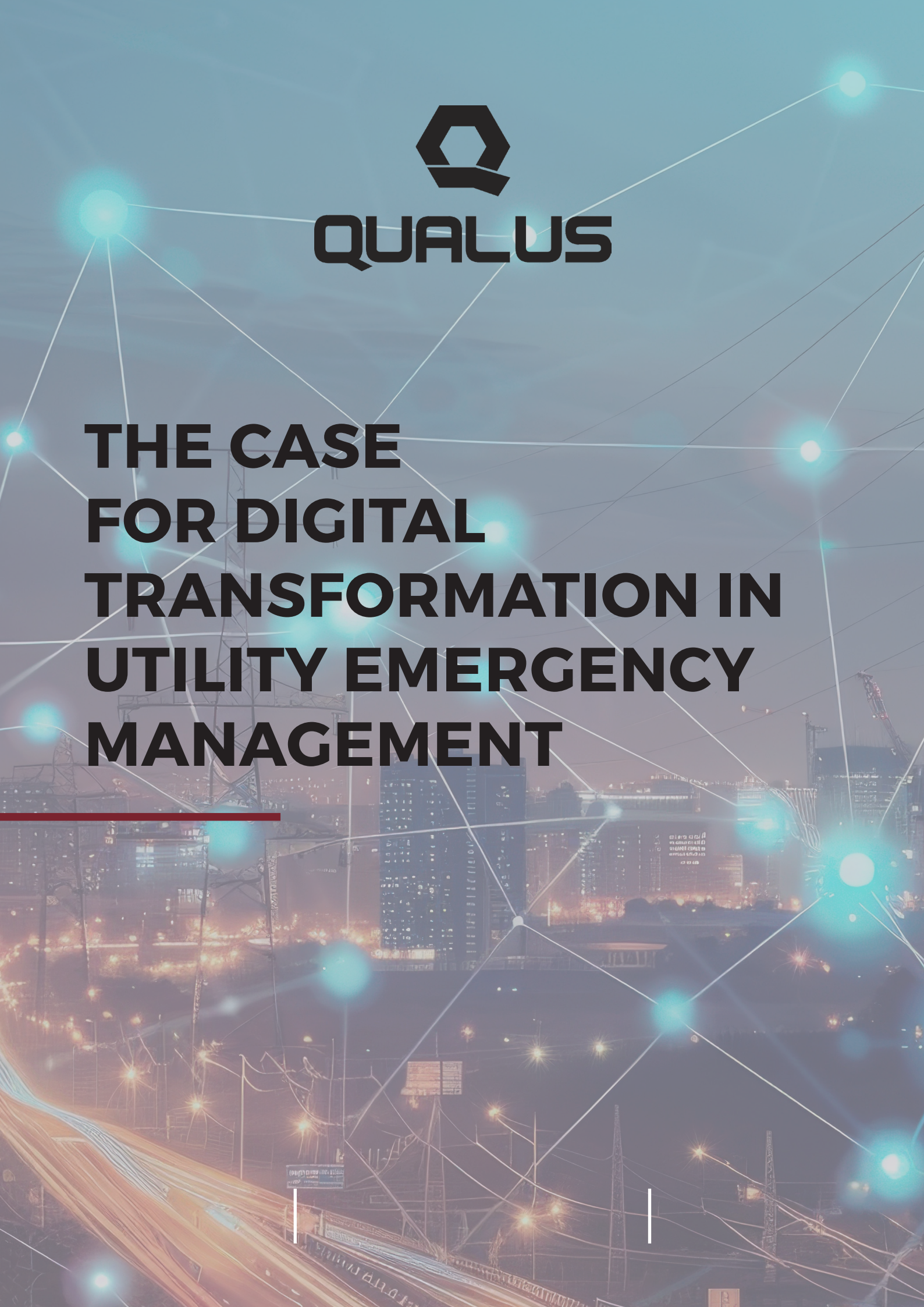

QUALUS

THE CASE FOR DIGITAL TRANSFORMATION IN UTILITY EMERGENCY MANAGEMENT

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ADVERSE OUTCOMES ESCALATING

Events with adverse outcomes—officially termed "incidents"—increasingly pose significant risks and costs to utility operations. The spectrum of potential incidents is broad, encompassing "all threats, all hazards"[1] including but not limited to hurricanes, wildfires, earthquakes, floods, extreme weather, chemical spills, active shooter and civil unrest.

Utility emergency management is ripe for digital transformation.

Demographic trends exacerbate these impacts, with more people living in areas vulnerable to incident-induced damage nationwide. Escalating costs make recovery efforts progressively more expensive, as the costs to recover and repair damages are typically higher today than in the past. The frequency of incidents that utilities must manage is rising. For most utilities, the days of occasional Emergency Operations Center (EOC) activations for significant events are long gone. Today's many hazards necessitate a continuous Emergency Management operation to manage the persistent risks and costs of emergency incidents effectively.

Utilities must maintain constant readiness. The cost of unpreparedness extends beyond physical recovery, impacting reputational integrity and legal liability. Regulators, customers, and investors expect utilities to uphold a fiduciary duty of care. Emergency management does more than restore services; it ensures effective counterparty communication and coordination, mitigates reputation decay and reduces legal liability. This shift elevates emergency management to a board-level issue, transforming it from an esoteric and episodic component of utility operations into a crucial element of a utility's resilience strategy. A recent McKinsey Assessment[2] highlighted, "Unless utilities become more resilient to extreme weather events, they put themselves at unnecessary risk, in both physical and financial terms." In essence, proactive measures are more cost-effective than reactive responses.

Despite this, utilities' emergency management processes have remained static for decades, employing manual and inconsistent processes that impede effective and efficient incident management. The need and value of digital transformation of utility emergency management is clear—the industry is ripe for a digital transformation.

[1] https://www.whitehouse.gov/briefing-room/presidential-actions/2024/04/30/national-security-memorandum-on-critical-infrastructure-security-and-resilience/

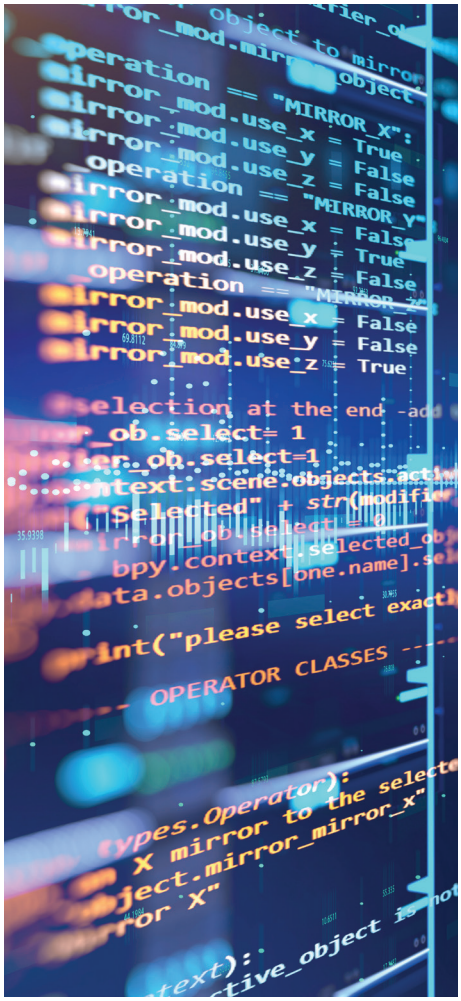
[2] https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/why-and-how-utilities-should-start-to-manage-climate-change-risk - /

EMERGENCY MANAGEMENT—
A DIGITAL LAGGARD IN UTILITY OPERATIONS

Utility emergency management is traditionally labor-intensive and archaic, demanding meticulous planning, coordinated response, and robust recovery efforts. To enhance resilience and deepen crisis management capabilities utilities must adopt best practices, leverage mutual aid agreements, and maintain constant readiness. Essential to accomplishing this is continuous training, collaboration, and investment in innovative technologies that are essential for effectively navigating the complexities of emergency management in the utility sector.

Digitally transforming emergency management implements a modern digital purpose-built system that orchestrates and integrates the utility incident process. Such Incident Management Systems (IMS) introduce a paradigm shift in how utilities approach crisis management. By integrating advanced data analytics, machine learning (ML) and real-time situational awareness, IMS enables utilities to respond to emergencies with unprecedented speed and efficiency. Furthermore, the collaborative capabilities of IMS ensure seamless coordination between various stakeholders, thereby optimizing resource allocation and minimizing downtime during critical incidents.

The transformation of emergency management through adopting IMS represents a pivotal moment for the utility sector. Utilities can significantly enhance operational resilience by embracing these innovations, ensuring they are well-prepared to meet current and future challenges head-on.



With such a compelling value proposition, why has Emergency Management lagged dramatically as a focus in utility digital transformation?

The reasons are several intricate and multifaced challenges.

- There is often a perception that existing emergency management practices are sufficient, especially in the absence of recent significant incidents, fostering a sense of complacency. Added to this is cultural resistance within organizations, driven by a reliance on traditional methods and a reluctance to change, which hinders the adoption of innovative approaches.

- Reliance on legacy systems and infrastructure presents significant barriers to modernization, as these systems, often rigid and antiquated, resist integration with contemporary technologies. This integration is further complicated by the inherent complexity and high costs associated with seamlessly incorporating new emergency management solutions into existing utility operations.

- Investment prioritization also plays a critical role; utilities allocate resources to areas with immediate impact on core operations, such as infrastructure upgrades and customer service improvements, relegating emergency management to a lower priority despite its critical importance.

- The technological landscape has only recently begun offering advanced solutions, such as low-cost systems integrations, cloud infrastructure, Artificial Intelligence (AI), Internet of Things (IoT), and sophisticated analytics, that can significantly enhance emergency management capabilities.

Addressing these challenges necessitates a concerted effort from utility companies, technology providers, and regulators to prioritize and facilitate the evolution of emergency management practices, integrating advanced technologies, fostering a culture of innovation, and ensuring adequate resources and regulatory support.

Despite the significant technological advancements in utility operations, emergency management practices have remained static for decades. This stagnation underscores the urgent need for transformative change within the industry. Historically, market-changing technologies often begin by emulating the traditional solutions they aim to replace. For instance, horseless carriages of the 19th century retained many features of the horse-drawn vehicles they replaced, and early light bulbs were designed to mimic flickering candles. A similar trend is observable in utility emergency management, where we are witnessing the initial stages of a significant transformation driven by the implementation of Incident Management Systems (IMS).

Incident Management Systems provide stakeholders and decision-makers with comprehensive views and advanced optimization analytics, facilitating more informed operational and business decisions.

WHAT WILL DIGITALLY TRANSFORMED EMERGENCY MANAGEMENT LOOK LIKE?

Situational Awareness for All

A Common Operating Picture (COP) is an integrated display of relevant operational information gathered from multiple sources to provide situational awareness to all stakeholders involved in emergency management. It consolidates data into a coherent view, enhancing decision-making and coordination during emergencies.

The concept of a COP originated from military operations, where a unified view of the battlefield was crucial for effective command and control. Over time, this approach was adopted by emergency management sectors to improve disaster response and coordination. Initially, COPs were basic and manual, relying on physical maps and reports. With technological advancements, they evolved into sophisticated digital platforms integrating real-time data from various sources such as GIS, weather services, and communication networks. This evolution has significantly improved the efficiency and effectiveness of emergency management practices.

In the utility sector, the adoption of COPs is driven by the need to manage increasingly complex and frequent incidents, such as extreme weather events. IMS consolidate all necessary information into a single viewing window, creating a COP that enhances situational awareness, improves reactivity, and increases safety. The IMS architecture encompasses critical modules, including alert intelligent filtering and grouping, partner coordination, task management, and response playbook activation.

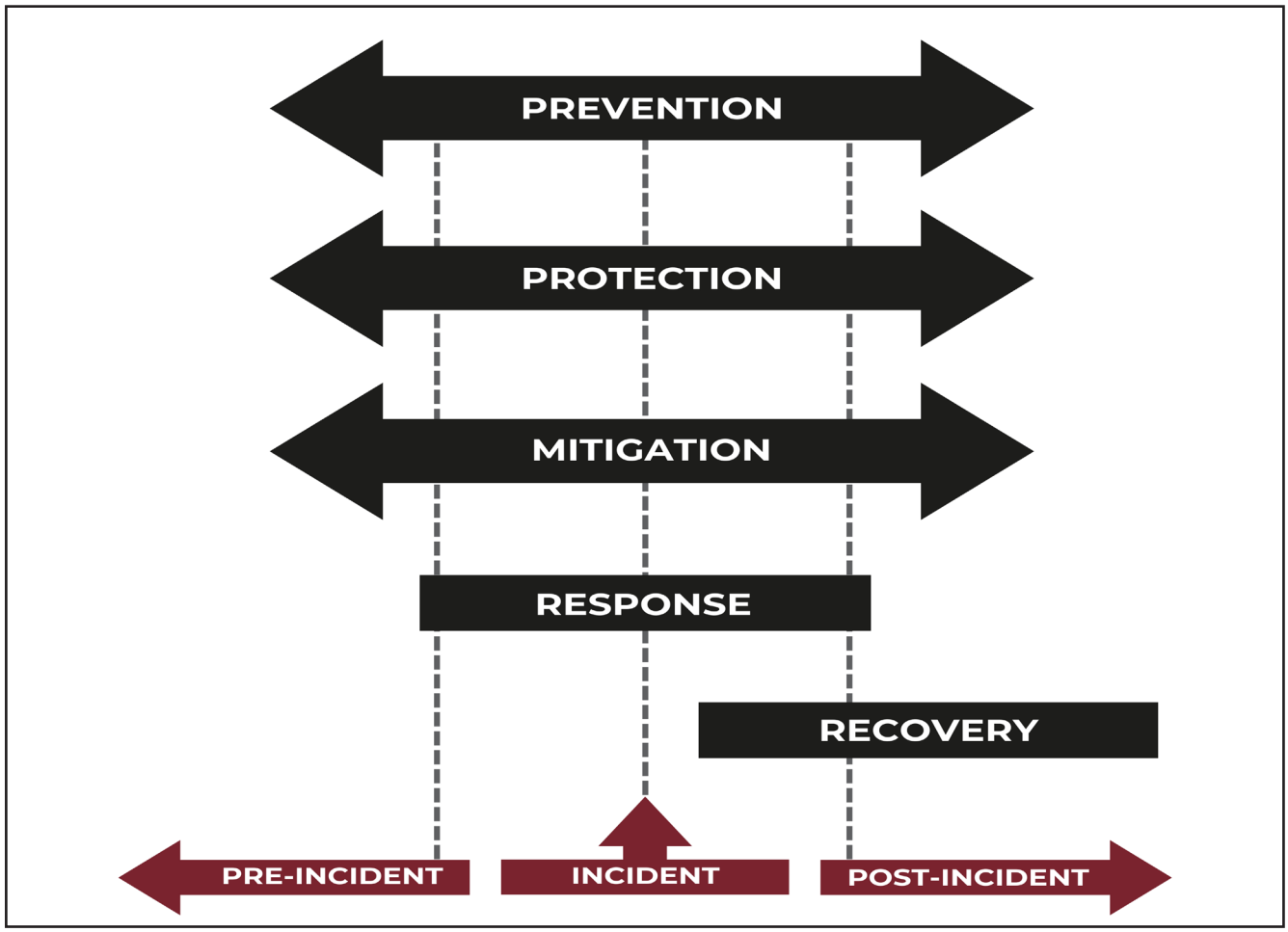
A COP provides situational awareness for all.

Anticipate, Learn, and Adapt

One of the most transformative aspects of an IMS is the deepening of capabilities across all elements of the Incident Management Continuum, particularly in the areas of mitigation and preparedness (see graphic.)[3] IMS serves as a learning tool—enabling the utility to better anticipate, learn, and adapt its emergency management processes.

As major incidents become more frequent, the robust data capture and logging capabilities of IMS allow for the creation of detailed event snapshots; multiple snapshots over time enable IMS to develop state-of-the-art training simulations and scenarios, significantly enhancing the preparedness and performance of utility team members.[4]

The Incident Management Continuum



SOURCE: FEDERAL EMERGENCY MANAGEMENT AGENCY

[3] Cohen, E. A., & Gooch, J. (1990). Military misfortunes: The anatomy of failure in war. Free Press. *(Concepts Adapted)*

[4] https://emilms.fema.gov/is_0362a/groups/18.html

Spectrum of Improvement Opportunities

Data-Driven Continuous Improvement

Robust data capture: IMS inherently capture detailed data on every aspect of an incident—timelines, decisions made, resources allocated, communications, and outcomes. This data can be analyzed post-event to identify gaps, inefficiencies, and opportunities for process optimization.

Feedback loops for learning: Enables the creation of structured feedback loops where learnings from each incident are systematically fed back into the organization's response protocols. This iterative process ensures that lessons learned from past incidents directly inform future preparedness and response strategies.

Machine learning and AI integration: By incorporating ML and AI, IMS can evolve beyond static procedures, using past incident data to predict potential outcomes, optimize response strategies, and recommend proactive measures to prevent future incidents.

Simulation and Scenario-Based Training

Realistic simulations: IMS can use detailed data from past incidents to create realistic, data-driven simulations replicating actual emergencies. These simulations help utilities test their readiness, evaluate response times, and identify gaps in strategies.

Scenario customization: Enable customizable scenarios tailored to specific geographic, infrastructural, or environmental conditions unique to each utility to ensure highly relevant and effective training.

Increased preparedness: Regular training sessions and simulations using real-world data enhance team readiness and adaptability, ensuring that responders are well-prepared for various scenarios.

Continuous Process Optimization

Dynamic protocol updates: Utilize real-time feedback and analysis to ensure procedures remain relevant and effective in a rapidly changing environment.

Performance metrics and KPIs: IMS provides a platform for tracking that can be used to set benchmarks and goals for future performance.

Automated reporting: Simplifies the generation of post-incident reports, which can be used to drive expediated and more complete cost recovery.

Benchmarking and Performance Management

Industry benchmarking: Use IMS data to benchmark performance against industry standards and peers to identify leading and lagging areas.

Adaptive learning: Utilities can adapt their strategies to evolving risks and operational landscapes by regularly measuring and analyzing performance.

Mitigating Risk and Enhancing Resilience with Information

IMS is the backbone for mitigating incident risk by ensuring all stakeholders have access to accurate and timely information—Situational Awareness! This unified approach is crucial for reducing fragmented communications and enhancing emergency coordination. Key attributes of the digitally transformed approach include:

Real-Time Data Integration	Continuously integrating data from weather sources, field sensors, and operational systems to provide a comprehensive view of all critical infrastructure status, including actions taken and scheduled, resourcing, and costs as the event proceeds.
Utilities Preferred Tools	Deploying industry-familiar tools to enable different teams and departments to plan and execute responses seamlessly.
Incident Orchestration	Tracking actions and results in high detail over the life cycle of an incident, supporting the efficient allocation of resources, and ensuring swift and coordinated responses.
Replay & Hotwash Automation	Providing for the replay of events and automating post-event reviews (hotwash), facilitating continuous improvement.

A utility-specific IMS enhances resiliency by enabling faster event recovery and improving preparation, planning, and training processes. By leveraging the integration of predictive analytics and historical data, utilities can anticipate and prepare for potential issues before they escalate into major problems. Specific outcomes include:

Faster Event Recovery	Real-time data and streamlined communication channels allow for quicker identification and resolution of issues.
Better Predictability	Predictive capabilities help utilities foresee potential risks and prepare adequately, reducing the impact of emergencies.
Enhanced Training and Drills	Regular drills and training facilitated by the platform ensure that utilities are always prepared to manage emergencies effectively.

Enhanced information of incidents is foundational to improved resilience outcomes. As outlined in a relevant MIT Sloan insight, "Using insights gained from detecting potential disruptions early, companies can respond to such threats effectively — and exhibit the power of resilience."[5]

[5] https://sloanreview.mit.edu/article/preparing-for-disruptions-through-early-detection/#ref6

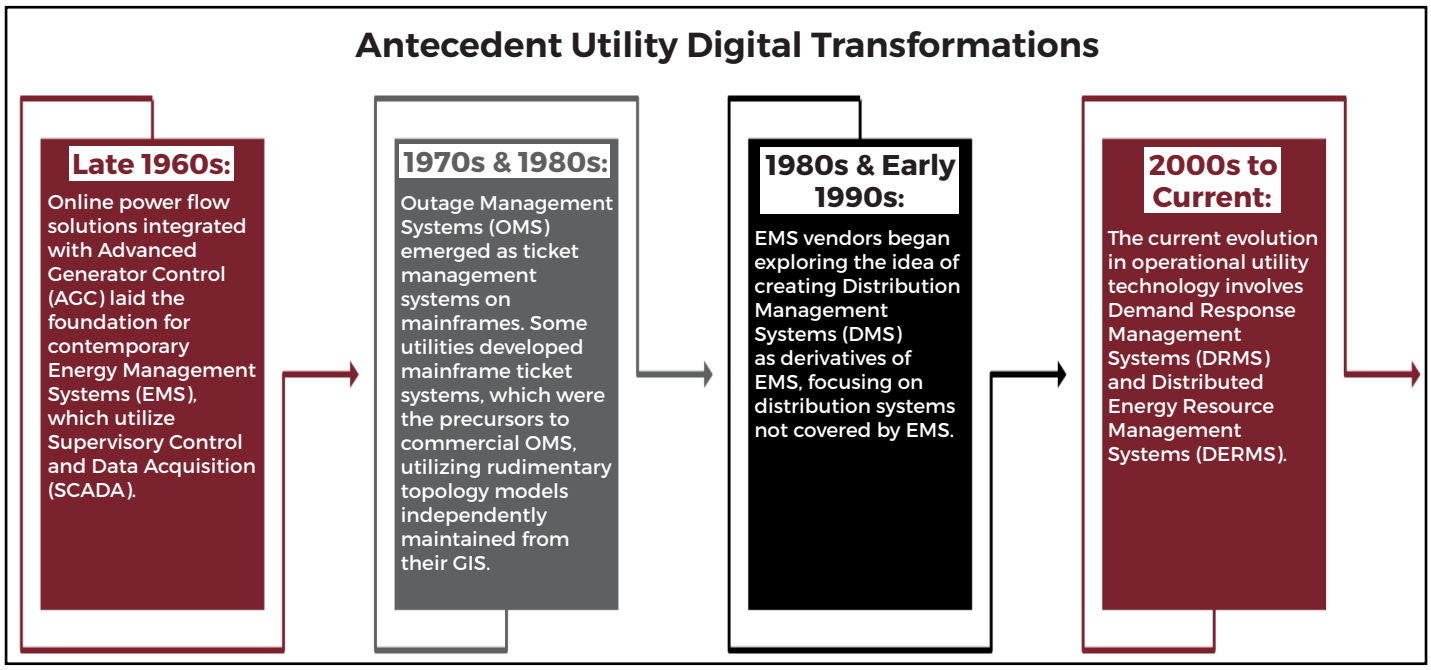
EMERGENCY MANAGEMENT LEADERSHIP

Utilities have unique emergency management responsibilities due to the nature of their business. These mission-critical responsibilities must be managed in real time, leaving little room for errors. The requirement for resiliency and stability in a constantly changing environment renders manual processes ineffective. Additionally, utilities manage extensive and expensive infrastructures, making their operations crucial for providing reliable energy to customers. Therefore, investing in advanced emergency management tools and systems is essential to protect critical infrastructure and all assets, ensure resiliency, and reduce financial risks. Investing in these tools is operationally and socially responsible and economically beneficial overall.

The Pattern of Transformation is a Paved Path

In the 1990s, entering a transmission control center equipped with an EMS felt like being on the technological frontier. In contrast, distribution control centers within the same utility often operated with dot-matrix continuous line printers. The EMS solutions enabled the transmission control center to become highly automated and primarily paperless. In contrast, distribution control centers relied on wall maps with push pins and manually grouped outage calls on printed tickets. The evolution of OMS and DMS products facilitated the maturation of these systems.

Today, similar technological disparities exist when visiting an incident command center or storm center at a utility. These centers often still rely on paper maps, clipboards for damage assessment, whiteboards for allocating accommodations, and sticky notes for assignment tracking. However, a revolution in storm and Emergency Operations Centers (EOC) is on the horizon, akin to the transformation experienced in transmission and distribution control centers. This revolution is embodied in Incident Management Systems (IMS). Following in the footsteps of antecedent transformations such as EMS, DMS, OMS, and DERMS; IMS addresses a problem not previously solved by past solutions, transforming emergency management in utility operations.



Elevating the Utility as a Leader

Historically, complex utilities have recognized gaps where their operations have fallen behind other jurisdictions in incident response due to siloed planning processes, shifting escalation levels from blue-sky through grey- and black-sky operations as emergencies evolve and a lack of unified internal to external communication systems and security concerns. These issues can be addressed by providing a secure and centralized platform that ensures stakeholders are proactively, preemptively informed, and highly coordinated. This integration helps utilities collaborate more effectively with local governments, incident services, and other key players, thereby improving overall incident management efforts to resolution.

Incident Management Systems position utilities as initiative-taking community leaders by keeping them steps ahead in incident preparedness and response. IMS helps utilities maintain a robust and at-the-ready posture to engage in critical incident events by improving coordination with cross-jurisdictional stakeholders. This proactive approach is essential in an environment where utilities often lag other jurisdictions in incident response.

CONCLUSION

Digital transformation in utility emergency management is essential for enhancing resilience and crisis management capabilities. By adopting advanced technologies like Incident Management Systems (IMS), utilities can integrate advanced data analytics and real-time situational awareness, enabling them to respond to emergencies with unprecedented speed and efficiency. This transformation optimizes resource allocation, minimizes downtime during critical incidents, and enhances overall operational resilience. Additionally, it positions utilities as proactive leaders in incident preparedness and response, ensuring seamless coordination between various stakeholders and improving overall incident management efforts.

Incident Management Systems (IMS) provide significant value by transforming utility emergency management through advanced data analytics and real-time situational awareness. IMS enables utilities to respond to emergencies quickly and efficiently, ensuring seamless coordination between various stakeholders. This integration optimizes resource allocation, minimizes downtime during critical incidents, and enhances overall operational resilience. By adopting IMS, utilities can better anticipate, learn, and adapt their emergency management processes, ultimately positioning themselves as proactive leaders in incident preparedness and response.

AUTHORS AND CONTRIBUTORS

KURT PULLMAN

Kurt Pullman is an accomplished energy sector operations leader with expertise in emergency response, control center management, and regulatory compliance. He is NERC-certified in electric system operations at both IOU and municipal utilities. His experience spans implementing NMS, EMS, and building and leading Human Performance and Training teams. Kurt holds numerous FEMA-issued Emergency Management certifications in Emergency Management.

GREG BREWER

Greg Brewer has over 30 years of experience across the industrial and utility sectors with a focus on unifying organizational silos and driving productivity gains. He has led teams that have accelerated adoption of unique software innovations to IOUs and large power consumers, including SCADA, predictive analytics, on-premise and SaaS solutions, and cybersecurity. Greg has led global organizations, start-up ventures and various industry associations.

STEPHEN J. CALLAHAN

Stephen J. Callahan's utility experience spans over forty years in industry management and consulting. He has led the creation of business and technology strategies and implementation of complex processes and systems for several top global utilities spanning the areas of T&D, network operations, Smart Grid, customer operations, finance, and telecommunications networks. He is a frequent contributor to industry conferences and publications focusing on the transformation of the electric utility industry.

qualuscorp.com
gridbright.com