

Thurston County - Step by Step

Simulcast Forum 2000

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Thurston County, Washington

Fire Simulcast System

- Multiple simplex sites with voted receivers.
- Dispatchers had to manually select sites for dispatch.
- Some departments had to be toned on two sites.
- 727 square miles - 230,000 population

Radio System Improvements

- New dispatch center
- Digital loop microwave
- Simulcast fire radio system

Simulcast System Design Steps

- Five sites
- Five frequencies
- Not all frequencies on all sites.

Initial situation

- Owner's goal to use existing sites.
- Not all sites on new digital microwave.
- Fire users were a particular bunch.
- CTCSS required on transmit.
- High frequency Plectron paging tones >2500 Hz.

Design situation

- Customer self maintained so an automated system was desired.
- Computer generated coverage predictions showed:
 - New sites needed to provide for coverage.
 - New sites needed because overlaps too big.
- High paging frequencies resulted in a modified approach.
- Loop microwave required special switching.

Design steps taken

- Develop coverage and timing predictions.
- Select sites.
- Review site facility requirements.
- Review customer paging tone and CTCSS requirements.
- Review and develop customer console interfaces.
- Review and engineer microwave changes.
- Evaluate existing RF infrastructure.
- Select equipment.

Equipment selection

- Tait simulcast controller.
- New Tait base stations.
- Spectracom GPS oscillators with CTCSS.
- Telco Systems channel banks.
- Western Multiplex 5.8 GHz microwave.

System Testing

- Verify basic system connectivity and basic channel bank adjustment.
- Input phase delay offsets into the Tait controller, controller automatically adjusts levels and timing.
- Drive testing, showed overlap problems and frequency offset problems.
- Removing offsets made big improvement in system.
- Adjusted delay offsets in Tait controller and modified base station power levels to adjust overlap area.
- Tested microwave loop back switching to make sure system is properly adjusted for both directions.

End results

- Tait system has been reliable.
- RF performance of the Tait base stations has been excellent.
- Generating CTCSS at the Spectracom works well.
- Audio quality not as good as single site systems but users are getting used to it and RF coverage is much better.