Austin District
Signal Wireless Interconnect
Turning Emergency Calls into Routine Maintenance

- Saving Crew Time
- And Public Delay
- While Enhancing Safety for Everyone
Two Systems

- Traffic Signals
- 5.8 Ghz Wireless Ethernet Radio
- 2.4 Ghz local WiFi on second band
- Centracccs (Econolite)
- WER at each signal
- Cluster WER at each maintenance tower

- School Zone/Beacons
- 900 Mhz Spread Spectrum
- Low Water Detection /Arterial ITS
- RTC Software for SZ
- Shares tower/repeater sites w/ 5.8
- Reuses old SS radios
The Impetus

- Anticipation of 3 Cities Going over 50k
- 2008 Economic Stimulus Funds
- Concerns on Signal Crew Overtime
- Hurricane Evacuation
- Recent Consultant Timing Studies
A Basic Schematic
Maintenance Tower
Traffic signals
SZ, TPWD Parking Lots & Low Water Crossings
SPECIAL SPECIFICATION

8826
Self Supporting Communications Tower (20 to 100 feet)

1. Description. Furnish and install 100 foot tall or less, self-supporting light duty communication towers in accordance with the plans or site information sheet and with these specifications.

2. Tower Relocation or Removal. If required, relocate or remove existing tower as specified in the plans.

3 Bids

- $45,000
- $58,607
- $65,193
Radio Layout Process

2) Crosstown Elevations (tower to old 2243 and Bagdad)

- In Google Earth, push pin signal and tower locations
- Draw path between tower and signal and save path
- Right-click on path and select path profile
- Examine LOS profile to locate repeaters/signal path.
- Consult locals for upcoming developments that could block signal (ie. new 5 story hospital, SH 45 DC’s, new RR football stadium).
- When considering terrain, the shortest distance may not yield the fewest number of repeaters. (ie. Mason to Doss vs. Fredericksburg to Doss)

\[
\begin{align*}
\text{Ground Elev + Old Tower} & = 955 \text{ feet} + 80 \text{ feet} = 1035' \text{ LOS.} \\
\text{Ground Elev + New Tower} & = 939 \text{ feet} + 80 \text{ feet} = 1019' \text{ LOS.} \\
\text{Ground Elev + signal height} & = 967+ 20 \text{ feet} = 987' \text{ Okay.}
\end{align*}
\]
Some PS&E issues

- After locating initial locations to determine bid quantities & prepare layouts and plans, recognize the complexity of the competitive low bid situation in setting up PS&E:
  - Sole sourcing
  - Hidden engineering services that might be bid
  - Unique brand features and software
  - Threat of Dis-Integration between system installed by different contractor or in different cities
  - IEEE std. same data protocol but radios not interchangeable
  - Subsidiary items (i.e., Cabling that comes free with every cluster radio)
- PS&E needs freedom to allow contractors to build system with any component that meets specs.
- Balanced by the need for a system that “talks” with itself in a district sized area that can be multi-jurisdictional.
- And to have TxDOT’s engineers to do the system, structural, electrical, and traffic engineering.
Additional System Components

- IP Addressing for each signal and each signal component (controller, MMU, VIVDS, etc)
  - Contact TSD to reserve block of IP Addresses.
- Central Command Software (ie. Centraccs)
  - Expensive, Controller brand specific in most cases.
  - Contact TSD early to purchase server loaded with software
It takes a Team.

- Signal techs & engineer, City engineers
- TRF signals
- TRF radio
- TRF ITS
- TRF/DES plan review
- BRG structural review
- TSD Server & Network
- Accounting/Purchasing
- Consultants
- Manufacturers/Suppliers
- Contractors and Subs
• 10 projects since 2008 totalling $7.5 million to rebuild aging signals and install new 5.8 Ghz WER radio systems.
• 4 cities under 50k population preparing to take over signals by agreement.
• Over 300 signals are interconnected to district signal shop. School zones and low water detection in upcoming projects.
• Every maintenance office tower has a 5.8 Ghz and 900 Mhz radio and antenna on it.
• Timing studies and remote maintenance lookups performed via system.
• Windows 7 compatibility issues that shut down systems.
Questions?

Scott R. Cunningham, P.E.
Traffic Engineer-AUS District
Scott.Cunningham @ txdot.gov,
512-832-7188