless industries!

- Source VDC, March 2008

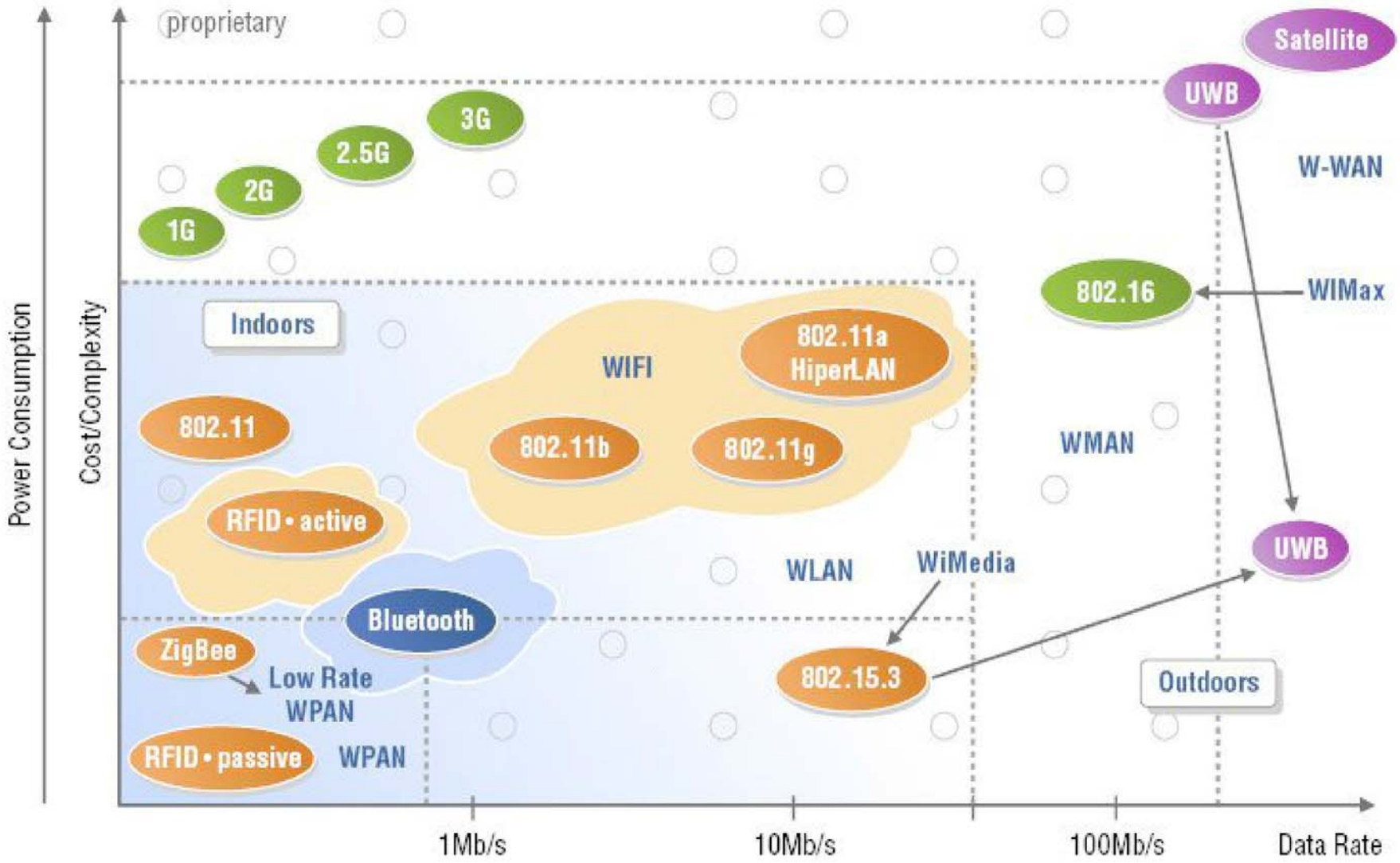
Proposition: Industrial Wireless Will Be Everywhere

- Industrial wireless will eventually be everywhere in your plants
- Pervasive technology like HMI-SCADA
- First apps are in difficult to reach and costly to implement solutions in monitoring where there is a 90% cost advantage versus wired solutions
- Next will be traditional safety and security applications
- “Stranded” Loop Controllers - PLCs In Remote Locations
- Non-traditional applications in Safety & Security like mobile asset tracking and man down systems
- Finally non-critical control will be done wirelessly because of the cost advantage and increasing security and reliability

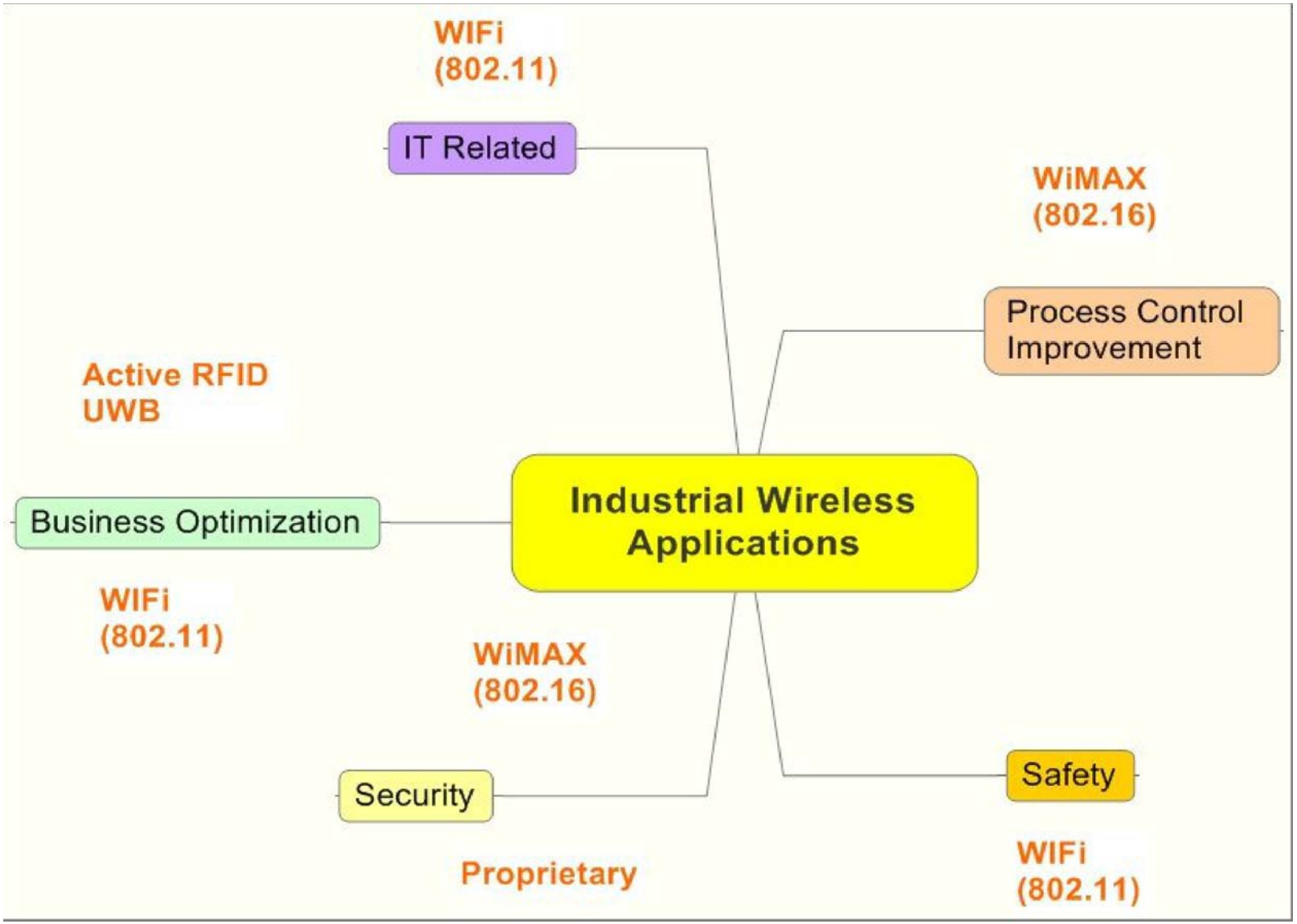
Applications, Bandwidth Requirements, Wireless Tech



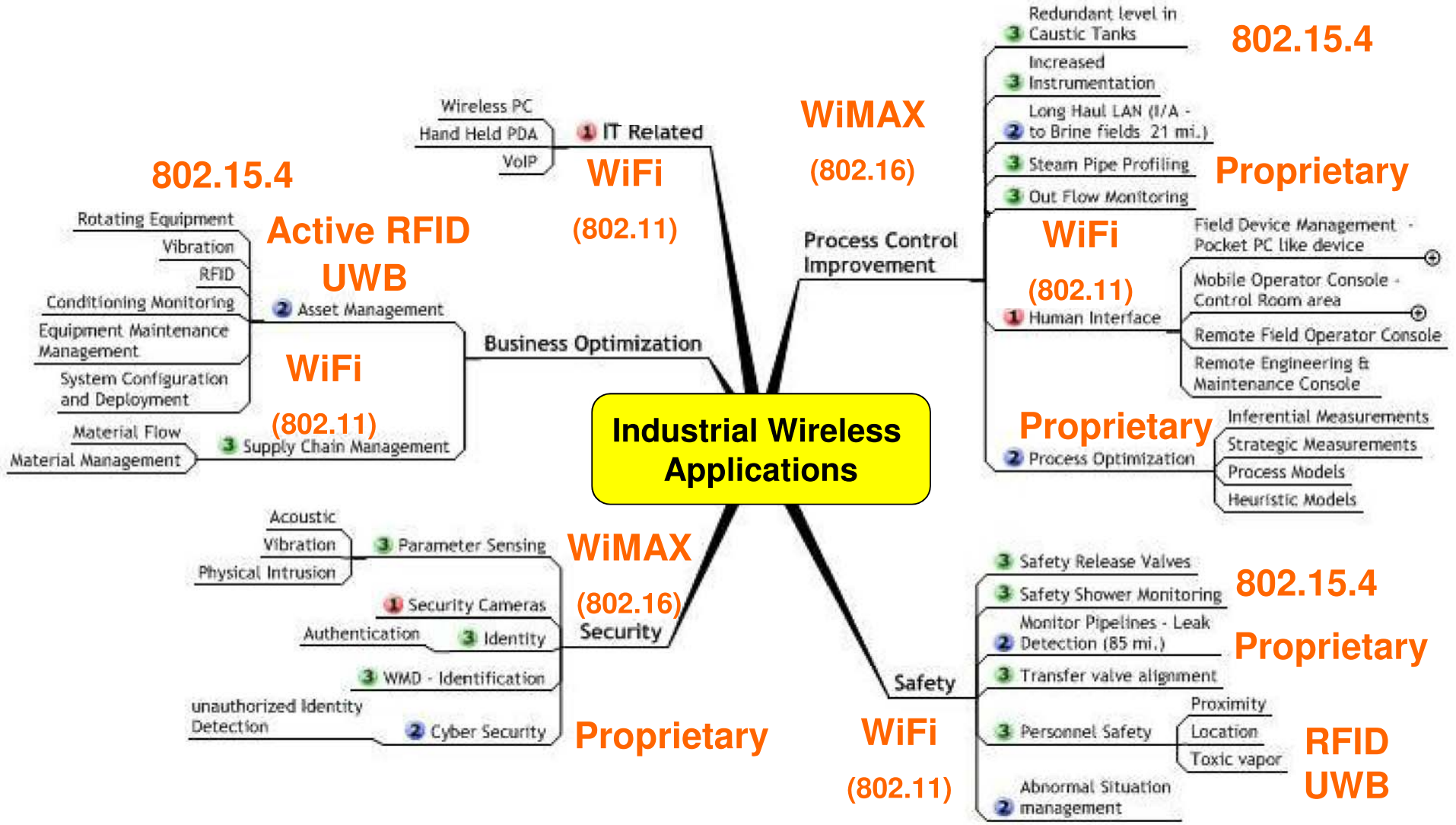
Multiple technologies with different costs



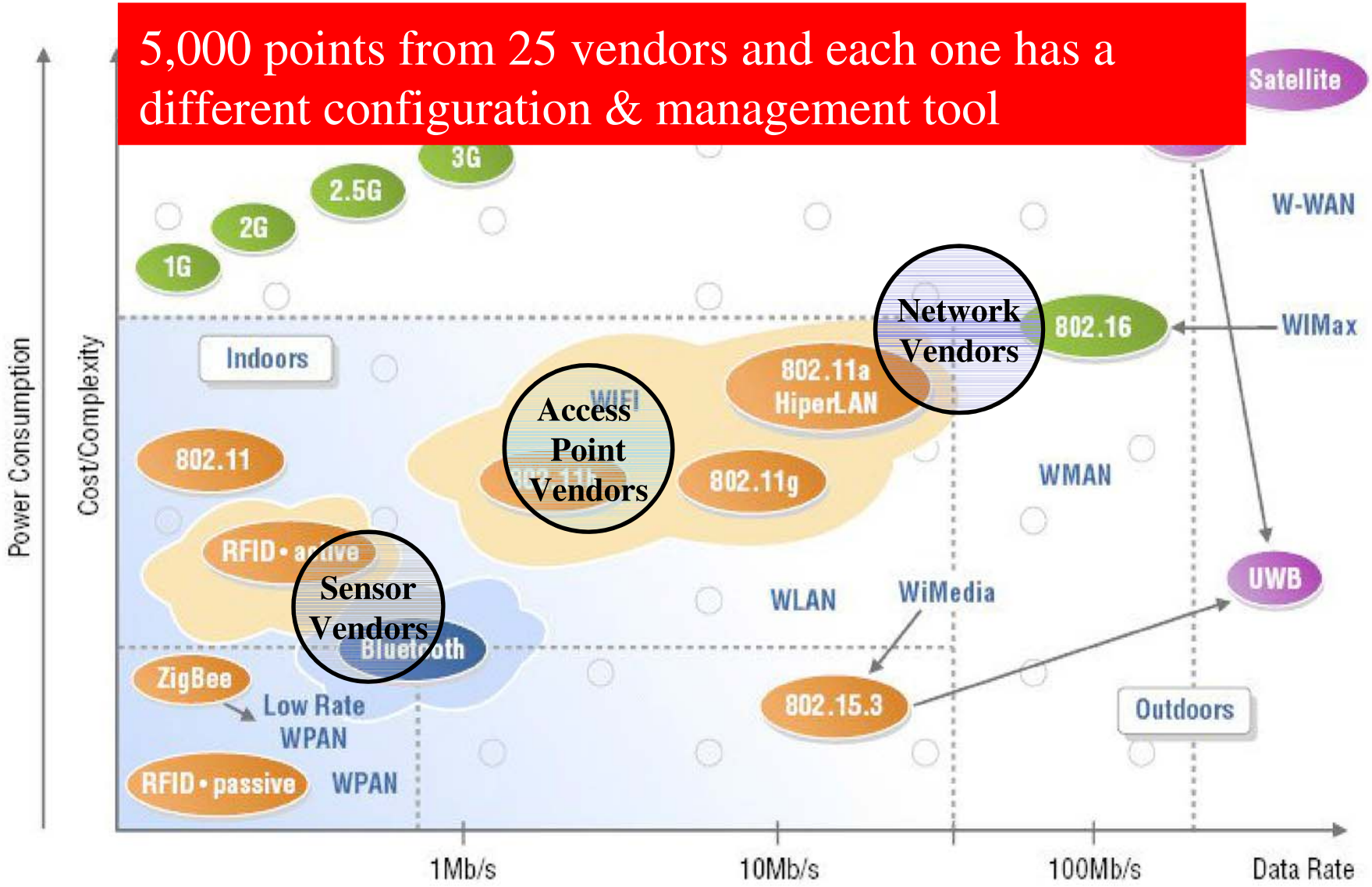
Roadmap: Matching RF Technologies to Applications



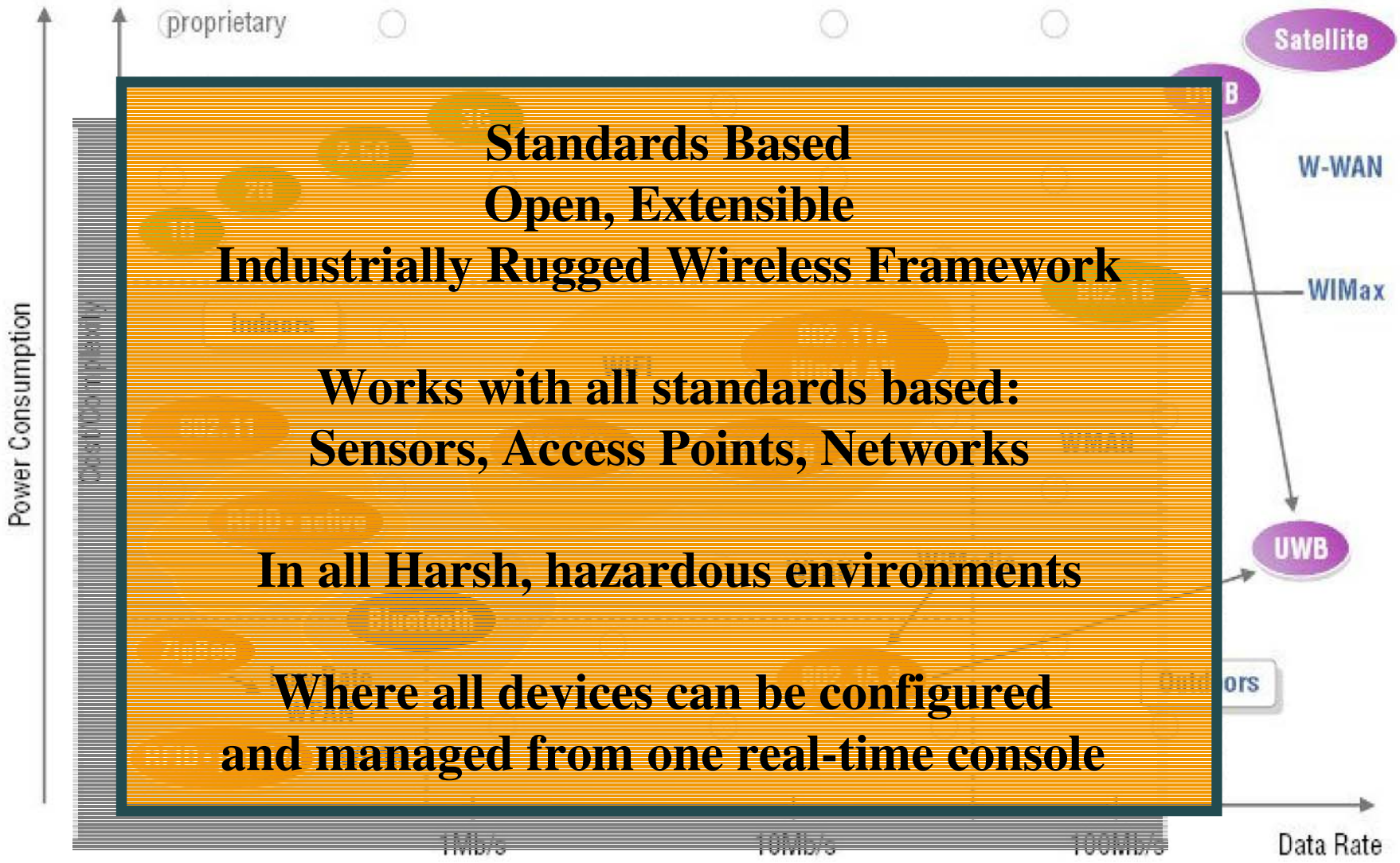
Example: Developing User Industrial Wireless Roadmap



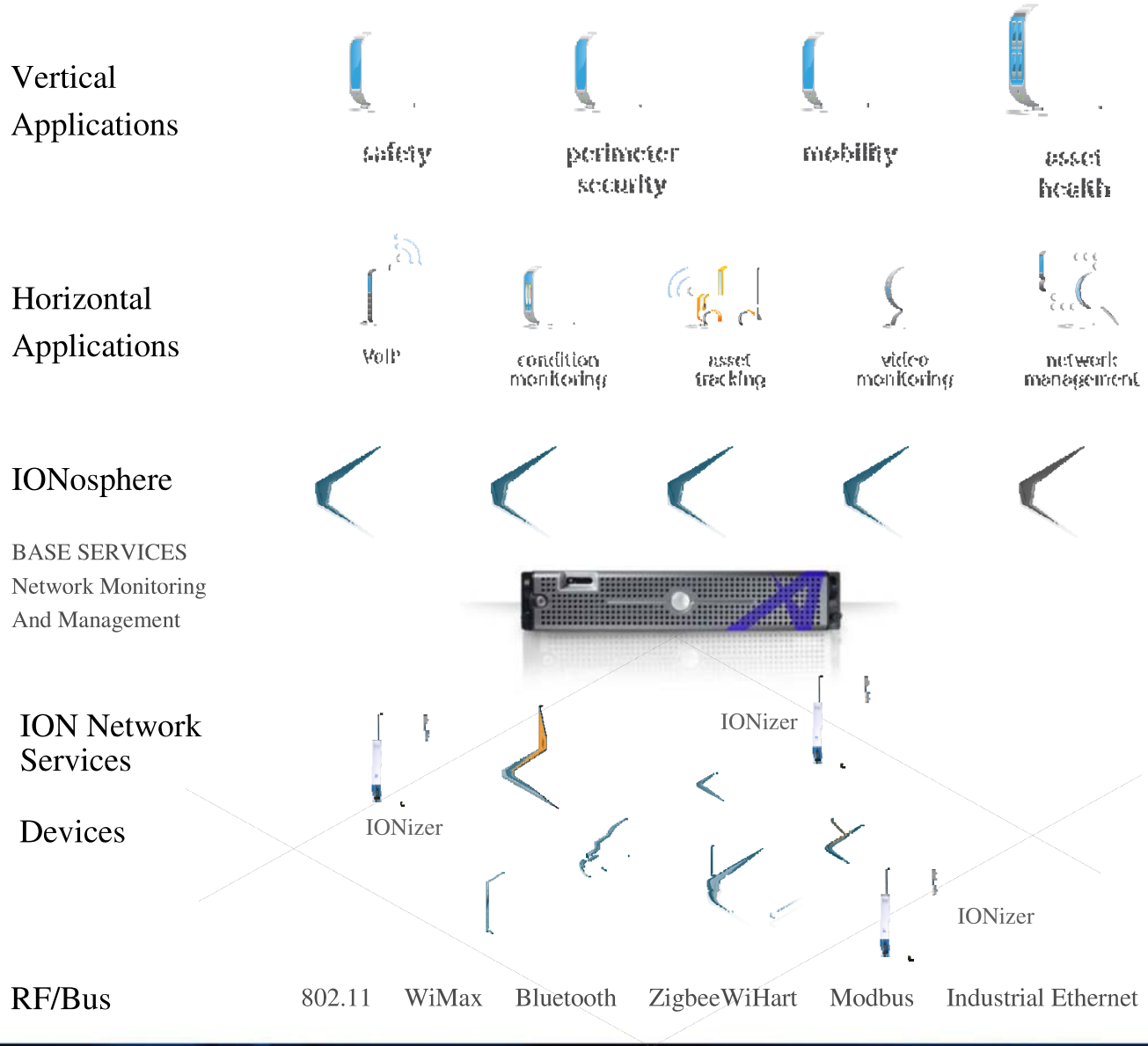
Challenges emerges as wireless grows in a plant

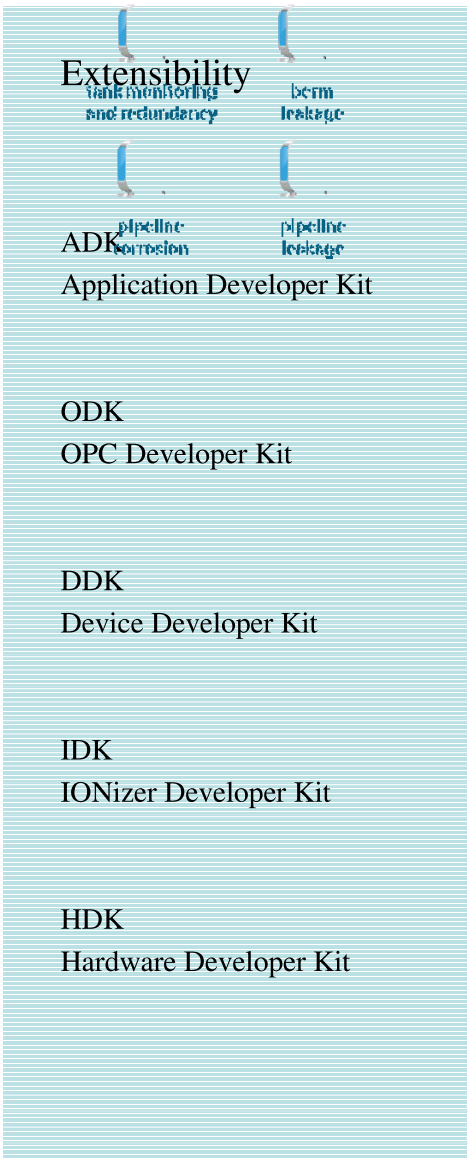


What's needed to meet this challenge



ION: example of an open, extensible wireless system





Industrial wireless value: sources, uses and measures

Key Business Unit Metrics Affected

Cost of Goods Sold, Safety, Security, Compliance, Sustainability

Sources of Value

- Standards Based
- Open
- Extensible
- Framework Versus Pt. to Pt. & Common device Configuration
- Industrially Rugged C1D1 & C1D2 Network Nodes
- Common Network Maint. and Monitoring 24/7

Uses of Value

- Ops. & Trng. Costs Minimized
- Increased Vendor Selection
- Sys. Int. Meets System Needs
- Reduced Implementation Cost & Fast Time To Solution Value
- Operations & Training Costs Minimized With One Network
- Network Uptime & Equipment Availability Maximized

Measures of Value

Minimal Time & Total Costs to Implement Wireless Solutions

% Production Targets Met

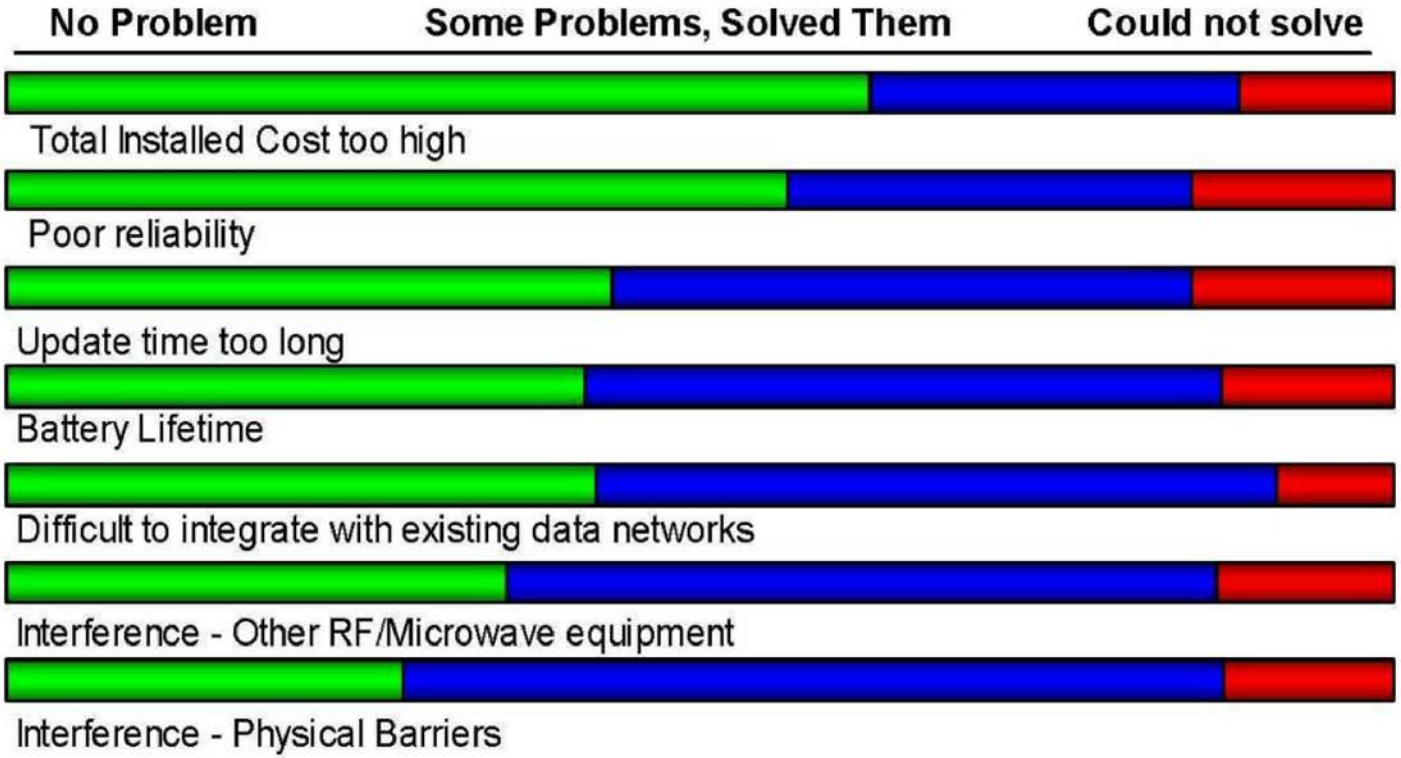
OEE (Util., Downtime, Avail.)

Number of Safety Incidents & Lost Work Days Minimized

FERC, OSHA, EPA Incidents & Penalties Minimized

User experiences with wireless evaluation

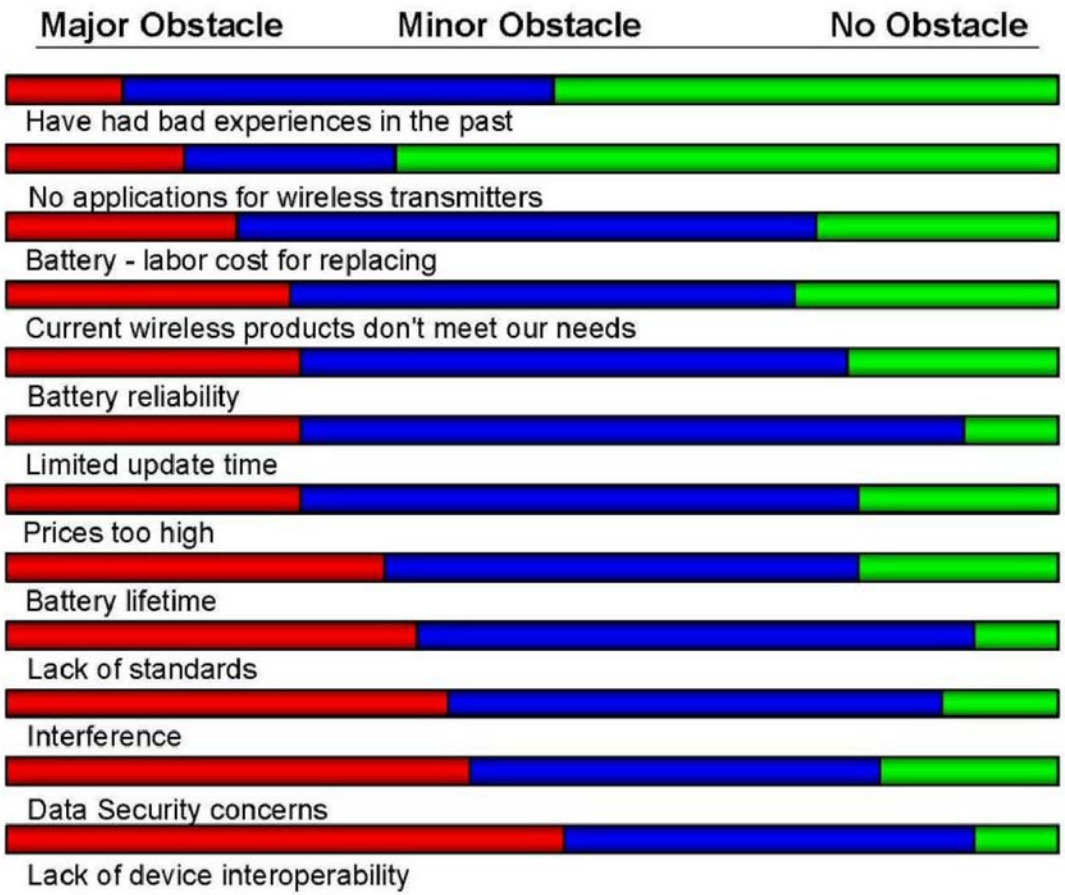
Question: "What were your experiences with your wireless evaluation or installation?



Costs, reliability, integration issues decreasing

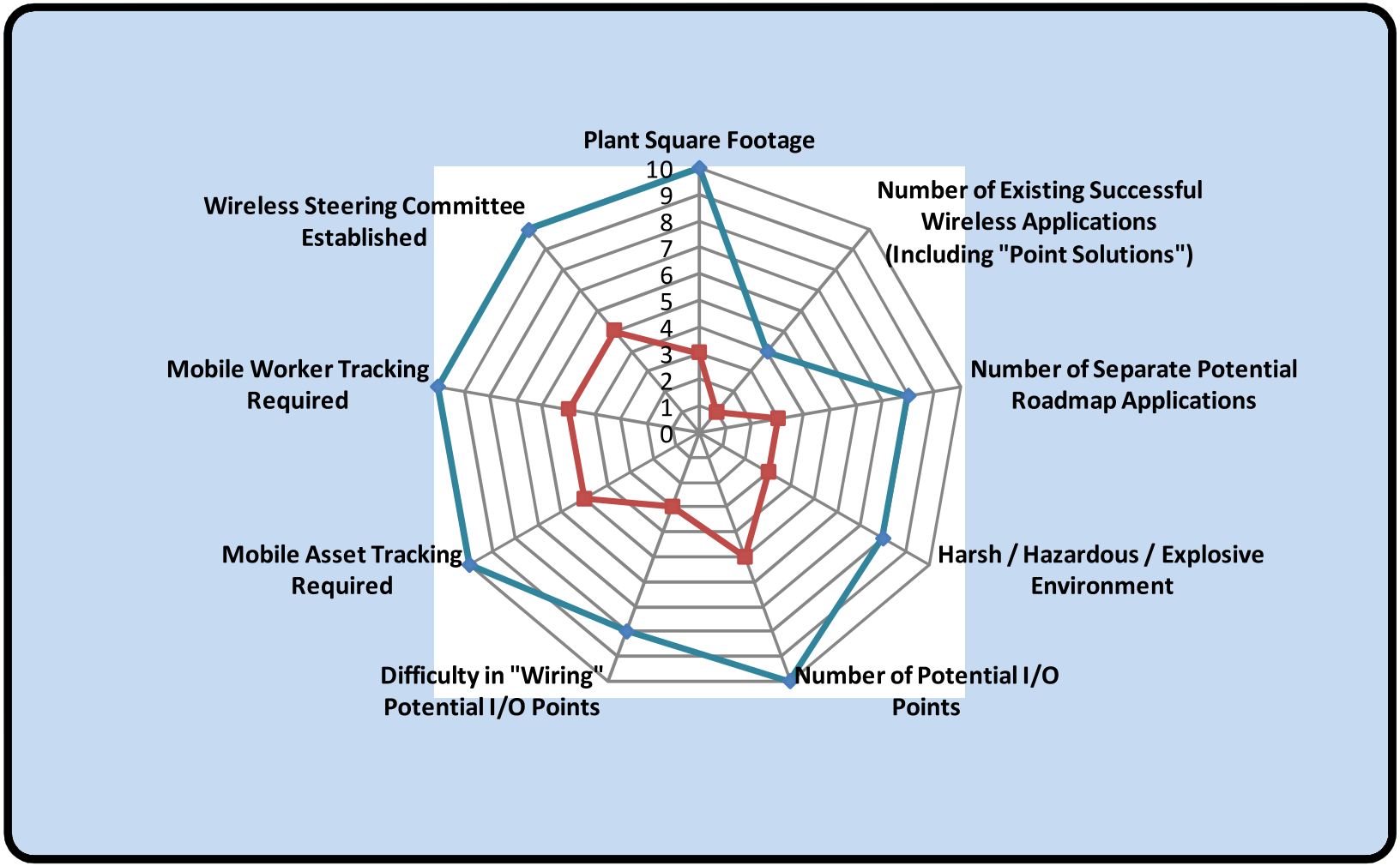
User perceived obstacles to using wireless field devices

"Please rank the following Obstacles to the use of wireless field devices in your opinion.



Security, standards & interoperability (open) getting much better

Driver Variables for Wireless Infrastructure



Where Wireless Is Going

Today

- Many proprietary point solutions
- Each application managed on its own
- Process plants with a large footprint
- Most activity in North America
- Early adopters just starting to apply
- Basic applications

Three Years From Now

- Standards based, open and extensible framework
- Managed services and applications
- All industries
- Global market
- Rapid diffusion
- Innovative mobile worker apps

Real world example: LCRA's Sim Gideon Power Plant

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Wireless in Action: LCRA Lost Pines Power Park

Sim Gideon Power Plant

- Began commercial operation 1965
- Three units – combined generation of 620 Megawatts (140,000 homes)
- Many systems and equipment reaching obsolescence or end of useful life

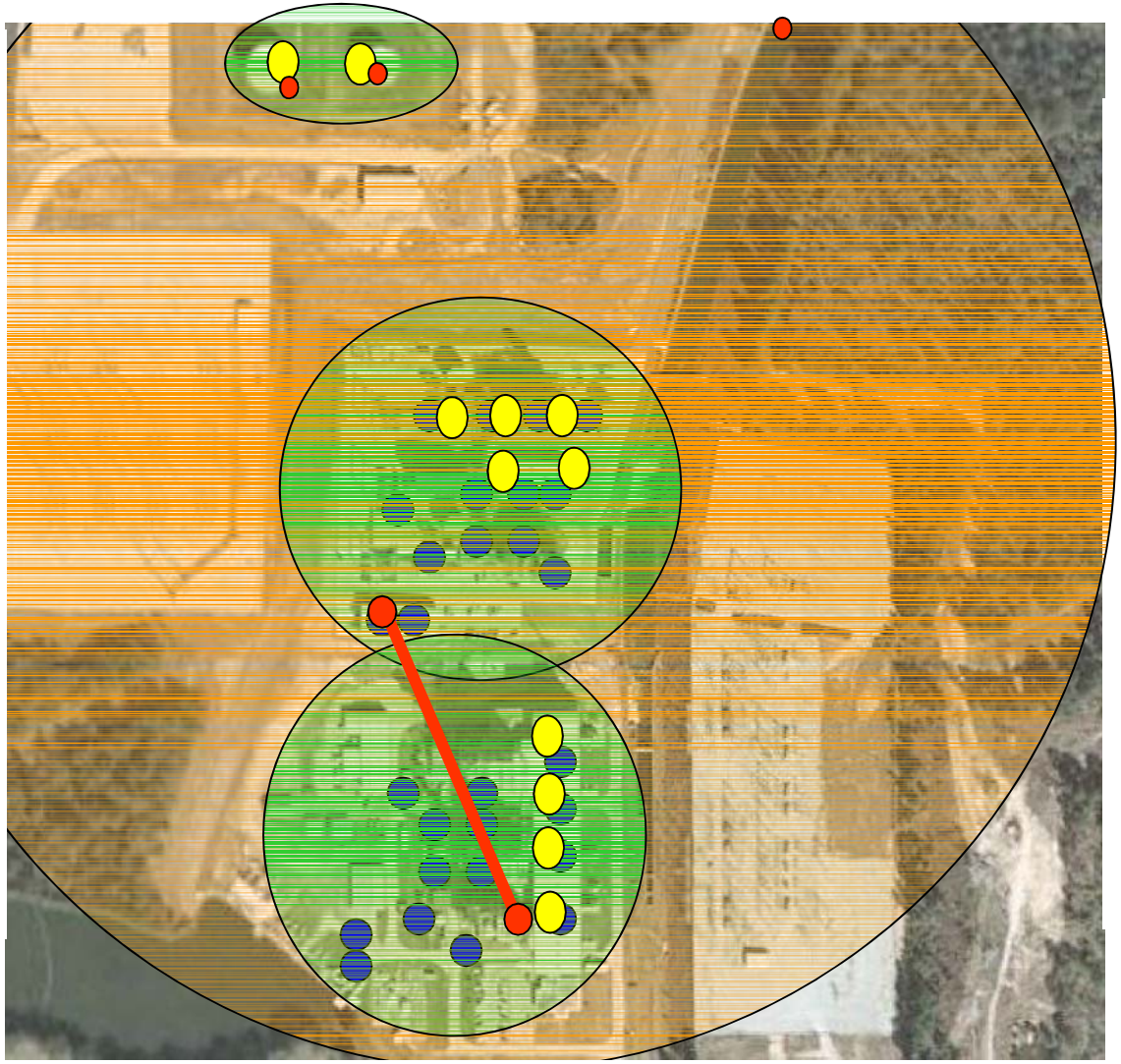
Lost Pine Power Project

- Commercial operation 2001
- Provides 545 megawatts of electricity (110,000 homes)
- 30-40 percent more efficient than traditional gas fired plants

Lost Pines Power Project

Wireless in Action: LCRA

- 802.11
- VoIP/PA
- WiMAX
- Condition Monitoring
- Remote I/O



Wireless applications currently in progress at LCRA

- **Wireless PA/VoIP communications network**
- **Remote pumping station monitoring**
- **Video surveillance of entrances and critical infrastructure**
- **Tank farm fuel oil level indications**
- **Condition Monitoring and Alarming**
  - **Pump vibration**
  - **Sewage lift stations**
  - **Anhydrous ammonia leak detection**
- **Remote unmanned peaker plant infrastructure extension**
  - **WiMaxlongshot technology**
  - **Extension of push to talk communications with parent site**
  - **Video surveillance of plant for security and visual monitoring**
  - **Potential for equipment health monitoring**
- **FW Heater level control and alarming**
- **Hi temp furnace video monitoring**
  - **Burner performance**
  - **Fireball monitoring**
  - **Burner tilt performance**

Futuristic example: Complete Tank Farm Monitoring

- Complete Tank Farm / Terminal Monitoring
  - Tank level monitoring
  - Berm leak detection
  - Corrosion monitoring
  - Pipe leak detection
  - Percent water detection
- Health of the wireless infrastructure monitored 24/7
- Completely Class I Division I and wireless links fully redundant
- Implements World class technology: minimizes any EPA fines

Futuristic example: Tracking Mobile Assets

- Tracking mobile operating assets in the field in remote areas
  - Where is a critical piece of equipment right now?
  - Where are all the pieces I need for a job right now?
  - What are the SOP's for installing this equipment … three miles from the engineering office?

Futuristic example: Safety for workers or contractors

- Man down detection – no response from a worker or possibly an alert from another worker who sees a “man down”
- Safety shower has just been turned on – who’s in there?
- Where is everyone that knows CPR within 500 feet of a man down?
- Where are all the fire trucks, right now?
- Where are all the workers right now that are assigned to Area One
- Automatically turn the video cameras toward the heat/smoke sensor that just went off, before we send a fire crew into that area

HMI & Industrial Wireless .. A Lot In Common

HMI / SCADA
Graphical User Interface

- Market leader **Wonderware** took an open approach to connectivity and extensibility - Switzerland
- Large number of plants and applications
- Broad market – process, batch & discrete
- Purchase budget / decision by plant
- 3rd party channels
- Extensibility of apps by System Integrators
- Significant reuse of apps

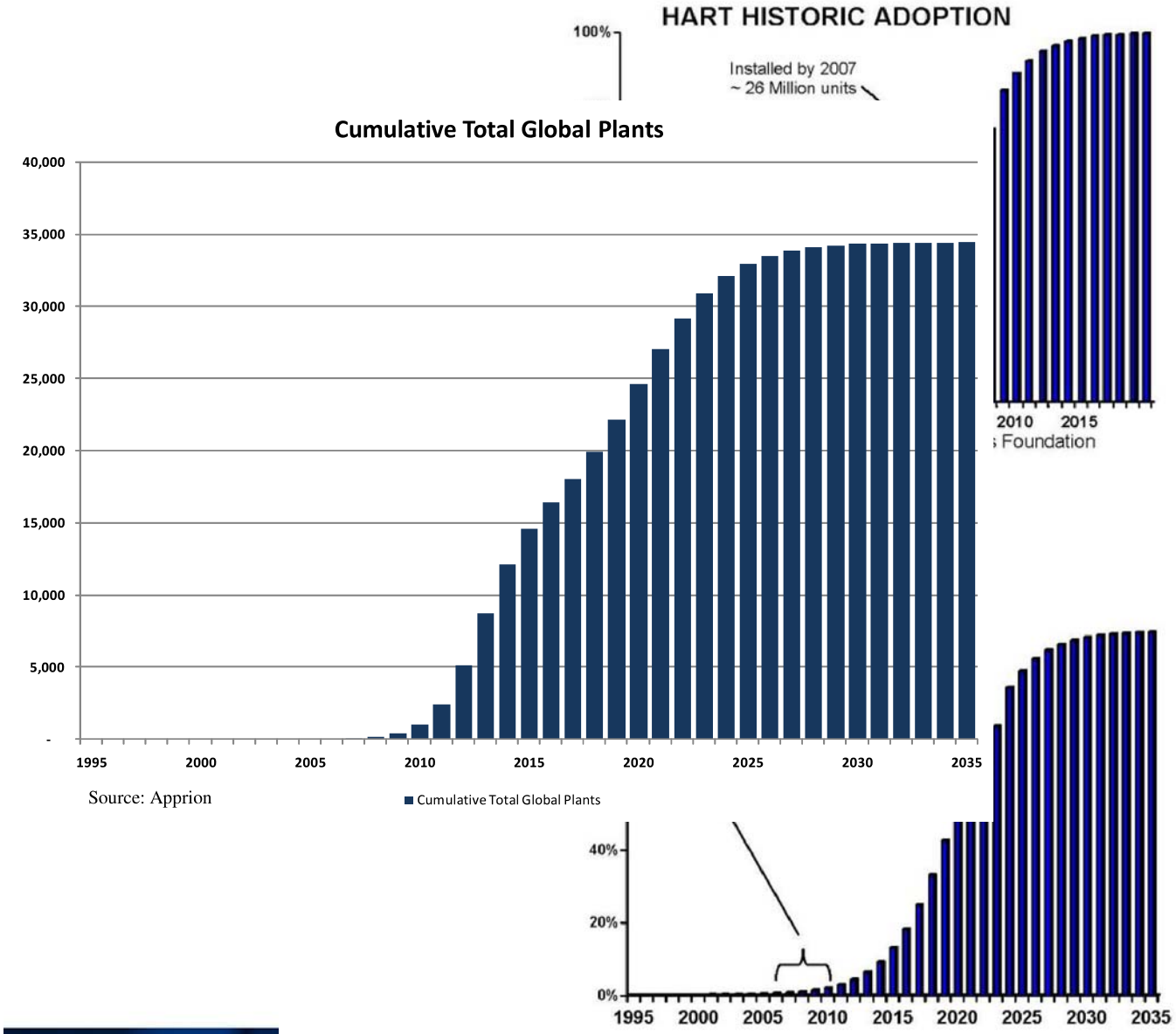
Industrial Wireless Infrastructure & Managed Applications

- Open, standards based market leader opportunity
- Large number of plants and applications
- Broad market – process, batch & discrete
- Purchase budget / decision by plant
- 3rd party channels
- Extensibility of apps by System Integrators
- Significant reuse of apps

Apprion Estimate

- Over 45% of the global 76,120 plants that could adopt a wireless infrastructure will do so in the future
  - Over 34,000 plants worldwide
- The exact number and timing is uncertain
- But if you look at wireless pervasiveness in other areas where wireless has penetrated … estimate is conservative
- We think the Wireless Infrastructure industry will grow at roughly the same historical rate as HART and HMI-SCADA

Apprion Plant Model Versus Global Foresight Group



Source: Apprion

Source: Rasmusson& Willey LLC

How Can You Move Forward?

- So what are your applications for industrial wireless … today … and three years from now?

- How can you move forward?
  - Learn more about industrial wireless
  - Develop a wireless roadmap to solve problems
  - Calculate the value created by the projects
  - Calculate the investment required .. and solution ROI

Powering An Open Wireless System For Your Plant