



**REDMOND SYMPOSIUM 2003**

HEALTH AND SAFETY FOR THE PROFESSIONAL FIRE FIGHTER

REDMOND SYMPOSIUM • SAN FRANCISCO, CALIFORNIA • OCTOBER 5-9, 2003



# Fire Service Communications

John P. Redmond Symposium

Group B Workshop

Wednesday, October 8, 2003

**“Firefighter Involvement & Training Considerations”**

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# A Radio Experience

*Introduction & History*





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# A Radio Experience



***Introduction & History***



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# Current Field of Play

- Fire / EMS
    - Tactical channels in high band VHF (150s)
  - EMS patch use
    - Medical channels in UHF (460s)
  - Diversity receivers
    - No repeaters used
  - Interoperability
    - Automatic aid area of 2,000 sq miles, 19 cities
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# Why Consider Change

- Outdated, 1950s technology
- Unable to support operational needs
- Current channels overloaded
  - New channels not available
- Inadequate support for secure operations
- FCC changes increase risk of interference





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# Should We Build It

- '80 - Consultant report: 800 MHz
- '88 - Consultant report: 800 MHz
- '93 - Consultant study/report: 800 MHz / P25
- '95 - Consultant/Integrator: 800 MHz / P25
- '95/'98 - Survey other cities, meet with manufacturers, independent reviews, vendor forum (cases for and against P25)
- Bottom line:
  - **Build an 800 MHz P25 radio system**



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# Build It & They'll Come

- **PRWN** - Phoenix, Tempe, Guadalupe, Chandler, Sun Lakes, Avondale, Goodyear, Tolleson, Glendale, Peoria, Daisy Mountain, Sun City, Surprise, El Mirage, Sun City West, etc.
  - **TOPAZ** - Mesa, Gilbert, Apache Junction
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# Field of Dreams

- It will support 20 Fire Depts, 3 Police Depts, Sky Harbor Airport, and the municipal functions of 2 of the 3 largest cities in AZ (15,000 estimated users)





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# Field of Dreams

- The PRWN & TOPAZ are a:
    - Digital...
    - Trunked...
    - Project 25...
    - Smartzone...
    - Simulcast radio system...
    - Operating in both 700-800 MHz Bands
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# Project Timeline

- Construction Oct '01 - Sept '02
  - Infrastructure installation Feb '02 - Apr '03
  - Issued RFP for radios Nov '02
  - Portable evaluation & selection Jan '03
  - System tests and acceptance May '03 - Dec '03
  - System operational Dec '03
  - Police and Municipal loading Jan '03
  - Phoenix Fire transition Jan '06
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# Firefighter Involvement



*Stepping Up to the Plate*





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Public Safety Steering Committee

Steering Committee

*\*Yellow background indicates change based on user involvement.*

Project Mgmt

Project Support

Project & Transition Management

QA?

Mesa Liaison

External Liaisons

Regulatory

Department Liaisons

Site Acquisition Construction

Technical Team

Motorola Project Management

Training Development



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## Dual contract methodology

Increase competition & development time while decreasing potential costs.

Administrative  
Subscriber  
Committee

User Needs  
Subscriber  
Committee

Technical  
Team

*\*Yellow background indicates change based on user involvement.*

Labor/Mgt  
Focus Groups



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# PFD 800 MHz Team

*“The size and impact of the project clearly requires a new fire department Section to be formed.”*

- Deputy Chief (Technical Services)
    - Division Chief (Project Manager)
    - Four Captains (Project Staff)
    - Communications Engineer (Tech Support)
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# Firefighter Research

## 1. Lack of adequate training

- “It’s a radio” / “It’s not a radio”
- Are FFs prepared to react in a uniform, predictable manner

## 2. Lack of adequate funding

- Budget crunch vs. required infrastructure
  - Lack of funding for project related training
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# Firefighter Research

## 3. Inadequate system design

- Didn't consider operational functionality of fire service
- Designed for street-level mobile radio coverage (PD use)

## 4. Lack of User Input

- No understanding of what the users need or want

## 5. Premature transition

- Partners move on before 'everyone' is ready
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# How To Guide

*Building Your Own Field of Dreams*





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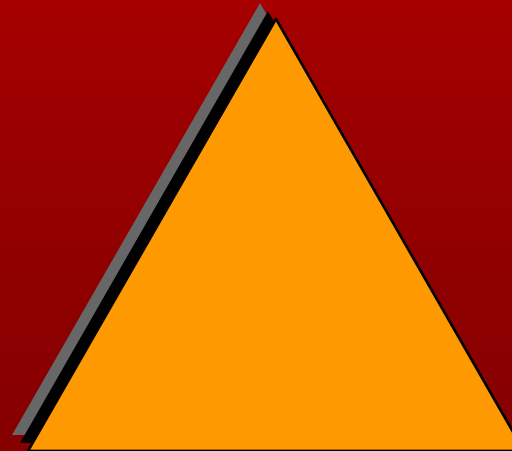
# Architectural Plans

(Conceptual Design / Detailed Design / Construction / Acceptance)

## INFRASTRUCTURE

(Knowledge / Glue)

**INTEGRATION**



(Radios)

**SUBSCRIBERS**





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# Building Supplies

- The strategy is “offensive”
  - Build a system that will meet your operational performance objectives
- Tactical benchmarks (building supplies) for firefighter involvement include ...





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## #1 Design Phases

### Conceptual Design

- Firefighter involvement
- Hire a consultant (begin early)
- Identify your performance requirements

### Detailed design

- What, where, why, how, when, etc.
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# #2 In-Building Coverage

- Identify in-building requirements
  - Fund it (bond?) & then build it
  - Don't compromise; building codes?
  - Test to your requirements!
  - Treat vs. build robust system (23 dB or greater)?
- If you choose to “grow” the system understand it'll be a dangerous and painful experience



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# #3 System Coverage

- Equivalent to site location and signal strength
  - Is 95% sufficient coverage?
    - Where's it acceptable to have no radio coverage?
    - “Can you hear me now?”
  - What's the coverage in dense areas?
  - What's the coverage in rural areas?
    - What's the impact of a sudden large event in a rural area?
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## #4 Capacity

- Equivalent to the number of frequencies
- Is 95% capacity sufficient?
  - If your talkgroup (channel) is clear, when is it acceptable to get a “System Busy”?
- Perform a “traffic analysis” to identify current needs vs. needs 5-10 years away
  - Plan for peak activity...





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## #5 Training

- Awareness (marketing change)
  - Education (learning about change)
  - Pre-Training (understanding change)
  - Training (experiencing change)
  - Post-Training (reinforcing experience)
  - Annual Refresher Training
    - Review, revise, implement
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# #6 Dispatch Center

- Key component of all fireground communications & firefighter safety
    - Benchmarks, accountability, etc.
    - A safety net for firefighters...
  - Controlling the communications process is essential toward firefighter safety and completion of the tactical benchmarks
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# #7 Dispatch Staffing

- What level of customer service will be required when firefighters can talk?
  - Opportunities:
    - Split Fire & EMS channels
    - Pre-assigned channels (safety, rescue, etc.)
    - Special use channels (haz mat, services, etc.)
    - Interoperability (add neighbors/partners)
    - Patch channels
    - Other (logistics, rehab, investigations, PIO, etc.)
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## #8 Interoperability

- Interoperability essentials
    - Language
    - Common command structure
    - Organizational interoperability
  - Automatic aid partners?
  - Mutual aid partners?
  - PD, Sheriff, Highway Patrol, etc.?
  - Support? Municipal...
  - Feds? Other visitors?
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# #9 System Evaluation

- Sounds reasonable to “test” it operationally before lives are on the line...
- Fits right into Command Officer training
  - Which also helps develop Company Officers...





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## #10 SOPs

- Standard radio procedures
  - The order model
    - “E1 to E2”... “E2 to E1 go ahead”...
  - Content of reports (CANS)
  - Loss of Communications procedure
  - Site Trunking / FailSoft Procedures
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## #11 Talkgroup Planning

- Analyze current channel delegation and departmental usage
    - Ask why?
  - Attempt to mirror current usage
    - Don't reinvent the wheel
  - Look for opportunities to improve
  - Develop opportunities to add future partners, services, etc.
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# #12 Radio Selection

- Effectively evaluate the portable and mobile radio options
- Apply to functional use
  - Ergonomics; use while in a hostile environment, in the dark, with gloves on hands, mask on face, hand on a hose line, other hand has a tool, etc.





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# #13 Radio Configuration

- A radio is just a box...
- What's necessary to include so that it operates on your system?
- What would be nice to have...?
  - ...what's a have to have?
- What accessories are required...?





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# #14 Radio Templates

- The radio template is the pattern that includes all of the features you have selected for your radios...
- We could spend the next 40 hours talking about the features... and still not finish the list or answer the all questions





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# #15 Vehicle Installations

- Vendor?
- Staff?
- Quality control?
- Transition each company after installation or wait until all of the units are completed before transition
  - If you wait you need to relocate the other radio chargers...





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# #16 Station Package

- How integral is alerting firefighters within your system...
- Change out before...
- Change out after...





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# #17 System Testing

- Staging
  - Coverage Acceptance Testing (CATP)
    - Only small portion of grid actually tested
    - Should be equal to your operational requirements
  - Functional Acceptance Testing (FATP)
    - Test it like we really play with it
  - Acceptance testing
  - In-building testing
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# Contacts

*Questions / Information*





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- Our Website

- [www.phoenix.gov/fire/800.html](http://www.phoenix.gov/fire/800.html)

- Email Question Box

- [newradios.pfd@phoenix.gov](mailto:newradios.pfd@phoenix.gov)

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