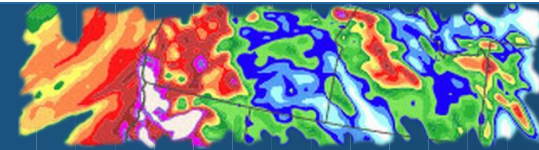


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Northern California ALERT₂ Network Design



23 September 2015

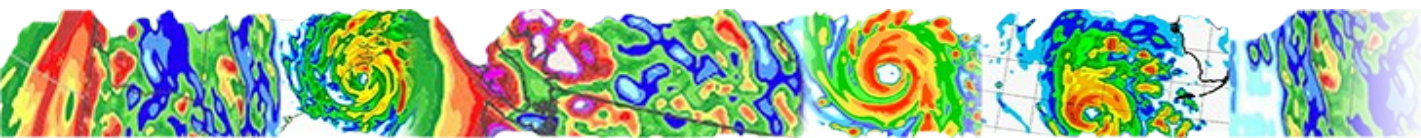


ALERT2 Network Design Project

- 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

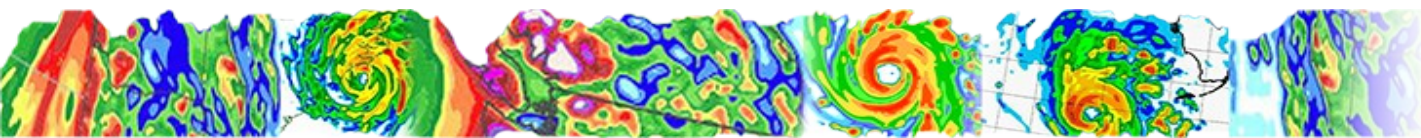
ALERT2 Network Design Project -cont

- Which agencies are involved?
 - All Northern California ALERT user agencies
- How long will it take?
 - Draft designs by October 2015
 - Project completion by December



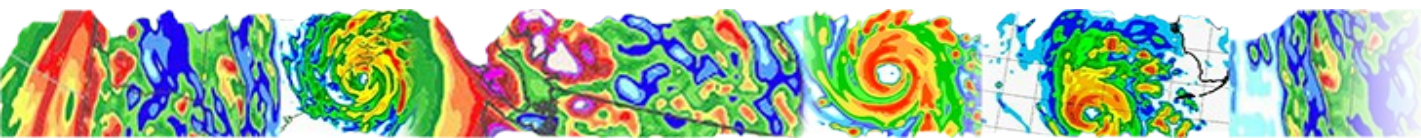
Process we are going through

- 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

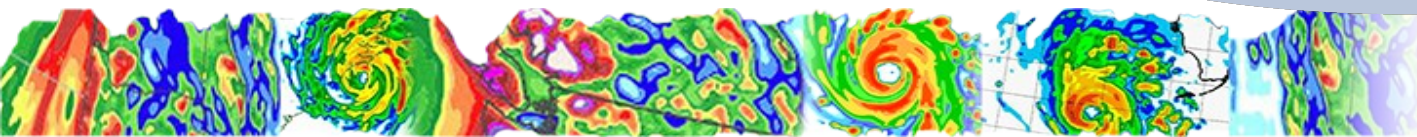
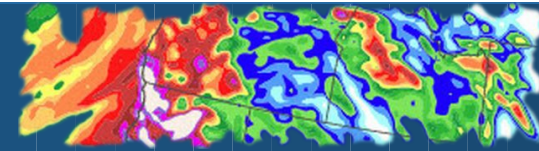


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ALERT2 Network Design Example

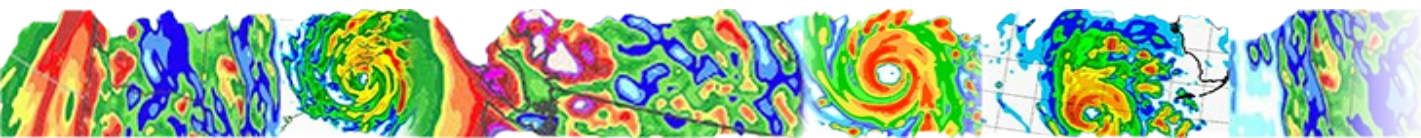


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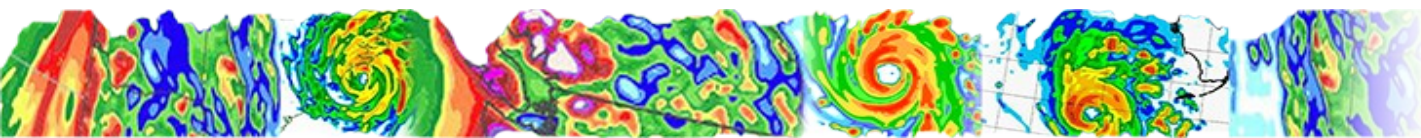
Monterey / Santa Cruz Counties

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

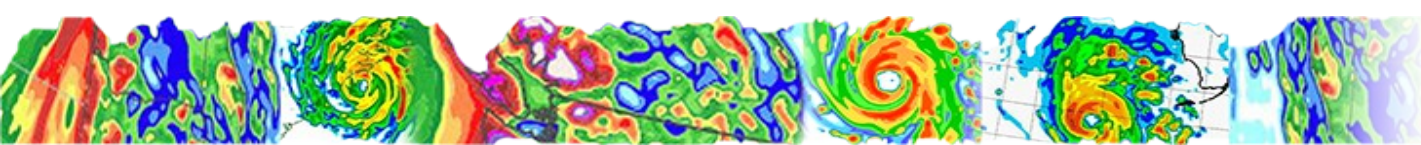
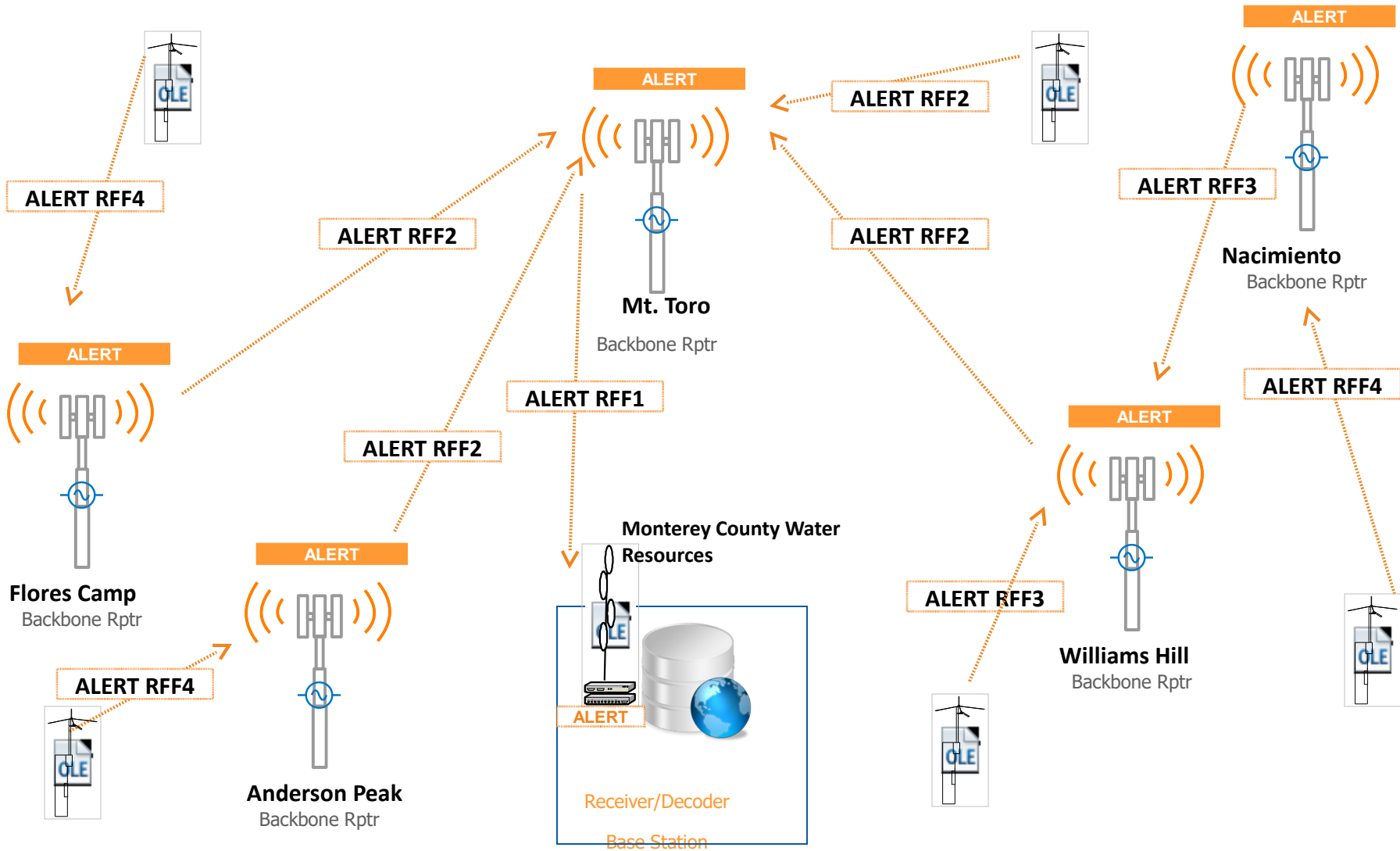


Monterey / Santa Cruz Counties

- 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



Monterey County



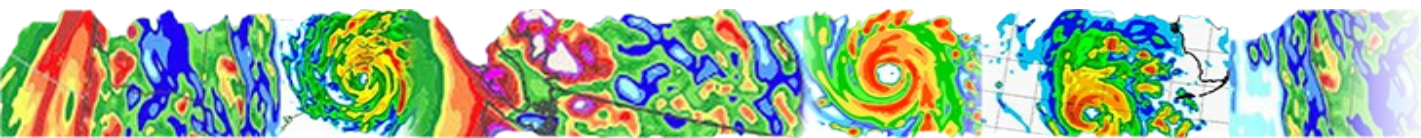
Upgrade preparation

•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

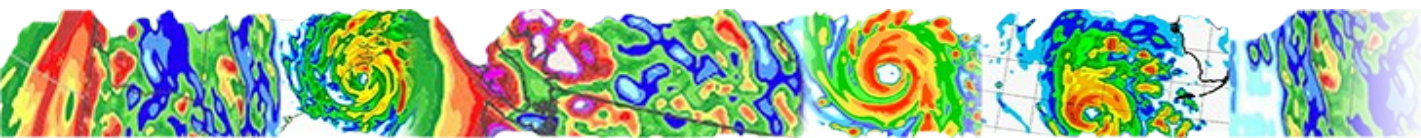
•Base station must support ALERT2

- Base stations must support full ALERT2 protocol
- Both ALERT concentration, and ALERT2



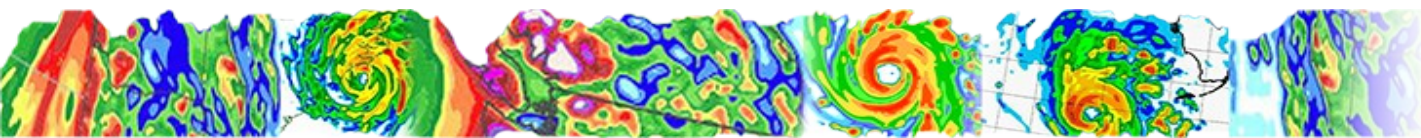
ALERT2 Upgrade Options

- 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



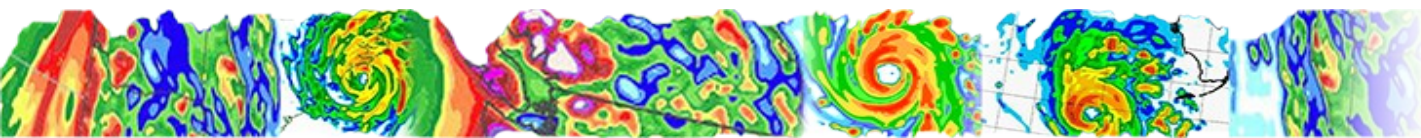
Additional Considerations

- 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



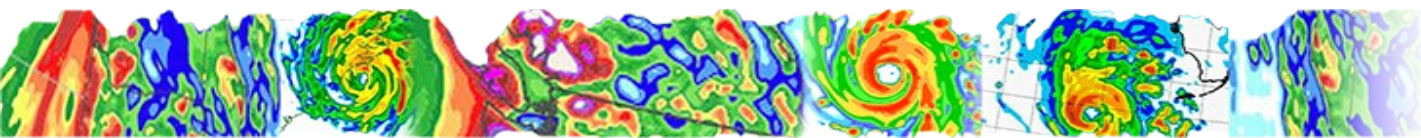
Option 1 pros and cons

- 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,



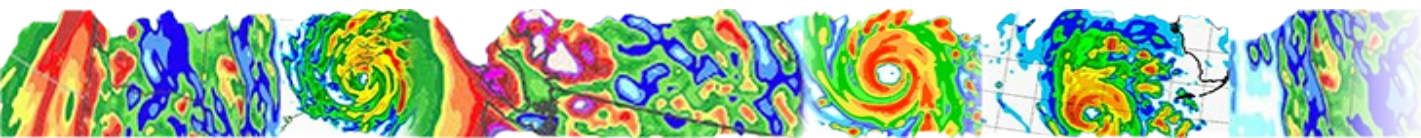
Option 1 steps to upgrade

- 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

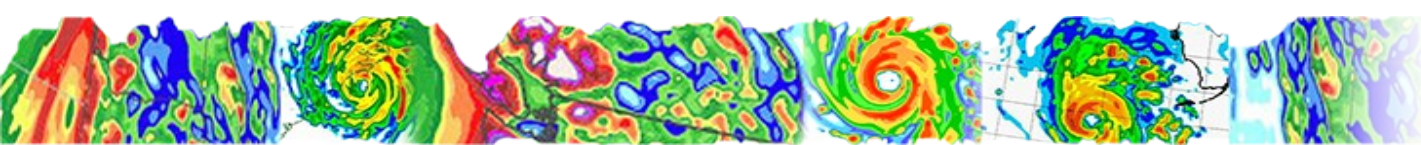
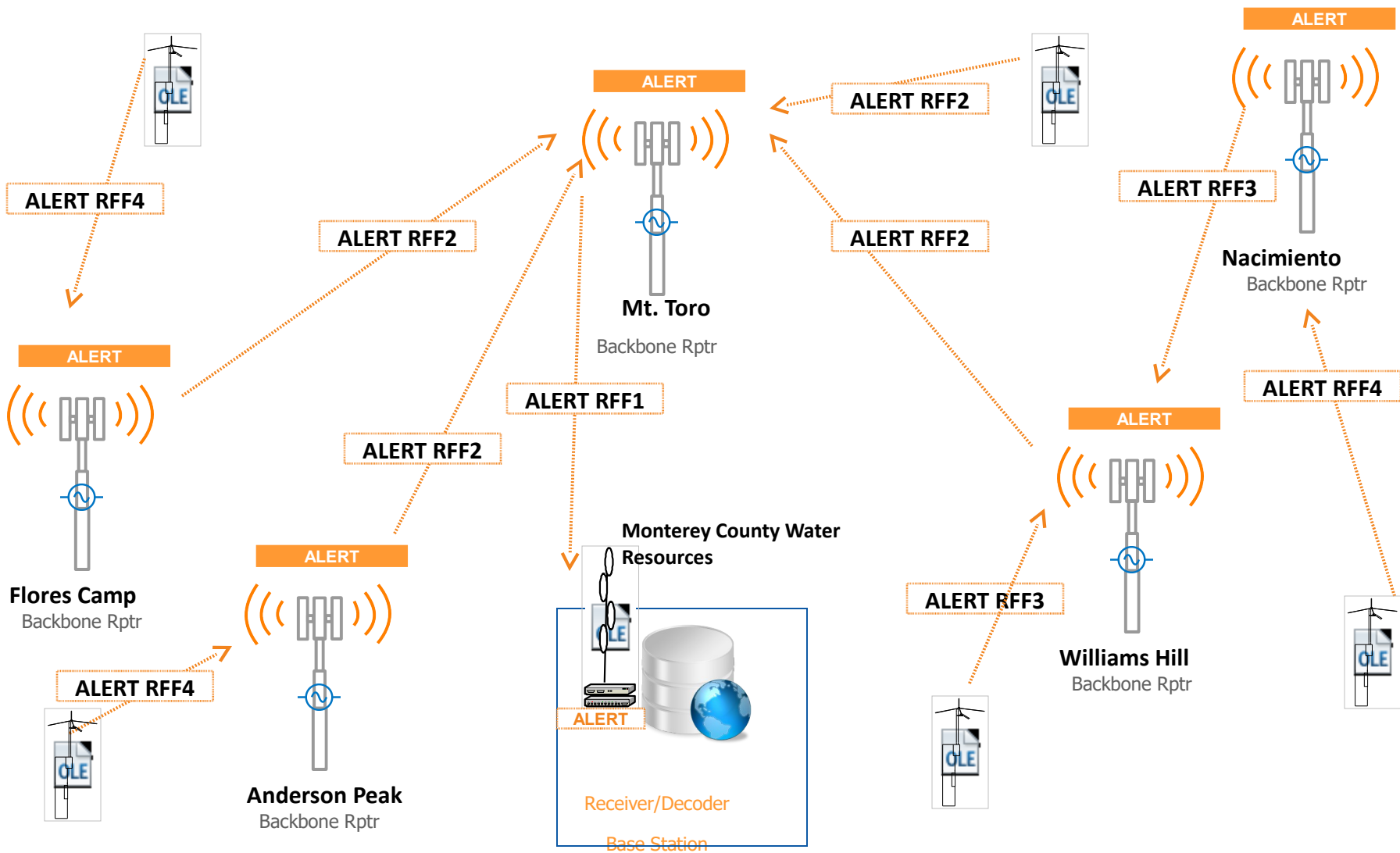


ALERT2 Upgrade – Option 2

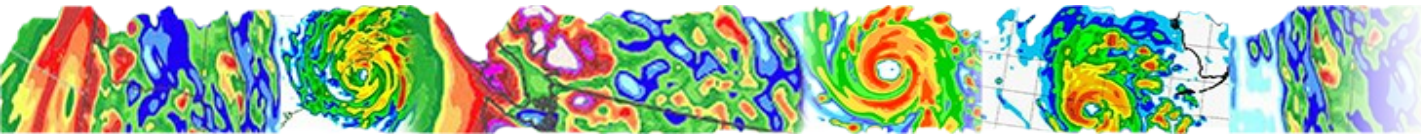
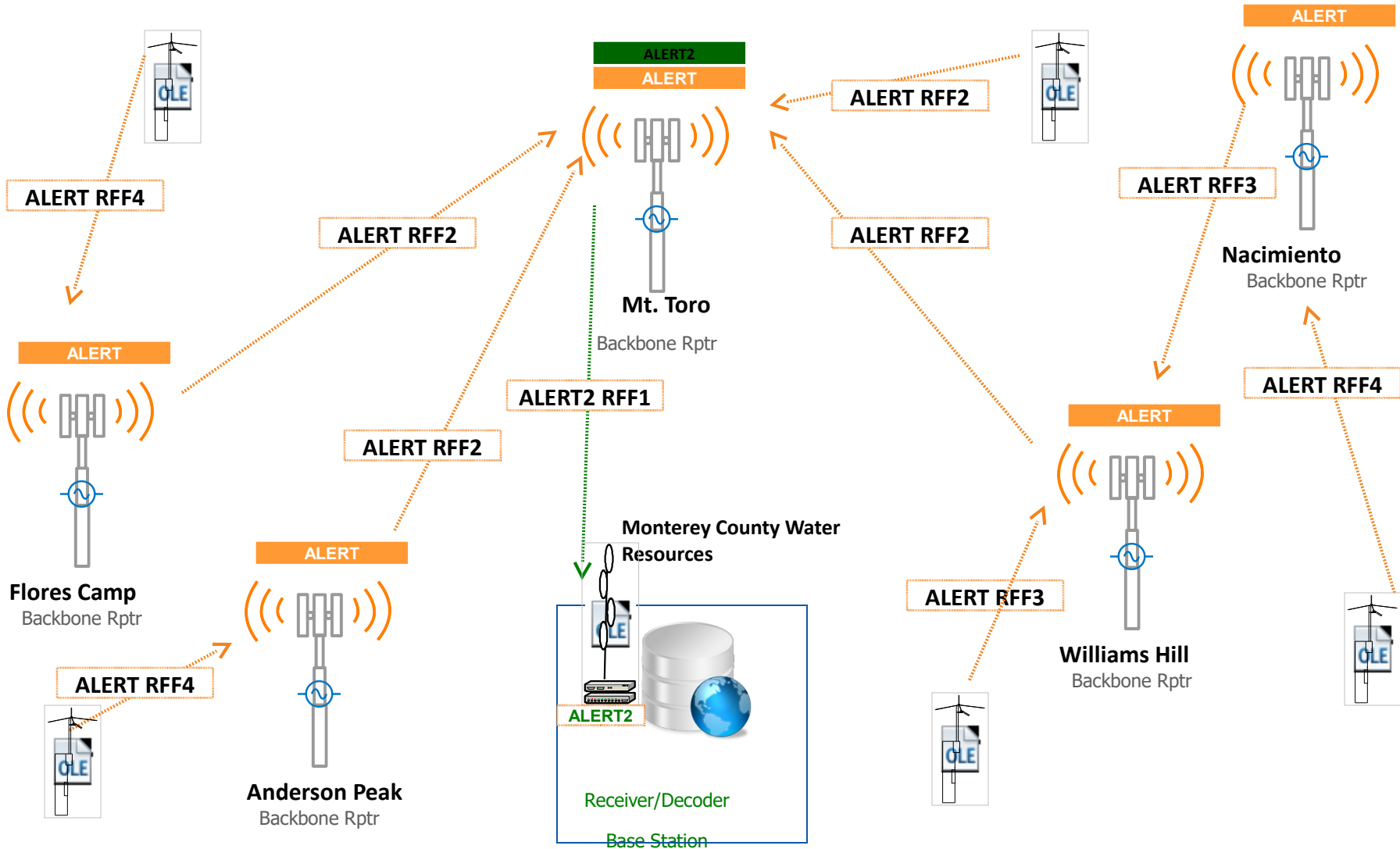
- Phase I – ALERT2 Backbone to concentration
- Phase II – Convert all ALERT gauges to ALERT2
 - Add dedicated ALERT2 input frequency to Santiago Peak
 - Convert gauges at the pace of your budget



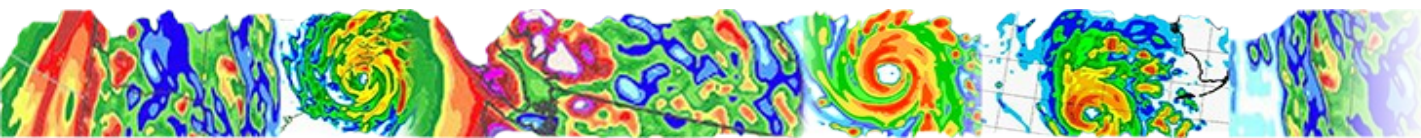
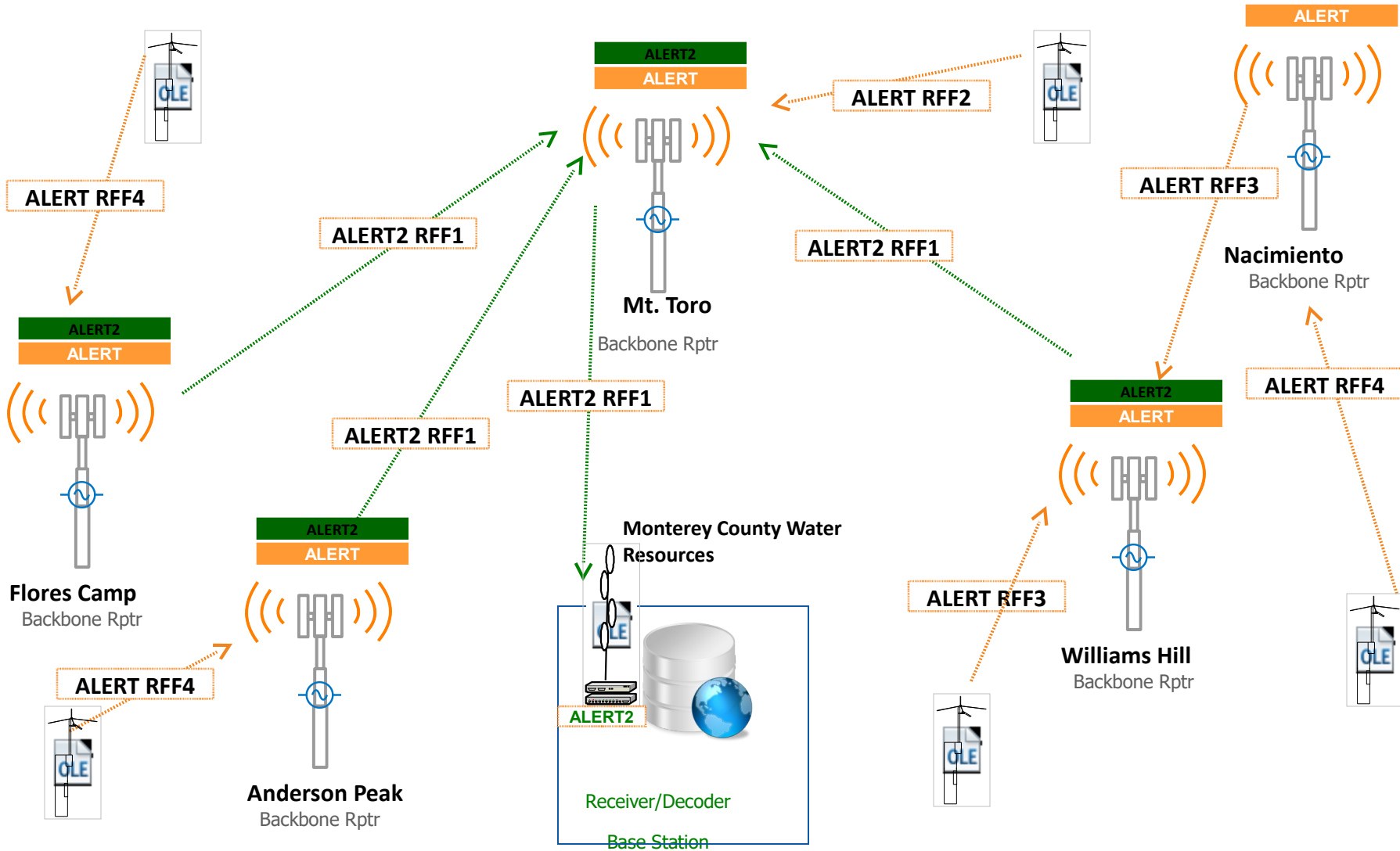
Legacy ALERT Network



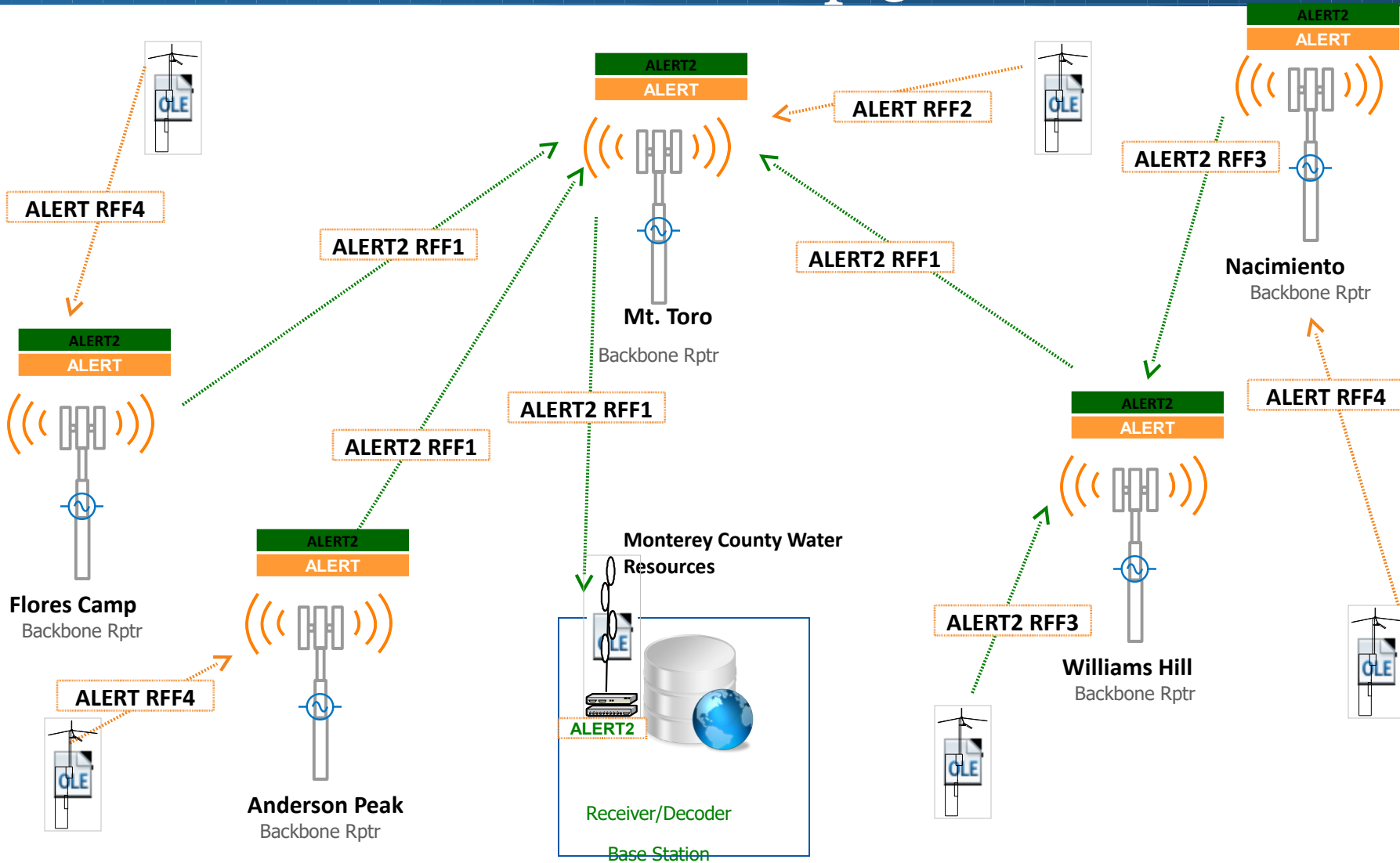
Phase 1 – Step 1



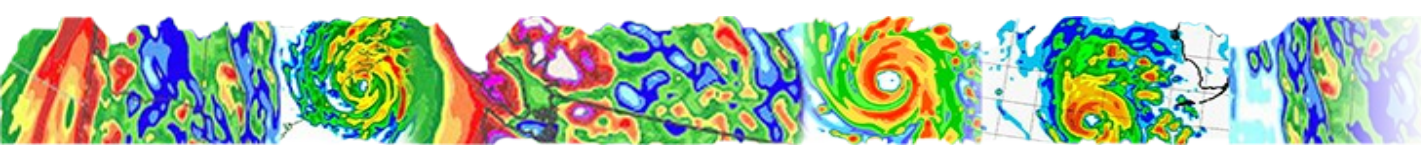
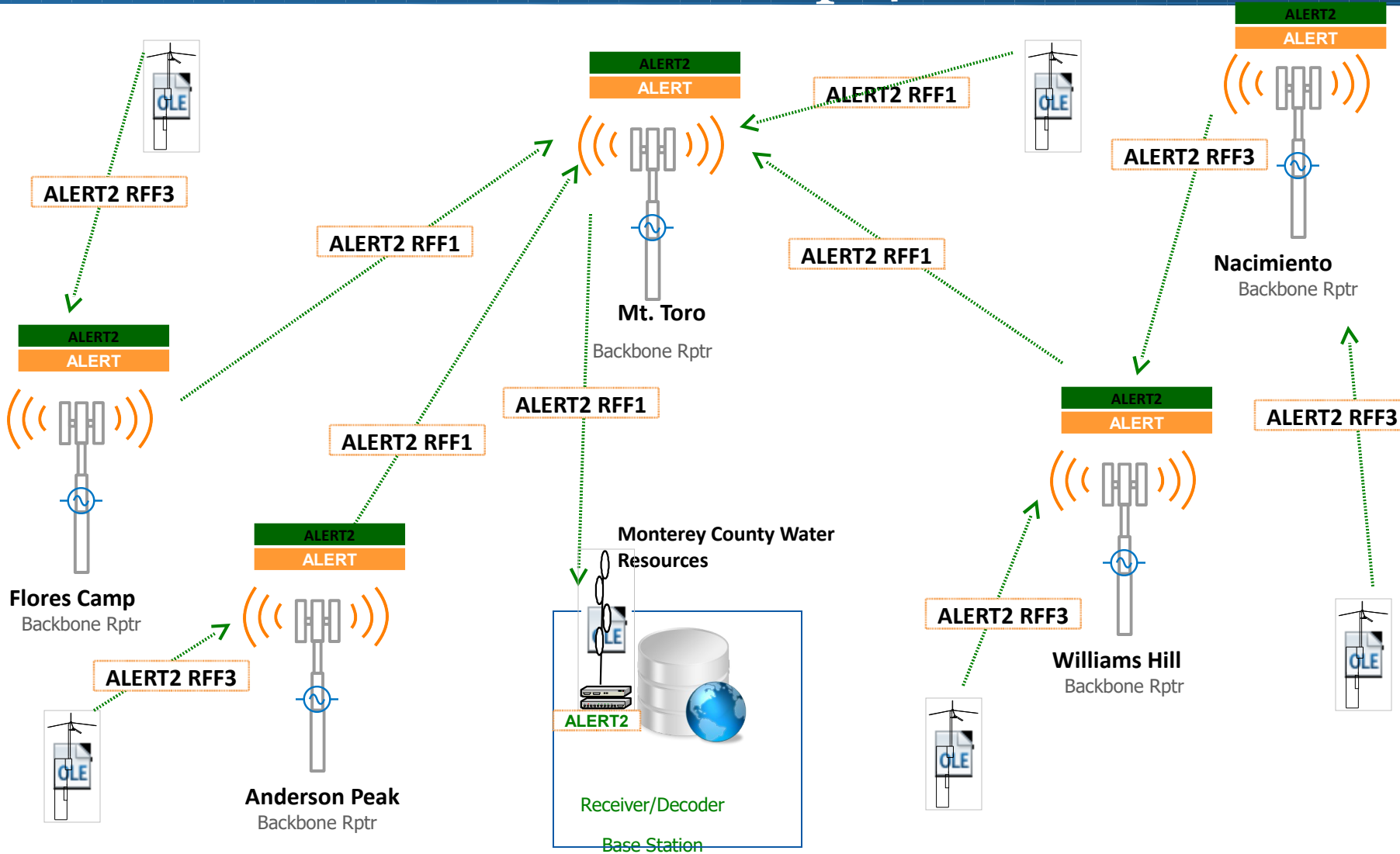
Phase 1 – Step 2 – Concentration complete



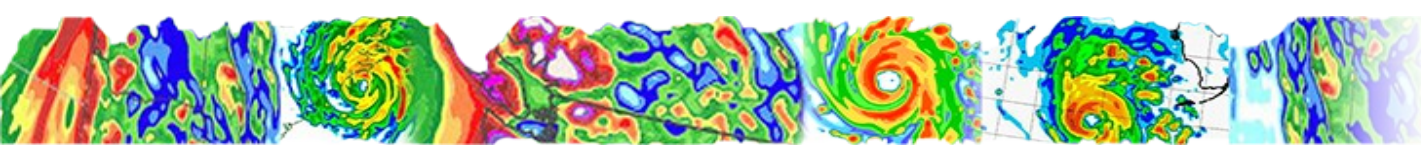
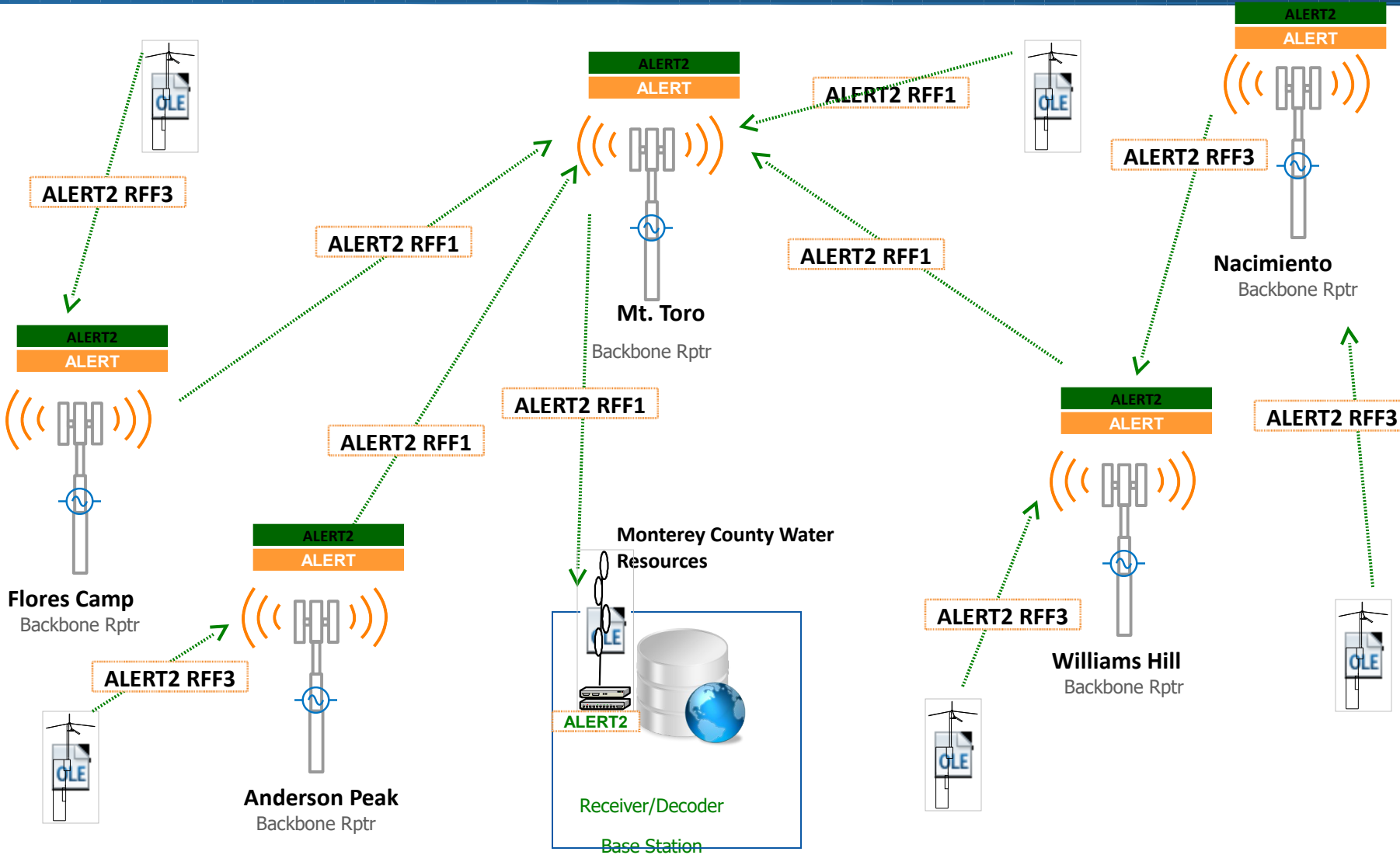
Phase 2 – Step 3



Phase 2 – Step 4

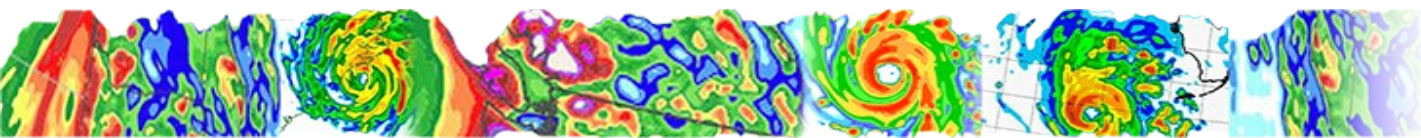


Final



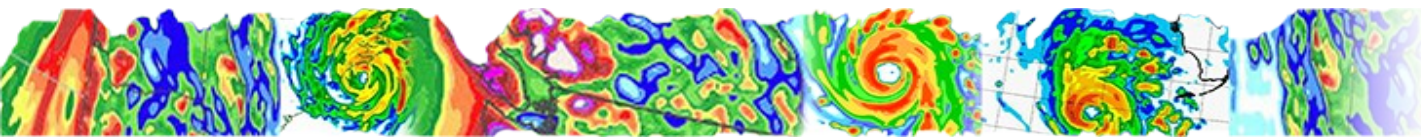
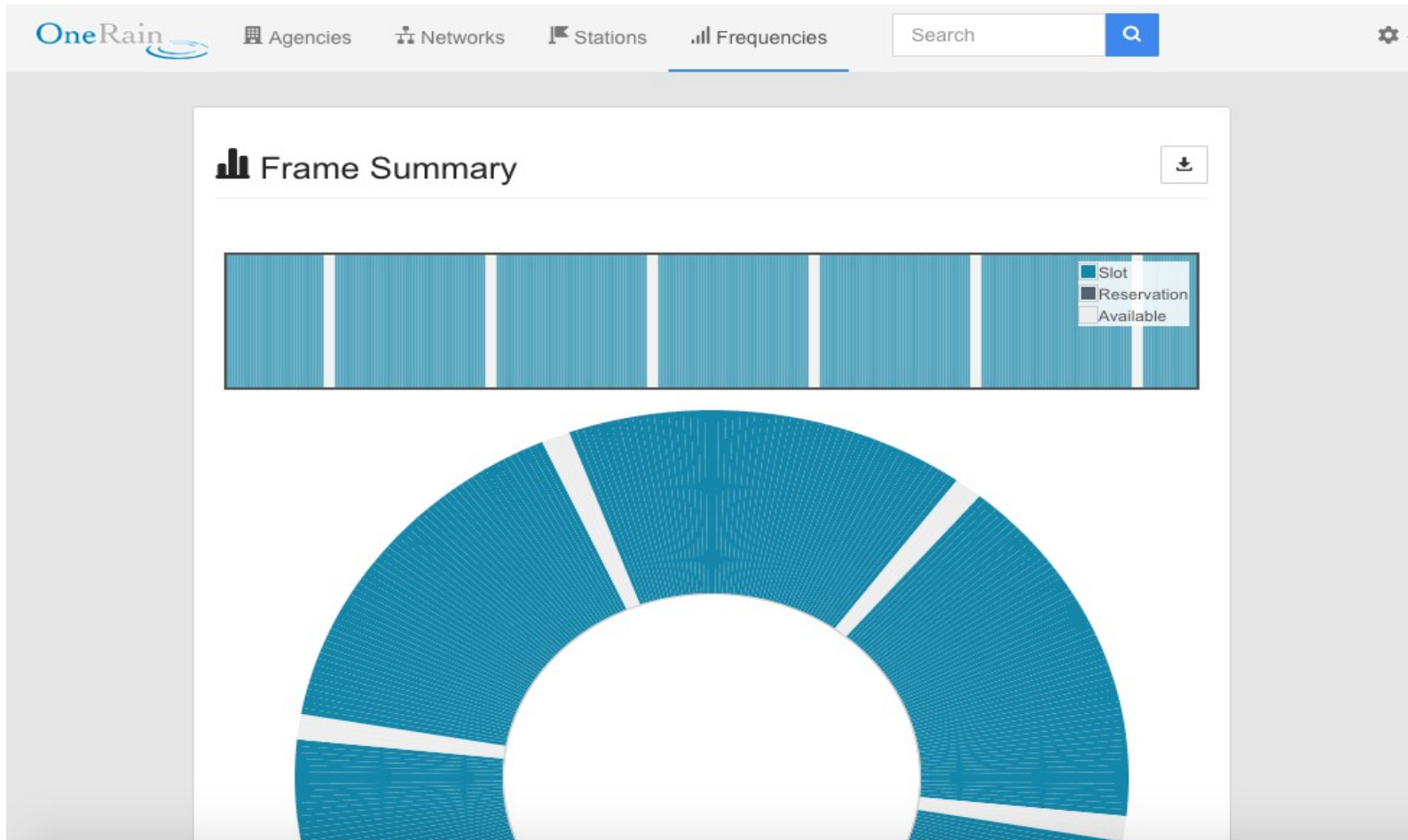
Monterey – TDMA Plan

- Time slotting
 - F1 main frequency:
 - Gauge/Frequency Frame: 120 seconds
 - Repeater Frame: 15 seconds
 - F3 gauge frequency:
 - Gauge Frame: 30 seconds



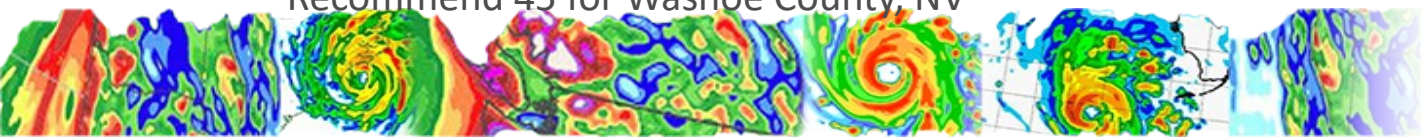
Monterey– TDMA Plan

- See <http://tdma.onerain.com>



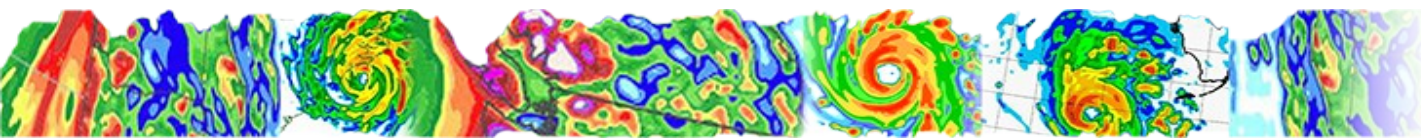
Source Address Assignment

- 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



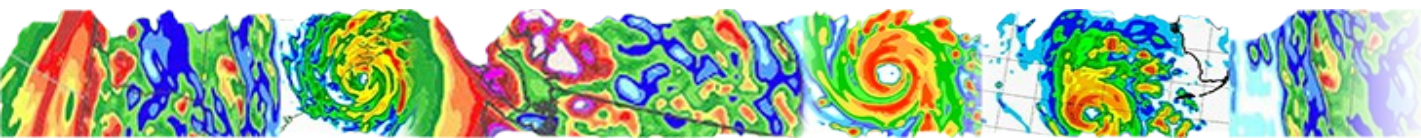
Monterey – Source Address Assignment

- 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



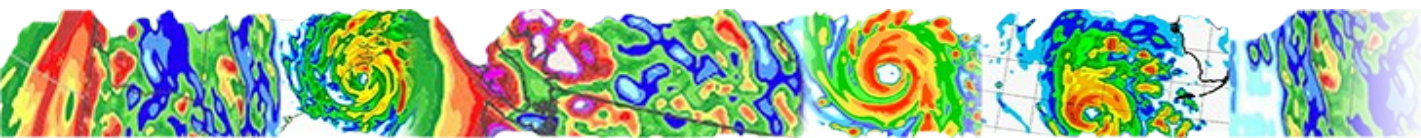
Monterey– Summary

- 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

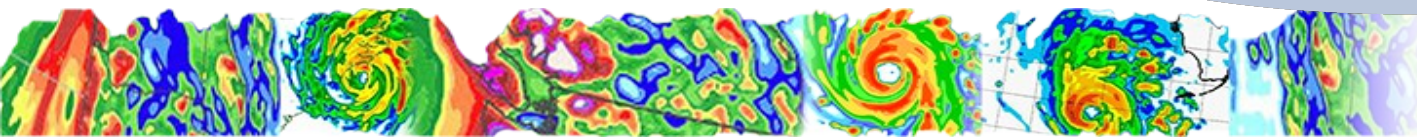
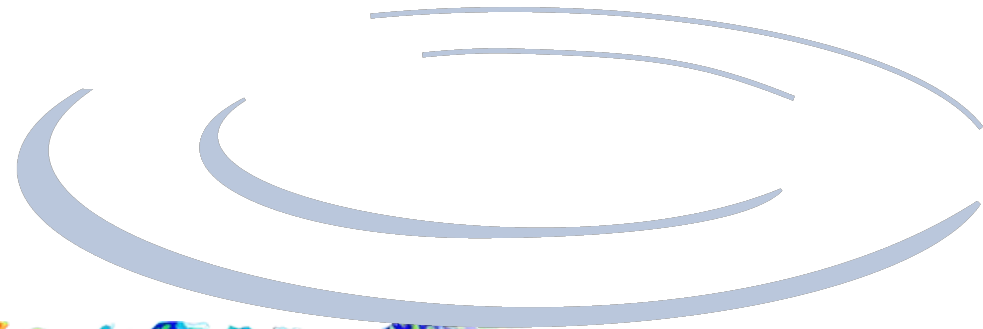
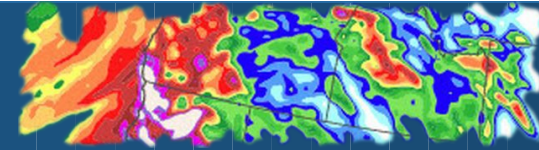


Monterey– Issues to discuss

- 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

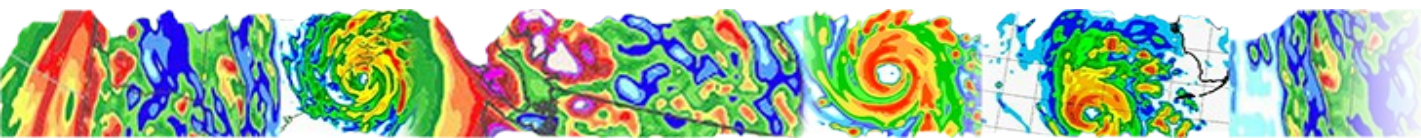


End of Monterey Design



Follow Up

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



Thanks!

