# Safer Skies

**Mitigating the Transportation Risk of Batteries** 

Prepared by Independent Pilots Association

# **Presentation Objectives**

- Discuss the risks associated with transporting batteries on aircraft
- Describe Operation Safe2Fly, a Third-Party validation process for enhancing safety at passenger and cargo airlines
- Explain the next steps in program development

# Aviation has risks...



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## Normal Flight Profile



Source: Flight Safety Foundation

# **Risk Transporting Batteries**



Source: Transport Canada

## FAA List of Incidents

- 2015 20 incidents
- 2016 31 incidents
- 2017 46 incidents
- 2018 37 to date

As of April, 2018, there have been 221 air/airport incidents involving batteries as cargo or baggage that have been recorded since March, 1991



### Can you spot a trend?

# UL Survey in Germany

Industry professionals express strong concern about the aviation safety risks of lithium-ion batteries and strong interest in an industrywide solution to address those risks, despite positive perceptions about organizational readiness.

- Given a list of common hazardous materials, aviation industry professionals ranked lithium-ion batteries as the top passenger safety risk by a 1.5 to 1 margin (40% compared to 26% for flammable liquids).
- Concern about passenger safety risks of lithium-ion batteries (55%) was comparable to that for terrorist acts (61%) and cybersecurity incidents (58%), among others.
- In reply to an open-ended question, respondents cited a range of concerns about lithium-ion battery safety, including fire and explosions (63%), dangers in the cargo hold (11%), and passenger carelessness or lack of awareness (11%).

# **UL Survey in Japan**

Industry professionals express strong concern about the aviation safety risks of lithium-ion batteries and strong interest in an industrywide solution to address those risks, despite positive perceptions about organizational readiness.

- Given a list of common hazardous materials, aviation industry professionals ranked lithium-ion batteries as the top passenger safety risk by more than a 2 to 1 margin (48% compared to 22% for lighters and safety matches).
- Concern about passenger safety risks of lithium-ion batteries (80%) was comparable to that for unruly passengers (79%) and mechanical failures (78%), among others.
- In reply to an open-ended question, respondents cited a range of concerns about lithium-ion battery safety, including fire and explosions (50%), dangers in the cargo hold (15%), and passenger carelessness or lack of awareness (11%).



# Lithium Batteries are a Leading Safety Risk

Lithium-ion batteries	
Unruly passengers	
Mechanical failure	
Terrorist acts	
Cybersecurity incidents	
ardous materials exposure	
oulence or depressurization	
Fire	
Crew fatigue	

#### Concerned or very concerned

#### Not at all concerned or unconcerned

Percentages are top-two and bottom-two responses from a 5-point scale where 1=Not at all concerned, 2=Unconcerned, 3=Neutral, 4=Concerned, and 5=Very concerned. Not Applicable (NA) responses were removed from the base.

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### Cargo vs. Passenger Airlines

# Who Has More Risk?



### **Risk in Cargo Airline Operations**

- UPS 1307
- UPS Flight 6
- Asiana 991

### There is no ability to go back and "fight the fire"

Aircraft manufactures have stated their aircraft were never designed to transport the types of HAZMAT being transported today





# **Risk in Passenger Operations**

- Sheer volume of passengers carrying batteries
- Undeclared shipments
- Sub-par Manufacturers
- Disposable consumer products (e.g. E-Cigarettes)
- New applications emerge and are shipped in large quantities







## The Risks are Similar

- Batteries pose a risk to both
- Halon systems in passenger or cargo lower deck cargo areas can be ineffective
- A passenger 777 can carry more cargo in their lower deck than an all-cargo Boeing 757



- Both are facing an increase in incidents
- Both have to "trust the customer"





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### Combining Battery Science and Aviation Safety





- IPA and UL developed a programmatic solution to mitigate risk
- Some concepts of the program already exist in the retail sector
- The program applies a factual risk assessment of batteries by testing them to failure
- A database is a necessary component of this program



# Safe2Fly Background



- This program has been socialized and widely accepted by:
  - FAA, NTSB, DOT, PHMSA
  - Major Airlines
  - Airline Pilot Associations
  - Flight Attendant Associations
  - House and Senate Staff
  - Specific Battery Manufacturers



## Battery Safety Begins with 4 Questions



- 1) What's in the box?
- 2) Is it safe, and what is the integrity of that declaration?
- 3) Is it in a safe state for shipment?
- 4) How can I discover and verify all this information in a way that is productive and efficient?



# Safe2fly Third-Party Programmatic Solutions





# Safe2Fly Third-Party Programmatic Solutions



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



# Safe2Fly



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Safe2Fly Next Steps



Next step #1

Develop standardized battery test procedures to provide objective data for SMS risk assessments

In other words...

"A battery is not just a battery"

### **Battery Test Procedures**



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"A battery is not just a battery"

Safe2Fly Next Steps



Next step #2

Continue to modify software in the WERKS database to detect counterfeit labels and products

> In other words... "Protect the Supply Chain"

Safe2Fly Next Steps



Next step #3

Work to integrate the SAE-G27 packaging standards under development

In other words...

**Battery + Packaging = Safety** 





- 1) A battery is not just a battery
- 2) We need to protect the supply chain
- 3) The battery and the packing are

interconnected for safety



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