• Why a Northern California ALERT2 Network Design?
  - Because there are shared frequencies, shared repeaters, and interdependent networks

• What is the intended outcome?
  - Each agency will have a plan for upgrading their ALERT networks to ALERT2

• How is this design work funded?
  - DWR Delta Grant through San Joaquin County

• Why ALERT2?
  - Higher bandwidth, correct data, almost no data loss
  - Efficient use of frequencies, allows for future expansion
Which agencies are involved?
- All Northern California ALERT user agencies

How long will it take?
- Draft designs by October 2015
- Project completion by December
Process we are going through

- Meeting notes and questionnaire responses
- Assembled information of existing agency ALERT networks
- Network Designs
- Frequency assignments
- SAMS Source Address Management System
  - http://alert2.org
- TDMA Manager
  - http://tdma.onerain.com
Deliverables

- Meeting notes and questionnaire responses
- Assembled information of existing agency ALERT networks (http://tdma.onerain.com)
- Network Design
  - Preliminary now through Oct. 3
  - Finalize by November
- Updated SAMS Information
  - Scheme for orderly assignment across all agencies
  - Source address assignment for each sites
  - TDMA slot assignments for each
ALERT2 Network Design Example
Monterey / Santa Cruz Counties

- Legacy ALERT Network
  - 1 Base station receive location
  - 5 backbone repeaters
    - Mt. Toro – Primary repeater (RF and IP feeds)
    - Anderson Pk, Flores Camp, Naciemento, Williams Hill
  - 50 ALERT gauge sites
    - Gauges transmit on same frequencies as repeaters,
    - Relay repeaters retransmit local gauges on same frequency
    - Repeaters listen to gauge frequency and retransmit on repeater frequencies
  - Shared repeater and frequencies with Santa Cruz County
• Legacy ALERT Network Frequencies

  - Mt Toro output to Base Stations
    • F1: 170.225 to Base Stations
  - Gauges & Repeaters transmit to Toro
    • F2: 171.8375
    • F3: 171.025 – into Williams Hill
  - Relay repeaters on gauge frequency
    • F4: 170.275
Upgrade preparation

• SHEF feed from base station to NWS
  • Removed RF network dependencies required for NWS
  • Their goals to have NWS offices be RF independent
  • All base station vendors support SHEF feeds
  • NWS has a prescribed procedure for sending them SHEF data
  • Coordinate with NWS for SHEF assignments

• Base station must support ALERT2
  • Base stations must support full ALERT2 protocol
  • Both ALERT concentration, and ALERT2
**Option 1: Upgrade from inside out**
- A few frequency changes to eliminate conflicts
- No data loss on backbone throughout transition
- Gauges can be upgraded when budget allows
- Long term, two frequencies, each at 50% capacity
Additional Considerations

- Santa Cruz County and Monterey County need to coordinate their ALERT2 upgrades because they depend on the same frequencies, share a repeater, and are adjacent to each other.
- Gauge/Repeater Frequency of F2: 171.8375 is used by both agencies.
- Mt. Toro Repeater is last hop to both agencies base stations:
  - Input F2: 171.8375
  - Output F1: 170.225
  - According to AUG database, San Benito Grapevine Repeater is configured to listen on 170.225, transmit on 171.8375
  - Grapevine repeater config needs to be confirmed.
Option 1 pros and cons

- Pro – Immediate advantages of lower data loss due to dedicated ALERT2 frequencies
- Pro – Only two frequencies required after final network
- Con – Frequency input addition at Mt Toro may require intermod analysis,
Option 1 steps to upgrade

· Base stations upgraded to receive ALERT2 on F1: 170.225
· Mt Toro ALERT2 upgrade
  – ALERT2 output backbone (F1: 170.225)
  – ALERT gauge input for concentration (F2: 171.8375)
  – ALERT2 input for repeaters and ALERT2 sites (F1: 170.225)
· Nacimiento gauge and frequency change
  – Gauges and input to F4, output still on F3
· Repeaters to ALERT2 (Williams, Anderson, Flores)
  – Output F1, ALERT input same, ALERT2 input
· Nacimiento repeater upgrade to ALERT2
· ALERT2 Concentration Complete
• Phase I – ALERT2 Backbone to concentration
• Phase II – Convert all ALERT gauges to ALERT2
  – Add dedicated ALERT2 input frequency to Santiago Peak
  – Convert gauges at the pace of your budget
Phase 1 – Step 1

Santa Cruz to update base station simultaneously

Monterey County Water Resources

Receiver/Decoder

Base Station
• **Time slotting**
  - **F1 main frequency:**
    - Gauge/Frequency Frame: 120 seconds
    - Repeater Frame: 15 seconds
  - **F3 gauge frequency:**
    - Gauge Frame: 30 seconds
Monterey– TDMA Plan

- See http://tdma.onerain.com
Source Address Assignment

- Source Addresses assigned using five digit AASSS format
  - Allows identification of source agency for any traffic
- Each Agency takes a two digit id (AA)
  - Recommend 47 for Sacramento County (30 if they want to change)
  - Recommend 31 for San Joaquin County
  - Recommend 32 for Monterey County
  - Recommend 33 for Santa Cruz County
  - Recommend 34 for Santa Clara County
  - Recommend 35 for Alameda County
  - Recommend 36 for Placer County
  - Recommend 37 for Contra Costa County
  - Recommend 38 for Marin County
  - Recommend 39 for Sonoma County (Petaluma)
  - Recommend 40 for Napa County
  - Recommend 41 for San Mateo County
  - Recommend 42 for San Benito County
  - Recommend 45 for Washoe County, NV
Monterey – Source Address Assignment

- Source Addresses assigned using five digit AASSS format
  - Allows identification of source agency for any traffic
- Each Agency takes a two digit id (AA)
  - Recommend 32 for Monterey County
- Assign sites (SSS) in range 001 – 999
- Example
  - Base station receive: 32001, 32002
  - Repeaters: 32010, 32011, 32012, 32013
  - Gaging sites: 32020 – 32099
  - Future gaging sites: 32100 - 32200
Network Design
- Option 1 – Backbone frequency, gauge frequency with orderly transition from current network to final network

TDMA Plan
- Accommodates data volume requirements

Source Address assignment
- AASSS for each site
- Agency 32, base stations 001 - 200
Monterey—Issues to discuss

- SHEF Feed to NWS
- Coordination with Santa Cruz County
- F1 backbone and gauges
- Grapevine Repeater (San Benito)
- Any desire to remove dependencies with Santa Cruz County
End of Monterey Design
Follow Up

- Designs to will be available over next 10 days
  - Preliminary
  - Feedback and corrections
  - Expect to finalize designs by November
Thanks!