61ST CONFERENCE OF DIRECTORS GENERAL OF CIVIL AVIATION ASIA AND PACIFIC REGION

Kuala Lumpur, Malaysia
7 – 11 September 2026

AGENDA ITEM 3: AVIATION SAFETY

A PREVENTION-FIRST APPROACH TO MANAGING RISKS FROM PASSENGER-CARRIED LITHIUM BATTERIES

Presented by the International Coordinating Council of Aerospace Industries Associations (ICCAIA)

SUMMARY

The safety risk posed by passenger-carried lithium battery devices on commercial aircraft has continued to escalate, as demonstrated by the increasing frequency and severity of in-flight thermal runaway events. To date, aviation safety measures have remained largely reactive. Although existing international guidance is valuable, it is insufficient to address latent manufacturing defects, emerging battery chemistries, and the risk of deliberate misuse. A prevention-first approach is urgently needed, centered on stronger design standards, device-level mitigations, and more rigorous quality control throughout the manufacturing process. Risk could be significantly reduced through the development of a universal "Aviation Certified" standard for personal portable battery devices, supported by traceable conformity markings and verifiable identification features that would allow airports and airlines to screen out uncertified or higher-risk devices before they enter the cabin. ICAO, APAC States, and relevant industry stakeholders should collect and share best practices, evaluate enhanced screening technologies, and work together to advance internationally harmonized measures that reduce the threat posed by unsafe lithium battery products in commercial air transport.

A PREVENTION-FIRST APPROACH TO MANAGING RISKS FROM PASSENGER-CARRIED LITHIUM BATTERIES

1. INTRODUCTION

1.1 Lithium-ion battery technology has advanced rapidly and expanded exponentially across the consumer electronics market in response to demand for longer device life and greater charging capacity. Modern portable electronic devices (PEDs) and power banks now rely on high-energy-density cells. As energy capacity has increased, so too has the hazard associated with cell failure: a single cell failure today can release substantially more kinetic energy and heat flux than a cell manufactured a decade ago, significantly increasing the potential severity of an in-flight fire.

1.2 Safety data from sources, including FAA[1], UL Standards & Engagement (ULSE)[2], indicates a clear upward trend in inflight lithium battery incidents. Despite strict public awareness campaigns and cabin crew training, the sheer volume of batteries carried onboard has statistically multiplied the frequency of events.

1.3 The working paper (A42-WP/251)[3] submitted to the 42nd ICAO Assembly by the Republic of Korea highlighted that devices carried onboard present a fire hazard because of the risk of thermal runaway, especially when batteries are damaged, overcharged, or poorly manufactured. Crucially, internal short circuits — which cannot be prevented by external insulation — have been identified as the primary cause of several onboard fire incidents.

1.4 This risk has likely existed for an extended period, as evidenced by the Information Paper (DGP-WG/23-IP/4)[4], which drew upon data from the ULSE Thermal Runaway Incident Program (TRIP) and was presented to the ICAO Dangerous Goods Panel Working Group (DGP-W/23). The document demonstrated that the majority of inflight safety incidents involving these devices occurred while they were stored or being held and reportedly not in active use. The ULSE summary of 2025 thermal incidents corroborates that this pattern persists.

1.5 It should not be assumed that the current energy densities of consumer electronic power storage devices have reached an arbitrary maximum. News reports about advances in new battery chemistries and architectures aimed at achieving even higher energy densities appear nearly every day. Accordingly, the aviation industry must address not only the growing risks posed by today's chemistries and architectures, but also proactively prepare for the risks that are likely to emerge in the near future.

1.6 Evidence suggests that passengers are growing increasingly concerned about the possibility of in-flight emergencies caused by lithium battery thermal runaways. The comprehensive ULSE survey[5] indicated that passengers traveling in the Asia-Pacific region are willing to accept modest increases in screening time in exchange for a reduced risk of thermal runaway incidents.

2. DISCUSSION

2.1 It must be recognized that international standards and guidelines, such as the *ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air* and the *IATA Dangerous Goods Regulations (DGR)*, provide a strong foundation for managing thermal runaway-related risk. These measures include important safety protocols such as limiting the number of spare batteries and power banks that may be carried, prohibiting the recharging of power banks onboard, and providing

---

[1] https://www.faa.gov/hazmat/resources/lithium_batteries/incidents
[2] https://ulse.org/wp-content/uploads/2025/06/TRIP-Report-May-2025-Final.pdf
[3] https://www.icao.int/sites/default/files/Meetings/a42/Documents/WP/wp_251_en.pdf
[4] https://www.icao.int/sites/default/files/DangerousGoods/DGP Meeting Documentation/WG23WPs/DGPWG.23.IP.004.4.en.pdf
[5] https://ulse.org/wp-content/uploads/2025/05/Lithium-Ion_Battery_Safety_in_Air_Travel_An_Asia-Pacific_Focus.pdf

cabin crew training on the use of advanced thermal containment bags or other containment technologies/methods like water for cooling actively failing devices.

2.2 However, these existing frameworks are inherently reactive and increasingly inadequate in the face of the modern threat environment. Because current rules focus primarily on responding after a fire has already started or on limiting user behavior, they contain a critical blind spot: they cannot detect or prevent a passenger from boarding an aircraft with a battery compromised by an undetectable internal manufacturing defect. Relying on cabin crew as the primary line of defense against highly volatile, self-sustaining chemical fires places an unsustainable burden on frontline personnel and creates an unacceptable operational safety risk.

2.3 While current cabin safety protocols focus heavily on reactive approaches on storage, firefighting, and containment methods, meaningful, long-term risk reduction depends on the development and adoption of inherently safer consumer hardware and the prevention of devices that do not meet aviation standards from being brought onboard commercial aircraft. The aviation industry, working in concert with governments, should actively drive this outcome by establishing stronger regulatory requirements and performance standards, and by pressing consumer electronics and battery manufacturers to implement advanced device-level mitigations. Proactive intervention at the design and certification stage is far more effective than continuing to rely on in-flight response measures alone.

2.4 In the long term, the aviation industry must adopt a “prevention-first” approach, in which improved technical standards become the primary means of mitigating power storage device failures onboard commercial aircraft. These standards should include safer cell chemistries, integrated thermal protection, internal monitoring, safe-shutdown mechanisms at the device level, and stronger quality control throughout manufacturing processes. By encouraging manufacturers to voluntarily align their assembly standards with aviation-relevant safety thresholds and appropriate approvals by relevant authorities, and by offering a “safe-to-fly” endorsement to those that meet these requirements, the industry can help advance a future in which localized cell anomalies are contained within the device and prevented from escalating into cabin fire emergencies.

2.5 A “safe-to-fly” power storage device design framework should promote cell-level certification and traceable conformity markings for loose consumer power banks and replacement PED batteries prior to retail distribution. A harmonized “Aviation Certified” personal portable battery standard could be developed through a collaborative framework involving international bodies such as ICAO, IATA, CCC (3C), UL, and CE. Such a standard could include a highly visible physical logo, supported by an integrated cryptographic electronic marking. These measures would enable airport security screeners to rapidly verify device authenticity and certification at passenger checkpoints, helping to intercept uncertified or poorly manufactured power banks before they enter the aircraft cabin.

2.6 The Conference is encouraged inviting Member States to assess opportunities for encouraging airports and airlines to study and share best practices regarding advanced screening technologies at security checkpoints and departure gates, establishing a more effective, layered barrier against the introduction of high-risk cells into commercial flights.

3. ACTION BY THE CONFERENCE

3.1 The Conference is invited to:

a) note the growing safety concerns and emerging trends associated with in-flight thermal runaway events involving latent battery manufacturing defects, substandard build quality, and other hidden vulnerabilities in passenger-carried lithium battery devices;

b) encourage ICAO and APAC States to collect and share lessons learned, as well as best practices, from States that have already introduced, or are considering, enhanced controls on personal electronic power storage devices permitted onboard commercial aircraft. The aviation industry would benefit from studying

jurisdictions that have implemented more advanced risk controls for passenger-carried lithium batteries;

c) request ICAO's Dangerous Goods Panel to define the Standards necessary for a universal Aviation Certified personal portable battery designation This standard should cover certification and traceable conformity markings for loose power bank components, as well as requirements for retail-ready devices incorporating safer cell chemistries, thermal protection, internal monitoring, safe-shutdown mechanisms, and robust manufacturing quality controls; and

d) request ICAO's Dangerous Goods Panel to develop a clear and recognizable means of identifying batteries certified under the universal "Aviation Certified" standard. This should include a highly visible physical logo, supported by an integrated cryptographic electronic marking, to enable airport security screeners to rapidly verify device authenticity and certification at passenger checkpoints and intercept uncertified or poorly manufactured power banks before they enter the aircraft cabin.

— END —