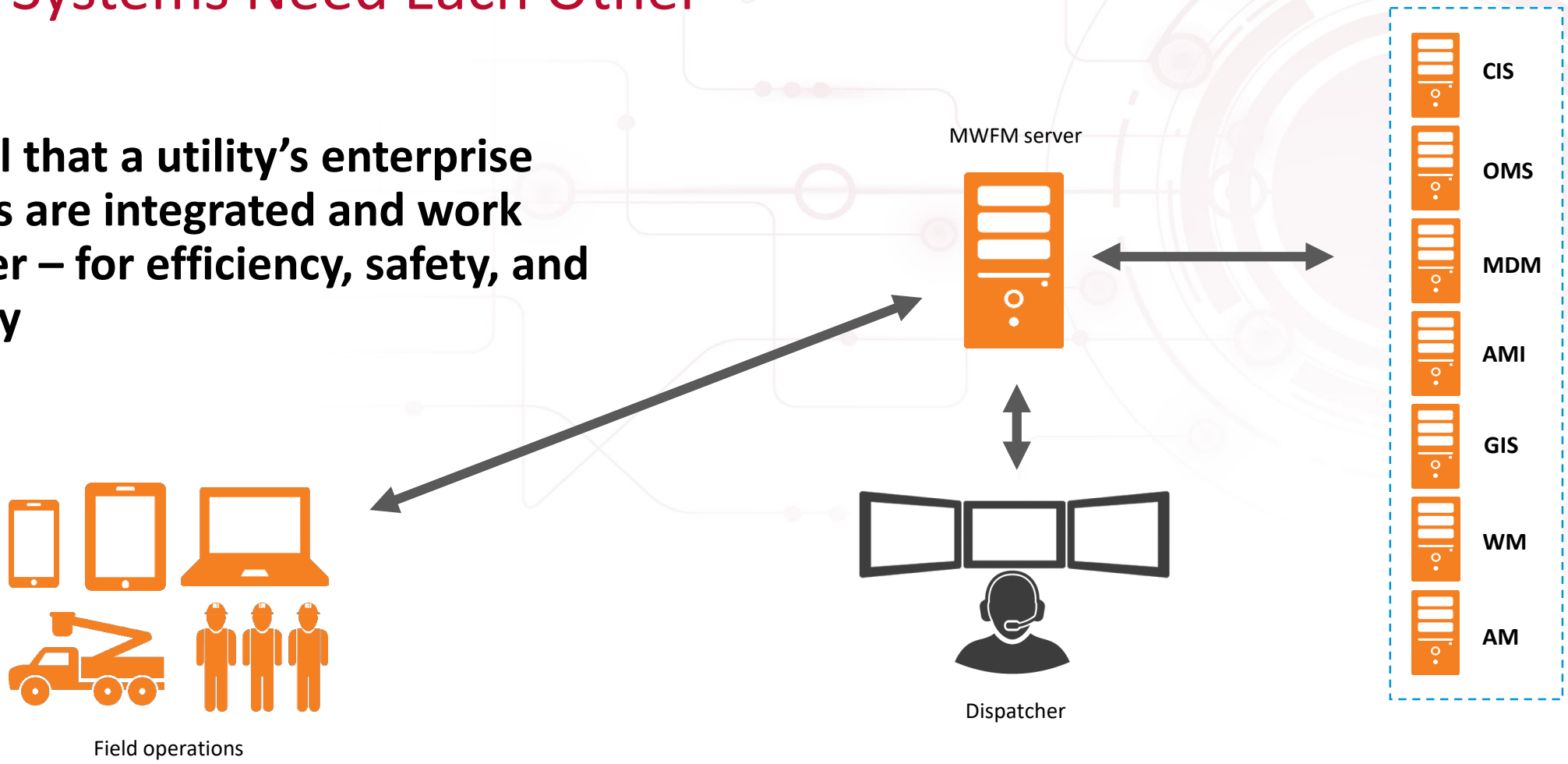
CONNECTIONS SUMMIT

Integrating Utility Enterprise Systems for a Smart Outage Response

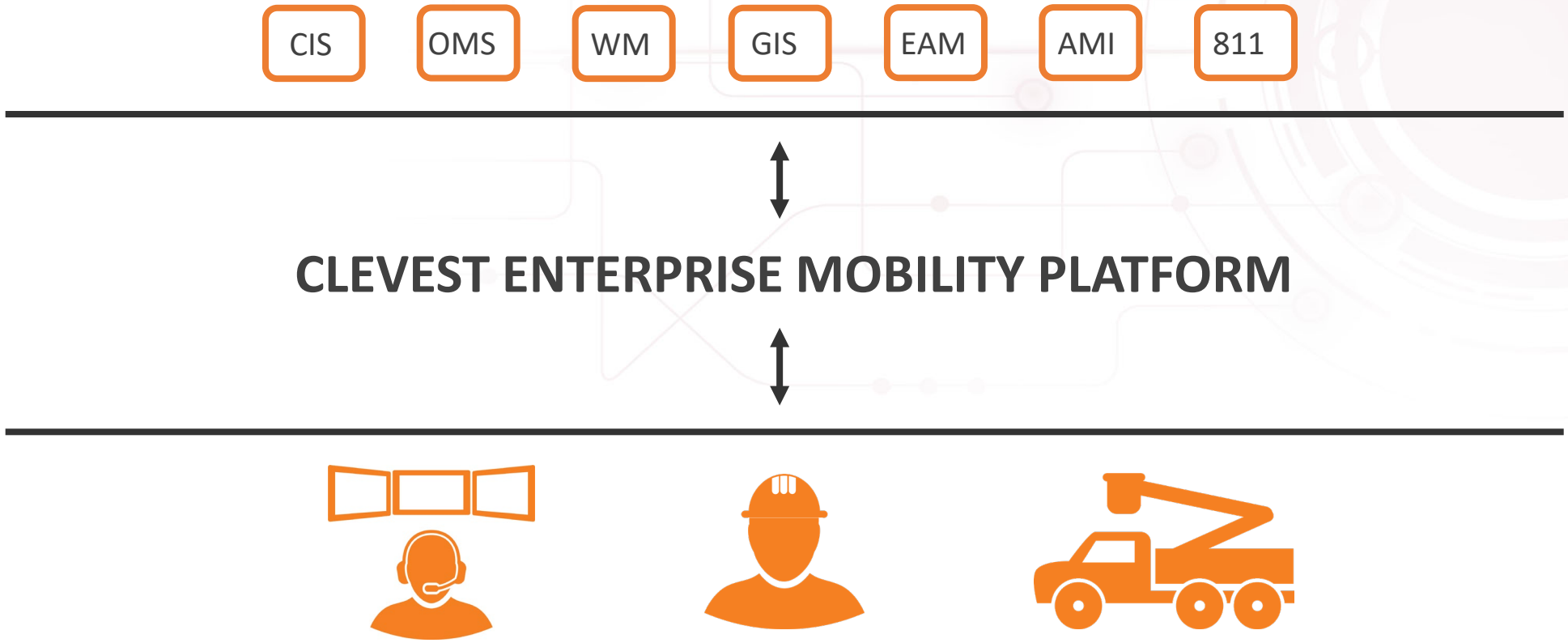
ELECTRICITIES of NORTH CAROLINA, INC.

Utility Systems Need Each Other

It's vital that a utility's enterprise systems are integrated and work together – for efficiency, safety, and visibility



Integrating Utility Enterprise Systems



Accurate Outage Information

- Integrated technologies provide accurate outage information
  - Improves field operations and worker safety

Anecdotes (unnamed):

AWL during hurricane (webinar slides)

Mutual aid (Dairyland example, TechAdvantage abstract)

Smart Mobile Technologies

- Mobile devices with screenshots…
- Damage/response photo…

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Case Study

Colorado Springs Utilities: Waldo Canyon Wildfire

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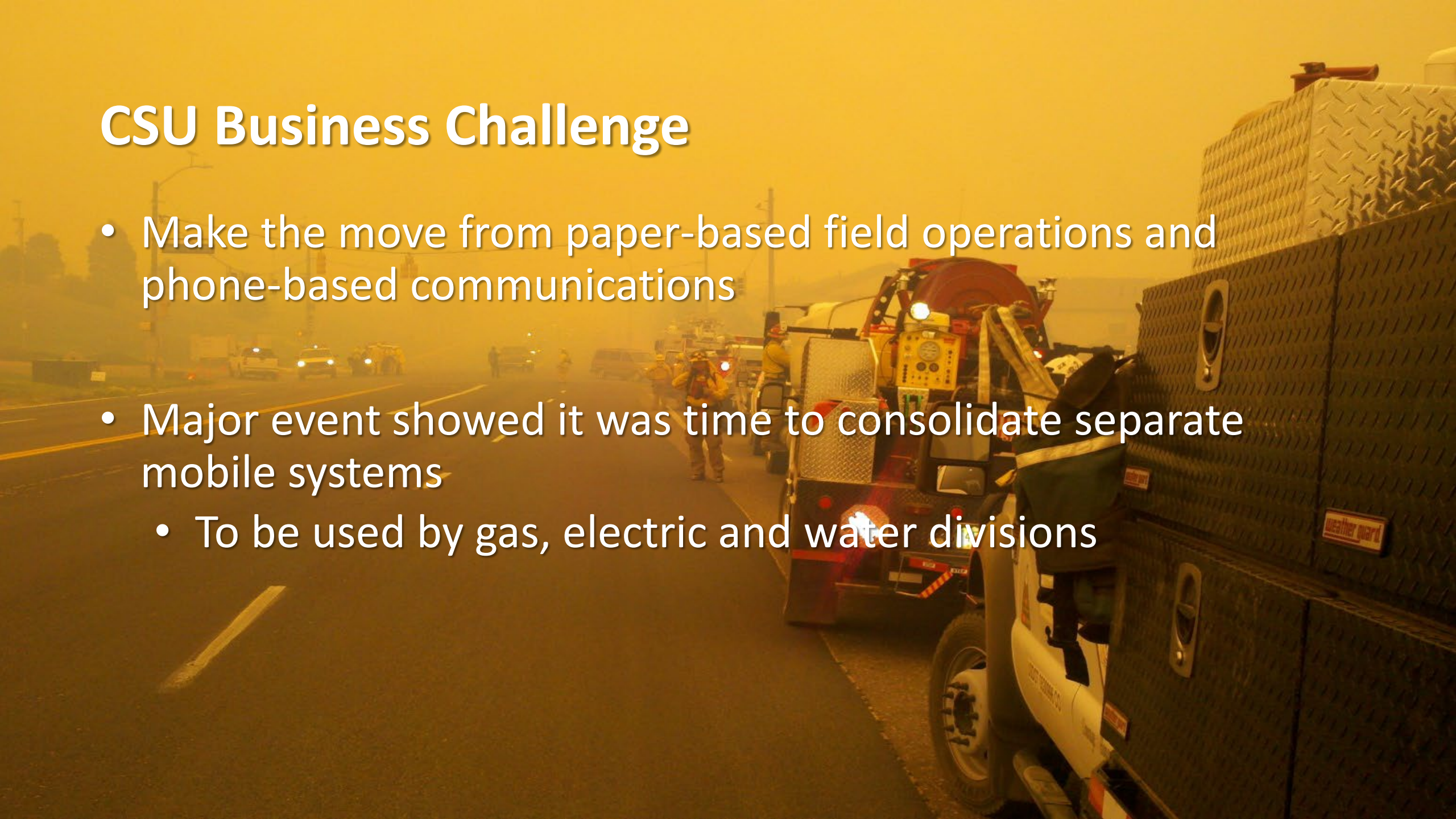
About Colorado Springs Utilities

- Gas, electric, water and wastewater
- 228K electric customers
  - 80% underground
- 140K water customers
- 196K gas customers
- 1,800 employees

CSU Business Challenge

- Make the move from paper-based field operations and phone-based communications
- Major event showed it was time to consolidate separate mobile systems
  - To be used by gas, electric and water divisions



Waldo Canyon Fire

65mph winds quickly escalated the status

Mandatory evacuations

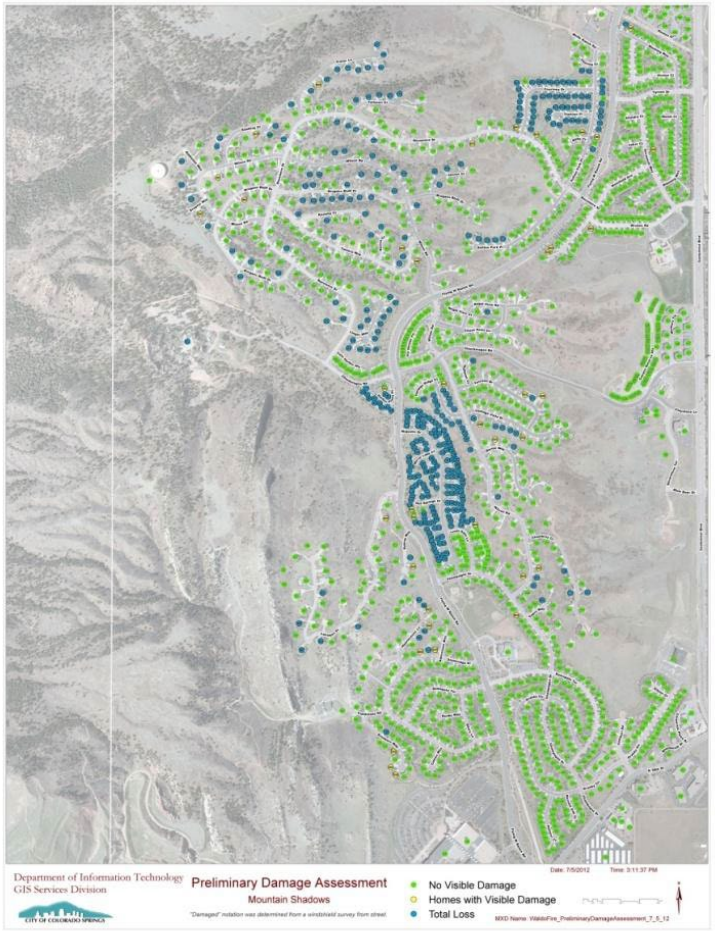
Coordination of operations with fire crews

- Impact on both electric and gas

Support from external crews

Scale of Waldo Canyon Fire

- 32K people evacuated
  - About 300 CSU employees included
- Almost 350 homes destroyed
  - Blue dot = home destroyed
  - Yellow dot = home damaged
  - Green dot = no damage
- 9.3m gallons from water distribution system used for fighting the fire



Extent of Outages

- Event effected gas more than electric
  - Shut off every meter
  - Sectionalize areas
  - Pinch points on main
- Qualified employees diverted to disconnecting services and re-pressurizing mains
- 52 miles of gas main and 4,200 service lines leak surveyed
- Over 4K relights in a week

Enterprise System Challenges

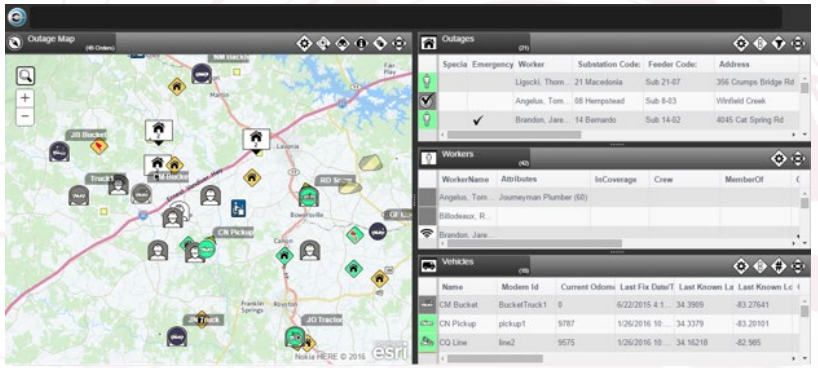
- Multiple disparate mobile systems
  - Electric OMS, customer service, AVL
  - Systems not linked together
  - No system for gas work
- Internal communications
  - Office, field and across departments
  - Relying on tabular data
- GIS maps were paper-based

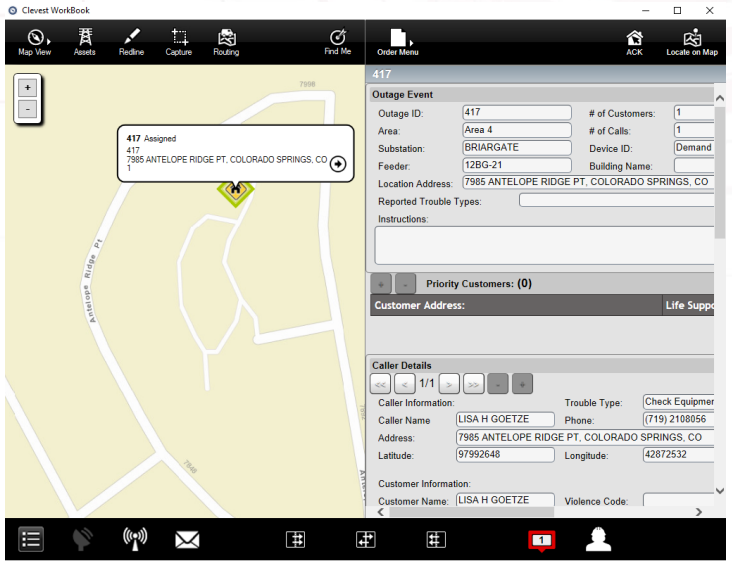
Lessons Learned From Waldo Canyon Fire

- Highlighted a need for technology improvements
  - Crew locations
  - Availability
  - Skills
  - Real-time status updates
- Needed better integration between back office systems
- Needed to automate manual or paper-based processes

CSU Technology Requirements

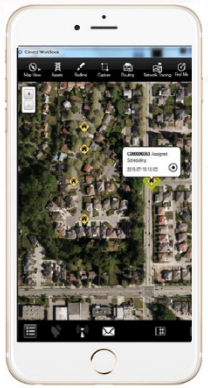
- Mobile solution
- Consolidated onto a single mobile platform
- Interface with OMS, CIS, EAMS
  - And potentially others
- Improve outage process
  - More accurate ETORs
  - Real-time status of work
  - Visualize crew locations/availability
  - Reduce restoration times





CSU Technology Requirements (cont.)

- Device agnostic
  - Future-proof hardware decisions
  - Potentially expand out to BYOD crews
- Integrated mobile GIS and AVL
- Support both connected and disconnected modes
- Scalability to support future work types
  - Vegetation management
  - Construction
  - Street light inspections
  - Possibly a full AMI deployment

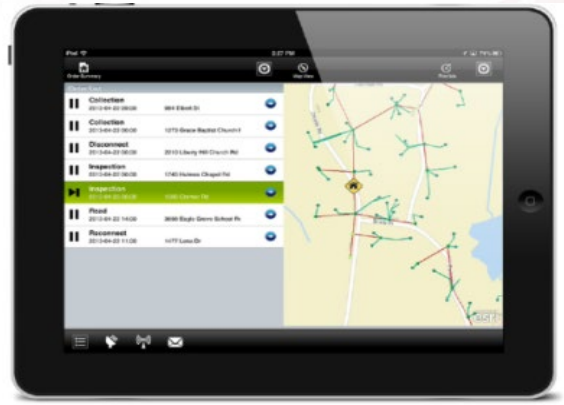


Coordinating Field Operations During Emergency Outages

Key results

- Single mobile platform for all work types
  - Combined mobile/mobile GIS/AVL/scheduling
  - Reduction in O&M

- Workflows are configured to match utilities' business processes, minimizing training and manual data entry
  - Supports reporting requirements tied to emergency plans



Coordinating Field Operations During Emergency Outages

Key results

- Improved outage restoration times
  - Simplified coordination of field operations during emergencies
  - Visualize crew locations and availability
  - Reshuffle work as additional crews arrive
  - Real-time access to asset data and outage orders
  - Integrated routing tool
  - Real-time updates of ETOR, completion data, follow-up orders
  - Re-prediction and roll-up of outage incidents sent back to OMS
    - In real-time
  - Restoration orders sent to crews

Coordinating Field Operations During Emergency Outages

Key results

- Integrated mobile GIS
  - Eliminated paper-based processes
- Operates in both connected and disconnected modes
  - Order and GIS data available in both modes
  - Back office users can see if crews are connected or not
  - Auto-syncing when connectivity is restored
- AD sign-on credentials

CSU Technology Ecosystem

Hardware:

- Dell laptops

Integrations:

- OMS: GE PowerOn via Microsoft BizTalk
- AVL: Verizon Networkfleet via Microsoft BizTalk
- WM: Oracle CC&B
- Mobile Workforce Management and Scheduling: Clevest

CSU Return on Investment

- Significantly reduced overall costs

- Cost is modest compared to savings from:
  - Ease of use
  - Operation efficiencies
  - Streamlined maintenance
  - Greater customer satisfaction

CSU Results

- Significant cost savings each year
- Driving miles reduced
- Reduced service restoration times
- High customer satisfaction ratings
- Full integration with OMS, CIS, GIS, asset management and other systems
- Greater ETOR accuracy
- Real-time status updates of work in progress
- Visualization of crew locations
- Manual data entry eliminated

CSU Future Plans

Additional work types

- Customer service
- Vegetation management
- Street light inspections
- Visualization across departments
- Automating contractors for AMI project
- Automating water and gas operations

CSU – Lessons Learned

1. Take your outage management plan ***seriously***
2. Integrate your enterprise systems
3. Get and provide accurate and current operational information
4. Out perform your customers' expectations

Questions?

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