



Waukesha & Milwaukee  
Counties Radio Consulting  
Project Status & Survey  
Final Results

28-Sep-2012

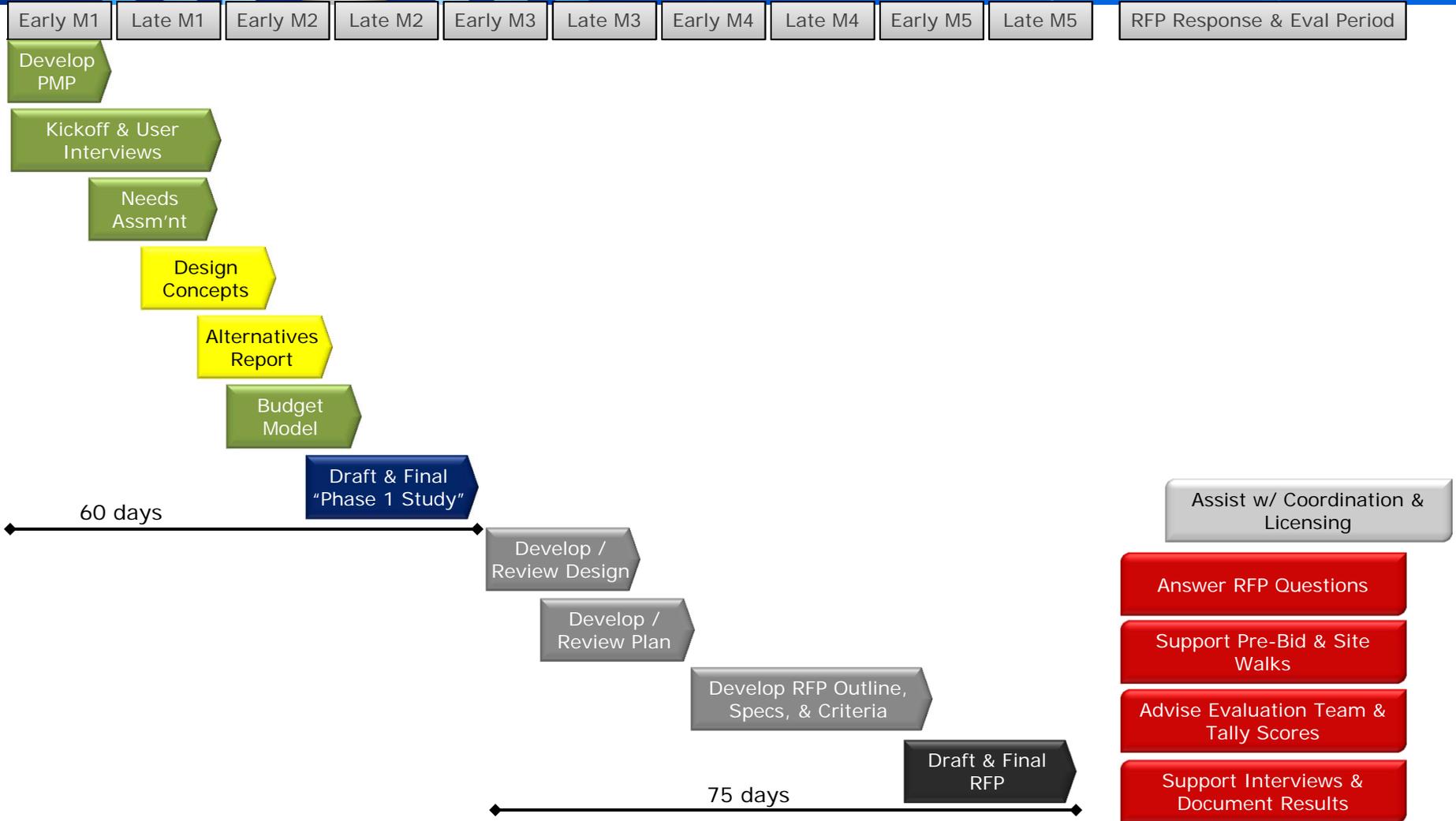


# AGENDA



- Overall Project Status
- Survey Status
  - Responses by Topic
  - Impact to Design
- Comparison of Alternatives
- Next Steps

# CDX Wireless Work Plan



# DISCLAIMERS



- The purpose of this presentation is to summarize the responses received from the User, Management, and Dispatch Surveys launched in August, 2012 to collect information about radio-system needs
- Nothing from this presentation should be interpreted as a 'design decision' or other type of conclusion - future reports will incorporate survey responses with other information to provide formal analysis and recommendations
- The terms "Milwaukee County" and "Waukesha County" are typically used in this document to designate all users of the Milwaukee County and Waukesha County systems, respectively, and not necessarily County-level agencies

# Survey Status



- Three surveys (User, Management, and Dispatch) were open for 6 weeks (from 03-Aug-2012 to 14-Sep-2012)
- All contained Quantitative and Qualitative questions about current needs (met and unmet) and future requirements
- Responses Collected:
  - User Survey: 115 Responses (71 Waukesha County, 44 Milwaukee County)
  - Management Survey: 39 Responses (33 Waukesha County, 6 Milwaukee County)
  - Dispatch Survey: 7 Responses (All Milwaukee County)

# User Survey: Coverage



Identify the degree to which the current systems meet your organization's needs for coverage:

Possible Responses	Milwaukee County	Waukesha County	Combined
Needs Very Well Met	16.3%	14.1%	14.9%
Needs Well Met	46.5%	35.2%	39.5%
Needs Adequately Met	25.6%	39.4%	34.2%
Needs Only Somewhat Met	4.7%	7.0%	6.1%
Needs Not Met	7.0%	4.2%	5.3%

Comments / Concerns / Problems / Issues	Milwaukee County	Waukesha County
Problems reported in specific buildings	15	24
Problems reported in outdoor areas (Vernon (3), Big Bend, (2), SE Waukesha County (1), SW Waukesha County(1), Merton/Monches (1), Coldwater Creek/Rockridge (1))	0	9
Problems reported at Lakefront	6	0
Insufficient for fireground	0	2

# User Survey: Audio Quality



How would you rate the ability of the radio(s) to produce good-sounding audio (on average, or most of the time) for both portable and mobile:

Possible Responses	Milwaukee County	Waukesha County
<b>Very Good Audio (port/mob)</b>	25.6% / 30.2%	16.9% / 21.1%
<b>Good Audio (port/mob)</b>	48.8% / 46.5%	43.7% / 38.0%
<b>Acceptable Audio (port/mob)</b>	20.9% / 11.6%	33.8% / 25.4%
<b>Bad Audio (port/mob)</b>	4.7% / 0.0%	5.6% / 14.0 %
<b>Very Bad Audio (port/mob)</b>	0.0% / 11.6%	0.0% / 0.0 %

Where is the portable's antenna when you key it?	Milwaukee County	Waukesha County
<b>At the head</b>	41.9%	50.7%
<b>At the hip</b>	44.2%	42.3%
<b>No answer</b>	14.0%	7.0%

# Impact of Coverage Responses



- Will need to consider locations and quantities of sites to better serve identified 'problem areas'
- Will need to evaluate user equipment configurations
  - Portables with antennas at head/shoulder (SMA) <<cord issues>>
  - Portables with shoulder mics but antenna at hip
- Will need to evaluate coverage specifications
  - "95% talk-in and talk-out coverage reliability to a portable transmitting at the hip in a 12 dB building with DAQ 3.4"
- Need to confirm vocoder requirements
  - IMBE (half rate) vs AMBE +2 (full rate)
- Will need to evaluate solutions for fireground operations
  - On-network
  - Simplex with vehicle repeaters
  - Simplex with analog tactical overlay

# User Survey: Capacity



Identify the degree to which the current systems meet your organization's needs for capacity:

Possible Responses	Milwaukee County	Waukesha County	Combined
Needs Very Well Met	32.6%	15.5%	21.9%
Needs Well Met	39.5%	31.0%	34.2%
Needs Adequately Met	25.6%	40.8%	35.1%
Needs Only Somewhat Met	2.3%	12.7%	8.8%
Needs Not Met	0.0%	0.0%	0.0%
Comments / Concerns / Problems / Issues	Milwaukee County	Waukesha County	
Busies during major events	5	7	
Congestion on main/dispatch talkgroups	2	2	

## IMPACT

- Will need to gather/evaluate typical “busy hour” and “major event” traffic loads
- Will need to review fleetmap when deploying future system

# User Survey: Features



Identify the degree to which the current systems meet your organization's needs for features:

Possible Responses	Milwaukee County	Waukesha County	Combined
Needs Very Well Met	32.6%	18.3%	23.7%
Needs Well Met	44.2%	31.0%	36.0%
Needs Adequately Met	18.6%	36.6%	29.8%
Needs Only Somewhat Met	4.7%	11.3%	8.8%
Needs Not Met	0.0%	2.8%	1.8%

Comments / Concerns / Problems / Issues	Milwaukee County	Waukesha County
Need improved encryption with clearer audio	3	5
Need better performance on emergency key	1	0
Need programmable scan lists	1	1
Need recording of fireground channels	0	2
Need capabilities for data (specifically GPS)	0	2

# Impact of Feature Responses



- Need to review all P25 features and identify those required in Waukesha and Milwaukee Counties including their signaling interface (compliance to P25) and their user functionality (fit to user needs)
  - Emergency Alarm / Group Call
  - Individual Call
  - Announcement Call / All-Call (System Call)
  - Radio Check
  - Radio Monitoring
  - Inhibit / Uninhibit
  - Encryption
  - Authentication

# User Survey: Interoperability



Identify the degree to which the current systems meet your organization's needs for interoperability:

Possible Responses	Milwaukee County	Waukesha County	Combined
Needs Very Well Met	20.9%	18.3%	19.3%
Needs Well Met	44.2%	28.2%	34.2%
Needs Adequately Met	23.3%	36.6%	31.6%
Needs Only Somewhat Met	9.3%	12.7%	11.4%
Needs Not Met	2.3%	4.2%	3.5%

Comments / Concerns / Problems / Issues	Milwaukee County	Waukesha County
Need better comms between Counties	2	2
Need to talk to Milwaukee PD or FD	5	0
Need to talk to other Counties (Ozaukee/Jefferson)	2 / 0	1/1
Need to talk to WISCOM	1	2
Need better patches to mutual aid channels (MABAS, IFERN, etc.)	5	4

# User Survey: Interop Features



If they were available, how often would you use the following interoperability abilities:

Interop Feature:	Cross-County Talkgroups		Inter-County Roaming		Cross-County Scanning	
	Milwaukee County	Waukesha County	Milwaukee County	Waukesha County	Milwaukee County	Waukesha County
<b>Possible Responses</b>						
<b>Would use often:</b>	16.3%	7.0%	9.3%	12.7%	18.6%	19.7%
<b>Would use sometimes:</b>	25.6%	39.4%	32.6%	26.8%	30.2%	36.6%
<b>Might or might not use:</b>	37.2%	31.0%	30.2%	29.6%	23.3%	18.3%
<b>Would probably not use:</b>	16.3%	16.9%	23.3%	25.4%	20.9%	22.5%
<b>Would never use:</b>	4.7%	5.6%	4.7%	5.6%	7.0%	2.8%

# Impact of Interop Responses



- Need to compare inter-county interop requirements (roaming, scanning) to design alternatives
- Need to identify the external systems as well as the methods of connection
  - Infrastructure and Patches
  - Gateways
  - ISSI
- Need to evaluate impact to capacity and user operations
- Need to evaluate solutions to sharing alias databases
- Need to review fleetmap and unit programming

# User Survey: Reliability



Identify the degree to which the current systems meet your organization's needs for reliability:

Possible Responses	Milwaukee County	Waukesha County	Combined
Needs Very Well Met	41.9%	25.4%	31.6%
Needs Well Met	37.2%	40.8%	39.5%
Needs Adequately Met	20.9%	29.6%	26.3%
Needs Only Somewhat Met	0.0%	4.2%	2.6%
Needs Not Met	0.0%	0.0%	0.0%

Comments / Concerns / Problems / Issues	Milwaukee County	Waukesha County
Concerns over lack of "backup tower"	0	2
Concerns over lack of "backup system"	2	0

## IMPACT

- Will need to specify overall system reliability requirements including points of failure, total uptime, and coverage redundancy

# User Survey: Security



Identify the degree to which the current systems meet your organization's needs for security			
Possible Responses	Milwaukee County	Waukesha County	Combined
Needs Very Well Met	25.6%	26.8%	26.3%
Needs Well Met	39.5%	35.2%	36.8%
Needs Adequately Met	27.9%	36.6%	33.3%
Needs Only Somewhat Met	4.7%	1.4%	2.6%
Needs Not Met	2.3%	0.0%	0.9%
Comments / Concerns / Problems / Issues	Milwaukee County	Waukesha County	
Need encryption with good audio quality	4	7	
Need better physical security at radio sites	0	1	

## IMPACT

- Will need to specify requirements for encryption as well as for system network intrusion protection

# User Survey: Maintenance\*



Identify the degree to which the current systems meet your organization's needs for maintenance\*:

Possible Responses	Milwaukee County	Waukesha County	Combined
Needs Very Well Met	20.9%	23.9%	22.8%
Needs Well Met	41.9%	33.8%	36.8%
Needs Adequately Met	30.2%	40.8%	36.8%
Needs Only Somewhat Met	4.7%	1.4%	2.6%
Needs Not Met	2.3%	0.0%	0.9%

Comments / Concerns / Problems / Issues	Milwaukee County	Waukesha County
Lack of standard process for requesting service	2	0
Lack of standard recommendations for subscriber service schedule	1	1
Request for more options for subscriber maintenance/programming (including user-agency self programming)	2	2

**IMPACT:** Will need clearly defined roles for service between vendor, shops, agencies  
 [\* Note: The topic of "Monitoring" had nearly identical results to "Maintenance".]

# User Survey: Training & Exercises



- Training Comments / Concerns / Problems / Issues: 59 responses
  - New user equipment will need new user training: 21
  - Training should come from outside 'professionals': 11
  - Training should include interop (not just daily use): 12
  - User training will need to be both in-person and on DVD: 9
  - User training will need to include laminated guides: 5
- Exercise Comments / Concerns / Problems / Issues: 15 responses
  - Make sure exercises are multi-jurisdictional: 5
  - Do exercises as part of training: 4
  - Include patching, mutual aid, interop: 3
  - Ensure compliance with ICS: 2
  - Include failsoft: 1

# Management Survey: Summaries



- **COST:** Some agencies across both counties wish for no costs but equal number (from both counties) wish for a realistic, equitable cost.
- **COVERAGE:** General concerns over in-building coverage. In Waukesha County, need for improvements in SE & SW areas. In Milwaukee, need for improvements at lakeshore.
- **CAPACITY:** Systems have been busy during storms. Too much congestion on some dispatch talkgroups.
- **FEATURES:** Channel marker messages (alert tones) and data/GPS would be used.
- **INTEROPERABILITY:** Need to improve interop with surrounding counties (Ozaukee), Milwaukee PD/FD, conventional interop channels, and with WISCOM.
- **RELIABILITY/MAINTENANCE:** Systems are generally reliable but concerns exist over age/serviceability and performance in large events.
- **SERVICE:** Some agencies voiced a request for more 'self programming' or more competition through more programming shops.
- **OVERALL:** Cost, coverage, interoperability, and voice quality (especially in a P25, encrypted environment) are critical.

# User & Management Interviews



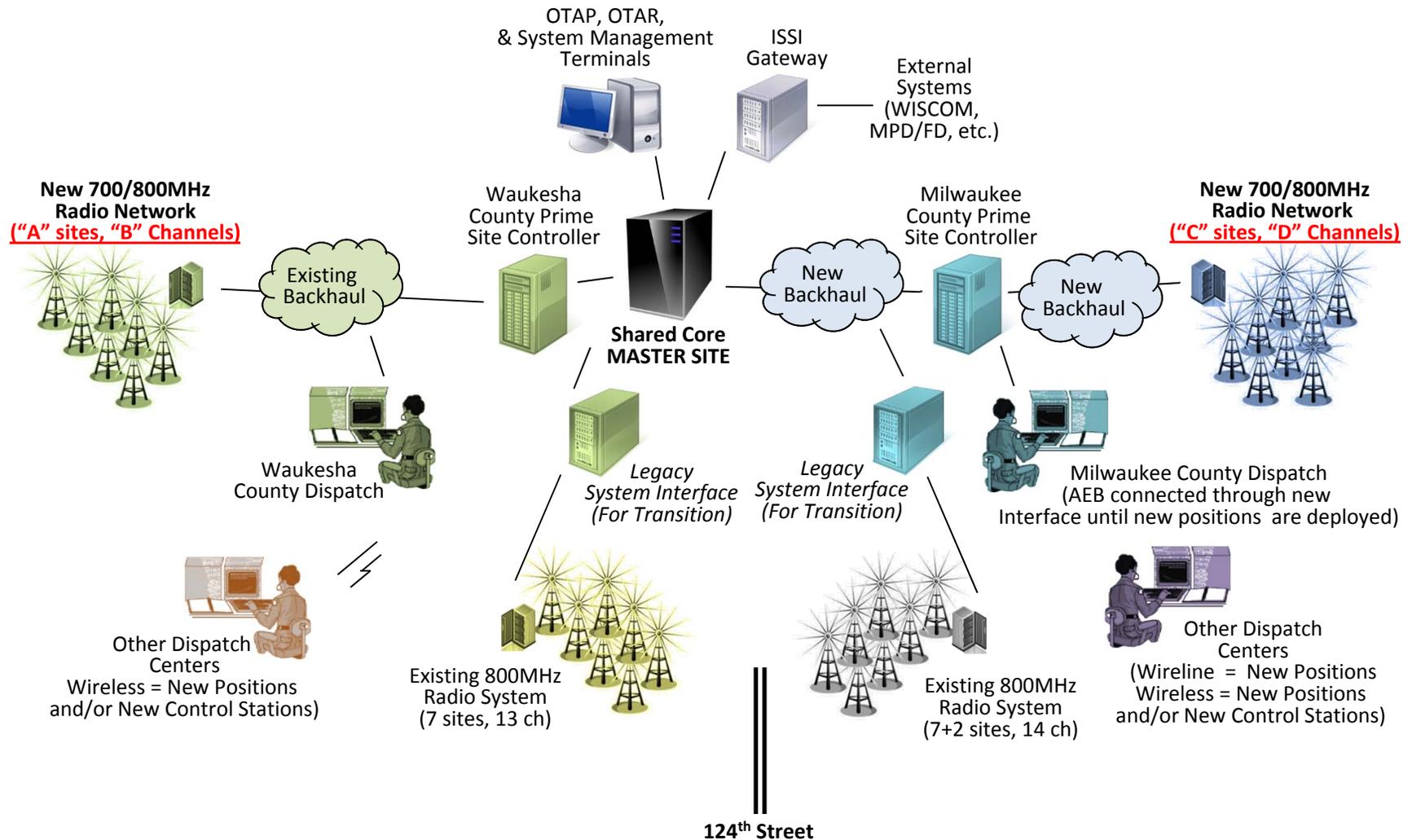
- Interview Status:
  - Completed: 14
    - Waukesha County Sheriff's Department (2)
    - Waukesha County Highway Operations (2)
    - Waukesha County Parks / Land Use (1)
    - North Shore Fire Department (1)
    - Bayside Police Department (1)
    - Milwaukee County Sheriff (1)
    - Milwaukee County DPH / EMS (1)
    - West Allis Police Department (1)
    - Brookfield Fire Department (1)
    - Milwaukee County Police (1) and Fire Department (1)
    - Milwaukee County Transit System (1)
  - Contacted, To be Completed: 2
  - Contacted, No Response: 12
- Summary of Interviews: Same input as user/management surveys but strong sentiment of "Keep Us Informed & Involved"

# Two High-Level System Alternatives

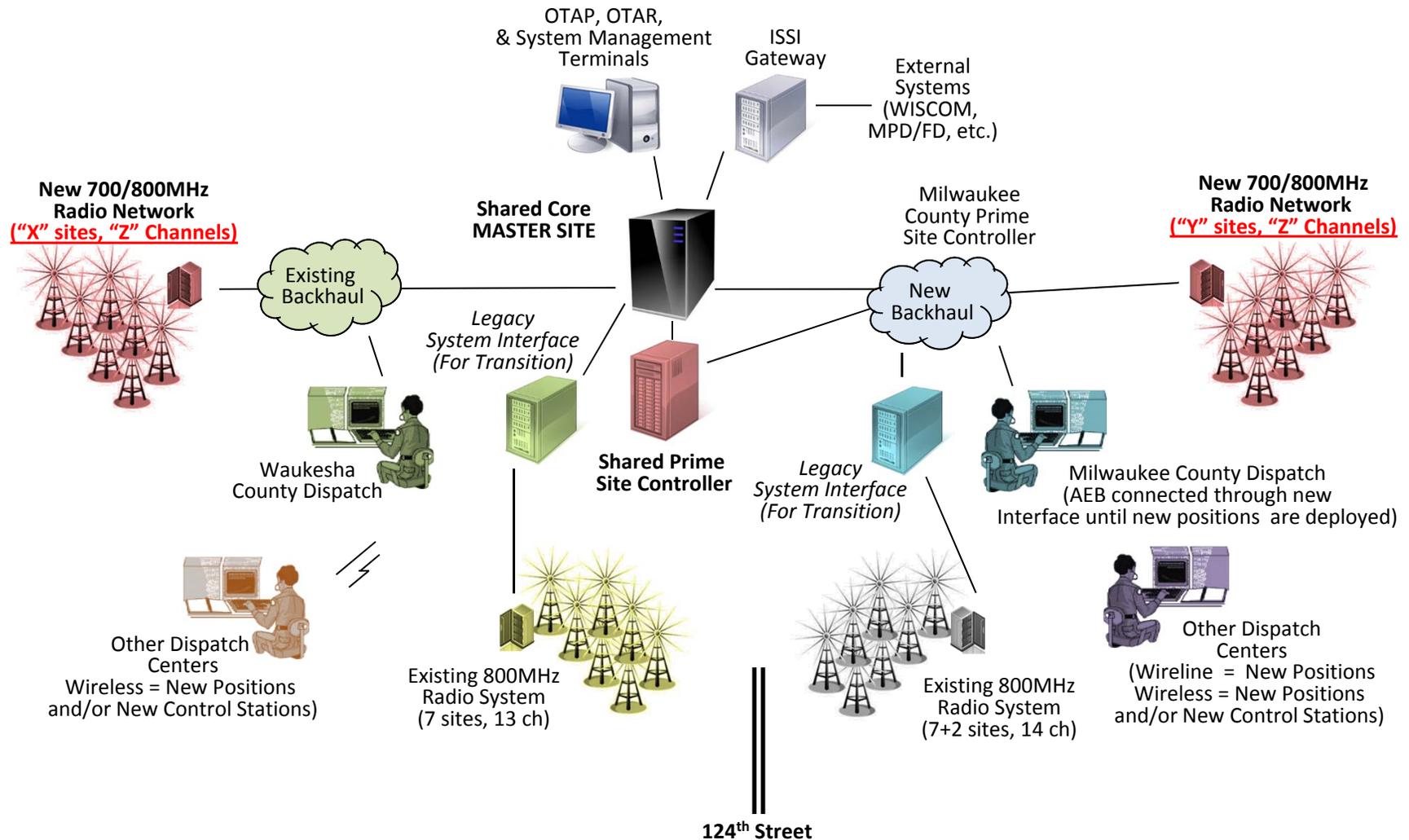


- ALTERNATIVE: "Two Separate Zones"
- ALTERNATIVE: "One Massive Simulcast System"
  
- Main Similarities
  - Both use shared Zone Controller
  - Both are based on P25 simulcast technology
  - Both could use 700 or 800 MHz frequencies
  - Both could allow legacy migration
  
- Main Differences
  - Different approach to architecture to radio network (more homogenous vs more differentiated)
  - Different delivery of interoperability performance
  - Different cost models

# Alternative: 2 Separate Zones



# Alternative: 1 Massive System



# High-Level Comparison of Alternatives (Tech Issues)



Issue	Requirement	Advantage	Rationale
Coverage	Must meet each County's coverage spec	Push	The number of sites per county is independent of approach. (One massive system might save costs by eliminating sites but that could also eliminate 'redundancy' along border.)
Capacity	Must meet each County's current user load plus anticipated growth	Two Separate Zones	Separate zones allow different number of channels per zone.
Features	Must provide required features with P25 compliance	Push	Either approach would allow same features to be deployed.
Interop (Internal)	Must meet needs for inter/cross County talkgroups, roaming, and scanning	One Massive Simulcast	One system is as interoperable as it gets. (Separate zones can support same interop features but not seamlessly.)
Interop (External)	Must meet needs for connectivity to external systems (MPD, WISCOM, other counties, mutual aid, etc.)	Push	Either approach would allow ISSI, gateways, patches, etc.
Reliability	Must meet needs for uptime	Two Separate Zones (slight)	Either approach can be designed to minimize single points of failure but separate Prime Sites would divide effect of their failure. Failsoft would be more flexible in Two Zones. Coverage redundancy (along border) also exists in Two Zones.
Security	Must meet needs for communications, site, and network security	Push	Either approach would support encryption and site/network security is independent of approach.

# High-Level Comparison of Alternatives (Non-Tech Issues)



Issue	Requirement	Advantage	Rationale
Maintainability	Must be easy to maintain with clear support processes.	One Massive Simulcast	Fewer controllers in "Two Zones" approach means less to maintain.
Cost (Capital Amount)	Must meet technical requirements at lowest possible capital cost (total and per County)	Push/TBD	Separate zones allow different number of channels per zone (cost savings of repeaters has slightly greater impact than cost savings of prime site controllers) but One Massive System might allow elimination of sites.
Cost (Capital Flexibility)	Must meet requirements for funding availability (Waukesha vs Milwaukee County)	Two Separate Zones	Separate zones allow different number of channels per zone allowing slower roll-in of channels in Milwaukee County.
Cost (O&M)	Must meet technical requirements at lowest possible ongoing cost	Push	Cost of O&M of two Prime site controllers is approximately equal to cost of O&M of more repeaters. Site impact of two zones (rent, power, etc.) would be less in Two Separate Zones.
Licensing	Must be able to be licensed	Two Separate Zones (slight)	Region 54 has stated that One Massive Simulcast could be done but it would be non-standard.
Governance	Must be able to have clear delineation of rights, roles, responsibilities	Push	Either approach includes some shared and some individually-owned components (Two Separate Zones would be easier to 'dismantle' in case of separation).

# Next Steps



- Immediate Actions:
  - Continue coverage analysis
  - Begin capacity and backhaul analysis
  - Finalize Waukesha and Milwaukee Costs
- To Close Out Phase 1 by 08-Oct-2012
  - Develop Criteria for Alternatives
  - Use Surveys, Cost Models, Coverage Analysis, Capacity Analysis, and Criteria to limit Alternatives
  - Complete Phase 1 Study