Mitigation Strategies for Transporting Batteries by Air

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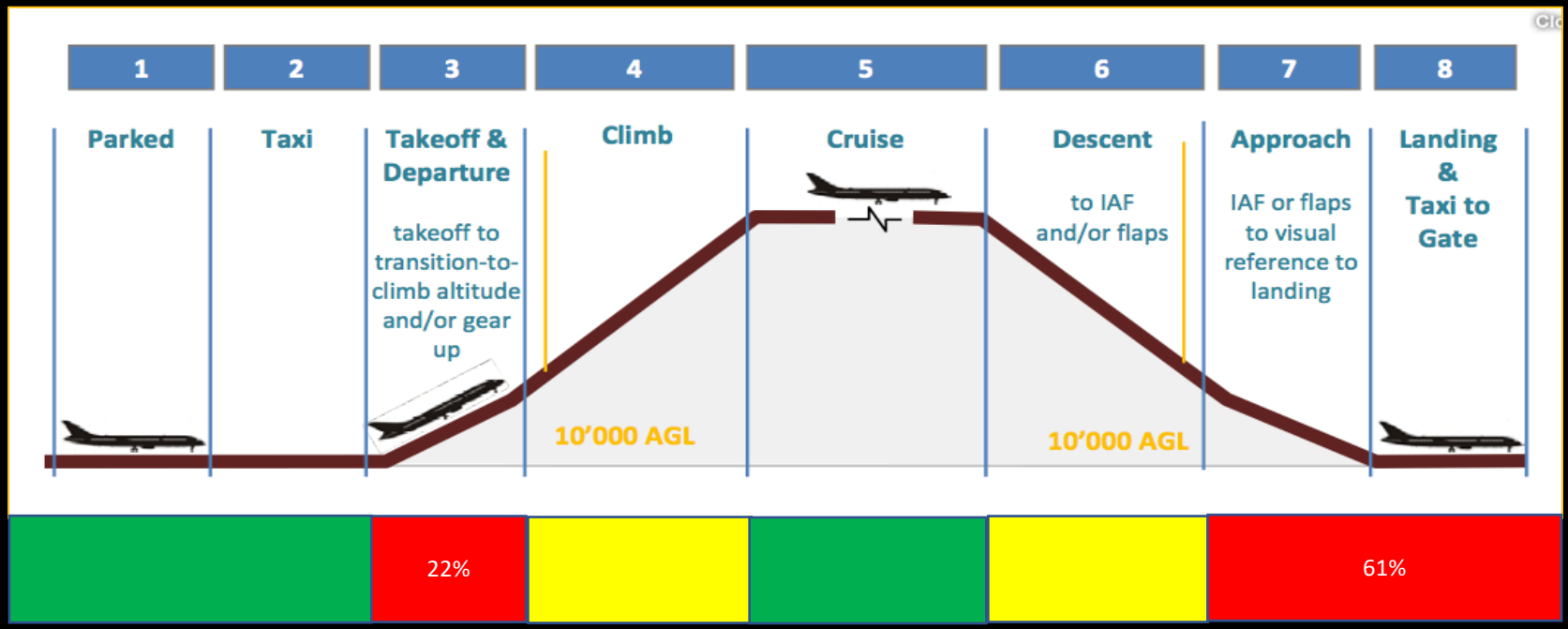
Presentation Objectives

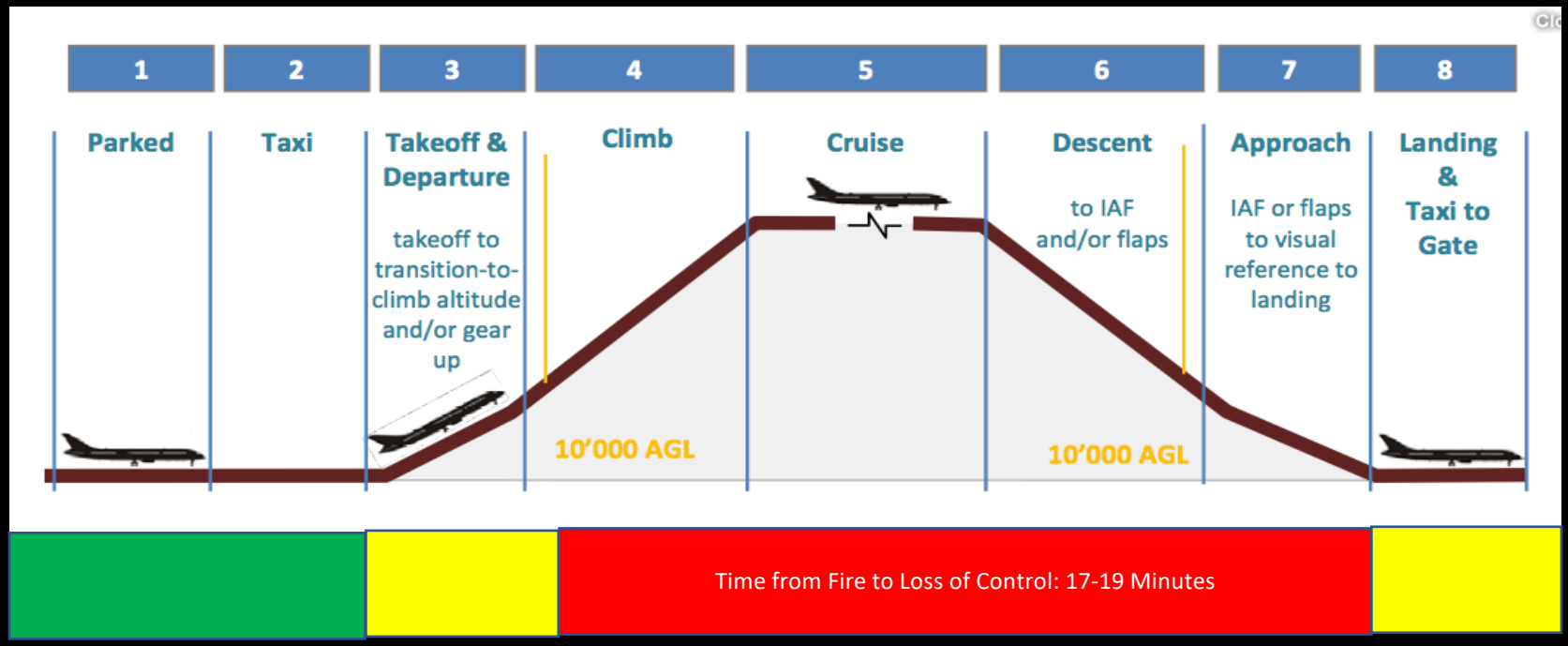
- Discuss the risks associated with transporting batteries on aircraft
- Describe mitigation strategies currently in use
- Explore new opportunities to improve safety

Normal Flight Profile Risk



Source: Flight Safety Foundation

Risk Transporting Batteries



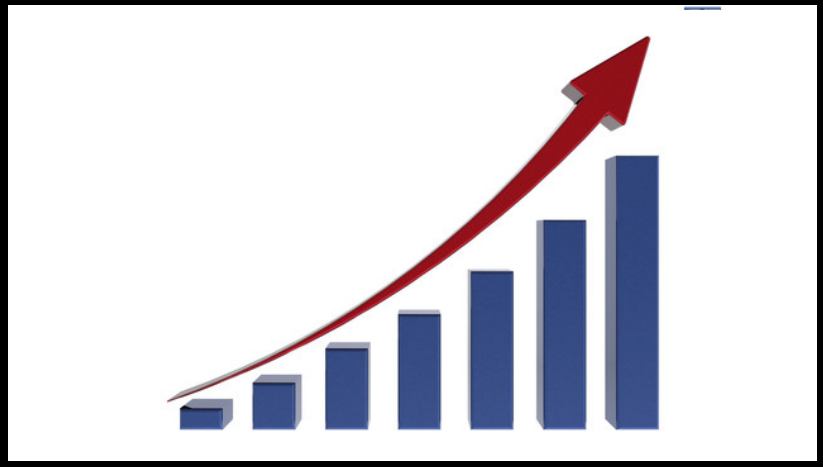
Source: Transport Canada

Battery Incidents

- 2015 – 20 incidents
- 2016 – 31 incidents
- 2017 – 46 incidents
- 2018 – 56 incidents*
- 2019 – 51 incidents*

  (through August 2019)

*US airlines have begun keeping their own list of incidents



Can you spot a trend?

Current Mitigation Strategies

Enhancing Safety for the Aviation Community

Full-Face Oxygen Masks

- Flight crews must be protected not only from smoke, but also from toxic fumes
- All UPS aircraft have been retrofitted with full-face oxygen masks
- Engineering solutions enabled a retrofit instead of a major purchase

Emergency Vision Assurance System

- Historically, smoke has entered the cockpit numerous times due to fire onboard an aircraft and remained a continuous threat. (UPS 6, Asiana 991, Express Jet 5912)
- Emergency Vision Assurance System (EVAS) is installed on all UPS aircraft
- EVAS is installed on 70% of the top 25 air cargo carriers worldwide

Fire Containment Covers (FCC)

- FCC requires no additional time and are used on palletized freight
- FAA testing demonstrated 1500F fire containment for 4 hours
- 700 currently in use
- UPS covers from origin to final destination

Fire Resistant Containers (FRC)

MACROlite FRCs

- Enhanced fire safety
- Weight savings
- Fuel savings
- Reduced repair frequency and cost

20,000 New MACROlite ULDs have been purchased

New Opportunities for Safety

Remember – “Hope is not a strategy”

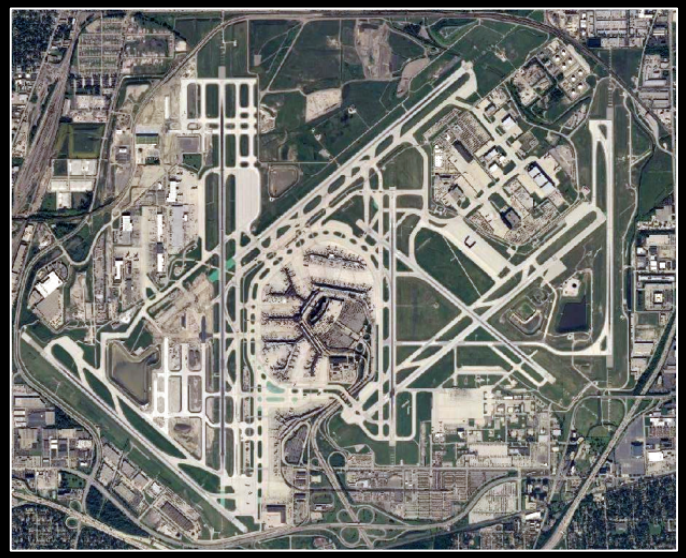
Thermal Runway Incident Program (TRIP)

- Current reporting of lithium battery fires is limited in scope

- The TRIP program captures the significant number of close calls including:

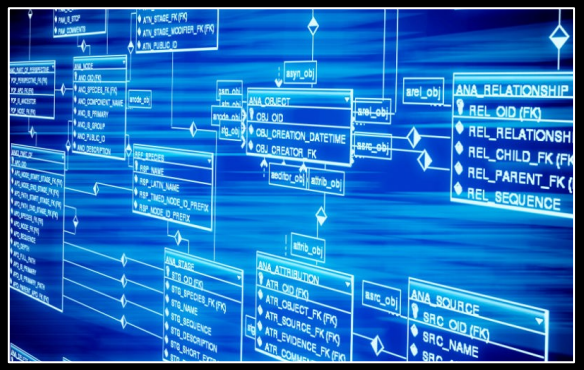
  - ✓Events on airport property including check in, security and ramp fires

  - ✓Packages catching fire when being transferred between aircraft



How does the TRIP Program Work

- Data from multiple sources is compared to avoid duplicate reporting
- Multiple reporting may offer additional details about the event
- A more wholistic view of lithium battery fire events occurring in aviation is gathered from increased data



TRIP Data Drives Solutions

- **What causes problems:**
  - Power Banks
  - E-Cigs
- **Where are they occurring?**
  - 60% in the cabin
  - 20% in the cargo compartment

What is being done with the data?

- UL 2056 - a new standard for power banks
- UL 5800 - a new standard for fire containment bags

Third-Party Validation Process

OPERATION SAFE2FLY

Combining Battery Science
and Aviation Safety

Battery Safety Begins with 4 Questions

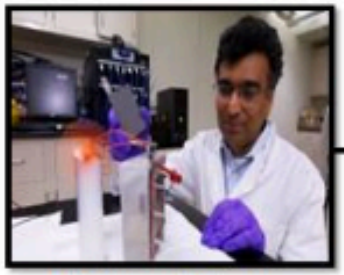
1) What's in the box?

1) Is it safe, and what is the integrity of that declaration?

1) Is it in a safe state for shipment?

1) How can I discover and verify all this information in a way that is productive and efficient?

Safe2fly Third-Party Programmatic Solutions



Battery Science

Design, Manufacture & Certification

Packaging

Labeling

Database

Risk Assessment

Transport, Inspect or Reject

or

Identify and Prosecute Counterfeit

Safe2Fly Third-Party Programmatic Solutions

- ✓Tests batteries for fact-based SMS risk assessment
- ✓Inspects manufacturing facilities
- ✓Validates proper packaging for risk level
- ✓Labels packages and tracks batteries via a database
- ✓Ensures complete and proper documentation
- ✓Identifies and removes counterfeit products
- ✓Enables prosecution of counterfeit manufacturers
- ✓Improves shipping times

Safe2Fly Summary

- A battery is not just a battery
- The battery and packaging are interconnected for safety
- A greater level of aviation safety is possible

Questions?