
FRIDAY
JUNE 6
ADVANCING
PUBLIC SAFETY
NextGen Broadcast Innovation
for Critical Communications
POLICE
FIRE
EMS
GPS
EMERGENCY MANAGEMENT
COMMUNITY SYMPOSIUM
HUMBER POLYTECHNIC BARRETT CENTRE FOR TECHNOLOGY INNOVATION
Presented by:
HUMBER POLYTECHNIC
B2C Lab
VATEQ
DeviceSolutions
Imagination. Realized.
triveni DIGITAL
NCDIT

Emergency Paging over ATSC3

Red Grasso, NCDIT

Fred Engel Technology Consulting, Device Solutions

Tony Sammarco, Device Solutions

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OVERVIEW

1. Introduction
2. NextGenTv
3. Datacasting
4. Paging over ATSC 3.0
5. Public alerting
6. Demo description
7. Questions

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Introductions

Red Grasso

Director, First Responder Emerging Technologies (FirstTech) Program

State of North Carolina Department of Information Technology

Fred Engel

Fred Engel Technology Consulting

Device Solutions Inc

Tony Sammarco

Director, Product Technology Strategy

Device Solutions Inc

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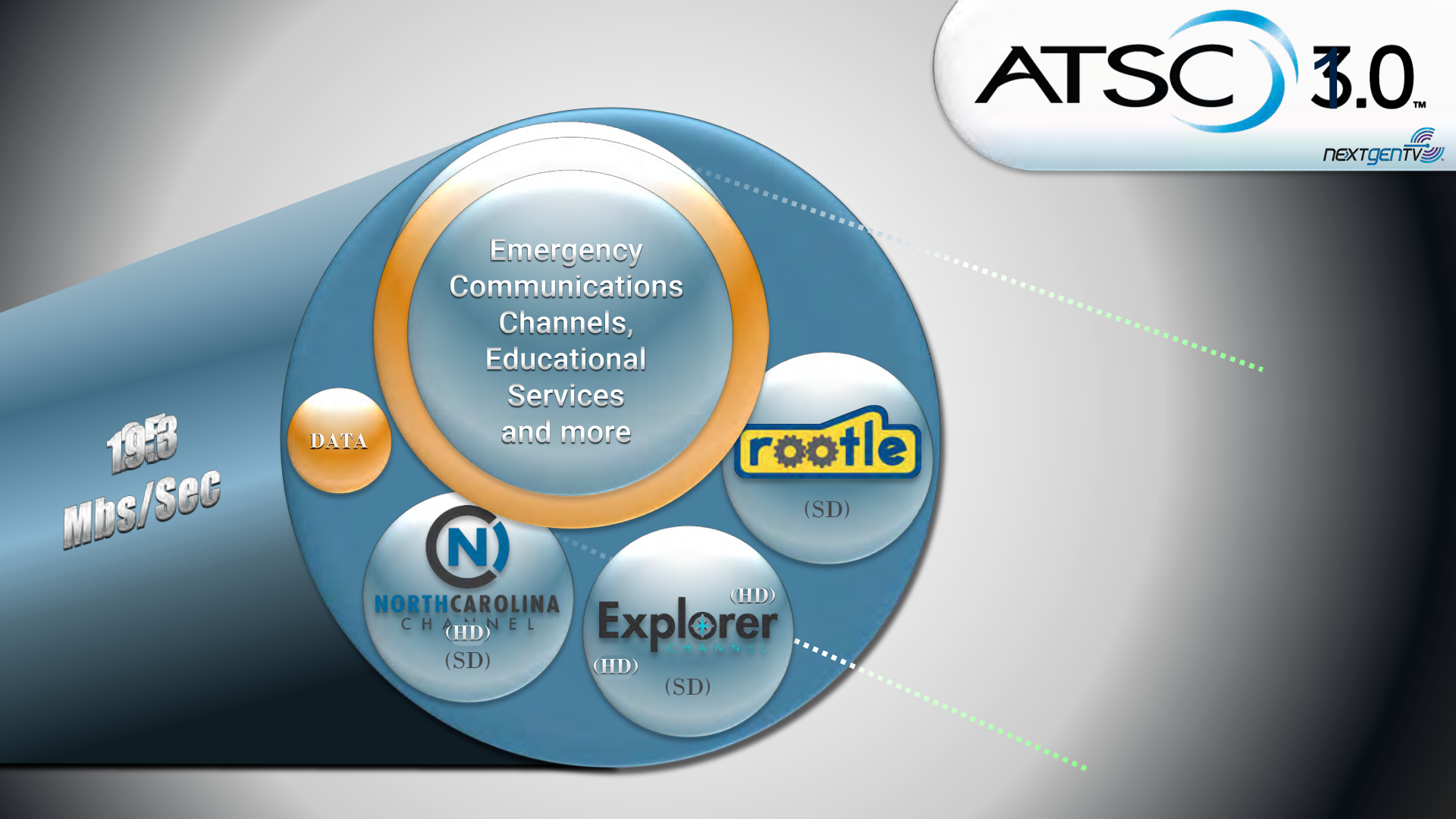
DeviceSolutions® Imagination. Realized.

NCDIT NORTH CAROLINA DEPARTMENT OF INFORMATION TECHNOLOGY

NEXTGEN TV //

ATSC 1.0 to ATSC 3.0 Explainer Slides


ATSC 3.0
nextgenTV
19.5
Mbs/Sec
Emergency
Communications
Channels,
Educational
Services
and more
DATA
rootle
(SD)
NORTHCAROLINA
CHANNEL
(HD)
(SD)
Explorer
CHANNEL
(HD)
(HD)
(SD)

What is Datacasting?

- Unused bandwidth for other needs
- Sending one-way data using the existing TV transmission
- Data can include text, video, audio, files, etc.
- Does not interrupt other content

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Current Kitchen Fire Dispatch

- 5 tones to 9 units – 26 seconds
- Voice announcement *only after* all pager tones
- 11 seconds to read unit numbers
- Location announced 42 seconds after alert initiated
- Full alert = ~67 seconds

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Tone Alerting and Analog Pagers

- Technology from 50+ years ago
- 70% of firefights are volunteers
- Volunteers might not be located at the fire station
- Tone & Voice Pager
- Extremely reliable & durable
- Most have no display, voice only

ATSC 3.0 Kitchen Fire Dispatch

- Full alert ≈ 1 second
- All information delivered as text
- On-board text-to-speech

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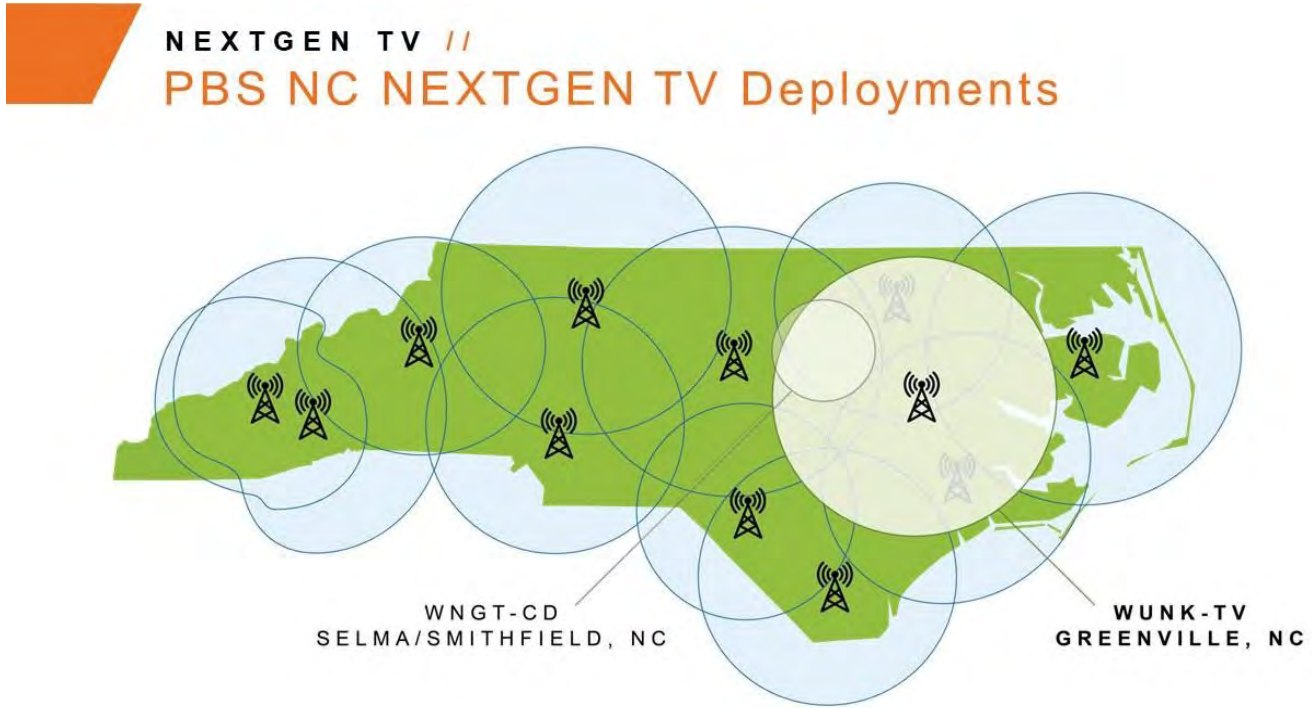
Datacast Paging Benefits

- High Tower & High Power
- Infrastructure already exists
- Instantaneous
- Encrypted
- Scalable bandwidth
- Simultaneous dispatches
- Maps, preplans, ICS forms, audio, video
- Device is always aware of coverage

ATSC 3.0 Coverage



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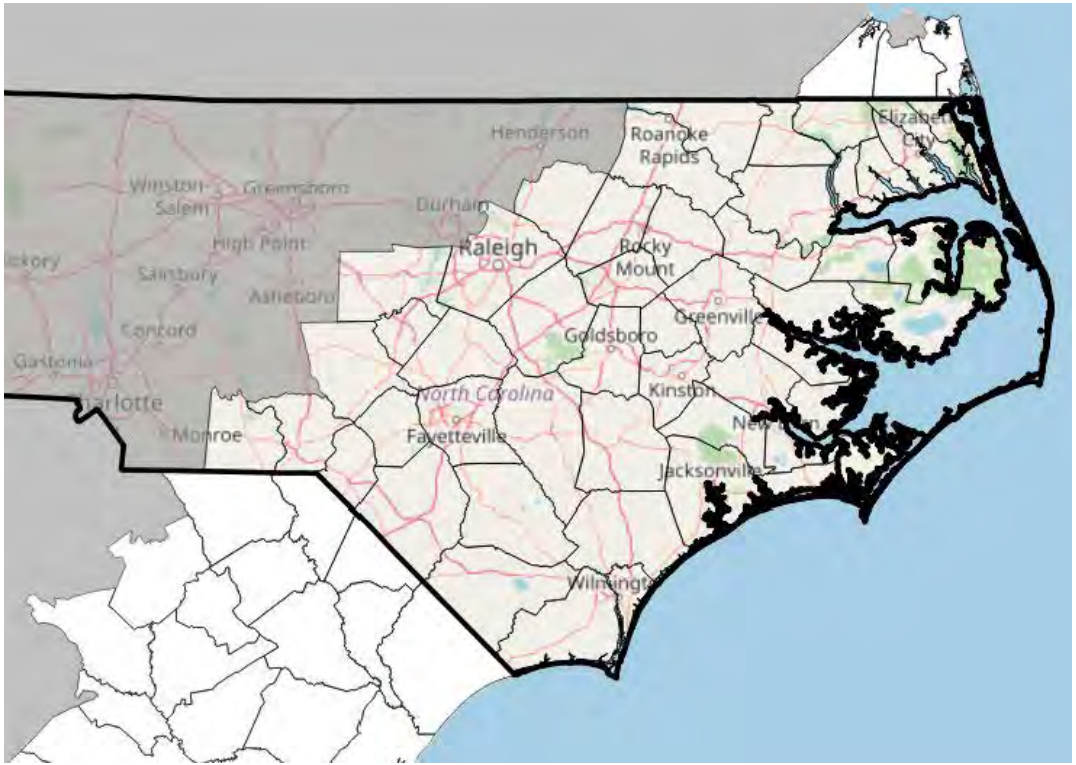
North Carolinas Impact from Hurricane Florence



Multiple Carrier Cellular Network During Hurricane Florence

- 40 NC Counties
- 5800 Cellular sites
- 1063 Site failures
- 18.4% of total sites failed

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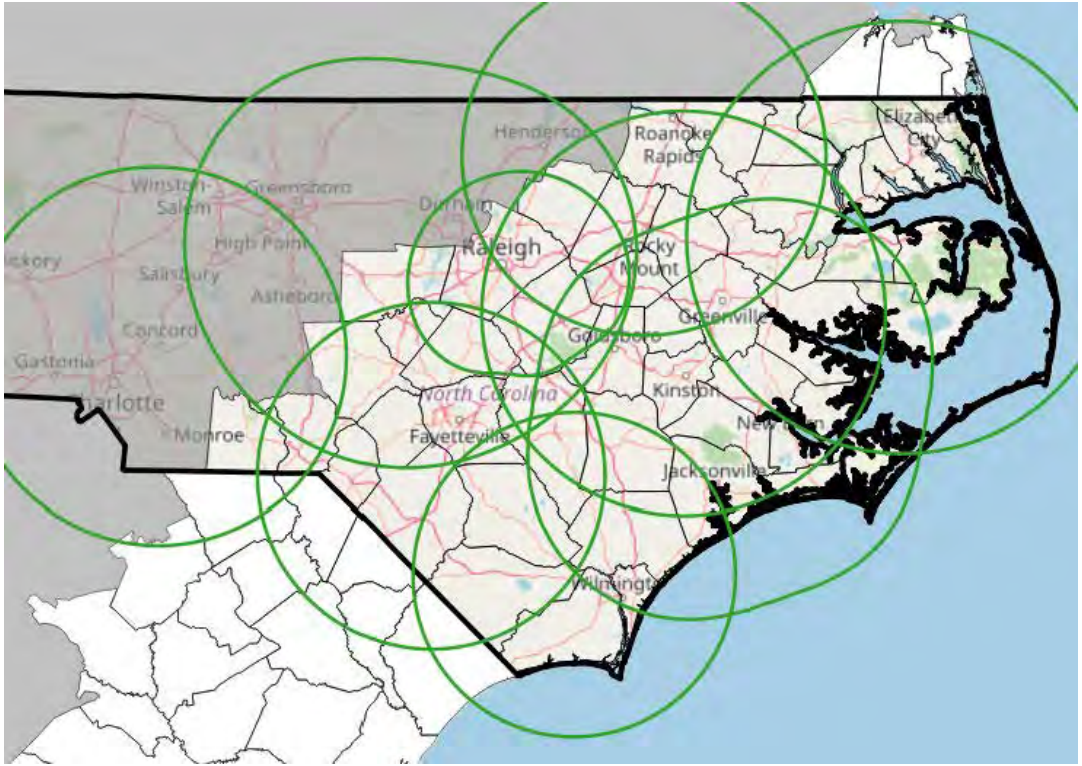
PBS NC Television Sites During Hurricane Florence



PBS North Carolina Television Network During Hurricane Florence

- All affected 40 NC Counties
- 8 TV sites vs 5800 Cellular sites
- 1063 Cellular site failures
- ***0 TV site failures***

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Tony ↘

Baseline Technology / Shortcomings - Recap

Today's emergency paging systems (analog broadcast systems, Smartphone applications via cellular) limit situational awareness for emergency responders

- Coverage issues, system interruptions
- Latency / delayed delivery
- Lack of secure data
- Lack of interoperability with neighboring emergency services

Computer Aided Dispatch (CAD) / Emergency Call Centers largely non-standardized

Two-way voice radios are prohibitively expensive

Unication G5 P25 Pager

Motorola Minitor VI Pager

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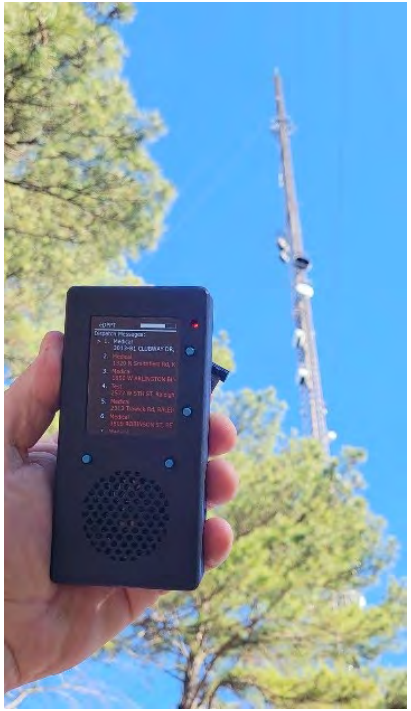
ATSC 3.0 Pager Prototype

- DHS SBIR Phase II funded a prototype pager
- A collaborative effort to win DHS SBIR S&T grants with our partners WRC, PBS-NC, and Triveni
    - Phase I, Phase II, CRPP Commercialization
- Real 911 call information was routed from the PSAP to responders

DHS SBIR Phase II eDPPT Objectives

- Develop *2 prototype, low cost, low power receivers*; a *standalone and companion version* which connects via Bluetooth to a smartphone *running an iOS or Android emergency paging application*
- Perform *modeling of signal propagation of ATSC 3.0 receptibility* in a controlled environment for anticipated *paging receiver antenna design* (for example, body worn small device on a belt).
- Develop a prototype *Data Normalization Server* to connect to multiple PSAPs, normalize the data, and use the Triveni Digital Transport Encoder to communicate to the ATSC 3.0 broadcaster to improve performance, improve reliability, and implement additional features
- Identify methods and *configurations of the ATSC 3.0* delivery chain that optimize delivery to the paging receiver *without compromising the Public Broadcasters Federal Communications Commission (FCC) requirement* for television program delivery
- Identify ATSC 3.0 transmitter sites and *cooperating jurisdictions within the coverage area*, test planning, data collection, analysis
- Provide a practical *demonstration of the capability with at least 10 receivers located with different first responder organizations from different jurisdictions* within a state. The organizations should represent different types of jurisdictions from urban to rural, career to volunteer, mountainous to coastal



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The ATSC 3.0 Innovation Eco-system

ATSC 3.0 broadcasts are a reliable transmission means to deliver emergency information over a large area with superior coverage, penetration, and reduced latency

This is groundbreaking technology

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PBS NORTH CAROLINA triveni DIGITAL WRC Technologies DS

DHS SBIR S&T Phase I, II, Completed

An ATSC 3.0 based emergency digital paging system was successfully tested by Fire Fighters and First Responders live in the field

Winterville FD, Fire Chief David Moore (left) and Emergency Services Director for Lenoir County, NC Murry Stroud (right) participated in the coastal live testing in December 2022.

Winterville FD requested to continue using the system after the trial concluded.

This flexible architecture can be easily adapted to support a secondary means of emergency communication (like Jaspar…)

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Fred ↘

The Need for Reliable Civilian Emergency Alerting

- Issued by:
  - National Authorities
  - State Authorities
  - Local Authorities
  - National Weather Service
- Consumer "Opt in"

ALERT READY

EMERGENCY ALERT SYSTEM

Your phone has the power to save a life.

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https://www.alertready.ca/

Camp Fire – Paradise, CA - 2018

NEWS

Camp Fire Aftermath: 'Technology, the Thing I Trust Most, Failed'

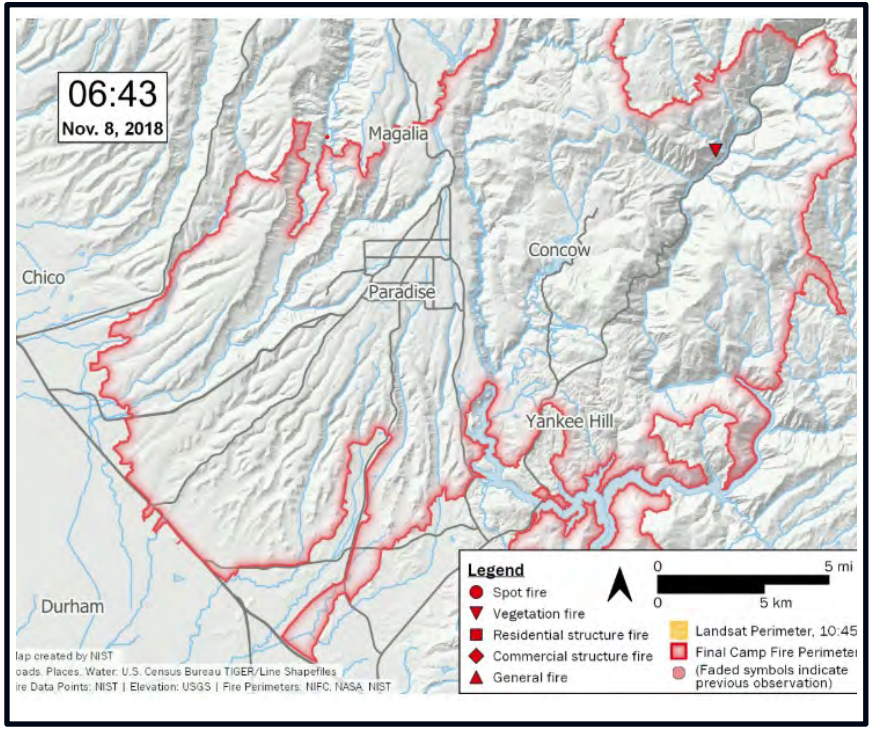
Technology intended to warn Butte County residents about the rampaging Camp Fire failed in several ways, an analysis shows, revealing the fragility of electronic notification systems.

December 16, 2018 • Tribune News Service

Residents of Paradise bitterly complained in the wake of the Camp Fire that Butte County's early warning system failed them, and now a detailed Bay Area News Group analysis shows just how thorough that failure was: Thousands of critical cellphone messages were missed, delayed or lost — a disturbing reminder of the fragility of electronic notifications systems.

"The system failed. Technology, the thing I trust most, failed," said Lisa Parr, an accountant who had signed up to get the county's emergency alerts but never received one. "The system that was supposed to help save us — it didn't."

https://insider.govtech.com/california/news/camp-fire-aftermath-technology-the-thing-i-trust-most-failed.html



https://www.nist.gov/image/animated-map-camp-fires-rampage

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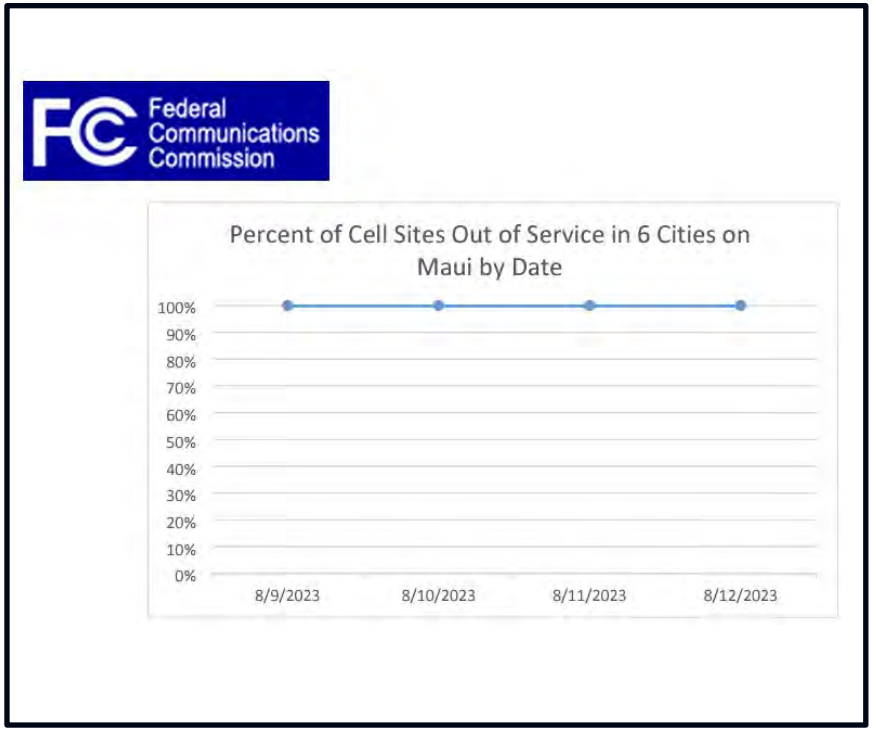
Maui, Hawaii Wildfire - 2023

https://www.wunc.org/2023-08-12/hawaiis-governor-orders-review-as-maui-fires-become-deadliest-in-modern-u-s-history



docs.fcc.gov/DOC-395973A1

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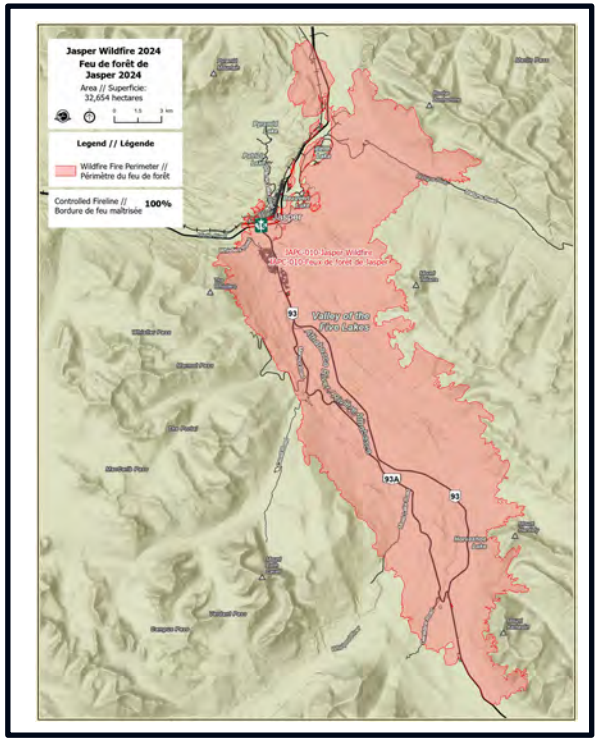
Jasper, Alberta - July/August 2024



https://parks.canada.ca/pn-np/ab/jasper/visit/feu-alert-fire/feudeforet-jasper-wildfire

https://www.freeworldmaps.net/united-states/northcarolina/where-is-northcarolina.jpg

https://connect.ncdot.gov/resources/State-Mapping/Documents/nc_statemap_countyoutline.pdf

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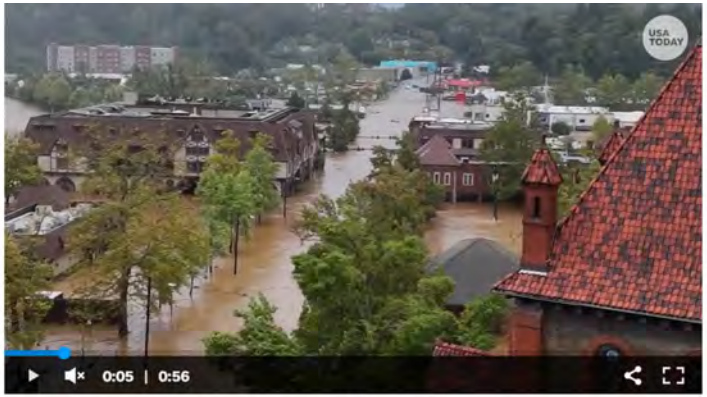
Hurricane Helene – September 2024

September 15, 2024



https://www.usatoday.com/videos/news/weather/**2024/09/28**/asheville-nc-flooding-biltmore-village-underwater-after-helene/75432336007/

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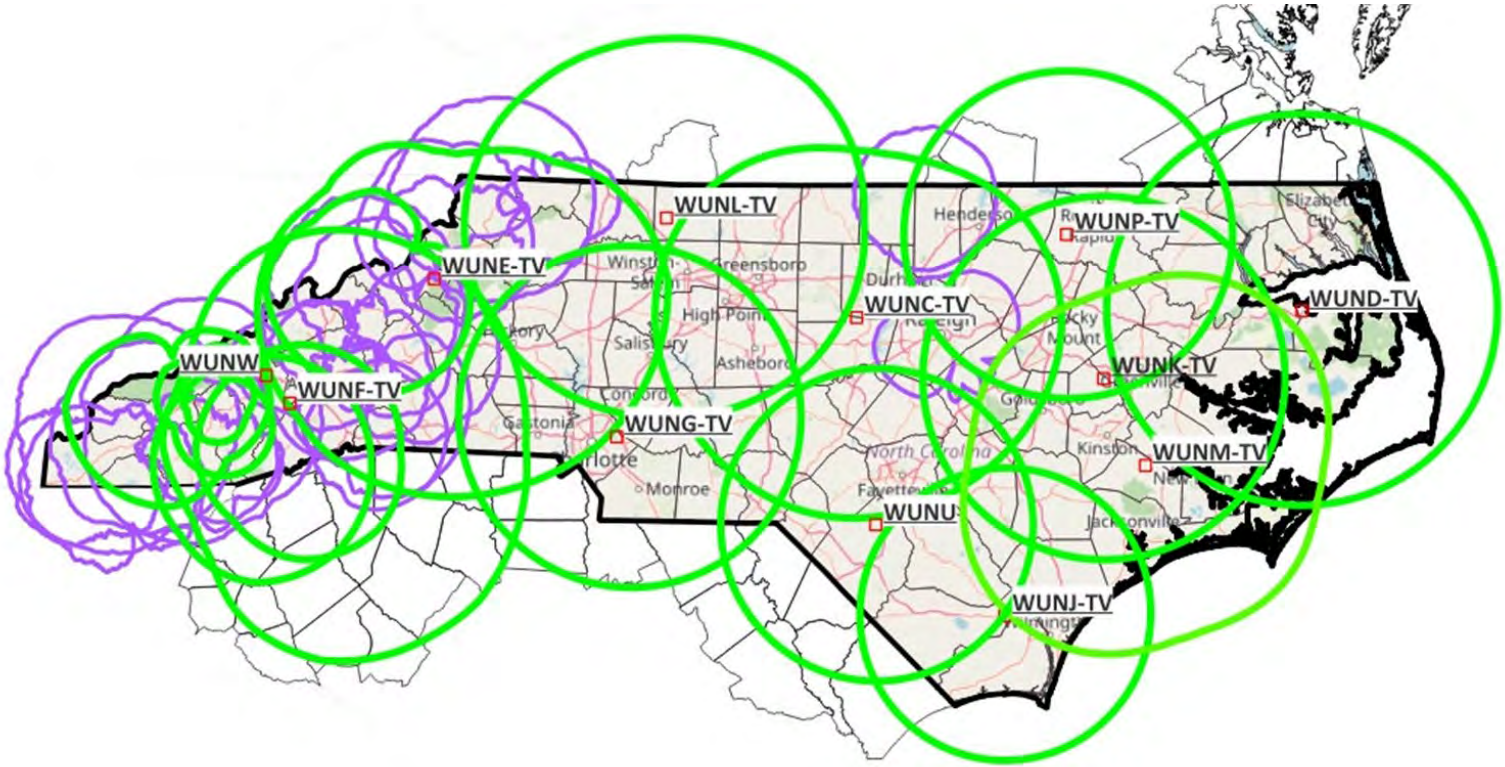
https://connect.ncdot.gov/resources/State-Mapping/Documents/nc_statemap_countyoutline.pdf

PBS NC Signal Coverage



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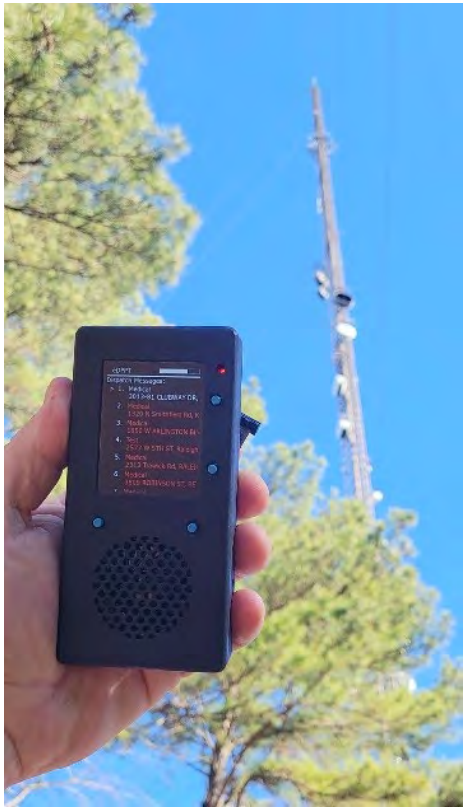
Improving and Enhancing NPAS Alerting

Civilians would be better served by NPAS (Alert Ready) alerts being available on more devices, more reliably, and over a larger area.

- Builds on the successful DHS Phase II emergency paging over ATSC 3.0
- NPAS (Alert Ready) alerts can be easily delivered over an ATSC 3.0 transmission to a portable ATSC 3.0 receiver
- The ATSC 3.0 receivers can be low-cost, low-power consumption, and suitable for integration into weather radios, smart speakers, automobile infotainment systems and other devices



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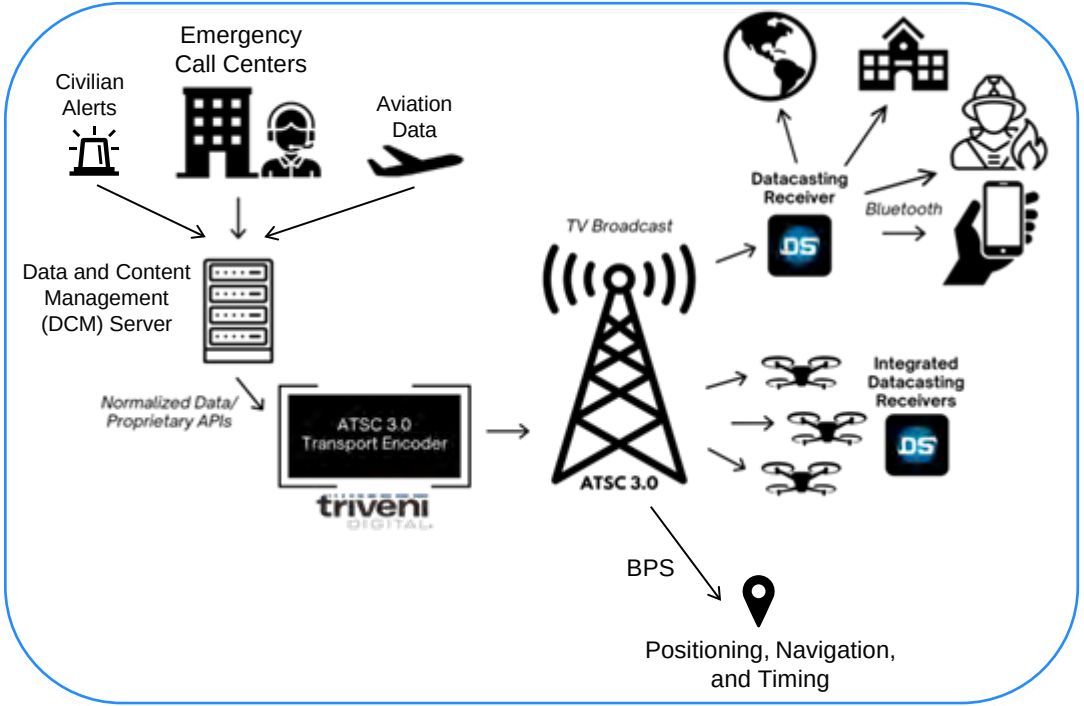
Tony ↘

ATSC 3.0 Revolutionizes Broadcast IP Content

- Educational and training content
- Drone / Aviation Data – flight restrictions and location data
- Weather radio content – audio, graphics, maps
- Civilian public emergency updates
- Firmware updates to remote devices
- Traffic schedules
- Billboards
- BPW - reliable, accurate GPS PNT secondary source

What can you broadcast?



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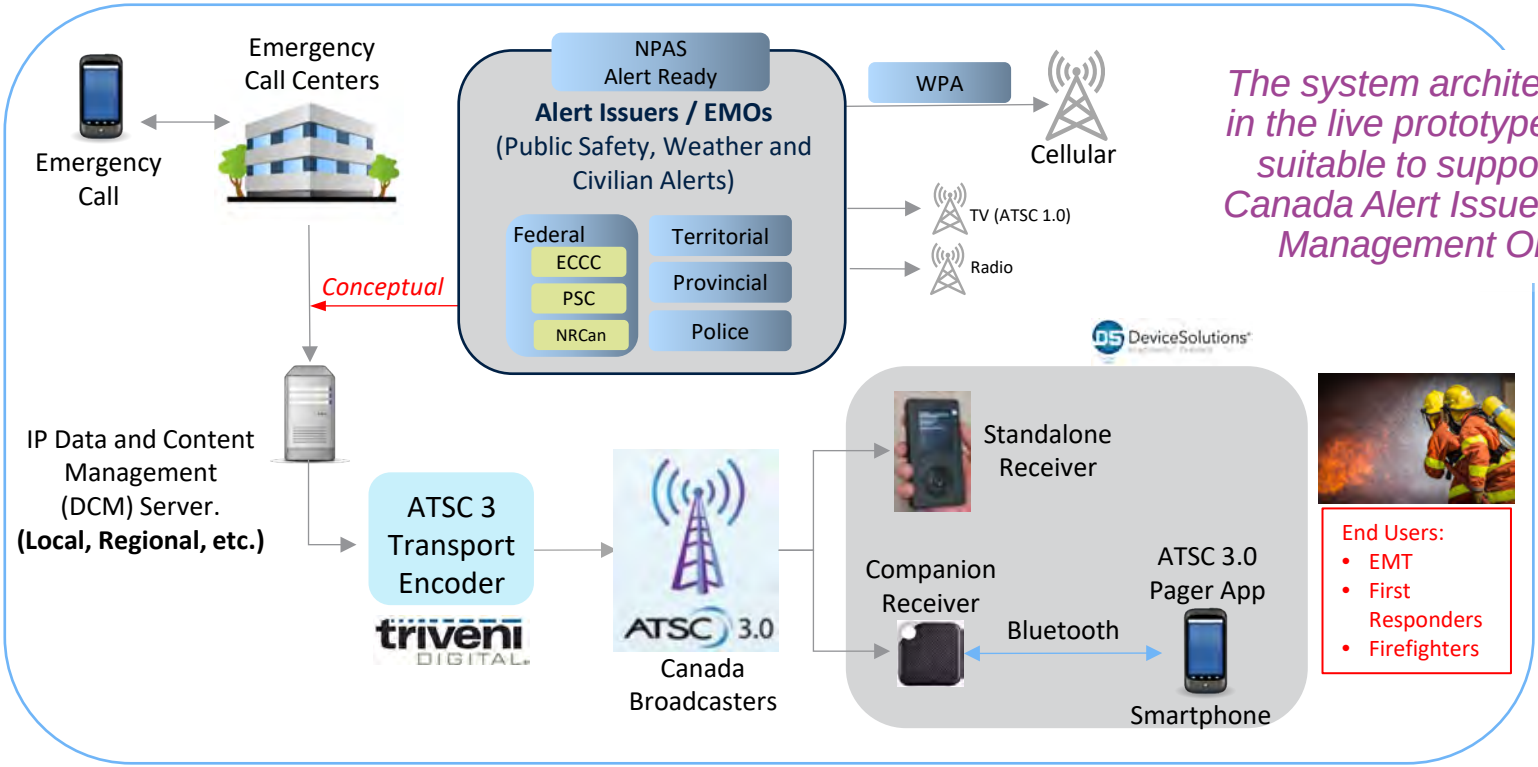
Canada Alert Entities Over ATSC 3.0 (Illustration)



The system architecture deployed in the live prototype eco-system is suitable to support the input of Canada Alert Issuers / Emergency Management Organizations

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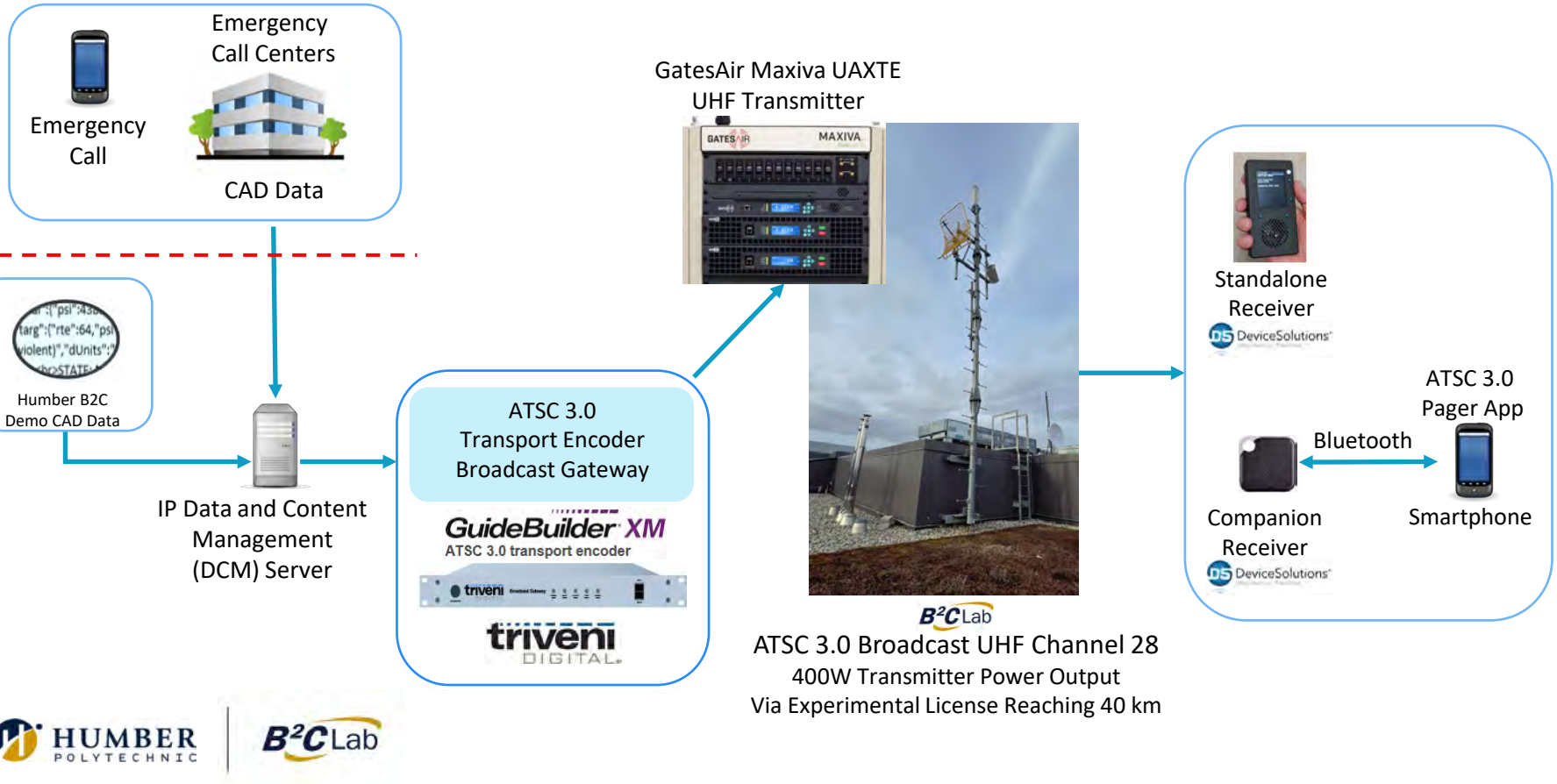
Humber B2C ATSC 3.0 Broadcast / Receiver Demo



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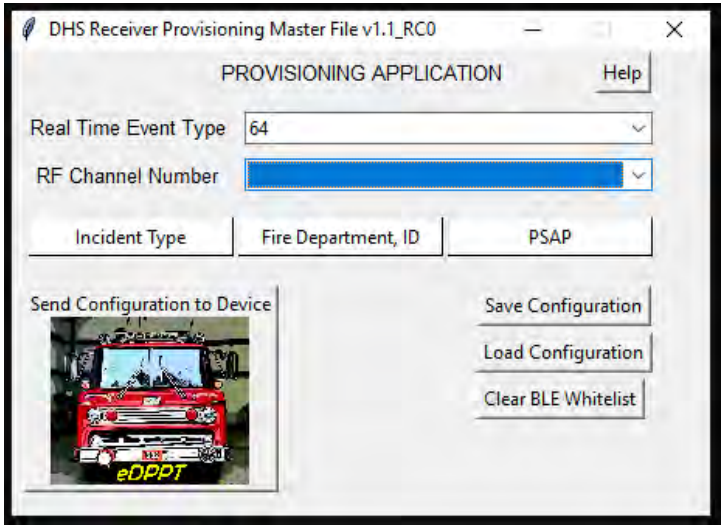
Provisioning Application



- Configuration of receiver via PC Provisioning Application
- Interfaces with the receiver via a data capable cable connect to the USB charging port
- Uses Incident Type, Fire Department ID, PSAP ID, etc. to enable receiver message filtering
- End users can provision / re-configure the receivers based on area of operation, types of pages they are qualified to receive/respond to, as well as the ATSC 3.0 broadcast RF channel being used
- Easily updated and expandable to accommodate expansion of the project, new qual data filtering parameters

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