SCIENCE-DRIVEN SOLUTIONS ON THE SPOT: THE ART OF SOLVING THE UNPRECEDENTED

White Paper

Americase®

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EXECUTIVE SUMMARY

Some of the most consequential problems faced by modern industries are those for which no precedent exists. Whether triggered by the introduction of new technology, an unexpected regulatory shift, or the operational complexity of a changing logistical landscape, these challenges can emerge without warning and escalate quickly. There is often no established protocol to follow, and in many cases, no time to wait for one to be developed.

Depending on the industry, these challenges may include safety risks and operational downtime due to thermal runaway, added costs and delays due to difficulty staying compliant with evolving regulations, the need to adapt and update business processes or infrastructure, and many others.

To solve emergent and novel problems in real time – problems for which there is no ready-made solution that has been put to the test – requires a specific combination of the right processes, people, and knowledge.

At Americase, that can mean anything from creating one-of-a-kind containment solutions for sensitive equipment to managing mass recalls.

"We don't start out with solutions. We start out with data, research, knowledge, and a disciplined problem-solving mindset that leads to solutions," says Americase President and CEO Robby Kinsala. "We have multidisciplinary background in scientific, technical, and testing expertise in house, and we have systems and processes that provide the right framework for our staff to come together and reliably solve our customer's challenges."

Because the company can bring such robust scientific discipline and technical precision to situations that demand both speed and certainty, Americase is often called upon when the nature of a potential risk or obstacle is still being defined. This means that the scope of the challenge is not fully known, the regulatory requirements are evolving, and the potential risks to people, assets, or infrastructure can be immediate. These are the scenarios that require not only subject-matter expertise, but also the ability to act decisively and responsibly in uncharted territory.

In situations when adapting existing products or templates is not viable, Americase custom-engineers solutions grounded in science, informed by real-world constraints, and validated through rigorous testing.

This white paper illustrates how that approach takes shape in practice.

Further, we hope to show a clear picture of what it means to be a science-driven partner in moments of uncertainty: not just solving the problem at hand, but doing so in a way that creates trust, advances knowledge, ensures safety and compliance, and strengthens operational readiness for the future.

THE AGE OF EMERGENT PROBLEMS

Across industrial sectors, a new category of challenges is emerging—problems that cannot be anticipated, categorized, or resolved using conventional methods. These are not iterations of known risks or deviations from standard procedures. They are unfamiliar, potentially high-stakes events that can arise from shifts in material science, technology, and global logistics often outpacing the systems designed to manage or regulate them.

New Technologies, Unmapped Challenges

The widespread adoption of next-generation energy storage systems illustrates this dynamic clearly. Lithium-ion batteries—and increasingly, lithium metal, solid-state, and other advanced chemistries—introduce thermal and chemical behaviors that are still being characterized. The **U.S. Department of Energy** notes that lithium-ion battery fires have increased in frequency and complexity, prompting both government and private-sector efforts to redefine transport and containment protocols through ongoing research and policy development.

New material classes, emerging technologies, costly fragile components, mission-critical equipment, and many other hazardous or high-value products across a variety of industries require cutting edge, next generation solutions as existing methods no longer meet the rapidly evolving needs.

Regulatory Lag and the Consequences of Ambiguity

When materials, technologies, or systems evolve faster than regulations, organizations are often left to operate in procedural and legal uncertainty. The U.S. Department of Transportation, for example, acknowledges that current hazardous materials regulations are being challenged by the emergence of new lithium battery configurations and chemistries (**PHMSA: Lithium Batteries Transportation Guidance**). In many cases, these materials do not fit cleanly into existing classifications, leaving companies without a definitive compliance path.

Similar challenges are unfolding globally. The European Union's **REACH** regulation continues to redefine chemical handling standards for manufacturers, often forcing operational updates before formal guidance is finalized (ECHA: Understanding REACH). As regulators race to keep up with innovation, industry decision-makers are increasingly responsible for filling the gaps themselves—without compromising safety, continuity, innovation, or legal defensibility.

Precedent Is No Longer a Strategy

Engineering systems and risk protocols have historically relied on precedent—using data from past incidents to shape current mitigation strategies. But emergent problems, by definition, resist this model. They arise in situations where past experience doesn't apply: where the material properties are unknown, where critical systems behave unpredictably, or where environmental conditions introduce new variables.

Research supports this shift. A 2016 study published in Nature Communications found that as industrial and infrastructure systems become more complex and interconnected, they are increasingly vulnerable to "unanticipated failure cascades"—situations in which unfamiliar components fail in ways that trigger secondary and tertiary risks across systems not previously considered vulnerable (**Nature Communications: Reducing Cascading Failure Risk by Increasing Infrastructure Network Interdependence**). The study reinforces a growing consensus: that organizations need new tools and frameworks to understand, contain, and respond to problems before they escalate.

Meeting the Moment with Science-Driven Agility

What's required in these situations is not improvisation, but discipline. The ability to act decisively in ambiguous, potentially high-consequence environments depends on structured methodologies, empirical validation, and a multidisciplinary approach to risk mitigation. Companies need partners who can operate with the speed of a crisis response team, but with the precision of a scientific institution.

Americase was built to serve this function. Rather than forcing new problems into existing solutions that do not adequately solve the challenge, the company engages from first principles—framing the problem, collecting data, testing variables, and engineering a solution that holds up to both operational and regulatory scrutiny. Its role is not only to respond, but to help define the contours of the problem itself—often in collaboration with regulators, clients, and industry partners.

The following section details how Americase applies this capability in practice: a science-based process designed to deliver clarity and resolution when time is short, stakes are high, and no precedent exists to follow.

AMERICASE'S APPROACH—SCIENCE IN MOTION

Americase does not begin with assumptions. It begins with questions. In environments where failure to act—or acting on the wrong information—can have serious consequences, the company's methodology is designed to replace guesswork with evidence, and urgency with efficient and disciplined execution.

Americase's core approach is grounded in scientific inquiry and real-world application. It is not a fixed protocol, but a framework—adaptable, iterative, and built to respond to challenges that emerge without warning or precedent. While situations may demand a customized response, the underlying methodology remains consistent: define the problem with precision, test assumptions, engineer a solution, and validate it under actual conditions.

1. Framing the problem accurately and rapidly

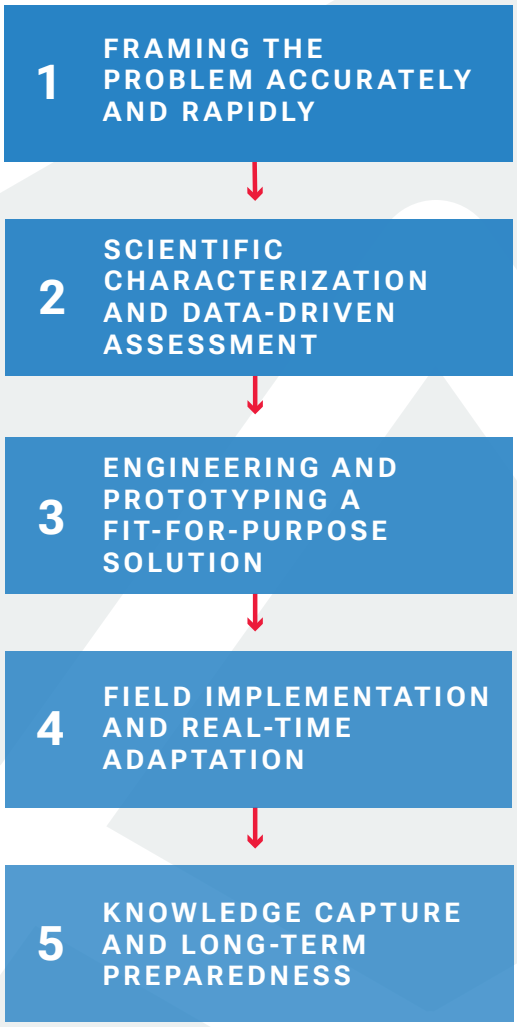
The first step is often the most critical: defining what exactly the problem is. In many emergent scenarios, the true risk is not immediately clear. A material may exhibit unknown thermal behaviors. A legacy or traditional containment or packaging system may have failed under unexpected stress conditions. A regulatory requirement may conflict with the physical reality of transport or disposal.

Americase engages directly with stakeholders—clients, engineers, operators, regulatory officials—to gather available data, clarify constraints, and isolate variables. The team begins not by proposing a solution, but by identifying what must be understood in order to build one. This phase often involves:

- Field assessments.
- Interviews with subject-matter experts and site personnel.
- Material and process audits.
- Rapid literature or regulatory reviews.

The goal is to create a shared and accurate definition of the problem, which becomes the basis for everything that follows.

AMERICASE'S APPROACH
SCIENCE IN MOTION



2. Scientific characterization and data-driven assessment

Once the problem is framed, Americase draws on its multidisciplinary technical bench—including engineers, manufacturers, and regulatory and testing experts—to investigate the conditions at play. This may include:

- **Thermal or structural modeling** of containment or packaging materials.
- **Chemical compatibility testing** to assess reactivity or degradation risk.
- **Failure mode analysis** to identify cascading risks.
- **Interpretation of incomplete regulatory guidance** to ensure confidence and validity of the response.

This process is informed by both empirical data and first-principles reasoning. When conventional data sets are insufficient, the team builds its own models or initiates targeted experiments. The on-site laboratory provides testing capabilities to allow Americase to simulate critical behaviors quickly and precisely.

3. Engineering and prototyping a fit-for-purpose solution

Armed with a defined problem and supporting data, Americase transitions into solution design. Unlike most traditional companies, Americase does not force existing offerings if they do not address the challenge. Instead, it develops bespoke containment, transport, or mitigation strategies aligned to the specific material, use case, logistical needs, and regulatory environment involved.

Designs are pressure-tested against:

- Operational conditions (e.g., temperature, vibration, altitude).
- Regulatory scenarios (e.g., domestic or international transport requirements).
- Stakeholder needs (e.g., field usability, inspection protocols).
- Worst-case failure modes.

Many solutions move rapidly from CAD models to physical prototypes. In many cases, on-site fabrication is deployed to compress timelines and validate early designs under live or real use simulated conditions.

4. Field implementation and real-time adaptation

Emergent challenges rarely resolve in a lab. Americase's process includes deployment support to ensure the solution performs as intended in the field. This may involve:

- On-site implementation guidance.
- Staff training and documentation.
- Real-time adjustments as new information emerges.
- Direct coordination with regulatory bodies or inspectors.

The emphasis is on delivering not just a technically sound response, but one that can be executed safely and efficiently under real-world constraints. Solutions are monitored through deployment, with iterative refinements made as necessary to ensure performance holds over time and across use cases.

5. Knowledge capture and long-term preparedness

Once the immediate problem is resolved, Americase works with the client to capture what was learned. This process is optional but frequently requested, as it supports internal training, risk reduction, and regulatory documentation.

Deliverables may include:

- Custom protocols or handling procedures.
- Root cause analysis reports.
- Playbooks for recurring risk scenarios.
- Engineering documentation for internal or third-party audits.

Americase's value does not end with the solution; instead it provides the knowledge that becomes a long-term asset for the client—enabling proactive risk management in the future.

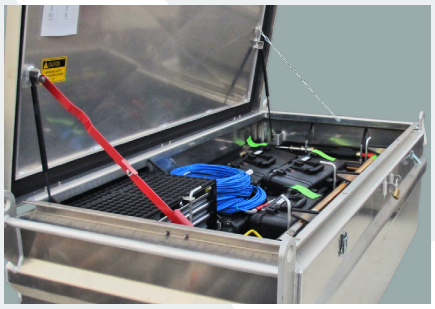
"The process of scoping, assessment, design, deployment, and documentation—has been successfully applied across a range of industries and scenarios," says Americase Vice President Chris Egloff. "It enables Americase to operate not just as a technical partner, but as a structured response team capable of resolving

challenges when the timeline is compressed, the consequences can be significant, and the path forward is anything but clear."

The next section applies this methodology to a real-world case from the oil and gas industry, where Americase was called in to help resolve a critical issue. Faced with a challenge involving advanced Measurement While Drilling (MWD) tools, the project demonstrates how rapid assessment, custom engineering, and manufacturing insight can converge to solve problems that conventional playbooks simply aren't equipped to handle.

CASE STUDY: OIL AND GAS – REVOLUTIONIZING MWD TOOL TRANSIT

In the oil and gas sector, drilling success increasingly hinges on real-time data captured downhole. Measurement While Drilling (MWD) tools are essential for this process, providing directional, pressure, and formation information under extreme conditions. But while these tools are designed to operate deep underground, they face a different kind of risk above ground: damage during transport. When a major operator encountered repeated failures in transporting their high-value MWD equipment, they turned to Americase for a specialized solution.



The Challenge: Complex Tools, Inadequate Protection

MWD tools are long, sensitive, and built with precision electronics that can cost hundreds of thousands of dollars. The client had been using repurposed transport cases not designed to support the specific geometry or vibration sensitivity of MWD systems. As a result, units were arriving damaged, out of calibration, or entirely non-functional. The situation was made worse by remote, high-vibration transit routes and tight operational timelines.

The operator needed a solution that could:

- Securely house the entire MWD assembly, including sensors, transmitters, and power units.
- Withstand harsh handling, temperature swings, and vibration during land, water, and air transit.
- Meet all standards and requirements for tool protection, transport, and traceability.

"This wasn't just about preventing dents—it was about preserving operational readiness and data integrity," said Robby Kinsala. "Every hour of downtime due to damaged tools represented real production losses."

Response: Custom Engineering for a Precision Fit

Americase deployed its technical design team to assess the geometry, weight distribution, and vibration tolerances of the MWD tools. Using 3D modeling, material analysis, and field input, they created a custom container system that incorporated:

- Custom-cut shock-absorbing interior architecture tailored to each tool's profile to keep the equipment in place and in calibration.
- An all-aluminum case with innovative single piece envelope-like fold with an external weld for maximum case durability, protecting the delicate equipment from forklift punctures and other forms of damage.
- Customer training and hands-on demonstrations to ensure they fully understood and made best use of their new containers, plus annual visits to ensure satisfaction and address any issues.

The Outcome: Reduced Damage, Increased Readiness

After deploying the new transport cases, the operator saw a measurable drop in tool damage rates and calibration drift. Shipping incidents fell to near-zero, and field teams reported faster deployment times thanks to intuitive loading/unloading features.

More importantly, the project reframed how the client viewed asset protection—not just as a logistics function, but as a critical enabler of drilling efficiency and data reliability. With Americase's solution in place, the operator gained not only a transport case, but a strategy for extending the life and performance of its most critical downhole tools.

ADDITIONAL EXAMPLES OF EMERGENT PROBLEM SOLVING

Not all critical problems unfold over weeks with full technical visibility.

Says Americase President and CEO Robby Kinsala, "Many of Americase's engagements begin with a phone call, a partial data set, and a clear directive: solve this, and solve it now."

In some cases, long-standing operational pain points—like the safe transport and storage of EV batteries—go unaddressed until they start to pose serious risks or costs. For one global automotive manufacturer, outdated packaging methods weren't just inefficient; they were incompatible with the scale, safety requirements, and regulatory complexity of modern electric vehicle operations. That's when they turned to Americase for a safe, durable, compliant, and cost-effective solution.

CASE STUDY: ENHANCING EV BATTERY SHIPPING AND STORAGE SAFETY

The Challenge: Safety Risks and Regulatory Complexity

A leading global automotive manufacturer encountered major obstacles in safely transporting and storing lithium-ion batteries for their electric vehicles. Their legacy packaging system posed several critical issues:

- **Regulatory burdens**: Navigating complex lithium battery transport regulations beyond basic standards proved overwhelming, especially without internal experts on packaging compliance.
- **Inefficient packaging materials**: The use of heavy, outdated materials—such as wood, vermiculite, and fire blankets—added weight, cost, and complexity.
- **Operational vulnerability**: Existing packaging couldn't stand up to the rigors of real-world logistics, including exposure to forklift punctures and containment of potential thermal events, putting safety and continuity at risk.

The Response: A Custom-Engineered Steel Solution

Americase partnered with the automotive manufacturer to develop a durable, safe, regulation-ready packaging system purpose-built for EV battery transport. The engineered solution featured:

- **Lightweight galvanized steel construction**: Eliminated the need for supplemental materials like vermiculite, reducing both cost and weight.
- **User-friendly design**: A 90-lid/10-base configuration with an intuitive lid-lift mechanism made handling fast and efficient.
- **Full compliance & real-world testing**: The container met stringent US DOT 49 CFR and UN PG-1 standards and was tested to perform under severe conditions, including containment of thermal runaways.

The Outcome: Safer, Simpler, and Significantly More Cost-Effective Innovation

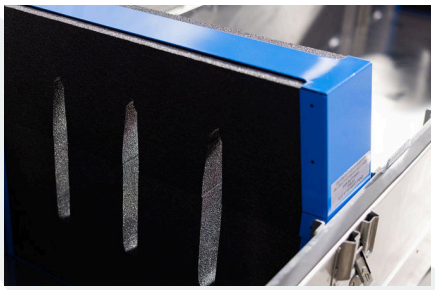
The new packaging system delivered measurable improvements across multiple areas:

- **Cost savings**: Packaging costs were reduced by over 75%.
- **Enhanced safety**: Mitigated risk from damaged or defective EV batteries, supporting a safer supply chain.
- **Operational efficiency**: Streamlined battery handling and transport processes.
- **Long-term durability**: Reduced replacement frequency thanks to robust construction and field-repairable design.
- **Regulatory confidence**: Positioned the manufacturer to stay ahead of evolving compliance requirements.

This collaboration showcased more than just a packaging upgrade—it marked a pivotal shift in how EV battery logistics can be approached. By applying scientific rigor, industry foresight, and innovative design, Americase delivered a game-changing solution that not only solved immediate safety and compliance challenges but also redefined what's possible in battery transport. The result was a durable, cost-effective, and scalable system that empowers the manufacturer to move forward with confidence in an increasingly complex regulatory landscape.

CASE STUDY: REDEFINING RELIABILITY IN AEROSPACE LOGISTICS





The Challenge: Fragile Containers Risked Critical Aerospace Assets

A global leader in aerospace innovation and one of the largest helicopter manufacturers was encountering serious logistical setbacks due to the limitations of their existing shipping containers. Constructed from wood and fiberglass, these containers frequently sustained damage during handling, even when empty. This presented multiple high-stakes challenges:

- **Frequent punctures and cracking**: Forklift impacts regularly compromised the integrity of the containers.
- **High-value cargo at risk**: Damaged containers exposed mission-critical components, including helicopter rotor blades—valued at hundreds of thousands of dollars each—to potential harm.
- **Recurring maintenance costs**: Weekly repairs were required, adding ongoing expenses and disrupting supply chain efficiency.
- **Unfit for purpose**: The lightweight, fragile legacy packaging materials were incompatible with the rigorous demands of domestic and international aerospace transport.

To address these challenges, the helicopter OEM partnered with Americase to engineer a rugged, multi-use packaging solution that would enhance safety, protect valuable assets, reduce repair frequency, and improve operational efficiency.

The Response: Precision-Engineered, Aerospace-Grade Container Innovation

Americase responded with a custom-engineered container system, grounded in material science and aerospace logistics expertise. The solution included:

- **Robust aluminum construction**: Rugged aluminum plus reinforced kickplates to endure forklift impacts.
- **Preventative design features**: Offset vents reduced the risk of foreign object debris; stainless steel hardware eliminated rust concerns.
- **Operator-centric usability**: Gas shocks for easy lid lifting, safety chains to prevent tipping, and forklift access optimized for both safety and balance.
- **Scalable versatility**: Both single-blade and universal multi-blade container models were created to support different mission types.

This tailored solution emphasized rugged durability, operational safety, and long-term scalability.

The Outcome: Streamlined Operations and Global Standardization

The Americase containers dramatically improved the helicopter OEM's logistics performance:

- **Eliminated recurring costs**: The need for frequent container replacements—costing roughly $4,000—was fully eliminated.
- **Enhanced asset protection**: The upgraded design safeguarded high-value rotorcraft components from impact and environmental damage.
- **Boosted efficiency**: Downtime was reduced, handling was simplified, and field repairs were enabled—significantly reducing disruptions.
- **Scalable success**: The solution's reliability led to the manufacturer's German division adopting Americase containers across their entire fleet.

A Game-Changing, Science-Driven Leap in Aerospace Logistics

Americase's approach wasn't just about building a better box—it was about solving a complex logistics problem through engineering rigor and innovation. By combining aerospace-grade materials with human-centered design and repairable architecture, Americase delivered a solution that exceeded expectations and redefined reliability in aerospace shipping. The long-term results speak for themselves: negligible losses, greater confidence in cargo protection, and a scalable standard now adopted internationally across the helicopter OEM's divisions. This partnership stands as a testament to what's possible when engineering meets operational insight—turning a persistent problem into a global logistics benchmark.

WHAT SETS AMERICASE APART

"Americase thrives where innovation is the only path forward," says President and CEO Robby Kinsala. "We specialize in solving problems that haven't been solved before—where both the solution and the regulatory roadmap often need to be created from scratch. It's not just about delivering a product; it's about inventing what's needed when nothing currently fits."

A PARTNER FOR WHAT'S NEXT

When the problem is familiar, the response can be routine. But when the challenge is new—when the material behaves unpredictably, the regulations don't apply cleanly, and the stakes are non-negotiable—routine doesn't work. In those moments, organizations need more than a vendor. They need a partner who can operate efficiently in complex situations or environments, move with urgency, and bring science to the center of the solution.

Americase fills that role. The company's ability to solve emergent problems is not the product of improvisation, but of discipline: a structured, evidence-based process that begins with inquiry and ends with resolution. Whether addressing the safe transport and thermal containment of advanced battery or energy storage systems, designing protective containers for fragile high-value equipment in the oil and gas sector, or redefining the logistical efficiency and mission-critical component safety for the aerospace industry, Americase brings clarity where there was none—and delivers results that are both defensible and deployable.

"The real value of Americase's approach isn't just in solving the immediate problem. It's in helping clients build resilience for the future," says President and CEO Robby Kinsala.

"Each solution is an opportunity to generate knowledge, strengthen processes, and prepare for the next unknown. In this way, Americase doesn't just solve isolated issues—it helps shift the entire risk posture of an organization. It enables clients to move forward with greater confidence, not because the road ahead is fully mapped, but because they have a partner capable of navigating what comes next," he concludes.

For organizations operating at the edge of innovation—or in environments where failure is not an option—this capability is more than useful. It's essential.

Let's talk. If your team is facing a challenge without a clear solution, or wants to be better prepared for the ones that haven't arrived yet, Americase is ready to help.

Visit **americase.com** to learn more about us,
or scan the QR code below:

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