



*Robotic Parking Systems, Inc.*

B. DE 301

THE PIONEER IN AUTOMATIC PARKING SINCE  
1994 ALWAYS AHEAD

The FIRE BOX

# THE FIRST FIRE SAFE GARAGE IN THE WORLD



## The FIRE BOX: A Revolutionary Solution

Robotic Parking Systems' FIRE BOX represents a groundbreaking advancement in addressing the risks associated with EV battery fires in parking structures. Unlike traditional firefighting methods, the FIRE BOX aims to prevent a fire from escalating (spreading to other vehicles) by swiftly relocating the vehicle to a safe, controlled environment.

# THE FIRE BOX: A REVOLUTIONARY SOLUTION



Taming the Flames



Electric Vehicles Offer New Challenges



Understanding EV Battery Fire Risks



The FIRE BOX: A Revolutionary Solution



How the FIRE BOX Works



Advantages of the FIRE BOX System



The Broader Impact of the FIRE BOX



Implications for Urban Planning and Safety Standards



The Road Ahead: Innovations in EV Fire Safety



Conclusion

# TAMING THE FLAMES



## How Robotic Parking Systems' FIRE BOX™ Eliminates Catastrophic Garage Fires.

Car fires in a parking garage are a threat to human life, and can potentially cause catastrophic damage to hundreds or thousands of vehicles, as well as the garage infrastructure itself. However, with the introduction of the FIRE BOX, an optional addition to the Robotic Parking Systems, we now have a revolutionary solution designed to address these fire safety issues and offer the first "fire safe" garage in the world.

# ELECTRIC VEHICLES PRESENT NEW CHALLENGES

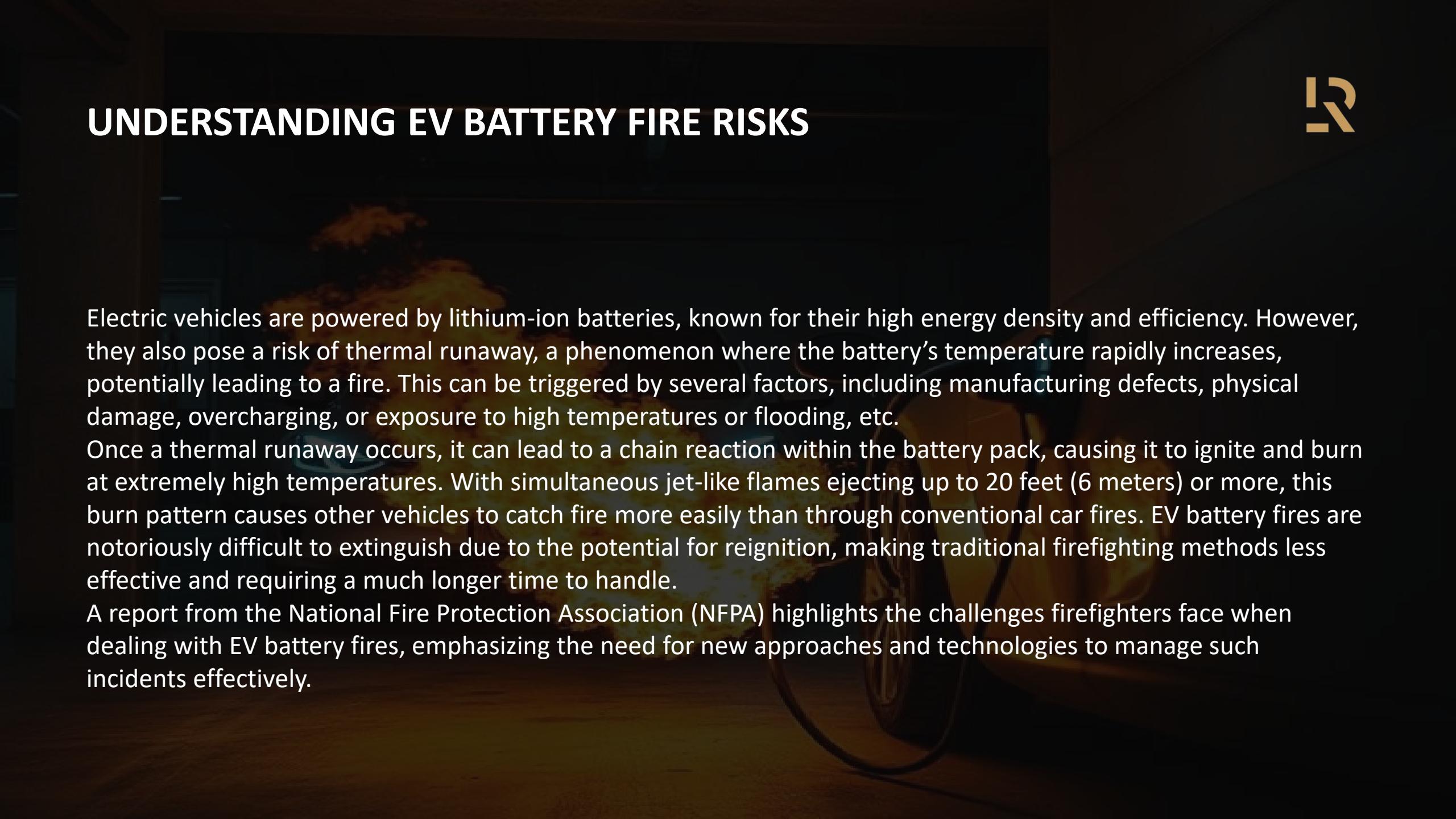


The rise of electric vehicles (EVs) has brought with it a new set of challenges, particularly concerning the risk of battery fires. These fires burn three times longer than fossil fuel fires (2 to 6 hours or more) with high intensity jet-like flames.

This article delves into the problems not only associated with EV battery fires but also any vehicle fires, and explores how the FIRE BOX offers a cutting-edge approach to mitigating these risks.



# UNDERSTANDING EV BATTERY FIRE RISKS

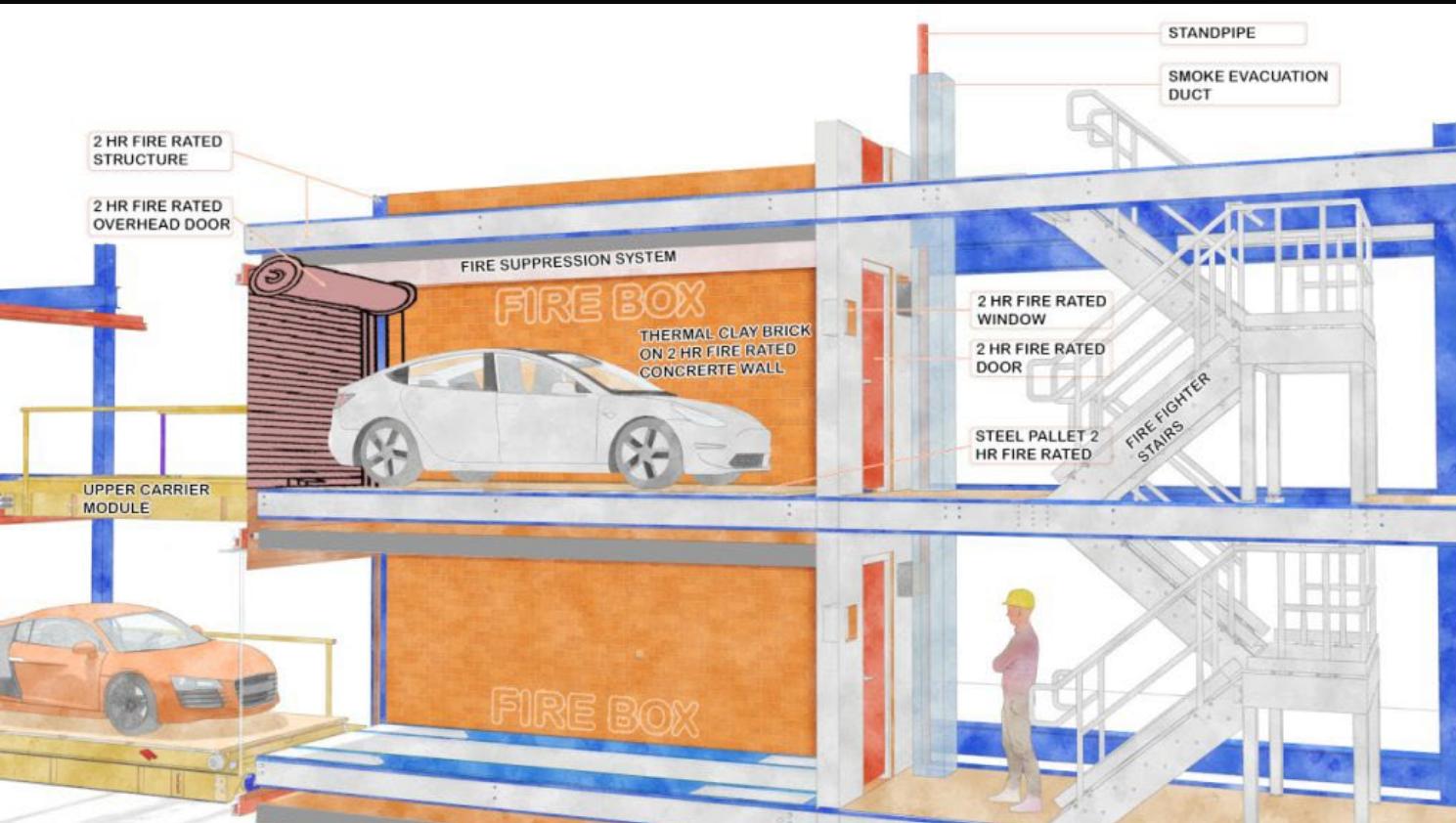
A dark, grainy photograph of a burning electric vehicle. The vehicle is mostly obscured by thick, billowing orange and yellow flames. The background is dark, suggesting night or a smoky environment. The overall mood is dramatic and dangerous.

Electric vehicles are powered by lithium-ion batteries, known for their high energy density and efficiency. However, they also pose a risk of thermal runaway, a phenomenon where the battery's temperature rapidly increases, potentially leading to a fire. This can be triggered by several factors, including manufacturing defects, physical damage, overcharging, or exposure to high temperatures or flooding, etc.

Once a thermal runaway occurs, it can lead to a chain reaction within the battery pack, causing it to ignite and burn at extremely high temperatures. With simultaneous jet-like flames ejecting up to 20 feet (6 meters) or more, this burn pattern causes other vehicles to catch fire more easily than through conventional car fires. EV battery fires are notoriously difficult to extinguish due to the potential for reignition, making traditional firefighting methods less effective and requiring a much longer time to handle.

A report from the National Fire Protection Association (NFPA) highlights the challenges firefighters face when dealing with EV battery fires, emphasizing the need for new approaches and technologies to manage such incidents effectively.

# THE FIRE BOX: A REVOLUTIONARY SOLUTION



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# HOW THE FIRE BOX WORKS



## Early Detection

Every car storage space is monitored by sensors in garages equipped with FIRE BOX protection. The sophisticated fire alarm system is capable of detecting heat before visible flames appear. This early warning system is crucial, as it allows for a rapid response before the situation becomes critical.

## Swift Relocation

Once critical heat is detected, the robotic system automatically transports the at-risk vehicle to the FIRE BOX. This process takes less than 90 seconds, significantly reducing the window for a fire to develop. (*Recent reports from the Research Foundation NFPA show that the development of flames occurs about two minutes after heat detection.*)

## Effective Containment

The FIRE BOX is designed to not only contain but to extinguish fires. It features advanced extinguishing methods that are effective against standard and EV battery fires, ensuring that the fire is controlled and extinguished before it can develop.

## Safety for Firefighters

The FIRE BOX is equipped with a standpipe system outside each platform level, a smoke evacuation system, and a two-hour rated envelope. These features allow firefighters to monitor the situation safely and ensure that the fire is fully extinguished.

# ADVANTAGES OF THE FIRE BOX SYSTEM



## Prevention Over Reaction

By focusing on early detection and swift relocation, the FIRE BOX prevents fires from escalating, reducing the need for extensive firefighting efforts.

## Minimized Risk

Containing the fire within the FIRE BOX reduces the risk of damage to the surrounding infrastructure and minimizes the threat to human life and other cars.

## Efficient Resource Use

The system allows firefighters to focus their efforts where they are most needed, conserving resources and reducing response times.

# THE BROADER IMPACT OF THE FIRE BOX



The introduction of the FIRE BOX marks a significant step forward in the evolution of fire safety in parking garages or facilities, particularly as the number of EVs on the road continues to grow. By addressing the unique challenges posed by EV battery fires, the FIRE BOX not only enhances safety but also paves the way for more widespread adoption of electric vehicles.



# IMPLICATIONS FOR URBAN PLANNING AND SAFETY STANDARDS



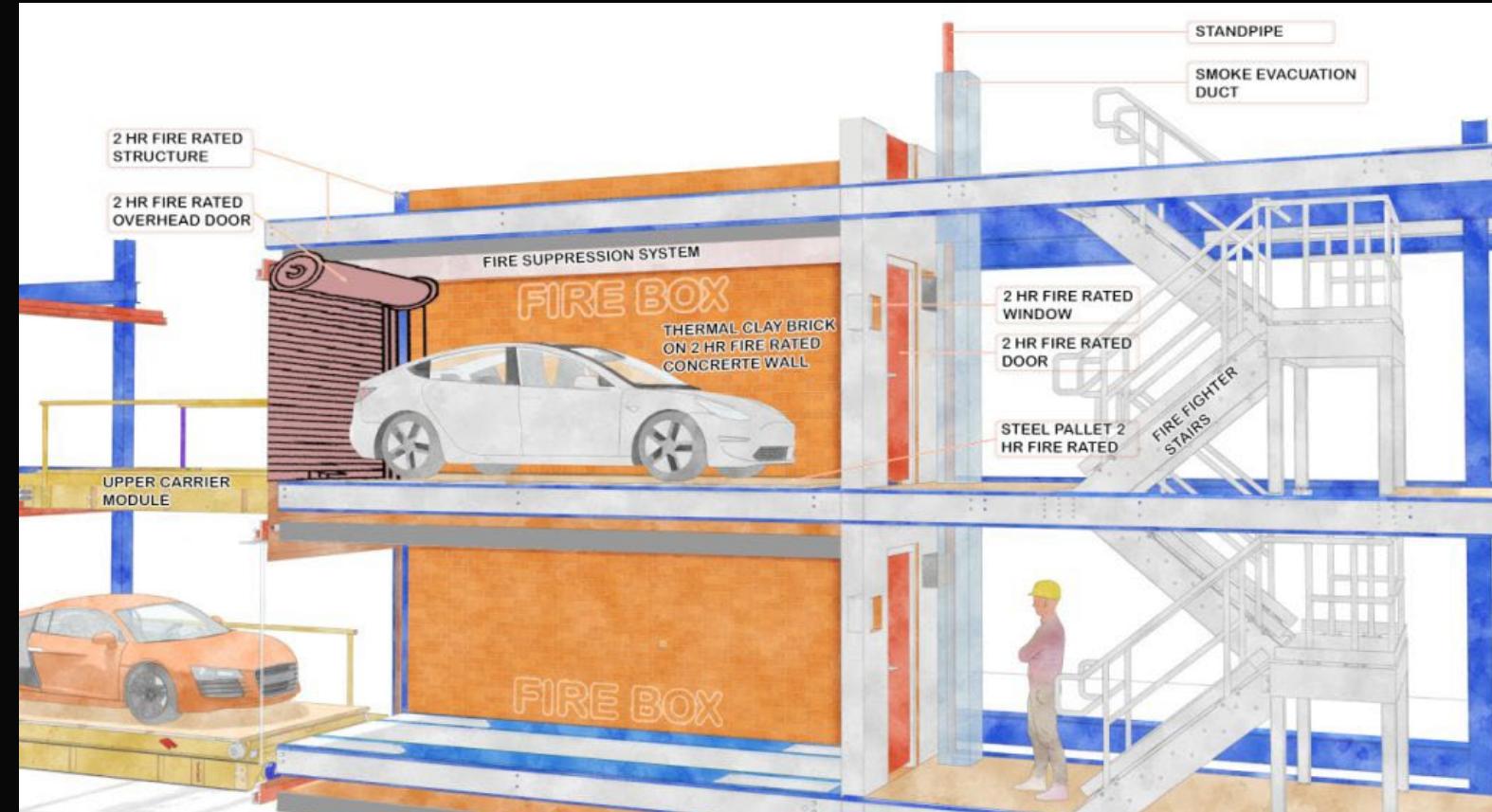
As cities worldwide grapple with the dual challenges of increasing urbanization and the push for sustainable transportation solutions, the FIRE BOX offers a viable solution to one of the critical barriers to EV adoption—fire safety. After an investigation that ended in 2021, the NTSB determined that high-voltage electric vehicle battery fires pose risks to first responders and that guidelines from manufacturers about how to deal with them were inadequate. Urban planners and safety regulators can look to the FIRE BOX as a model for integrating advanced safety measures into new and existing parking structures. By prioritizing proactive solutions like the FIRE BOX, municipalities can enhance public safety while supporting the transition to greener transportation options.



# THE ROAD AHEAD: INNOVATIONS IN EV FIRE SAFETY



The development of the FIRE BOX is part of a broader trend toward innovative solutions designed to address the challenges associated with EVs. Researchers and engineers are continually exploring new materials, technologies, and strategies to improve the safety and reliability of electric vehicles.



# CONCLUSION



The FIRE BOX by Robotic Parking Systems offers a groundbreaking solution to the challenges posed by both fossil fuel car fires in parking garages as well as EV battery fires.

By prioritizing early detection, swift relocation, and effective containment, the FIRE BOX sets a new standard for fire safety in parking structures. As the world moves towards a more sustainable future, innovations like the FIRE BOX will be instrumental in ensuring that safety keeps pace with technological advancement. Through continued collaboration and innovation, we can create a safer and more resilient urban environment for all.

FIRE BOX by Robotic Parking Systems offers fire safe garages throughout the world.

(1) FIRE BOX is patent pending.





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