

# NCEMC Technology Conference

**Emerging Communications Technologies  
Pros & Cons of Fiber, Wireless, Satellite, Etc...**

# TESSCO Technologies

- ***TESSCO is Your Total Source® distributor for wireless communications products and networking solutions for business professionals in many markets.***
- TESSCO offers a broad and deep range of products with over 30,000 competitively-priced items from more than 300 manufacturers
- TESSCO specializes in communications solutions and sells to over 400 Investor owned, Cooperatives, Municipal utilities
- Our experience selling to so many utilities gives us the vast knowledge to assist you with any solution
- Some of the key areas TESSCO is focused on in utility market are:
  - Communications for Distribution, Substation, and Backhaul applications
  - Towers, Hardware, Cable, Antennas
  - Power Systems
  - Two-Way Radio
  - Mobile Data
  - IP Networking
  - Security & Surveillance
  - Test Equipment, Tools, and Safety Equipment
  - Training

# Types of Communications & Considerations

## ■ Radio

- Bandwidth Needed
- Terrain
- Towers
- Hop Distance
- Line-of-Sight
- Frequency
- License Vs. Unlicensed
- Radio Network Types
  - Point-to-Point
  - Point-to-Point Ring
  - Point-to-Multipoint
  - Mesh

## ■ Cellular

- Available Coverage
- Carrier

## ■ Satellite

- Line-of-Sight
- Latency
- Bandwidth

## ■ Fiber

- Build
- Lease
- Carrier

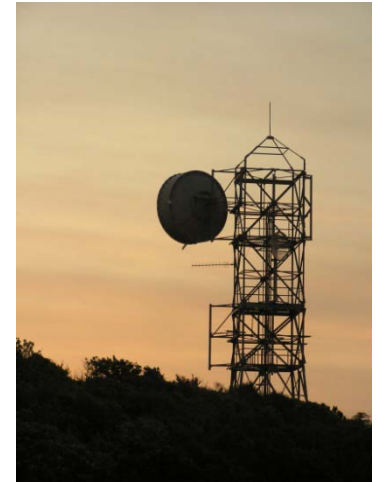
# Wireless technology - Cellular



- Applications for Cellular
  - Cell Phones
  - Mobile Data (Air Cards – Vehicle Modems )
  - Distribution Automation (Recloser Monitoring, Cap Banks, Regulators)
  - Substation for SCADA primary and backup communications
  - AMI
  - Industrial metering
  - Security
- Backhaul to office from Cell Carrier
  - Internet with VPN
  - Leased Line – Private IP addressing
- Negotiate with Carriers and talk with M2M Utility Solution Teams
  - AT&T
  - Verizon
  - Sprint
- Modem Vendors
  - Sixnet Bluetree
  - Sierra Wireless

# Applications For Wireless technology – Radio - PTP

- Radio Point-to-Point
  - Interoffice communications
  - Substation Ring Networks
  - Backhaul from Point-to-Multipoint base stations
- Data Rates & Frequencies
  - Ethernet & T1 TDM Based
  - Data Rate - 1Mbps to 4Gbps
  - Unlicensed – 900Mhz, 2.4Ghz, 5.2Ghz, 5.4Ghz, 5.7Ghz, 24Ghz, 60Ghz
  - Licensed – 2.5Ghz, 3.5Ghz, 4.4Ghz, 4.9Ghz, 6Ghz, 11Ghz, 18Ghz, 23Ghz
- Major Vendors
  - Alcatel
  - Exalt
  - Dragonwave
  - Motorola
  - Solectek



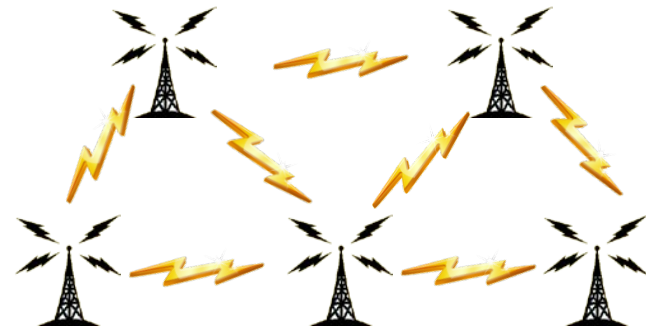
# Applications For Wireless technology – Radio - PMP

- Radio Point-to-Multipoint
  - Substation communications
  - Distribution Automation
  - Internet services
  - Security
- Data Rates & Frequencies
  - Ethernet & Serial
  - Data Rate – 9.6Kbs to 108Mbs (Shared)
  - Unlicensed – 900Mhz, 2.4Ghz, 5.2Ghz, 5.4Ghz, 5.7/5.8Ghz,
  - Licensed – 220Mhz, 400Mhz, 900Mhz, 2.5Ghz, 3.5Ghz, 3.65Ghz 4.4Ghz, 4.9Ghz
- Major Vendors
  - MDS
  - Redline
  - Motorola
  - AvaLAN



# Applications For Wireless technology – Radio - Mesh

- Radio Mesh
  - AMI Metering
  - Distribution Automation
- Data Rates & Frequencies
  - Ethernet
  - Data Rate – 11Mbps to 108Mbps (Shared)
  - Unlicensed – 900Mhz, 2.4Ghz, 5.2Ghz, 5.4Ghz, 5.7/5.8Ghz,
  - Licensed – 700Mhz, 900Mhz, 2.5Ghz, 3.5Ghz, 3.65Ghz 4.4Ghz, 4.9Ghz
- Major Vendors
  - Firetide
  - Motorola
  - Belair
  - AMI Vendors
    - Silver Spring
    - Senses
    - Arcadian



# Pros and Cons of Fiber, Wireless, Satellite

Technology	Recurring Cost	Hardware Cost	Typical Bandwidth	Ease of Deployment	Notes
Cellular	Low	Low	Up to 1.5Mbps	Very Easy	Coverage
Radio Point-to-Point	N/A	High	1Mbps – 4Gbs	Hard	Towers Needed Best Solution
Radio Point-to-Multipoint	N/A	Mid	9.6Kbs – 108Mbps	Hard	Towers Needed
Radio Mesh	N/A	Low	11Mbps – 100Mbps	Hard	Towers Needed
Satellite	Mid	Low - Mid	100Kbs – 1.5Mbps	Somewhat Easy	High Latency
Fiber	High	Mid - High	100Meg – 1Gbs	Easy at Termination	Best solution

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