UL Standards & Engagement

TRIP Data & Insights: 2024 – 1H 2025

EAGOSH
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12 November 2025

UL Standards & Engagement is a **safety advocacy organization** focused on achieving tangible results on pressing safety issues.

Involved in aviation since the 1920s, UL registered aircraft and pilots in the United States before the U.S. Federal Aviation Administration's formation.

TRIP

A voluntary, secure, Lithium battery incident surveillance system.

- Replaces an informal incident capture and reporting process administered by airline Dangerous Goods managers
- Capture incident data and aggregate information from multiple sources
- Maintain data in a more granular and consistent manner
- Provide participant airline-specific and anonymized industry data views based on user permissions
- ***Provided pro bono to participants***

mytripportal.org

Scope of the Program

TRIP is a voluntary program to capture and trend Lithium battery incidents, including “near-miss” incidents within the air carrier envelope (not limited to the aircraft).

Passenger Operations

- Carry-on
- Checked bags
- Curb ← → Curb

Cargo Operations

- Declared cargo
- Undeclared cargo
- Dock ← → Dock

Participants | Passenger

TRIP is designed *with* the industry *for* the industry

Participants | Cargo

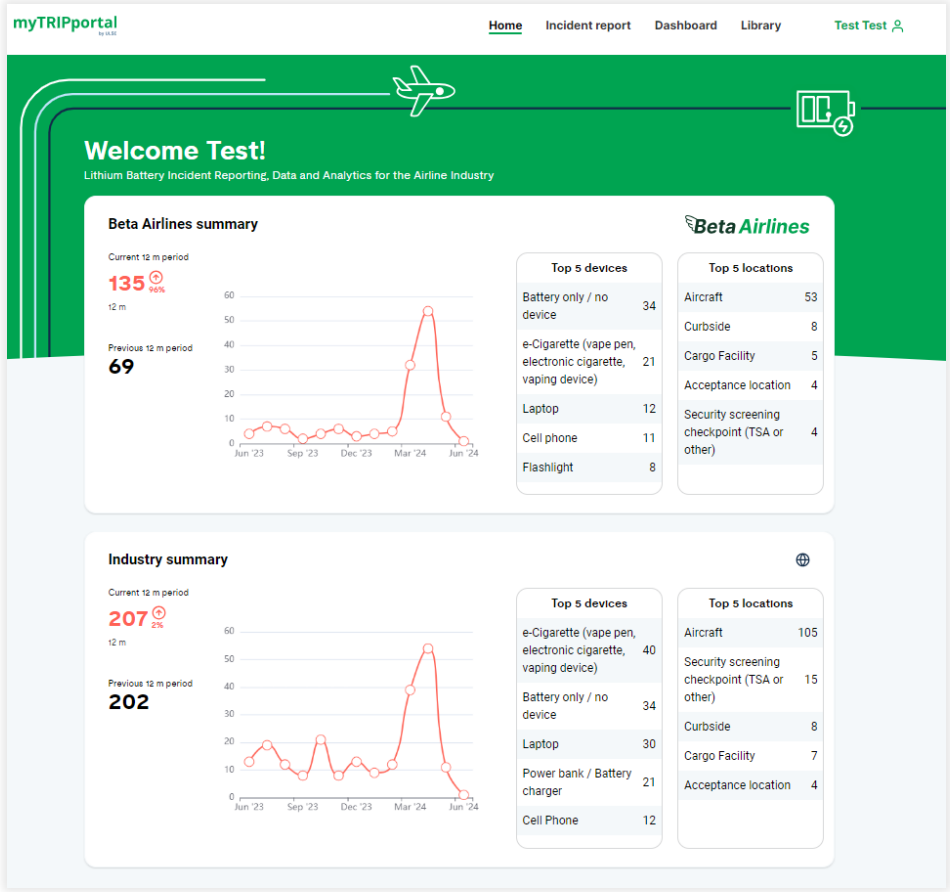
TRIP is designed *with* the industry *for* the industry

Participants | Safety Stakeholders

TRIP is designed *with* the industry *for* the industry

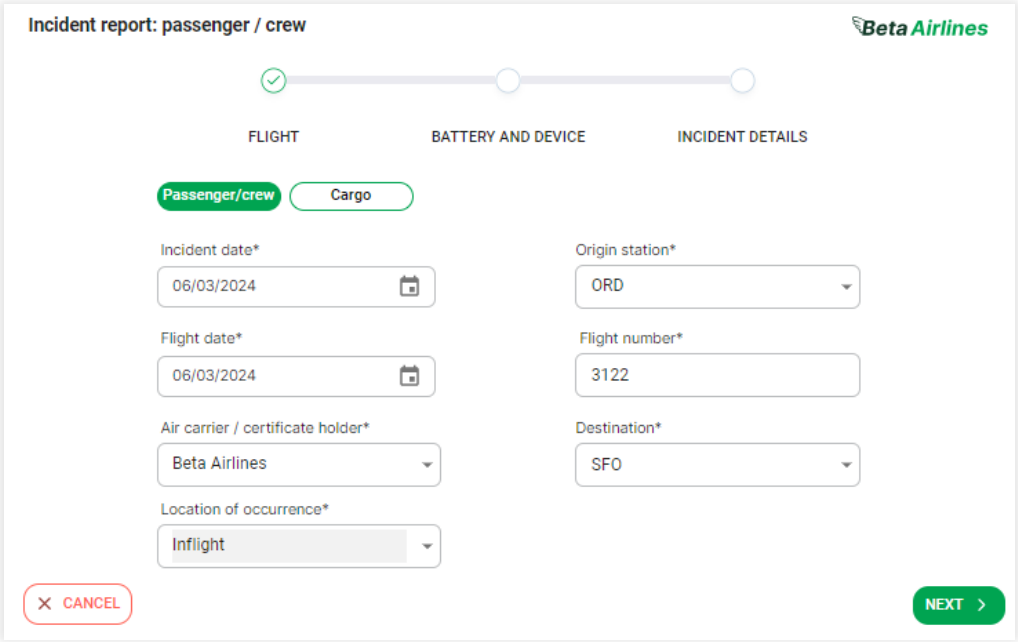
MyTRIPPortal.org

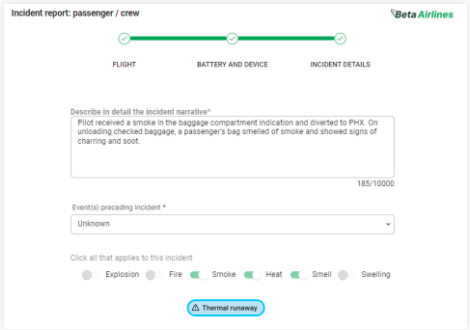
- Secure portal for voluntary reporting
- Summary of industry data
- Details of your airlines data, as submitted
- Ability to download
  - Full data for your airline
  - Incident summaries
- Tiered security model for different types of users:
  - Full access to enter, edit, delete incidents
  - Limited access to enter and view incidents
  - View-only access
- Library of reference materials

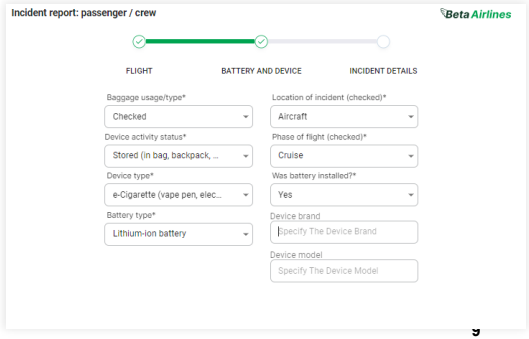


Data Collection

- Background details*
  - ✓ Date, Carrier, Flight #, Origin Station, Flight Destination, City of Occurrence
- Movement type*
  - ✓ Passenger: Checked baggage, Carryon bag/on person
  - ✓ Cargo
- Location of incident*
  - ✓ Specific to movement type
  - ✓ If on aircraft, includes specific location and phase of flight
- Event preceding incident*
- Device type*
- Device activity status*
- Device Brand and Model
- Incident narrative*
- Incident characteristics*
- Battery installation status*
- Injury and injury detail (if applicable)
- Images / documentation upload







Data Protection & Use

- UL Standards & Engagement commits to keeping individual airline data confidential. Our database has security roles that allow for full access, read-only access and public data (summary) only access.
- When data is shared with persons or organizations outside of the participating airline, it is anonymized and/or aggregated. The process of anonymization and aggregation removes the information that would enable an external party to identify the airline involved.

TRIP Goals

1

Provide the most accurate & timely accounting of Lithium battery incidents to better understand the scale & complexity of this safety issue.

2

Develop knowledge, raise awareness and increase transparency into Lithium battery safety issues.

3

Provide data to air carriers in support of their risk assessments and safety management programs.

4

Reduce risk and improve mitigation.

- Fewer rechargeable batteries in checked baggage.
- Increased use of fire containment products certified to UL 5800.

Data constraints and limitations

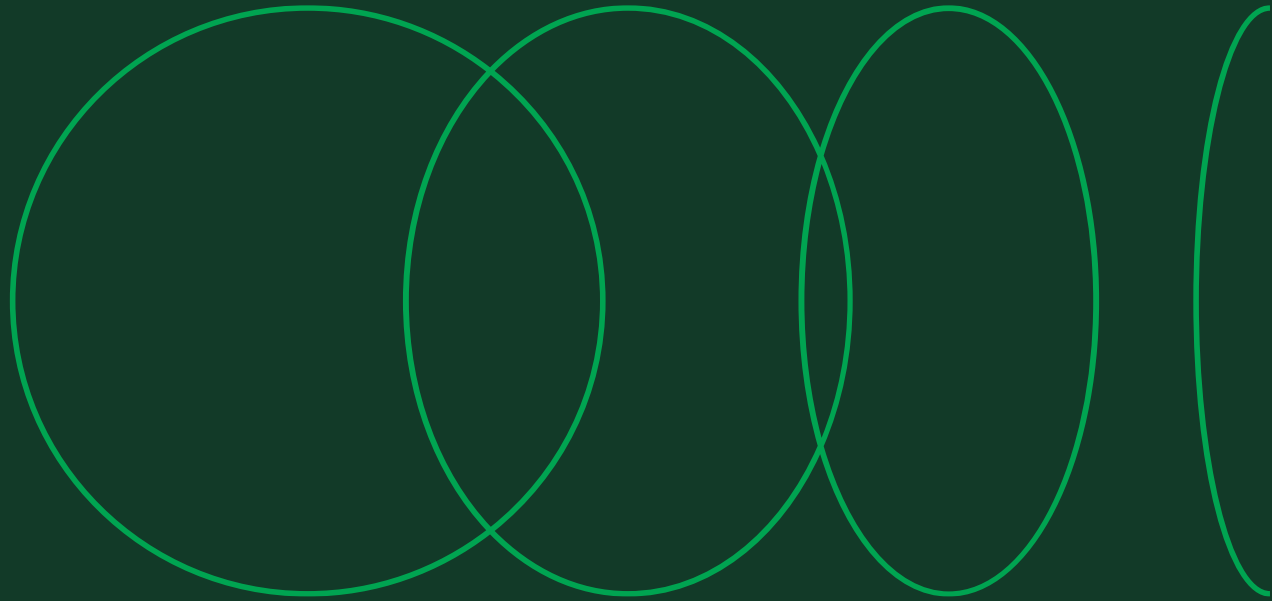
1. Compilation of 1097 incidents thru 11/03/2025.
2. 6+ years of tailored reporting.
   – Lithium Battery/Aviation specific.
   – Passenger / Baggage / Cargo.
3. Includes “near miss” / non-reportable incidents (segregated).
4. Increasing participation and data availability. Includes incidents from FAA lithium battery incident summaries.

Subset of airline industry – not a complete accounting, is not the full story.

Incident data capture process has “gaps.”

- Source is the crew – priority to safety, not data capture.
- Device ownership, damage, etc. limit detailed data capture.
- Lack of forensic process and resources at airlines limits root cause.

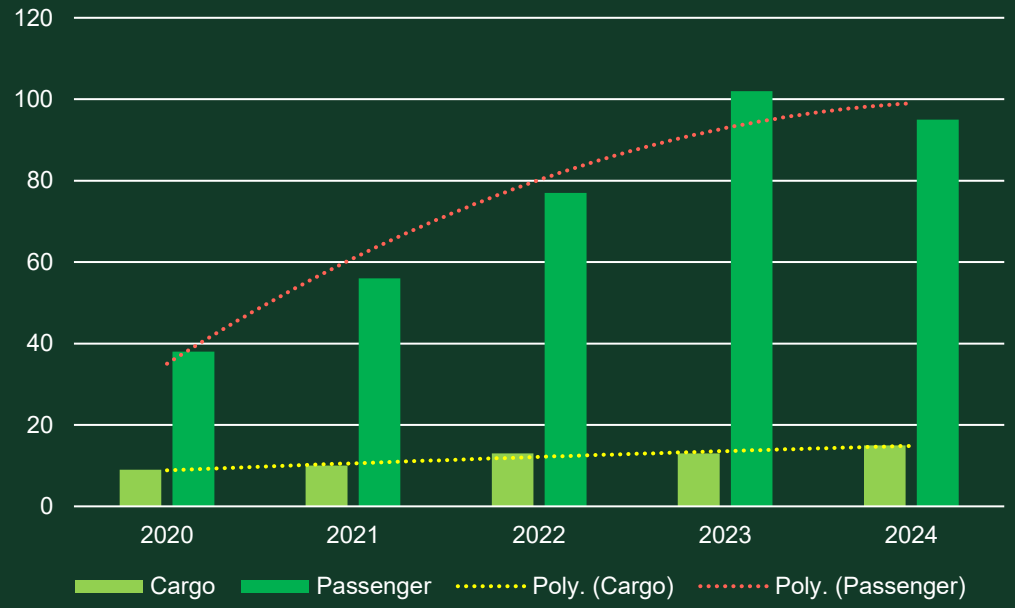
Incident Trends



Thermal runaway incidents continue to trend upward and have increased significantly since we began data collection in 2019

15%

increase between 2019 and 2024*



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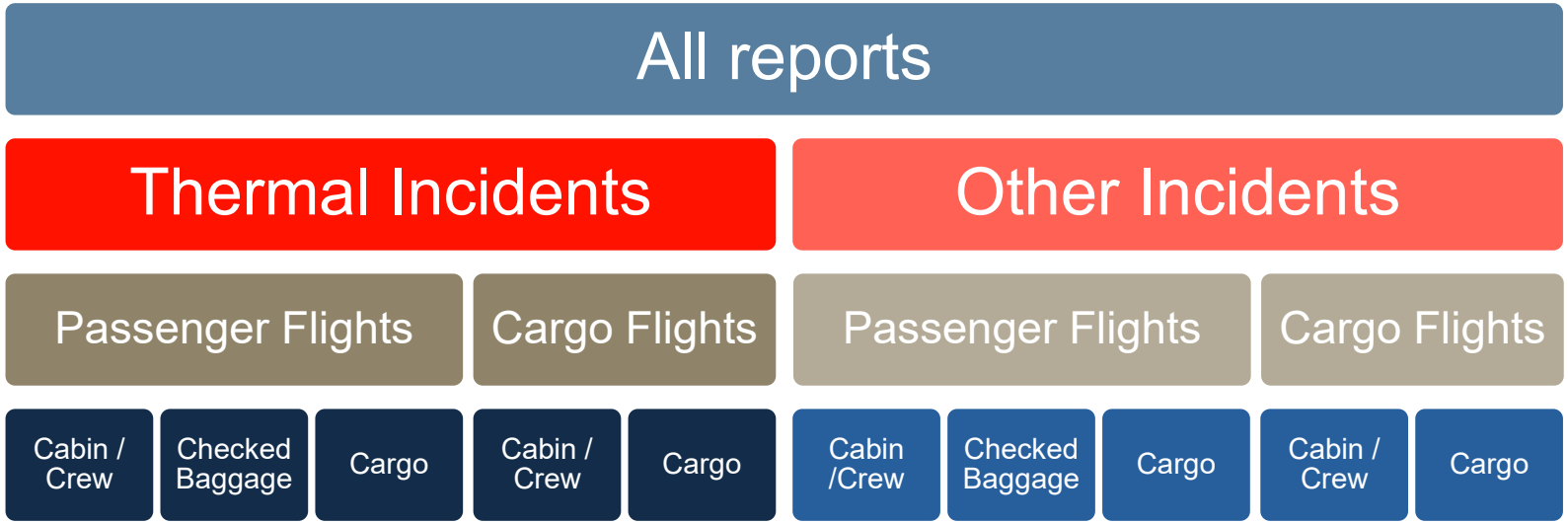
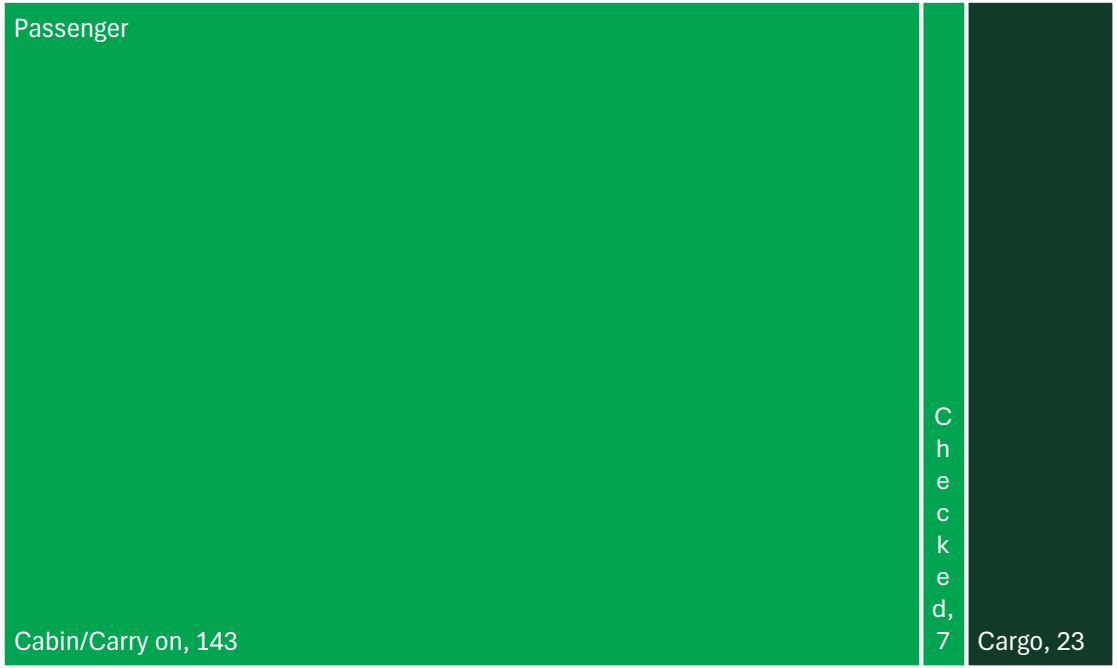
* Incident count, 2019 compared to 2024 | Source: ULSE TRIP Database, participant and FAA reports, as of 2024-12-31

Data analysis framework



Passenger and Cargo Incidents, 2024 – 1H 2025



173 thermal events

- No cargo incidents on Passenger flights
- 1 company device (point of sale device) on Passenger flight
- No cabin/crew incidents on Cargo flights
- 87% incidents involved Passenger operations

Incidents shown are events that involve “a fire, violent rupture, explosion, or a dangerous evolution of heat”

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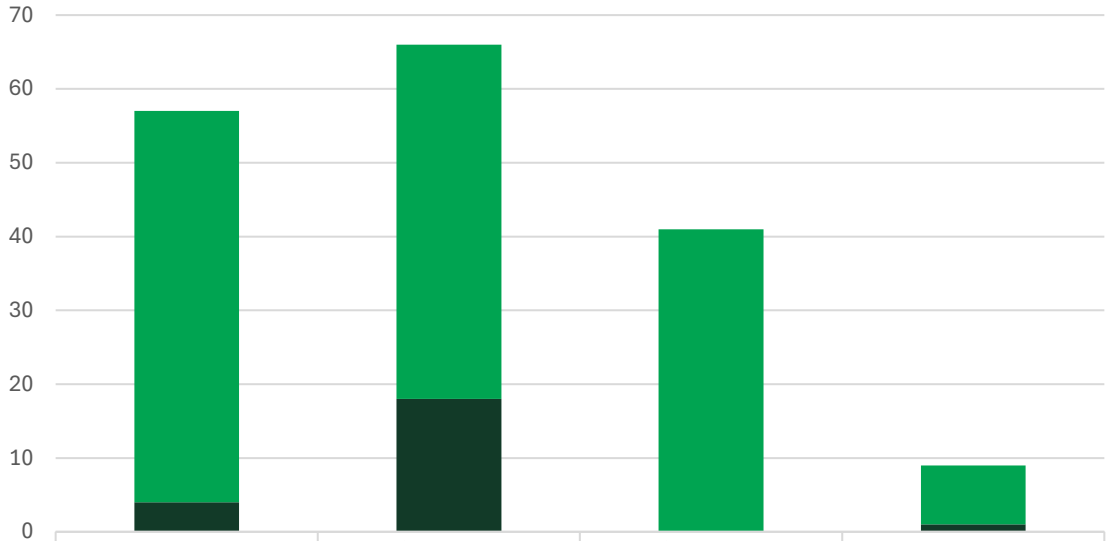
Source: ULSE TRIP Database 08/21/2025 and FAA reports 07/01/2025

2024 – 1H 2025 all thermal incidents, by device type group



	PEDs	Batteries/Powerbanks	e-Cigarette/Vape	Other
Passenger	53	48	41	8
Cargo	4	18	0	1

- Categorizing device type ‘groups’ indicates PEDs and batteries result in more events than e-cigarettes:
- PEDs includes cell phones, laptops, tablets, gaming devices, cameras and other similar products.
- Batteries No Device include batteries, power banks, other charging devices.
- E-Cigarettes (vape or pipe) are lithium battery powered devices that simulate smoking.
- Other in this chart includes flashlights, medical refrigerator, massaging device, point of sale device, other various products.

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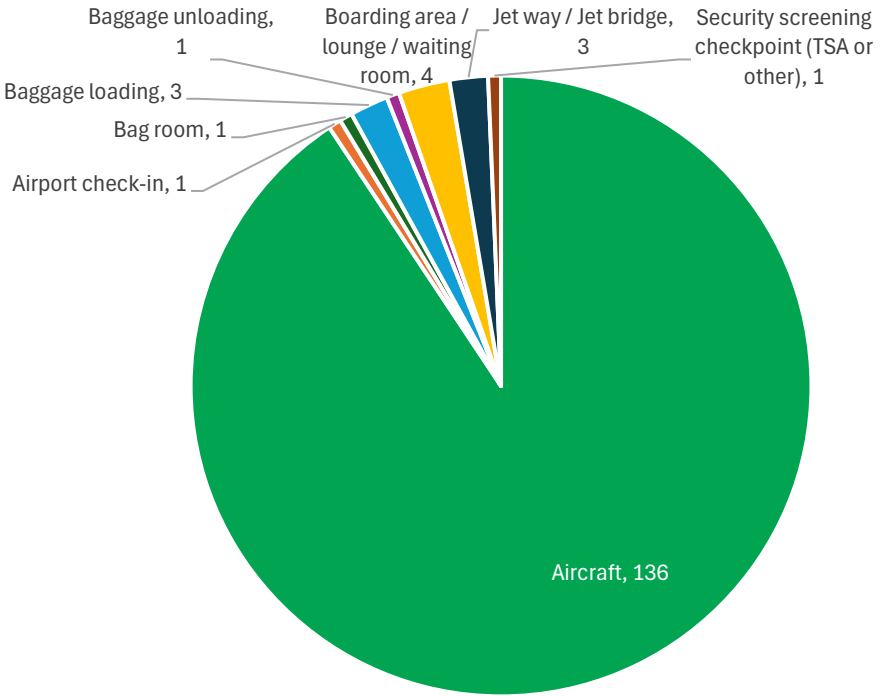
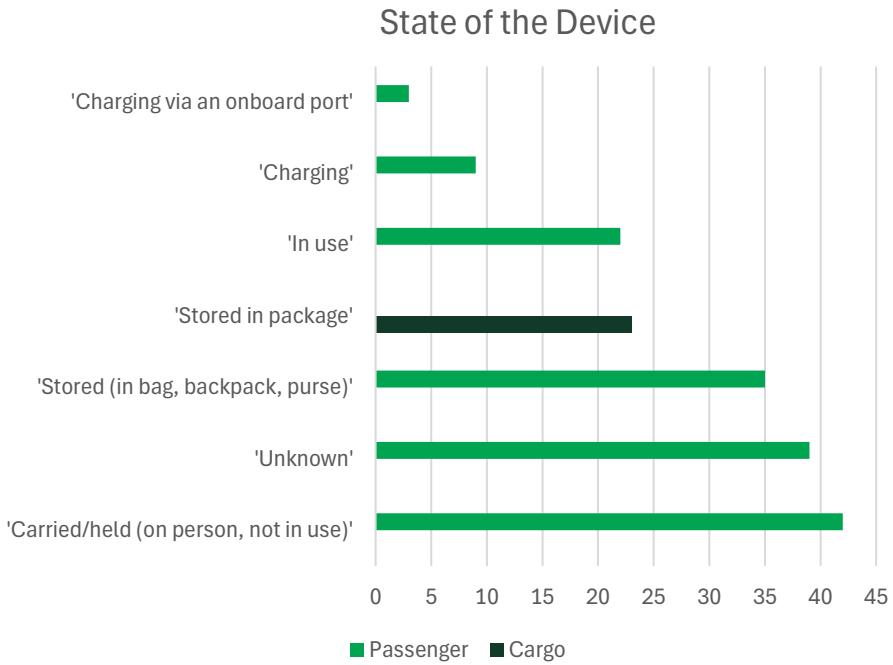
Source: ULSE TRIP Database 08/21/2025 and FAA reports 07/01/2025

2024 – 1H 2025 thermal incidents, by location, passenger flights





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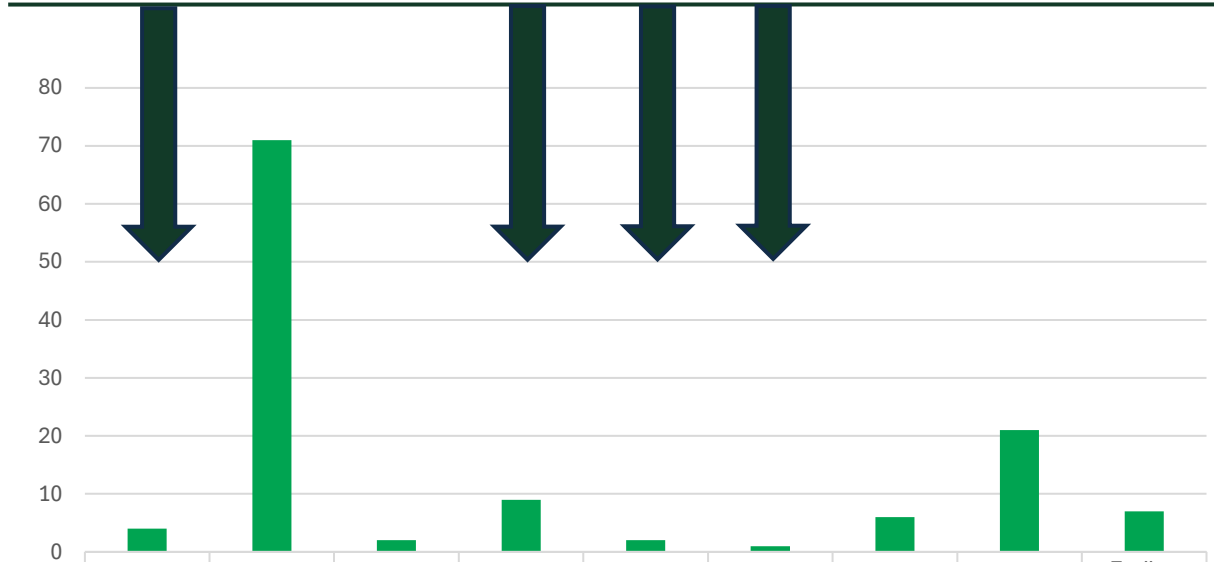
Source: ULSE TRIP Database 08/21/2025 and FAA reports 07/01/2025

2024 – 1H 2025 all thermal incidents, by phase of flight, (location = aircraft)



	Climb	Cruise	Deplane	Descent	Final	Landing	Not provided	Parked	Taxiing to/from runway
Total	4	71	2	9	2	1	6	21	7

At least 13% of incidents on the aircraft occurred in critical phases of flight (takeoff, climb, descent, final, landing)

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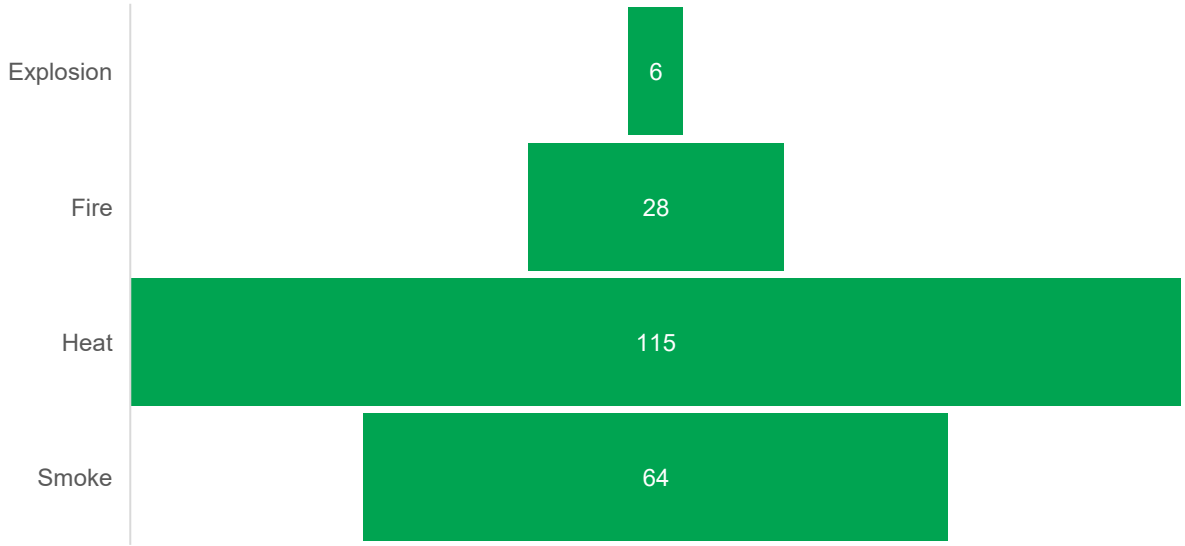
Source: ULSE TRIP Database 08/21/2025 and FAA reports 07/01/2025

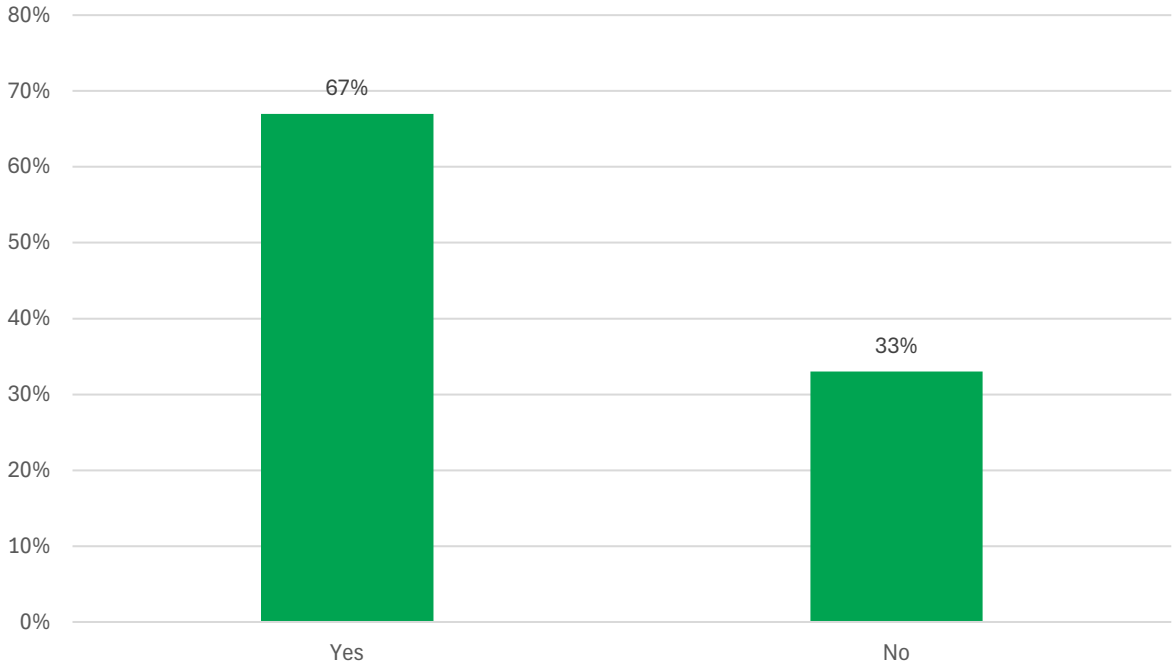
2024 – 1H 2025 thermal incidents, passenger, carry on & on person, by incident characteristics



- An incident can display multiple thermal runaway characteristics.
- Excessive heat is the most commonly reported characteristic of thermal runaway.
- Fires were reported in 20% of the incidents with devices carried by passengers (on person or carry on).
- Airlines described 6 thermal events as explosions.

Source: ULSE TRIP Database 08/21/2025 and FAA reports 07/01/2025

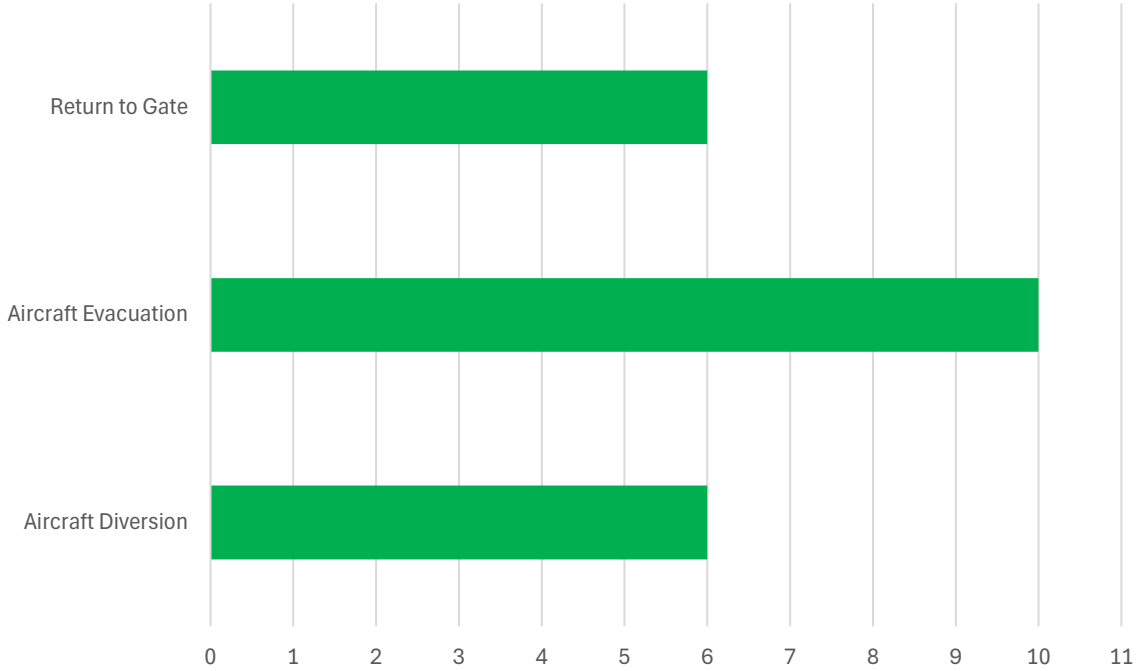
Passenger / crew, thermal containment product used, % of total



- From incident narrative analysis | “thermal containment” “battery containment” “fire containment” “tcb” “bcb”
- Many incidents where TCB used preventively (overheating, no other characteristics).

Source: ULSE TRIP Database 08/21/2025 and FAA reports 07/01/2025

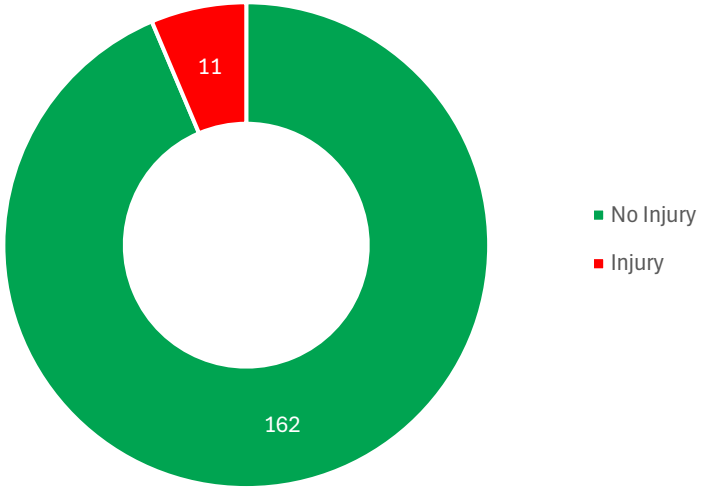
2024 – 1H 2025 thermal incidents, passenger, significant disruptions



Source: ULSE TRIP Database 08/21/2025 and FAA reports 07/01/2025

- From incident narrative analysis on Passenger Reports | “Evacuation”, “Divert” or “Return”
- Total of 21 flights (1 flight diverted and evacuated)
- More than 15% of onboard events (21/136) resulted in a significant customer disruption

2024 – 1H 2025 thermal incidents, injury involved, passenger flights, cabin/crew



- Redness and discomfort on passenger hand after handling vape pen
- Passenger potential slight burn to leg
- Passenger who owned the phone received burns and was treated at the scene
- Customer was burned on her hands and clothes and received first aid gel and bandaging from Flight Attendants
- Other minor burns to passenger hands or legs (6)
- 3 passengers were injured during an evacuation from one incident

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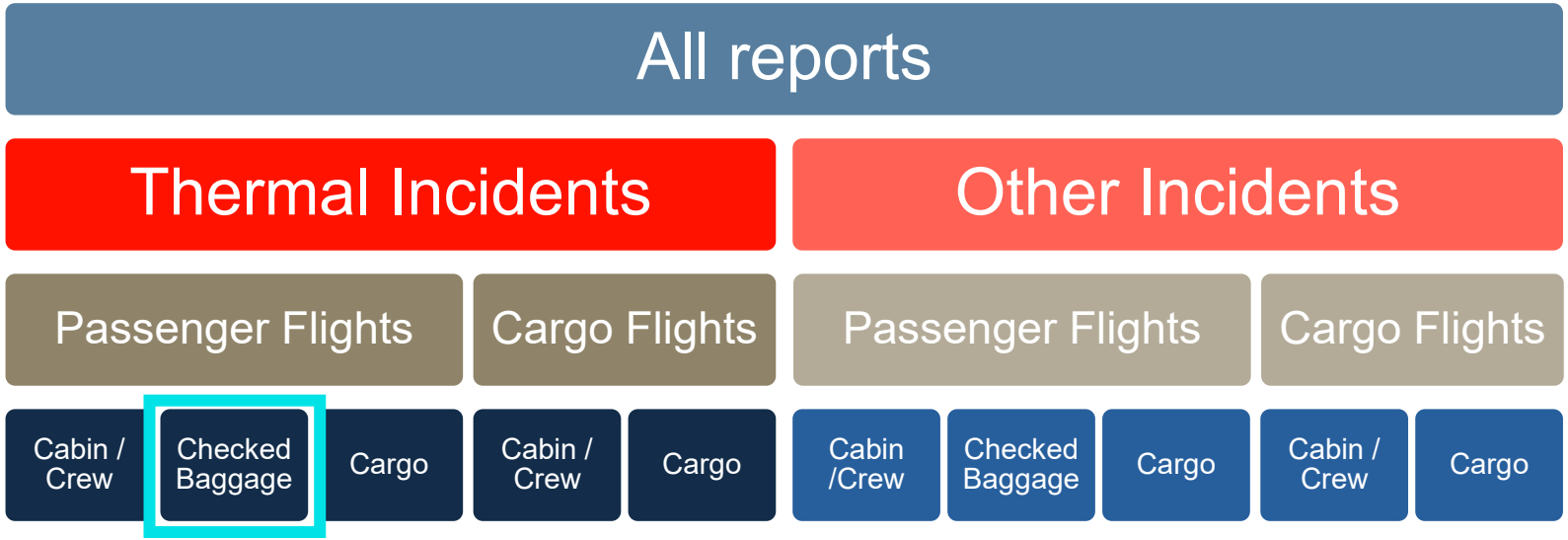
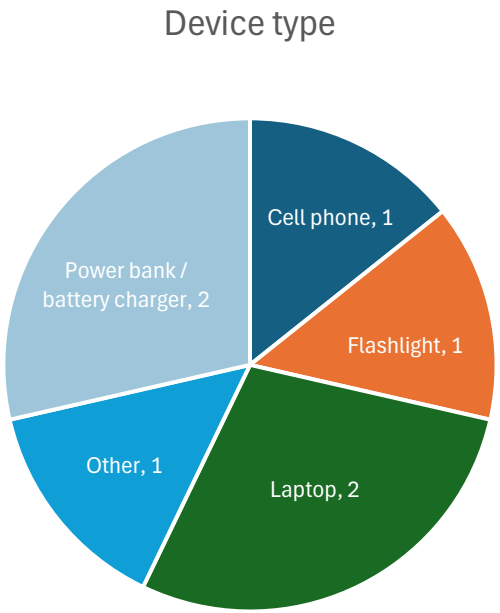
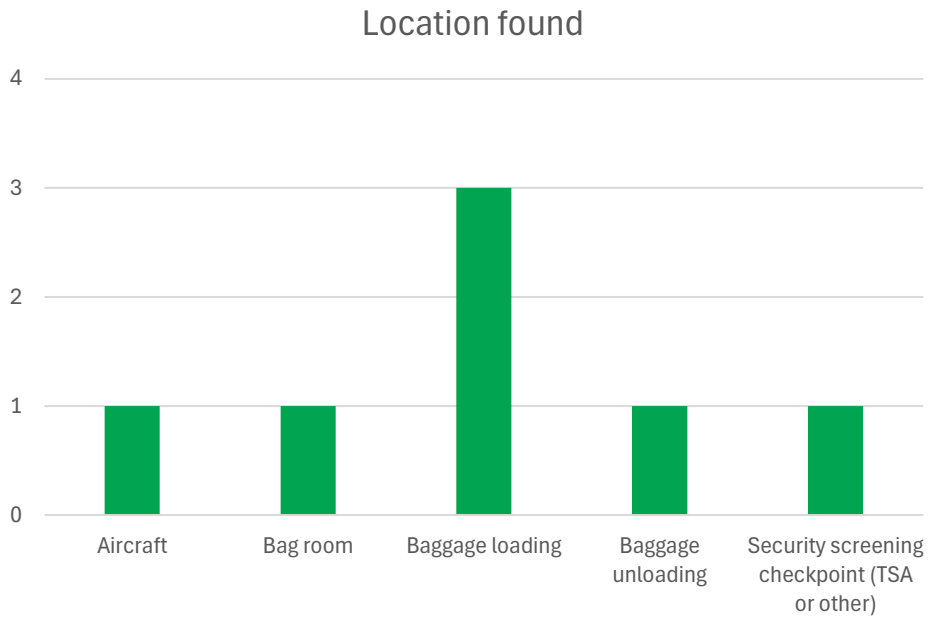
Source: ULSE TRIP Database 08/21/2025 and FAA reports 07/01/2025

Data analysis framework



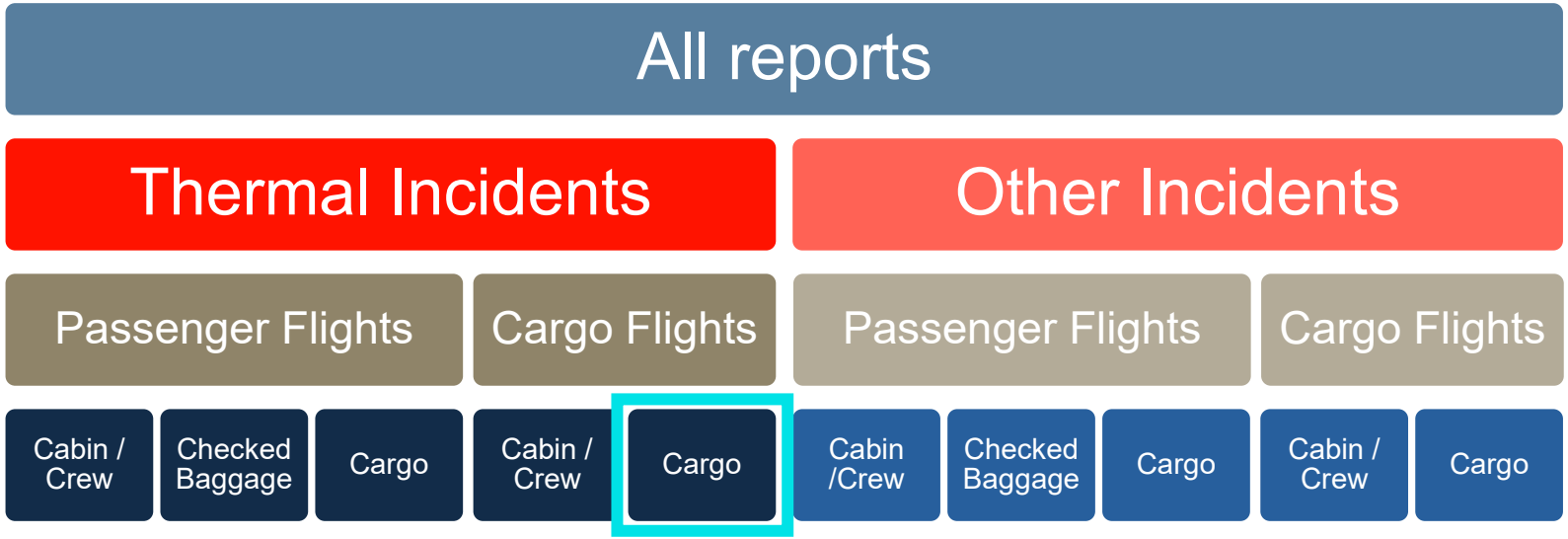
2024 – 1H 2025 thermal incidents, passenger, checked baggage (7)



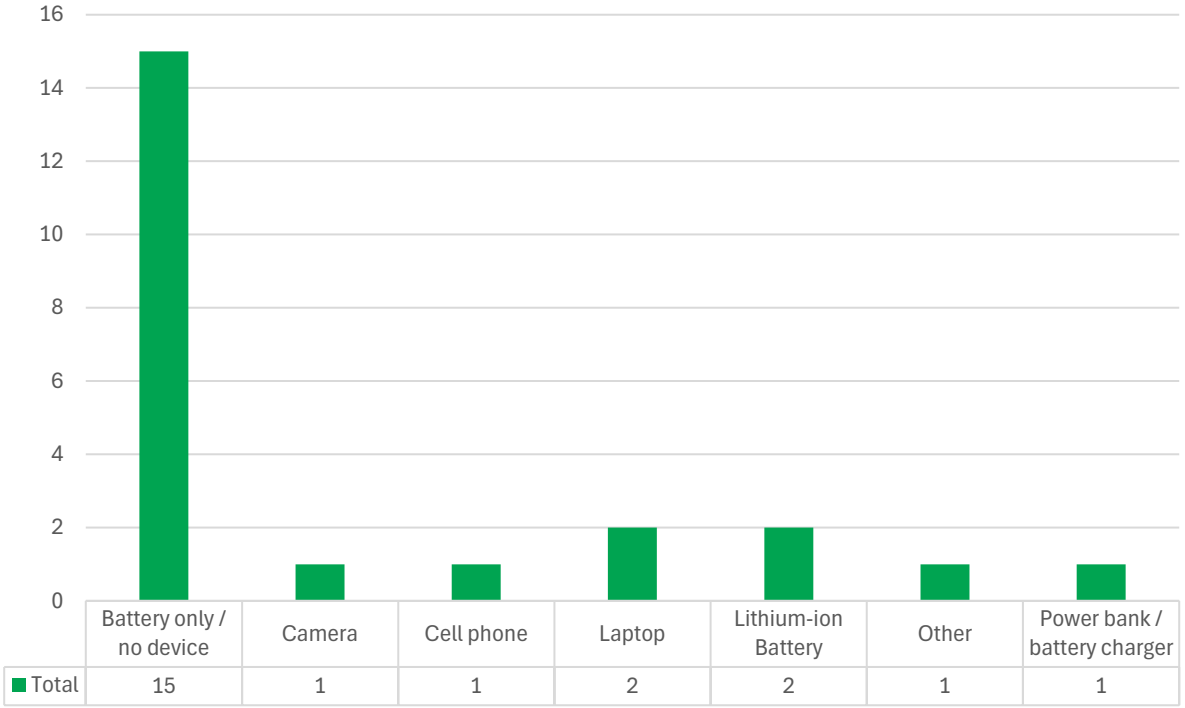


Source: ULSE TRIP Database 08/21/2025 and FAA reports 07/01/2025

Data analysis framework



2024 – 1H 2025 thermal incidents, by device type, cargo flights (23)



	Battery only / no device	Camera	Cell phone	Laptop	Lithium-ion Battery	Other	Power bank / battery charger
Total	15	1	1	2	2	1	1

Other:

- Lithium metal battery contained in equipment described as “People counting device”.

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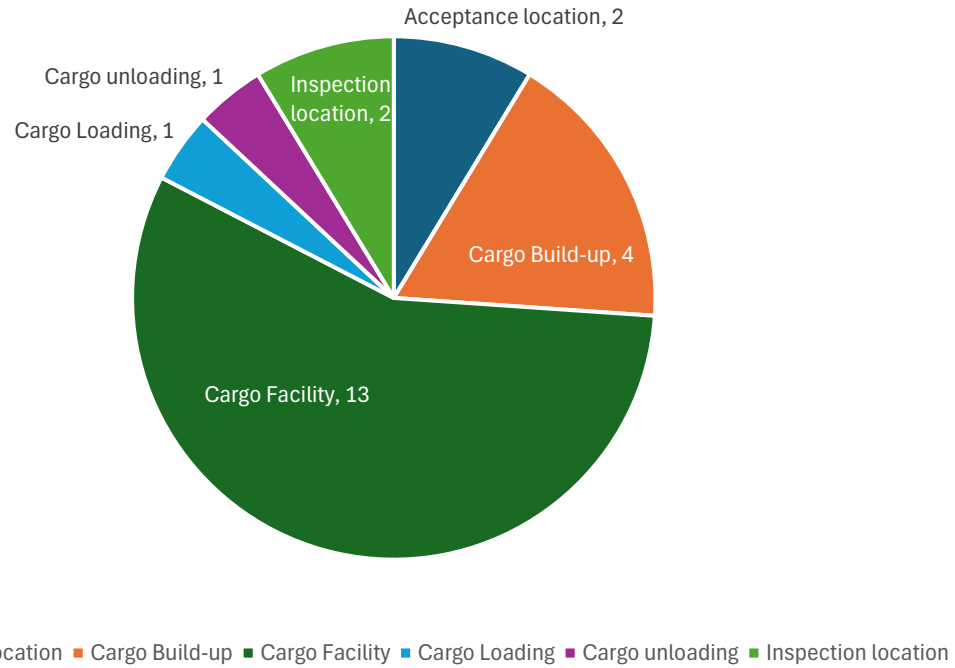
Source: ULSE TRIP Database 08/21/2025 and FAA reports 07/01/2025

2024 – 1H 2025 thermal incidents, by location, cargo



- None of the 23 cargo events indicated a location of aircraft.
- In many cases the package shows sign of a thermal event, but, it is not possible to determine when it occurred.
- Cargo facility often means sortation or other mechanized or manual handling.
- While all issues are concerning, those that occur in cargo buildup, loading or unloading are especially concerning due to the proximity of the aircraft.

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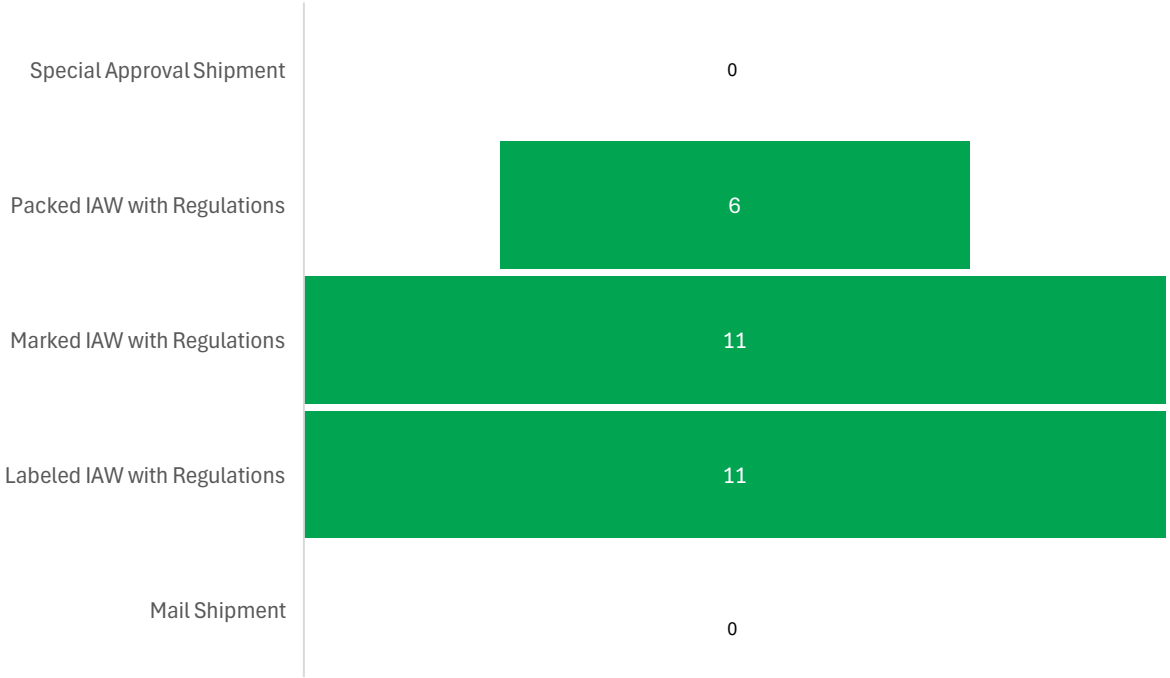
Source: ULSE TRIP Database 08/21/2025 and FAA reports 07/01/2025

Regulatory Compliance, Cargo



- No cargo incidents included those that required Special Permit or Approval.
- There were no Mail shipments indicated in the data.
- 6 shipments were packed In Accordance With the regulations, the remaining 17 are either unknown or undeterminable.
- 11 shipments were marked and labeled In Accordance With the regulations, the remaining 12 are either unknown are undeterminable.
- Greater than 25% of shipments appeared to be in conformance with the regulations.

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Source: ULSE TRIP Database 08/21/2025 and FAA reports 07/01/2025

Insights and conclusions

Passenger incidents

More than **80% of incidents occur in the passenger cabin**. The volume, variation, and condition of devices brought on board, coupled with the imperfect ability to enforce limits and rules, imply **passenger awareness must be improved**.

Cargo incidents

Apparent **trends were disrupted** in 2024, e.g., UN3480, UN3090. The small volume of incidents makes data analysis very challenging. **Mitigation strategies, i.e. 30% SoC must be implemented and enforced. Packages appearing compliant can still be a risk.**

Industry collaboration

Industry collaboration, **data sharing, and harmonization** must be embraced to reduce gaps in the system. **Any fire at 30,000 ft. is an unacceptable risk!**

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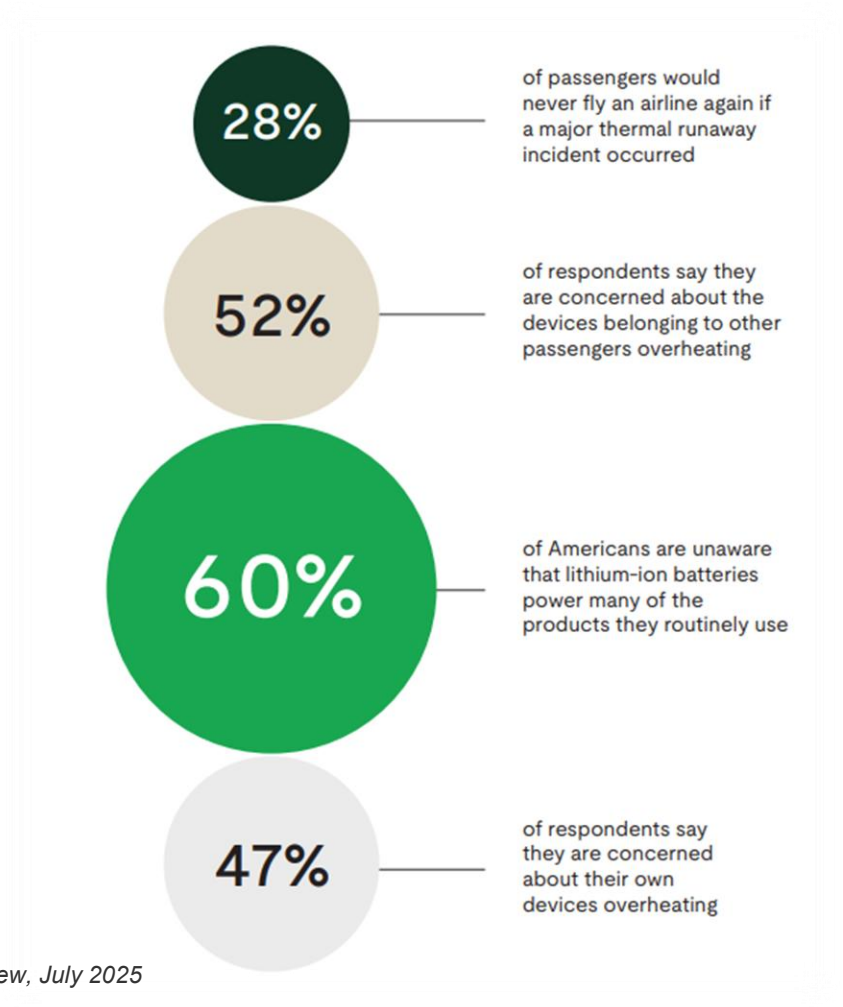
ULSE Insights

A look at the passenger mindset and what it means for flight safety

The Awareness Gap

50% of American consumers say they know nothing about lithium-ion batteries. Once alerted to the risks, passenger surveys show high rates of concern.



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Source: Lithium-Ion Battery Incidents in Aviation 2024 Data Review, July 2025

The average passenger brings 4 rechargeable devices on board

Smartphones (92%)

Laptops (63%)

Headphones (70%)

Tablets (64%)

SMALLEST JET

CRJ-440

44 passengers
3 crew members

188 devices on board

LARGEST JET

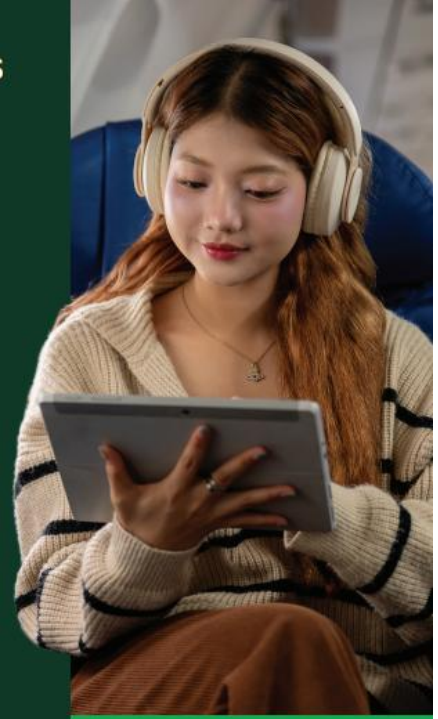
Airbus A380

525 passengers
20 crew members

2,180 devices on board

UL Standards & Engagement

Source: Lithium-Ion Battery Incidents in Aviation 2024 Data Review, July 2025



Approximately 2 in 5 (38%) passengers admit to putting lithium-ion powered products in their checked luggage

Despite explicit guidance prohibiting packing lithium-ion batteries in checked luggage, these items are routinely checked and often placed out of sight in the cabin.

Where Passengers Are Packing Rechargeable Devices

	Smartphone	Laptop	Tablet	Portable Charger	E-Cigarettes
At my seat	92%	54%	64%	44%	51%
Overhead compartment	4%	29%	20%	29%	18%
In checked luggage	4%	18%	16%	27%	31%

Source: Lithium-Ion Battery Incidents in Aviation 2024 Data Review, July 2025

Key findings from our cabin crew research include:

Flight attendants are highly aware of the risks of thermal runaway, but are concerned about increasing incidents and perceived gaps in passenger education efforts

Crew perceive themselves as highly-trained safety professionals, but identify areas for improvement in their training and access to equipment

Flight attendants who have experienced an incident report that instinct takes over when managing a chaotic situation

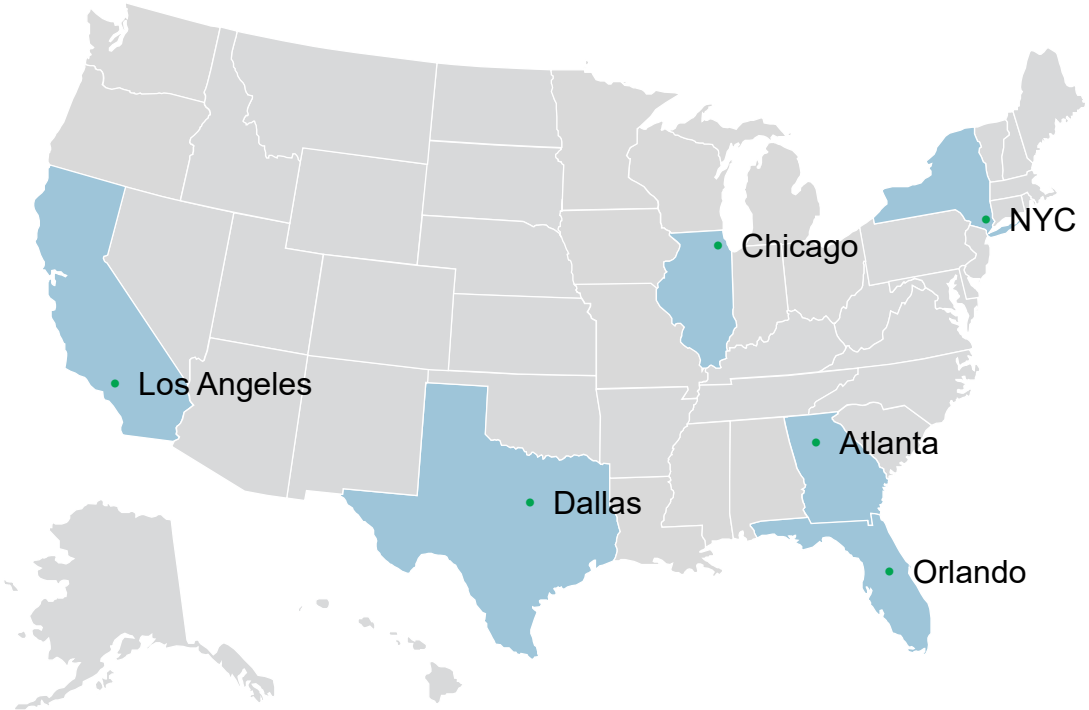
Cabin crew are satisfied with a multi-level regulatory framework to address the carriage of lithium-ion batteries, but differ on their opinions about the adequacy of efforts by the government or airlines to communicate guidance

Educating Passengers for Safer Skies

Passenger Focus Groups

Key takeaways that guided the campaign development:

- Use passengers' vernacular (rechargeable vs. lithium-ion) and clear visuals
- Be clear about the risk and passengers' simple role in limiting it
- Get attention the way memorable PSAs like Smokey the Bear

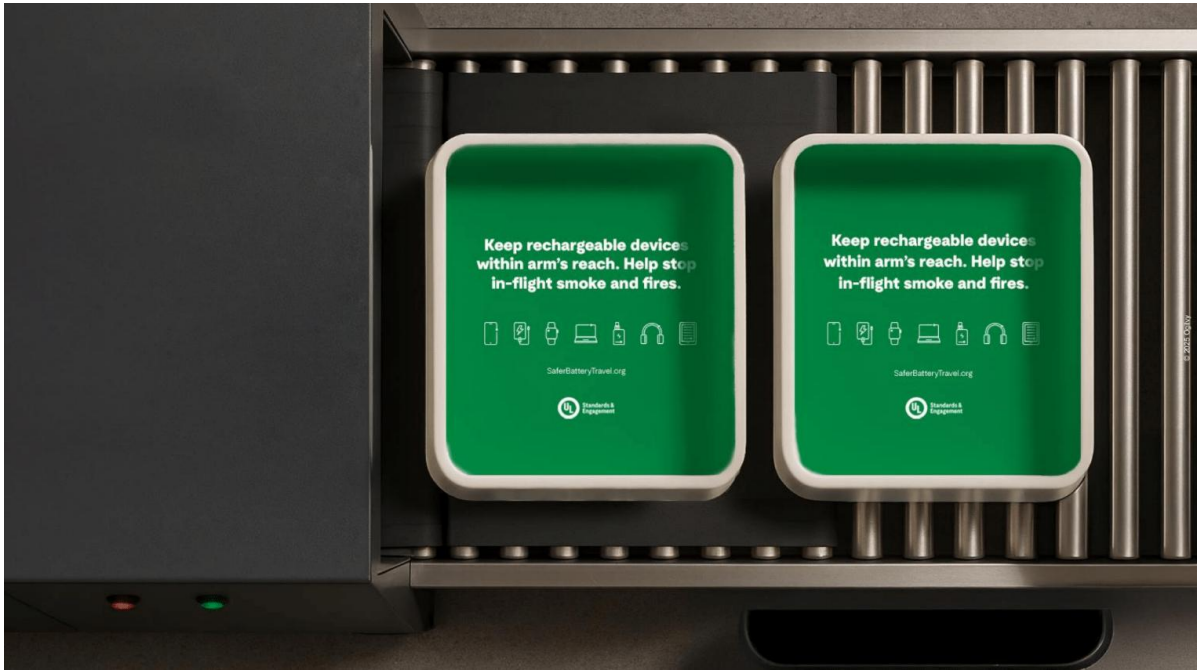


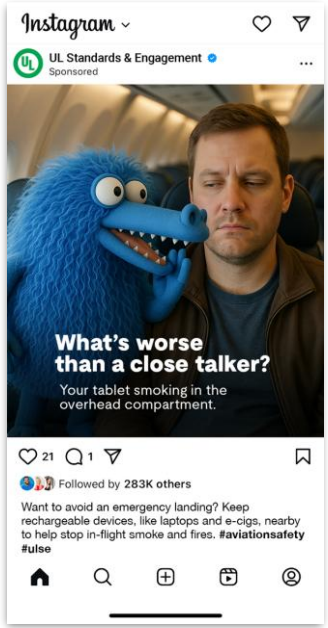
Passenger Education Campaign

- **Objective:** Reduce the number of passengers packing rechargeable products in checked luggage and issue a call to action to keep devices at arm's reach
- **Audiences:** Leisure travelers, family travelers, and business travelers
- **Launch:** ULSE launched the pilot effort this month and will use the results to guide its activity in 2026
- **Resource Toolkit:** Now available

SaferBatteryTravel.org

Additional Creative Samples





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Thank you

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For additional information, contact

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