Preventing the Next Bonhomme Richard or USS Miami: AI-Enabled Crisis Response for Maritime Survivability

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Submitted By: ANTEAN TECHNOLOGY LLC
Company Contact: Sean Floyd, COO
Company Address: Alexandria, VA 22315
Phone (Office): 703-254-0448 x701
Phone (Mobile): 703-408-7870
Email: seanfloyd@anteantech.com
UEI: K2ZEQM1YTTV3
DUNS: 080011379
CAGE Code: 7HPX4
GSA MAS: 47QTCA21D009W

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The Wake-Up Call: Lessons from Recent Shipboard Disasters

On July 12, 2020, a fire broke out aboard USS Bonhomme Richard while the ship was undergoing a complex Selected Restricted Availability (SRA) in port. This was not routine maintenance, but a major modernization effort to upgrade the ship's capabilities for F-35 aircraft, which helps explain why key fire-suppression systems were offline and normal crew integrity was compromised. Despite the heroic efforts of over 500 firefighters, the $1.2 billion amphibious assault ship was lost after a blaze that raged for five days. Subsequent investigations concluded that the tragedy was completely preventable. The Navy's review of the incident revealed a cascade of failures: fire-suppression systems were offline, crews were insufficiently trained, emergency protocols broke down, and coordination between ship and shore responders collapsed. In short, a lack of early situational awareness and prepared response sealed Bonhomme Richard's fate.

The Navy had been through this nightmare before. In 2012, the USS Miami, a nuclear-powered submarine, suffered a catastrophic fire set by a shipyard worker. Miami was ultimately scrapped after investigators found that delayed fire detection and disorganized response had allowed the blaze to inflict irreparable damage. Many lessons from Miami's fire were meant to be codified in Navy protocols, yet those lessons hadn't fully taken hold by the time Bonhomme Richard burned. Both disasters underscore a painful truth: without early detection, rapid decision support, and effective training, even peacetime accidents can destroy billion-dollar assets and put lives at risk. Post-incident reviews, including the Navy's Major Fires Review and subsequent GAO oversight, cite inconsistent training performance and a failure to institutionalize lessons learned, conditions our approach is designed to fix.

Not all emergencies are as visible as a burning ship. A man-overboard (MOB) incident is one of the most time-sensitive crises a crew can face. If a sailor falls overboard, especially at night or in rough seas, traditional alerts rely on someone witnessing the event or noticing a missing crew member. Precious minutes can slip by before the ship even sounds the alarm. History has shown that the chances of recovery drop dramatically with every minute of delay.

These scenarios, like the shipboard fires, highlight the Navy's need for smarter, faster ways to detect and respond to emergencies before they escalate into tragedies. This need is not theoretical, it is immediate. On 29 July 2025, carrier USS George Washington (CVN-73) suspended flight operations in the Timor Sea after a sailor was reported overboard. Helicopters, RHIBs, and maritime-patrol aircraft have been searching ever since. The incident starkly illustrates how a routine watch can turn into a life-or-death scramble, and why the Navy needs automated detection and rapid-response tools to close that deadly time gap.

Proposed Technical Solution: A Story-Driven Vision for AI-Enabled Response

In response to these wake-up calls, Antean Technology proposes a comprehensive, story-driven approach to prevent the next Bonhomme Richard or Miami and to save lives at sea. Our vision centers on an integrated suite of technologies that work together to detect dangers instantly, guide crews through crises, monitor sailors' well-being, and deploy autonomous support when needed. Rather than present a dry list of requirements, we paint a narrative of a ship equipped to sense and respond to trouble as if it has a "sixth sense". This four-part solution leverages artificial intelligence, advanced sensors, immersive simulation, and unmanned systems to dramatically enhance maritime survivability.

AI-Augmented Crisis Management System (AICMS)
Imagine an ever-vigilant digital watch-stander on board each ship. That is the role of the AI-Augmented Crisis Management System. AICMS continuously synthesizes inputs from across the vessel, including leveraging the detailed ship schematics and system data from the Navy's existing Advanced Damage Control System (ADCS). This foundational data is then integrated with real-time inputs from fire and flood sensors, equipment alarms, CCTV feeds, and other damage-control systems. By using ADCS as a static data source for our dynamic AI engine, we provide the intelligent, intuitive, and predictive decision-making layer that sailors currently lack. It uses this 360-degree awareness to spot anomalies within seconds: the first wisps of smoke in a compartment, a sudden pressure drop indicating a hull breach, or an engine vibration outside normal parameters.

As soon as a potential crisis is detected, AI assesses the situation and recommends immediate actions drawn from a constantly updated playbook of Navy emergency protocols. In a narrative sense, AICMS acts like an experienced damage-control officer providing guidance to the Captain, even when communications are in a degraded state. By providing instant alerts and action suggestions, this system buys back precious time that otherwise would be lost to confusion. AICMS also feeds a simple shipboard readiness view, live status of damage-control lockers, compartment hazards, and team posture, so leaders can see and act on risk in real time. AICMS ensures that no report of a smell of unknown origin on the 3rd deck goes unheeded, and it can operate autonomously if crew are overwhelmed, a crucial edge when minutes make the difference between a contained incident and a raging inferno. As we mature the system, we will structure key outputs as machine-readable artifacts (e.g., OSCAL) so security evidence is generated as we build, supporting continuous monitoring and a smoother path to authorization. This system institutionalizes vigilance, ensuring that critical data points are never missed and response protocols are immediately initiated.

Sailor-Centric Physiological Response Monitoring (SPRM)
In the chaos of an emergency, the well-being of individual sailors can be overlooked until it's too late. Antean's Sailor-Centric Physiological Response Monitoring network acts as a guardian for the crew. In our scenario, each sailor wears lightweight sensors that continuously track vital signs (heart rate, breathing, temperature), movement, and even stress indicators. If a sailor is injured, overcome by smoke, or knocked unconscious, SPRM will detect the abnormal vitals or lack of motion. It also utilizes advanced voice recognition, meaning if someone cries out "Man down in engine room!" or calls away "Fire!" in a smoke-filled corridor, the system will recognize the distress call.

Instantly, SPRM triangulates the sailor's location using their wearable and nearby wireless nodes. The crew and AICMS are alerted to exactly who needs help and where. Through AI-driven triage protocols, the system can even suggest or initiate life-saving measures: for example, dispatching a nearby firefighting robot or guiding a medic to the scene by the fastest route. Based on blocked or damaged-route obstacles, SPRM automatically reroutes first-responders to the fastest safe path. In narrative terms, SPRM gives the ship itself ears to hear a whisper for help in the dark; our eyes use thermal imaging to see through the smoke, ensuring a fallen shipmate is located even in zero visibility. This sailor-centric monitoring greatly enhances survivability, ensuring no one is left behind or goes unnoticed during a crisis.

To protect sailors' privacy, physiological data is processed onboard, encrypted at rest and in transit, and anonymized for routine operations, automatically reidentifying only when an emergency threshold is tripped. Because SPRM constitutes human-subjects research, we will seek IRB review and approval in Phase 1 under DoD policy, implementing minimum-necessary collection with full auditability and opt-in

protocols. This provides commanders with real-time personnel status, improving accountability and the effectiveness of emergency medical and rescue responses.

Immersive Crisis Simulation & Training (ICST)
Technology alone isn't enough; the crew must be ready to act decisively when disaster strikes. Our Immersive Crisis Simulation & Training platform provides sailors with realistic, story-driven emergency experiences before they ever face a real one. Think of it as a virtual time machine that lets the Navy re-live incidents like the Bonhomme Richard fire, Miami submarine blaze, or the John F. Kennedy and Belknap collision – all in a consequence-free environment. ICST is a high-fidelity simulation system that recreates the conditions of these disasters: thick smoke, failing equipment, communications breakdowns, the works. Crew members can step into the shoes of their roles (bridge officers, damage-control teams, engineers, medical staff, junior sailors on watch) and practice their responses in real time.

For example, an exercise might simulate a fire during maintenance with inactive sprinklers and require the team to adapt using portable extinguishers and coordinated effort, mirroring the real challenges from those investigations. The platform tracks how individuals and teams perform under stress, providing feedback on decision-making, reaction time, and collaboration. Over time, these immersive "dry runs" build muscle memory and confidence. In our narrative, ICST is the storytelling classroom: each session teaches through experience, ensuring that lessons from past tragedies are truly learned and not just written in a report. By training with ICST, the next generation of sailors will be far better prepared; when an alarm bell rings at 0200, they will have "lived through" similar chaos in simulation and know exactly how to respond swiftly and correctly. This data-driven training approach ensures that lessons learned are institutionalized, building a more resilient and prepared crew.

Sailor Overboard Response (SOR) System
Recent events, such as the search for a missing sailor from USS George Washington on 29 July 2025, prove that an overboard emergency can strike any hull, any day. The final piece of our solution tackles the dreaded man-overboard scenario, bringing cutting-edge tech to one of the oldest naval emergencies. Our Sailor Overboard Response system is like an automatic SAR (search-and-rescue) resource, always on duty. Picture this: it's midnight on a pitching destroyer, and a sailor slips over the side unnoticed. In our proposed system, wearable devices on each sailor and smart sensors on the ship's perimeter instantly detect an overboard event, by recognizing the sudden loss of a signal and the motion of a fall. Immediately, an AI agent cross-checks that it's a legitimate alert (filtering out false alarms) and pinpoints the sailor's last known GPS location in the water. Without waiting for human orders, the ship's integrated drone bay deploys an autonomous rescue drone. This drone zooms out over the waves to the man-overboard point, carrying a Mae West life jacket. Within mere minutes of the fall, the drone drops life-saving aid directly to the sailor, providing buoyancy and a tracking beacon. At the same time, the bridge crew is alerted with an exact location, live video feed from the drone, and real-time environmental data (currents, wind, etc.). Rescue boats or recovery maneuvers can be guided precisely to the person in the water.

The SOR system's narrative is one of instant response: even in the dead of night, the moment a sailor cries out and hits the water, technology races to their aid. This dramatically cuts down the response time from potentially many minutes (or discovering the person missing much later) to virtually zero delay, closing the detection gap between incident and first aid. The increased likelihood of a successful recovery under SOR cannot be overstated; it can be the difference between life and death in cold ocean waters. This automated response capability significantly closes the critical time gap between a man-overboard event and the delivery of life-saving aid.

In concert, these four components form a powerful safety net. AICMS and SPRM ensure the ship is continuously self-monitoring and can react to fires, floods, or injuries in seconds. ICST ensures the crew is practiced and ready for whatever comes, turning every sailor into a seasoned emergency responder. SOR extends the ship's protective reach beyond its skin, so even a lone sailor overboard remains under the watchful guard of the vessel. This integrated framework transforms a ship's crisis response from reactive to proactive. It's a vision of a resilient, "intelligent" ship that can anticipate and adapt to danger, keeping both the platform and its people safe.

Anticipated Benefits and Mission Alignment

Our proposed solution isn't just innovative; it directly translates to tangible benefits for the Navy's mission and the safety of its sailors. By deploying this integrated system, the Navy can expect:

- **Dramatically Faster Incident Detection.** Automated AI surveillance catches crises (like fire or flooding) within seconds, instead of relying on a roving watch or chance discovery. Early detection means damage is contained sooner and recovery actions start immediately, minimizing loss.
- **Enhanced Crew Safety and Survivability.** Sailors in distress, whether trapped in smoke or overboard in the ocean, will be identified and aided far more quickly. This yields fewer casualties and injuries. Every sailor has a guardian, and no emergency goes unseen or unheeded.
- **Greater Ship Survivability and Resilience.** With smarter crisis management and better-trained crews, ships can avoid the fate of Bonhomme Richard. Quick, coordinated action guided by AICMS can prevent a minor issue from engulfing an entire ship, significantly reducing the risk of catastrophic loss.
- **Empowered and Prepared Personnel.** Through immersive training, sailors gain confidence and experience in handling worst-case scenarios. This leads to improved decision-making under pressure, tighter team coordination, and ultimately a culture of resilience. The crew becomes as advanced as technology supports them.
- **Force Multiplier through Autonomy.** Using drones and AI to assist in emergencies effectively adds helping hands (and eyes) that act instantaneously. This human-machine teaming lets the Navy do more with the crew it has, for example, a single drone can conduct a search or deliver a life ring faster than a whole team could mobilize.

All of these outcomes contribute to the Navy's overarching goals of improved fleet readiness, warfighter safety, and mission continuity. Importantly, our concept aligns with Office of Naval Research’s (ONR's) priorities under BAA N00014-25-S-B001, which emphasizes survivability, human safety, and leveraging AI/autonomy for warfighting advantage. It directly addresses the shortcomings identified in the Navy's own Major Fires Review and recent investigations, delivering solutions for the very gaps that Navy leaders have urgently sought to close. In essence, we are offering a timely answer to the question, "How do we ensure there is never another Bonhomme Richard?" by providing the tools and training to make that a reality.

Feasibility & Risk Mitigation-Development Roadmap and Feasibility

We recognize that turning this vision into a deployed capability requires careful development and testing. Antean proposes an agile, phased roadmap over roughly 18-24 months to rapidly prototype and field-test these technologies. In Phase 1, we would focus on concept refinement and early prototyping of key components, for instance, developing the AICMS software algorithms and a basic SOR drone demo. This phase (on order of a few months) aims to prove the core ideas in a laboratory or shipyard environment quickly. Phase 2 would integrate these components into a working system and conduct controlled testing and validation, such as live simulations of a ship fire with AICMS + SPRM running, and training exercises using ICST. By the end of Phase 2, we anticipate having a fully integrated prototype system that could be demonstrated in a relevant environment (achieving roughly Technology Readiness Level 6).

Finally, Phase 3 would involve more extensive evaluation, feedback from actual Navy users, and preparation for transition, for example, developing a plan to outfit a trial ship with the system and training its crew.
Throughout these phases, we will keep the schedule focused and milestones high-level and flexible, ensuring we can adapt to findings and feedback. Our goal is to deliver a robust prototype ready for shipboard pilot use in under two years.

Compliance and cyber-worthiness

From inception, we will pursue the Risk Management Framework authorization path for Platform IT (PIT), define the authorization boundary with NAVSEA, and align artifacts to CYBERSAFE expectations for shipboard systems. We will generate control evidence as we build, using policy-as-code and standards like OSCAL, to support continuous monitoring and reduce rework on the path to an eventual Authority to Operate (ATO).

Crucially, this development plan is designed to mitigate risk and control cost. We leverage many existing technologies, commercial sensor hardware, proven machine-learning frameworks, and off-the-shelf drones, integrating them with our custom software and Naval expertise. This means we are not inventing everything from scratch but rather building reliable components in a novel way. The technical risks (such as sensor integration or AI false alarms) are manageable and will be addressed early through prototyping and iterative testing. By Phase 3, we expect to have ironed out major issues, giving the Navy confidence in the system's performance. We also anticipate that the total investment required is modest compared to typical defense programs: on order of only a few million dollars spread across all phases. For context, that is a small fraction of the cost of a single ship, and an exceptionally high return on investment if this technology can prevent even one major fire or save several sailors' lives. In short, our plan is fast, focused, and cost-effective, ensuring that this critical capability can be delivered to the fleet with urgency.

Appendix A – Team Antean Qualifications, Data Rights, and Concluding Remarks

Antean's Team and Expertise

Antean Technology LLC is uniquely qualified to bring this vision to life. As a small business, we marry agility and diversity with a proven record of successful delivery on government programs. We hold a Top-Secret facility clearance and operate under ISO 9001 (quality), ISO 20000 (IT service management), and ISO 27001 (information security)—a testament to the disciplined, high-quality standards embedded across all our service offerings and essential to supporting sensitive, mission-critical work.
Our core competencies align precisely with this effort's needs. Antean's team has deep expertise in artificial intelligence and machine learning (AI/ML), including real-time sensor analytics, along with autonomous systems and robotic controls that map directly to the drone-based SOR component. Our experience building cyber-physical simulation environments will drive the high-realism ICST training, while our secure-systems-integration skills are essential for uniting the software, hardware, and network layers of AICMS, SPRM, and SOR aboard naval platforms.

Our track record reinforces our readiness for Navy work. Ongoing modernization of the Department of the Navy's Enterprise Cybersecurity Initiatives under a Special Access Program (SAP) program, where we deliver network engineering, analysis, and cybersecurity across Unclassified-to-Top-Secret/SAR levels, gives us hands-on experience integrating secure technology inside Navy enclaves. Beyond that, we have delivered innovative solutions for Defense Counterintelligence Security Agency (DCSA), Defense Information Systems Agency (DISA), FEMA (disaster-response technology), the Department of Transportation (safety and sensor systems), and Centers for Medicare & Medicaid Services, demonstrating versatility and reliability. Our DoD mission-resilience projects meet the department's rigorous standards, and our staff includes U.S. Navy veterans, seasoned emergency-response engineers, and cognitive-training specialists, people who understand both cutting-edge tech and deck-plate realities.
In summary, Antean offers the right blend of innovation, credibility, and commitment. We may be a small business, but we possess the expertise and passion required to tackle this challenge in partnership with the Navy, and to help prevent the next naval disaster.

Intellectual Property and Data Rights

To enable smooth transition and sustainment, we will deliver technical data and software developed under this effort with Government Purpose Rights (GPR). Antean background IP, such as our ontology and playbook engines, will be identified and delivered with Limited/Restricted Rights. We will include the standard DFARS assertions (252.227-7013/7014) and the corresponding 252.227-7017 list in the full proposal.

Conclusion & Next Steps

The U.S. Navy cannot afford another preventable tragedy like Bonhomme Richard or USS Miami. The concept we propose is not about one gadget or one software module; it's about weaving together technology and training into a shield for our ships and Sailors. By sensing crises early, guiding the crew's response, protecting everyone, and extending our reach with autonomous systems, we can fundamentally change the story the next time a fire breaks out or a Sailor goes overboard. Instead of a billion-dollar loss or a fatal mishap, the story can be one of a crisis averted.

Antean's solution directly addresses the failure points that past investigations have lamented, and it introduces a new level of capability that the fleet currently lacks (for example, autonomous man-overboard rescue). It's a compelling, innovative approach that can save lives, preserve costly assets, and strengthen the Navy's warfighting readiness in an era of ever-increasing technological complexity.

We are excited about the potential of this concept and are prepared to move forward aggressively. Antean respectfully requests an opportunity for a technical dialogue with ONR to discuss this vision in detail. We believe a brief discussion would allow us to incorporate feedback and tailor our approach to the Navy's specific needs. Ultimately, we seek invitation to submit a full proposal under ONR BAA N00014-25-S-B001 so that we can fully flesh out the development plan and make this concept a reality.

Thank you for considering our white paper; we are ready and eager to partner with the Navy to ensure that the next time the alarm sounds, the Navy and its technology will be ready to respond in moments, not minutes. Let us work together to prevent the next Bonhomme Richard, protect our sailors, and write a new story of resilience and survivability for the fleet.