



# FullMAX: Private Licensed Wireless for Mission Critical Communications



# Full Spectrum Overview



- ④ We design, develop and manufacture our FullMAX Broadband Wireless System.
- ④ FullMAX is a complete, licensed, broadband wireless system designed for very long range, private, mobile and fixed data communications.
- ④ Enables rapid deployment of private, wide area intelligent networks: smart grids, smart fields, intelligent transportation
- ④ Full Spectrum's customers are electric utilities, oil and gas companies, defense and public safety agencies.



FullMAX  
MS4000

# Highlights & Intellectual Property



- ⊙ Extended and enhanced version of the worldwide Mobile WiMAX standard
- ⊙ Uses low-band, licensed VHF and UHF frequencies in narrow bandwidth for exceptional range
- ⊙ The FullMAX Software Defined Radio supports all frequencies 40 MHz to 958 MHz (tunable over the whole range)
- ⊙ Uses customer's existing radio tower infrastructure and backhaul (no new towers)



# Target Markets for FullIMAX

## State DOTs



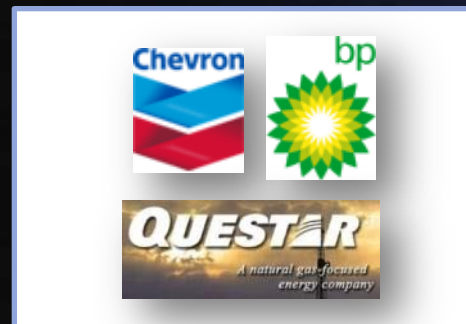
## Electric Utilities 3,000+



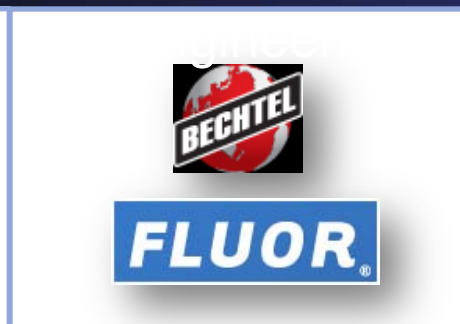
## DOD, DHS, EMS



## Gas / Oil



## Private Construction



## Commercial Rail



# Don't think smart meters



# Millions of remote locations needing reliable, private communications



Transmission & Distribution Substations



Voltage Regulators, Capacitor Banks



Oil and Natural Gas Wells



Mobile Data



Valve and Pump Control

# Existing Communications Fail to Meet their Needs



- Power Line Carrier (PLC): costly to implement, low data rate, poor availability, no mobility



- Satellite Networks: low data rate, high latency, poor mobility



- Unlicensed Wireless: limited range, data rate degrades quickly, poor QoS, no mobility



- Public Cellular Networks: incomplete coverage, not mission critical



- Private Mobile Radio: legacy technology, low data rate

# Customers can't rely on public networks

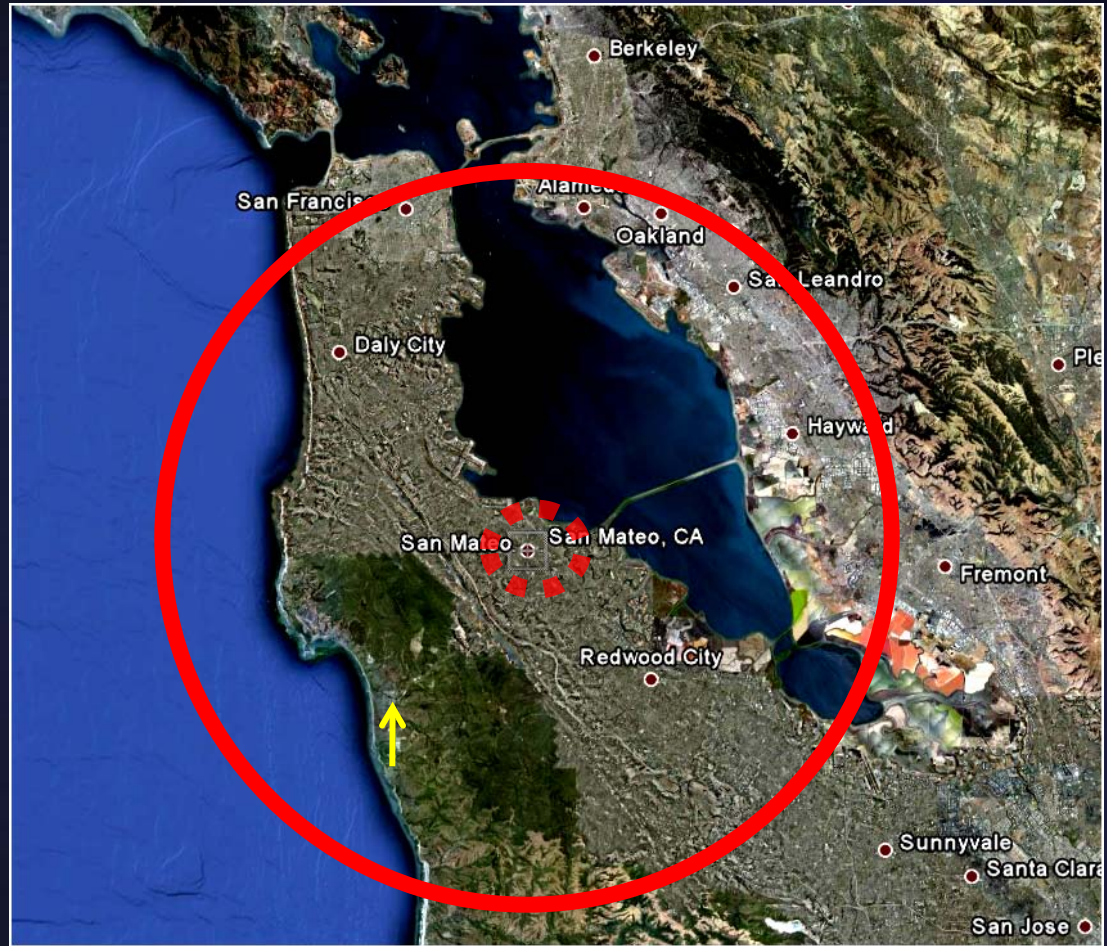


- ◎ *From San Diego Gas and Electric submittal to FCC*
  - Unreliable, insufficient or otherwise poor coverage or availability
  - Vulnerability to performance or service disruptions caused by competing uses
  - Uncertain survivability or recovery of those services during and after adverse events
  - Can't meet national regulatory standards related to critical infrastructure protection

# FullMAX Savings vs. 4G Private Systems



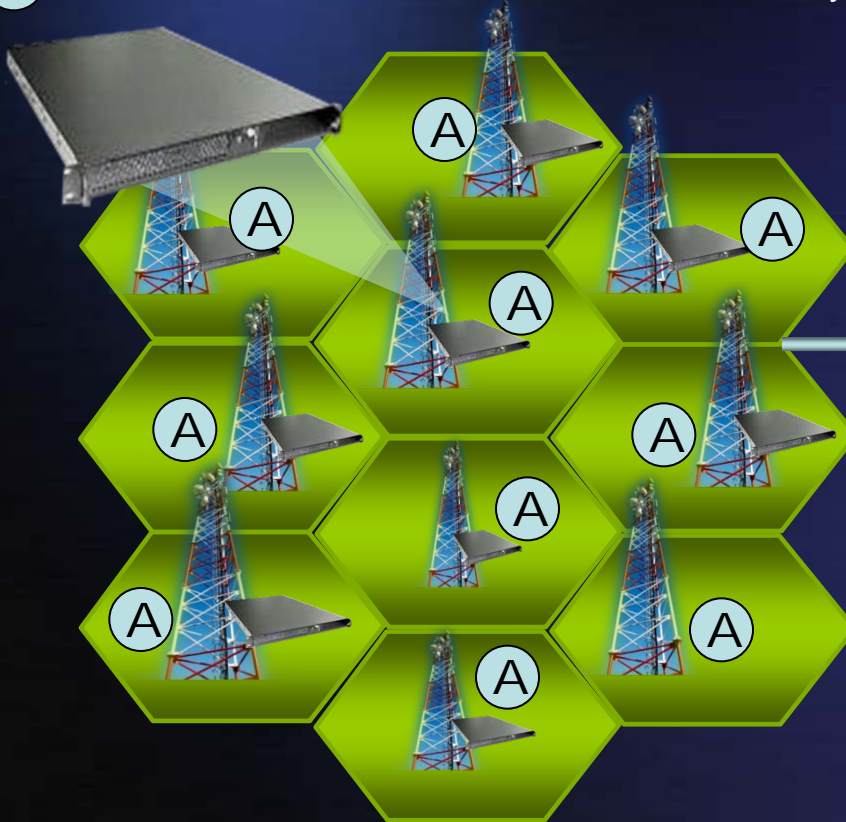
- ◎ FullMAX provides up to 20 mile coverage from a tower vs. 5 mile radius
- ◎ Typical customer covering 10,000 square miles
- ◎ \$2 million in infrastructure costs vs. \$30 million
- ◎ Eliminates \$8 million in recurring annual costs



# FullMAX System Architecture



**A** FullMAX Base Stations are installed at the utility's tower sites located every 20 – 40 miles



**B** FullMAX Remote Radios are installed on utility poles and in vehicles



**B**



**B**



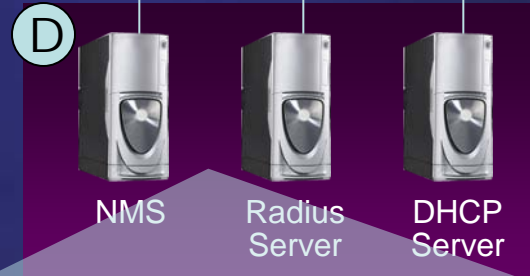
**B**



**C**  
Base Station Controller



Network Ops Center



**D**

NMS      Radius Server      DHCP Server

