Strategic Focus: Critical Event Management For EHS And Risk Management

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This report helps corporate EHS managers understand the use cases and market landscape for critical event management (CEM) solutions. With increased visibility on the key suppliers in the CEM solutions market, this report informs EHS managers on relevant solutions for mitigating critical events — both internal and external — such as IT system failures, extreme weather events, civil unrest and pandemics, and their effects on worker safety as well as business continuity. In the wake of the COVID-19 pandemic, EHS managers will gain valuable insights into techniques and examples of how industry peers apply CEM solutions to managing such 'black swan' events.

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ORGANIZATIONS MENTIONED

AlertFind, Avetta, Aware360, Benchmark Digital, Caterpillar, Centers for Disease Control and Prevention (CDC), Cisco, Cority, Crises-Control, Damstra, Enablon, Everbridge, Fatigue Science, Financial Conduct Authority (FCA), Global Security Operations Centre (GSOC), Haystax, Helios Fire Systems, IncidentEye, Intelex, Jira, Kenzen, Kintaba, Logical Safety, NC4, OneLook Systems, PagerDuty, Slack, Sony Pictures, Southern Company, State of West Virginia, TalkTalk, Triax Technologies, TSB Bank, VelocityEHS, Veriforce, Wake Forest Baptist Health, Xybion, Zoom.

Critical Event Management Technologies Are Vital To Worker Safety And Business Continuity

The ongoing global pandemic and its disruption to various industries' business processes have shown the need for a coordinated and automated response to unforeseen events. The complexities of tasks such as managing a remote workforce, workplace risk, civil unrest and natural disasters have been exacerbated by the impact of COVID-19. It is evident now, more than ever, that seamless communication, collaboration and complete oversight of all assets — infrastructure, digital, systems and workers — is invaluable to decision-making and for mitigating the financial and human cost of unforeseen events. Critical event management (CEM) solutions help firms manage and respond effectively to such unforeseen events, ensuring resilience and saving lives.

CEM Solutions Help Manage And Mitigate A Variety Of Risks

Firms apply CEM solutions to various internal and external risks, both as a preventative measure and as a means of efficient response to these risks. Internal events include examples such as system failures, process failures and workplace safety. External events include things such as natural disasters and cyber-attacks, human-driven events such as civil unrest, active assailants and terrorism, and public health issues such as global pandemics (see **Figure 1**). CEM solutions help firms:

- **Quickly identify which potential risk events impact specific assets, including mobile assets and travellers.**
  Modern society is highly digitized and fast-paced. Parallel business processes often work in tandem, like complex machinery, to accomplish overarching goals. Having real-time oversight of the participating cogs and wheels is therefore paramount to identifying any potential factors that could impact a firm's ability to operate effectively. Firms use CEM solutions to bridge the data and communication gaps between operational silos, ensuring oversight of physical and digital assets and their employees' safety. Thanks to this, firms can assess, locate, act and analyse threats or potential threats to their ability to operate effectively. CEM solutions give firms context on a threat's potential severity, helping to identify stakeholders and assets and to manage and analyse their response.

- **Efficiently respond to incidents caused by IT disruptions.**
  IT disruptions may include outages from natural disasters, overloads, errors when implementing new technology or upgrades, or external attacks such as cybersecurity attacks, including ransomware. Firms such as Crises-Control and Everbridge offer IT services covering security and disruption. These firms alert the relevant personnel within their networks by initiating a workflow when specific IT scripts show instability; prompt notification of these issues can buy valuable time and prevent a domino effect. A report from the UK's Financial Conduct Authority (FCA) in 2019 showed that banks reported as many as five IT 'glitches' per week between October 2018 and September 2019. TSB Bank, a retail and commercial bank in the UK, was issued with a £370 million ($516 million) customer compensation bill when its new IT system launched in April 2018 and led to nearly two million customers being unable to access their current accounts for weeks.

- **Preventatively manage cybersecurity threats.**
  In a highly digitized society where firms have significant online presence and operations, threat actors such as cyber-terrorists, organized criminals, state-sponsored actors and 'hacktivists' may attack digital systems. Motivated by financial gain, notoriety or military agendas, these threat actors exploit weaknesses to infiltrate firms' digital infrastructure, stealing customer data and proprietary information and sometimes encrypting the database for ransom. Sony Pictures, for instance, a US entertainment firm

FIGURE 1

Use Cases For CEM Solutions

Category	Use Cases
EHS	Access control and perimeter management
	Fire risk monitoring and prevention
	Vital sign monitoring
	Lone worker safety
	Hazardous substance release management
	PPE management
	Remote content delivery
Pandemic Response Management	Contact tracing
	Wellness tracking
	Case management
	Return-to-work management
	Social distancing
	Density mapping and occupancy threshold management
	Vaccine distribution
Business Continuity	Supply chain disruption management
	Emergency response and mass notifications
	Disaster response management, e.g. hurricanes, wildfires, tornados, earthquakes and flooding
	Civil unrest, terrorism and active shooter response
	Cybersecurity and IT system failures

Source: Verdantix

that produces, acquires and distributes filmed entertainment, experienced a cybersecurity breach in 2014. Its network infrastructure was offline, but the firm leveraged Everbridge's solution to communicate critical information to employees through the 'Live Operator' service. Although system interoperability is an important feature of CEM solutions, this example illustrates that it can also enable network segregation in the case of network failure.

- **Effectively handle the effects of natural disasters.**
  Cisco, Everbridge and IncidentEye are examples of firms that allow users to coordinate their responses to natural disasters — enabling secure communication to assets and workers. During or in the wake of natural disasters such as hurricanes, tornados and earthquakes, communicating critical instructions is paramount in terms of saving lives. CEM solutions help firms achieve this and coordinate evacuation plans through continuous information sharing. Everbridge's CEM solution enables mass notifications and can track user engagement, essentially aiding in headcounts and determining where critical resources and attention are required.

- **Proactively avoid disruptions to EHS processes and safeguard the wellbeing of employees.**
  Natural disasters, IT disruptions and cybersecurity threats may have equivalent health and safety consequences. IT disruptions and cybersecurity threats that result in the denial of access to documents, data or communication and control systems can lead to safety issues in high-risk operational environments. For instance, the 2014 cyber-attack of a German steel mill resulted in physical damage. As a result of the attack, the mill's control systems failed to shut down its blast furnaces properly. Given the hazardous nature of such industries, this could quickly become a critical safety event. Firms use CEM solutions to prevent such events, regardless of origin, by ensuring that they are quickly detected and managed and by implementing a timely response should these events occur. Kintaba, a New York-based software supplier that automates the full-cycle incident management process, helps firms report, respond, resolve and reflect on significant incidents quickly.

- **Actively mitigate the adverse effects of terrorism, active assailants and civil unrest.**
  Because of the real-time data feed enabled by CEM solutions, firms have up-to-date information on unfolding situations such as civil unrest, terrorism and active shooters. Everbridge's CEM solution draws data from multiple sources, including social media posts, news networks, closed-circuit television (CCTV), intruder detection devices and direct alerts from relevant organizations. During the El Paso shooting of August 2019, an on-duty Everbridge analyst alerted potentially impacted residents within five minutes of the first shots being fired, before the incident even hit breaking news. The analyst assessed the situation via Everbridge's CEM solution, drew a radius around the incident and instantly sent out notifications. Similarly, Aware360's EHS connected worker solution with geolocation and map layering enables geofencing, mass notifications, alerts and broadcast messaging — a handy feature for ensuring employees' welfare during potentially dangerous situations or in secluded locations.

- **Coherently implement pandemic response management.**
  In the wake of the COVID-19 pandemic, firms have been forced to juggle multiple priorities: maintaining the ability to operate, whilst keeping workers safe, as well as helping to mitigate the spread of the virus — a challenging task. In the 2020 Verdantix Global Corporate Survey of 301 EHS decision-makers, 88% of respondents stated that ongoing COVID-19 management was a high priority for their firms over the next two years (see Verdantix Global Corporate Survey 2020: EHS Budgets, Priorities & Tech Preferences). Environment, health, safety and quality (EHSQ) software providers such as Benchmark Digital, Cority, Enablon, Enterprise Health and VelocityEHS, to name a few, have implemented solutions for their customers to ensure social distancing, manage relevant personal protective equipment (PPE), track positive cases, identify potential exposures, and manage follow-ups such as wellness checks, symptom tracking and contact tracing. CEM solutions can combine otherwise disparate data sources and capabilities to create a holistic end-to-end tool including these features, as well as features such as the global tracking of infection rates, the monitoring of lockdown instructions and the managing of the supply chain consequences of a pandemic.

CEM Technologies Eliminate Silos, Resulting In Better Risk Management

When a critical event unfolds, the management and resolution of that event often involve multiple departments in an organization, including human resources (HR), physical security and IT departments. To facilitate expedient resolution, CEM solutions help firms break down departmental silos, so that collaboration, task coordination and event dashboards are available across multiple functions. On using a solution to manage a variety of risks, firms enjoy myriad benefits. Firms are using CEM solutions to:

- **Facilitate communication and collaboration between business functions and workers.**
  Managing critical events can be challenging — mostly because of disjointed business functions operating in silos with inconsistent tools, systems and processes. The interoperability of various technologies within a CEM ecosystem can eliminate organizational silos by facilitating better communication. CEM solutions can unify C-Suite, HR, IT and security departments by ensuring a consistent common operating environment on a single platform. Kintaba helps firms recover from outages by working with various workplace tools such as Jira, PagerDuty, Slack and Zoom, for seamless communication across business functions.

- **Ensure total business landscape oversight for better decision-making.**
  CEM solutions provide a bird's-eye view of a firm's business operations by integrating information from multiple sources, such as sensors, cameras and social media and news networks. This landscape oversight can reveal combined threats and potential vulnerabilities, facilitating the prevention of critical events and ensuring a rapid response should these occur, regardless of geographical location. For instance, Southern Company, an Atlanta-based energy firm, leveraged AlertFind's solution to gather information from and communicate with over 28,000 employees. The CEM solution enabled the firm to maintain business oversight, streamline communication and ensure continued business success across geographically dispersed locations as it grew in size.

- **Develop a coordinated and timely response to critical events.**
  CEM solutions enable firms to assess, locate and act on critical events and to analyse performance afterwards. Seamless communication between all relevant parties and real-time information exchange ensure that employees have the most relevant and up-to-date information to perform their duties effectively and efficiently. For instance, Everbridge's customer network helps with correlation and coordination. During the Southern California wildfire of December 2017, the Global Security Operations Centre (GSOC) leveraged the Everbridge network to reach employees who resided near the area, issuing health and wellness notifications and using relevant feedback to assess the next level of responses. The system correlated the location of the blazes with those of the impacted individuals, and then coordinated a response with insights gleaned from this correlation.

- **Protect and improve brand reputation via showcasing efficiency of response.**
  Firms using CEM solutions to prevent, manage or improve their responses to critical events safeguard their employees' wellbeing and save lives more effectively and efficiently. From a brand perspective, these firms will project an image of competency, good safety culture and care for their employees. The reverse is also true; for instance, TalkTalk, a telecommunications services firm in the UK, suffered a cybersecurity breach in 2015. Its website was compromised and information belonging to over 150,000 customers was stolen. When this information emerged, TalkTalk's share price fell by 20% and the firm lost customers.

CEM Solutions For EHS Leaders

CEM solutions suit a variety of applications from an EHS context. For instance, firms can apply CEM solutions to many aspects of pandemic response management — from tracking infection rates to managing supply chain risks. Similarly, firms can apply these solutions to areas that can directly influence EHS processes, such as fire prevention and response management, facility inspections and barrier management.

Firms Use CEM Solutions To Manage Worker Safety And Wellbeing

Firms can minimize disruption to EHS processes and facilitate the fulfilment of EHS compliance requirements to ensure the safety of assets and employees. Firms use CEM solutions to support EHS use cases such as:

- **Access control and perimeter management.**
  Access control and perimeter management are indispensable in high-risk and hazardous environments, keeping unqualified personnel and the public safe. Everbridge, through its CEM solution, uses various techniques such as fingerprint access control, perimeter cameras, physical access points and intruder alerts to achieve this. Software providers such as Avetta, OneLook Systems and Veriforce manage access via administrative controls using contractor management and permit to work software (see Verdantix Smart Innovators: Contractor Safety Management). Firms such as Triax Technologies, meanwhile, employ engineering controls like wearable devices for proximity sensing and geofencing.

- **Fire risk monitoring and fire prevention.**
  Firms are using CEM solutions for fire risk monitoring and fire prevention. The ability to connect sensors and camera devices such as fire alarms, thermal cameras and video analytics helps firms identify thermal hotspots that are fire hazards and raise alarms on fires that have already begun. A paper and plastics recycling facility in the UK employs a system of thermal cameras, video analytics and AI from Helios Fire Systems to monitor its recyclate storage area and mitigate fires caused by discarded rechargeable batteries. This use case is especially pertinent to workplaces where the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) apply.

- **Vital signs monitoring and lone worker safety.**
  The proliferation of wearable devices has created opportunities for firms to improve their employees' health and safety, with these wearables suitable for a variety of EHS use cases (see Verdantix Smart Innovators: Connected Worker Solutions For Health And Safety). Verdantix finds that 18% of the 301 EHS decision-makers interviewed in our most recent global survey are looking to increase spending on vital sign monitoring wearables, and 13% on lone worker wearables (see Verdantix Global Corporate Survey 2020: EHS Budgets, Priorities & Tech Preferences). The data from wearable devices feed to an analytics platform, with some data even feeding to a control centre for rapid response if a man-down alarm is triggered. Due to the open application programming interface (API), interoperability and configurability of CEM solutions, firms can incorporate these devices' data feeds to monitor whole teams across extended geographical regions. Damstra and Logical Safety offer lone worker solutions for monitoring workers' safety via a centralized location. Similarly, suppliers such as Caterpillar, Fatigue Science and Kenzen offer vital signs monitoring solutions.

- **Hazardous substance release management.**
  Firms manage hazardous substance releases by raising the alarm, notifying the fire brigade if relevant, evacuating and safeguarding the area, preventing unauthorized access, diluting the substance to render it inert, and then removing contaminated items, including soil, equipment and other items. CEM solutions can facilitate this process. Real-time oversight of the operating environment allows the relevant observer to raise the alarm. Mass notifications are then sent to all stakeholders in the area with instructions, and the relevant authorities are automatically alerted. Engagement from the notifications can serve as data for assessing the stakeholders' safety and wellbeing and further communication via the CEM solution's network can be used to coordinate efforts to contain and remove the hazard.

- **Emergency response and mass notification.**
  Firms use CEM solutions for emergency response planning and mass notifications. CEM solution providers such as Haystax offer a cloud-based emergency response tool for firefighters, law enforcement and school safety. Haystax offers web apps for scheduling drills, designating shelters, highlighting evacuation routes and sending incident alerts to convey information and report damage. Similarly, NC4's Emergency Operations Center (EOC) software solution enables the simultaneous sharing of information

among emergency response teams, decision-makers and relevant agencies, for coordinating response plans.

Firms Apply CEM Solutions To Pandemic Response Management

In the wake of the global pandemic, CEM solutions can provide insight into infection rates and the location of high-risk employees, and a means to ensure that employees are healthy via self-reporting capabilities. Additionally, these solutions ensure that affected employees are compliantly and safely re-introduced into the workplace when they recover. The solutions also enable firms to assess and manage supply chain disruptions from the pandemic. Verdantix finds that firms are applying CEM solutions to:

- **Managing the COVID-19 response.**
  VelocityEHS offers workplace respirator fit testing; Enablon offers case management; Cority provides wellness questionnaires and contact tracing; and Intelex offers exposure tracking. It is worth noting that these are not exhaustive lists of capabilities offered by these providers, but just examples. In the same vein, CEM solutions can keep firms abreast of recent developments in the pandemic, including total confirmed cases, geographical spread, travel restrictions and quarantine and curfew information for regions of the world. Using such information, government agencies, medical centres and relevant firms can also plan and implement vaccine deployment. The speed and effectiveness of immunization programmes will depend on the effectiveness of delivery supply chains: the availability of raw materials for manufacturing; the effectiveness of a closed cold loop supply chain for delivery of vaccines; and the success of government distribution planning (see [Verdantix COVID-19 Vaccine Implications For Corporate Executives](#)).

- **Conducting location-based contact tracing, wellness tracking and return-to-work management.**
  Firms such as Xybion, a cloud-based EHS, compliance and risk management software supplier, offer solutions that are capable of end-to-end contact tracing and follow-up management. Firms are using Xybion's solution to self-report, contact trace, notify and quarantine, and thus contain the spread of the virus. The solution has the capability to help identify positive cases via the reporting tool and potential exposures via location-based services, and can manage follow-up through wellness checks and return-to-work questionnaires. Aware360 offers software-based solutions that leverage connected devices for real-time contact tracing and proximity reminders — essentially facilitating social distancing and empowering firms to manage the safety of employees during the pandemic. Aware360 also offers a COVID-19 mitigation solution through its GoBand and GoClip wearable devices, which can function as ultra-portable alternatives to mobile phones.

- **Mitigating supply chain disruptions.**
  In the immediate wake of the COVID-19 pandemic, there was a shortage of N95 masks as supply chain disruptions occurred. Currently, the challenge concerns managing the supply chain risks around transporting vaccines. CEM solutions such as those from Everbridge help firms monitor the supply chain of their products and achieve oversight of possible disruptions, with alerts on affected suppliers and logistics routes, including warehousing and transportation, and on maintaining adequate temperature ranges for vaccines. The solutions also give information about resumption dates from all the relevant stakeholders within a supply chain and enable firms to allocate resources where they are needed and to plan adequately. Two hospitals in Stratford-upon-Avon and Warwick in the UK use Internet of Things (IoT) devices and hashgraph technology — a distributed ledger technology that is an offshoot of blockchain technology — to track vaccines and chemotherapy drugs and to monitor fridges storing COVID-19 vaccines throughout their supply chain.

- **Managing vaccine rollout.**
  Firms such as Enterprise Health offer immunization management capabilities as part of their occupational health solution — a functionality that Wake Forest Baptist Health, an academic health system based in Winston-Salem, NC, is using to administer its flu programme. In January 2021 Everbridge added its 'COVID-19 Shield' vaccine distribution solution to its CEM platform. The solution offers SMS opt-in, locations for vaccinations, alerts on phased distribution, rumour control, updates and changes to locations and schedules, provision of map images with information, and multi-lingual messaging. The State of West Virginia, using Everbridge's solution, successfully administered the first round of COVID-19 vaccinations to its residents. Almost 100% of first-round doses have been administered since deploying the solution, and the state has become the first in the country to complete second-round vaccinations at all nursing homes and assisted living facilities.

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