Business Aviation Safety Summit
BASS 2019

Capt. Boomer Bombardi
Air Line Pilots Association, Int'l

May 2-3, 2019

Why Are We Here?

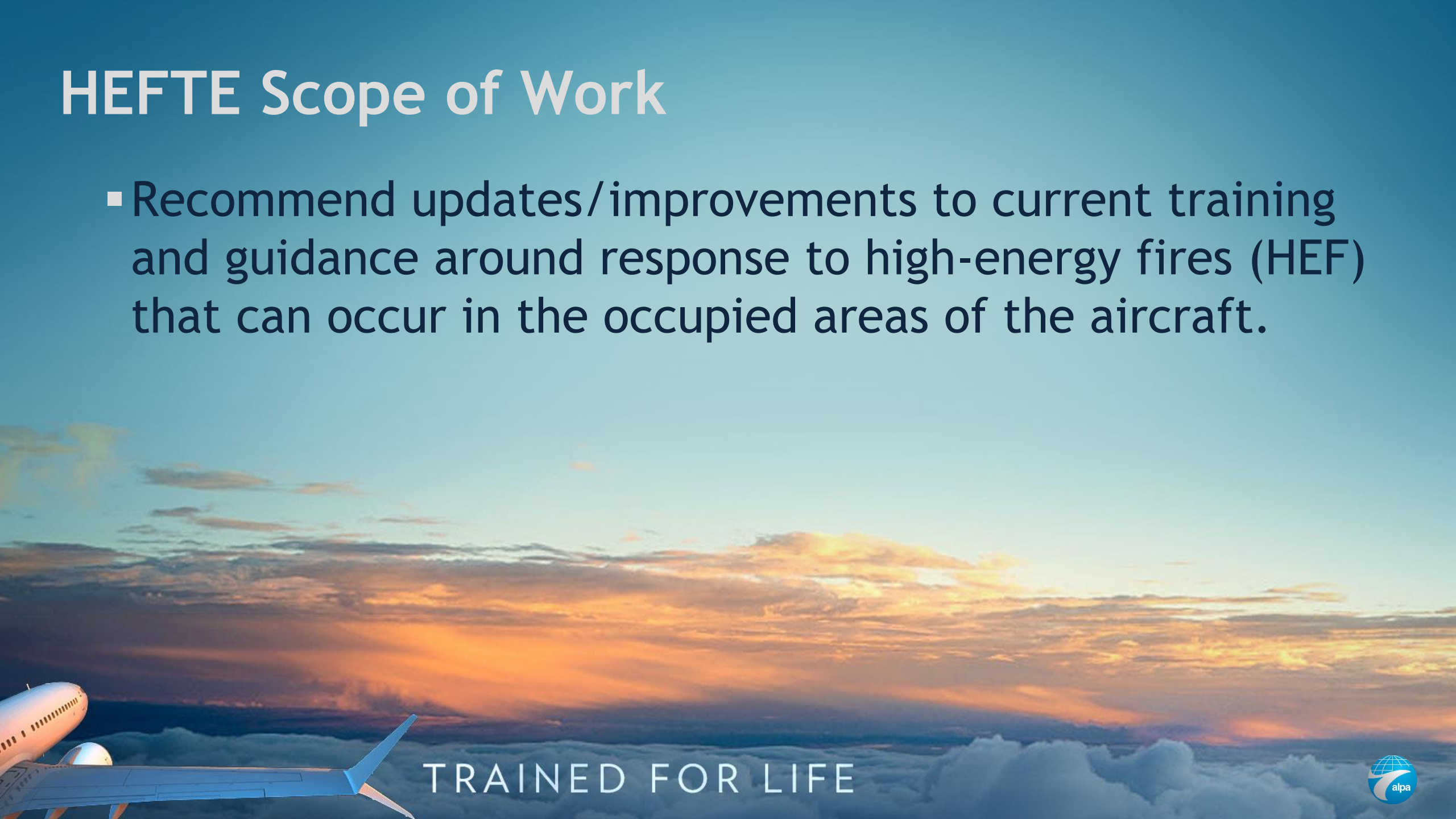
According to the FAA Air Traffic Organization, there are around 2.5 million airline passengers per day across the US airspace. If you assume somewhere between 2-3 lithium ion devices carried by each passenger (for calculation purposes we used 2.5 PEDs per person), this translates to approximately 2.3 billion lithium ion battery powered devices brought into the aircraft cabin per year just in the USA.

HEFTE WG Overview

- Air Carrier Training Aviation Rulemaking Cmt (ACT ARC)
- Tasked Aug. 2017 – Recommendations Nov. 2018
- 11 Members; 3 Industry SME; 2 FAA SME; 1 Support

HEFTE Scope of Work

- Recommend updates/improvements to current training and guidance around response to high-energy fires (HEF) that can occur in the occupied areas of the aircraft.



Recommendation

The FAA update advisory guidance related to HEF, by encouraging & supporting certificate holders to update their firefighting training and procedures related to HEF.	Recognizing the early warning signs of battery overheating
	Cooling of batteries experiencing thermal runaway
	Emphasis on use of PPE and volatility of HEF
	Flight deck/cabin procedures and SMS
	Smoke and fume concerns

A Closer Look

Recommendation

Update guidance to include more specific information for pilots responding to HEF to ANC*, including the handling of toxic & flammable fumes emitted by HEF.	Electronic Flight Bags (EFB) represent possible HEF sources
	HEFs can produce a considerable amount of smoke and fumes obstructing viewing of controls.
	Emphasis on use of PPE
	Research into clearing the smoke to support guidance development
	Research into vision enhancement devices

*Aviate, navigate, communicate

Recommendation

<u>Future</u> initiatives to develop technical performance standards for HEF containment and/or extinguishing products; update training products; update testing for smoke concerns.	Update FAA materials to ensure consistency and up-to-date information. Attachment 5 has suggested language.
	Research and testing of clearing the smoke to support updating guidance (AC 25-9A) to reflect current concerns of volume & toxicity. Current tests reflect three minutes to clear a non-continuous or dense smoke.
	Define containment and control for smoke and fumes for possible inclusion in guidance materials.

A Closer Look

- Containment Products (and/or extinguishment?)
- Handling of toxic and flammable fumes
- Smoke generation in the flightdeck
  - Procedures to clear the volume of smoke
  - Maintain aircraft control (PPE or other)

Smoke in the flightdeck

- Cabin is a concern also
  - But, differing designs in ventilation and volume
- Electronic Flight Bags (EFB) more prevalent now
- Research and testing of clearing the smoke to support updating guidance (AC 25-9A – limits entry of SFG) to reflect current concerns of volume & toxicity.
- Use of PBE (toxicity?)

TRAINED FOR LIFE

Smoke in the flightdeck

- The FAA Tech Center should conduct further lithium battery thermal runaway testing in one of its test aircraft or flight deck mock ups
- If smoke generated impacts pilot's ability to fly, testing must demonstrate that smoke can be cleared out
- If it cannot be cleared sufficiently, mitigation must allow for pilots to see the instruments and outside the airplane for landing

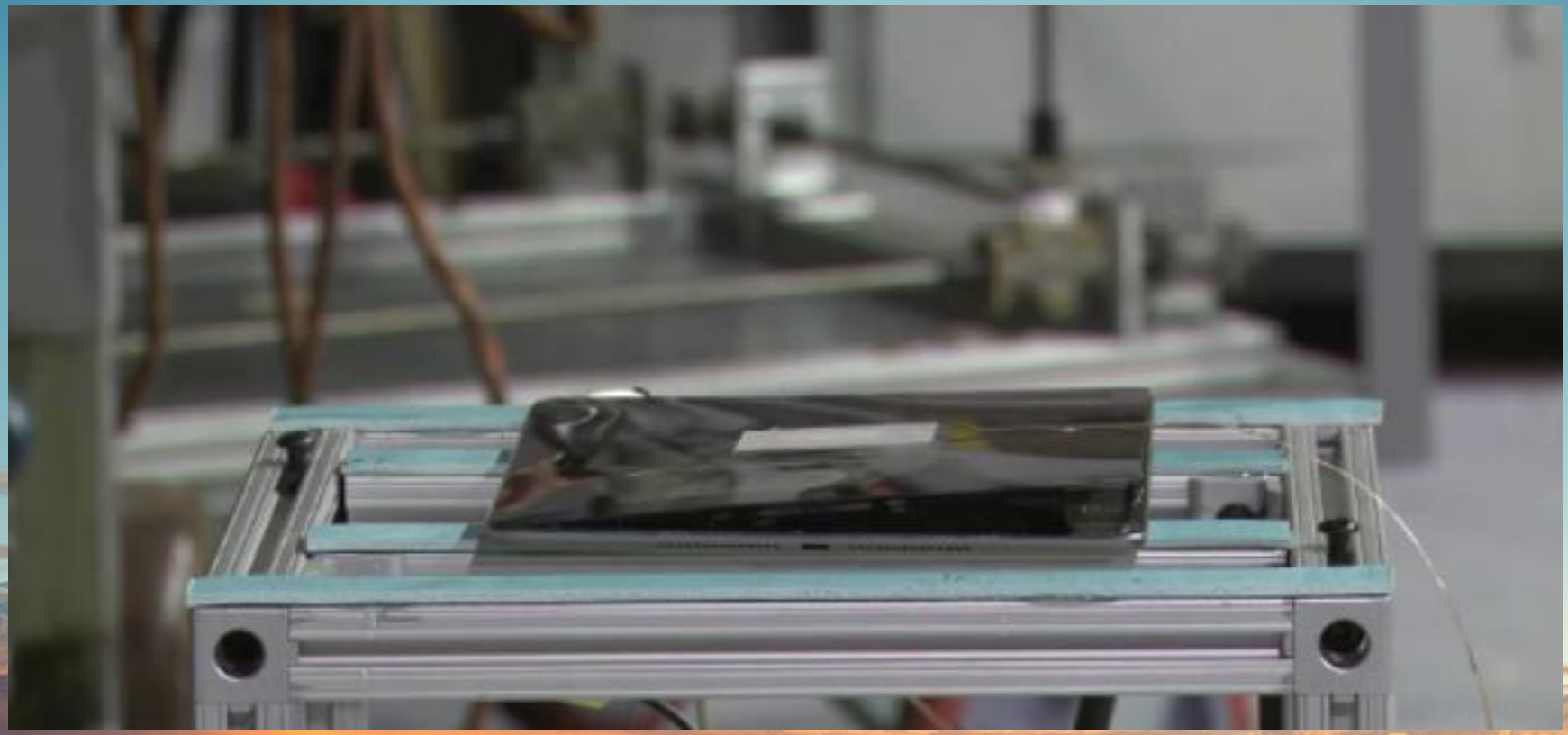
Electronic Flight Bag (EFB) Hazard Assessment

Steve Summer
Federal Aviation Administration
Fire Safety Branch
http://www.fire.tc.faa.gov

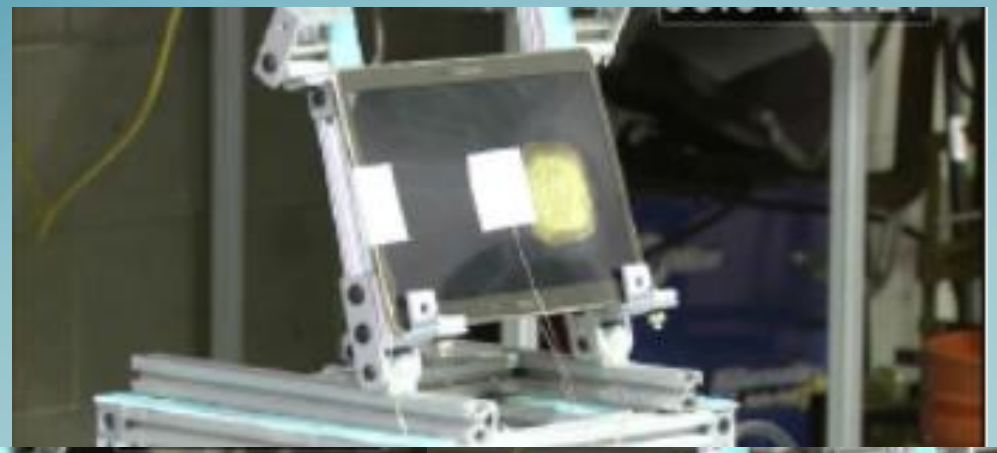
Federal Aviation Administration

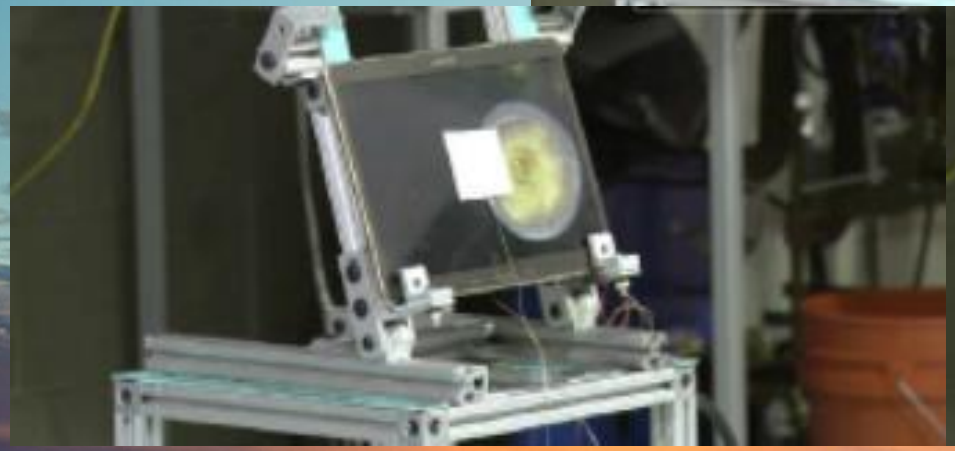
The Seventh Triennial International Fire & Cabin Safety Research Conference
Philadelphia, PA
December 2 – 5, 2013

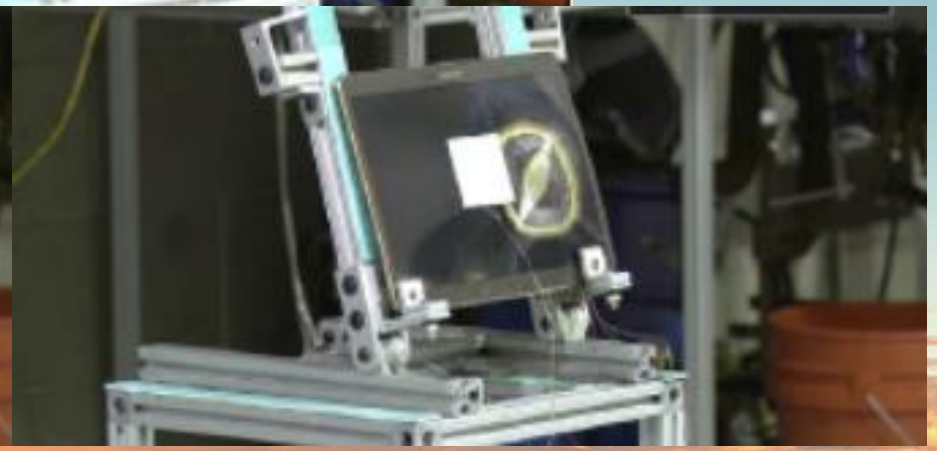
Test Results - Tablet Type 1



Test Results - Tablet Type 2







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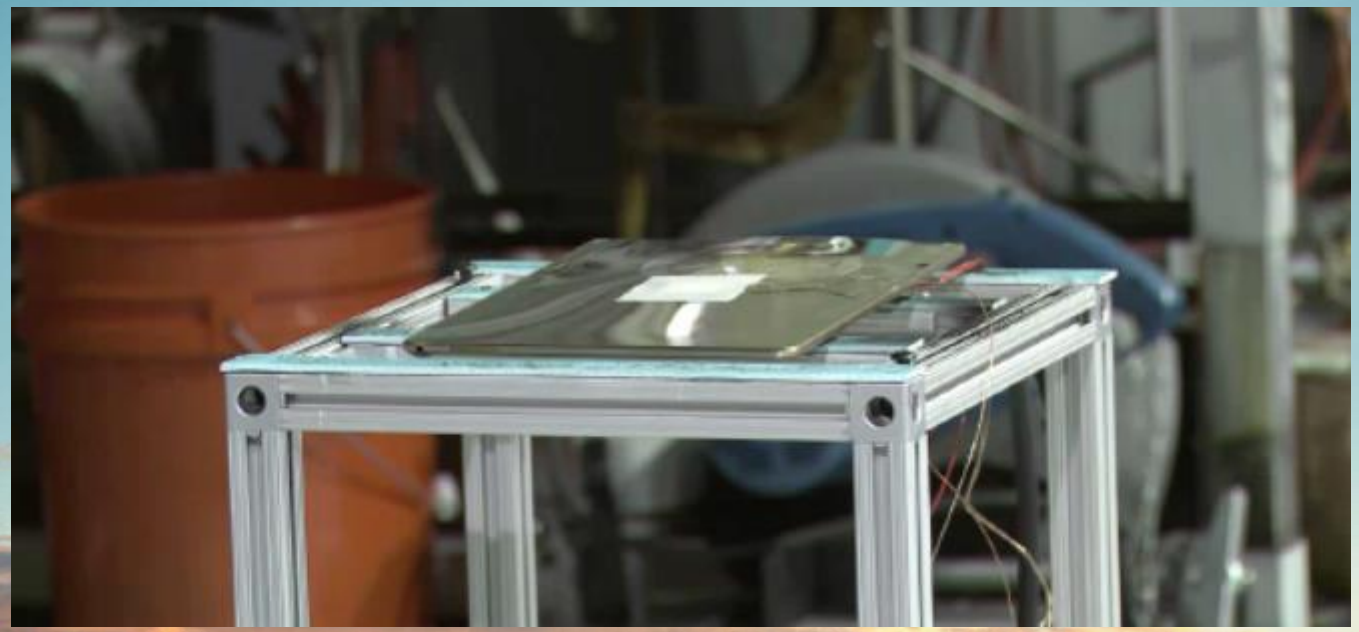

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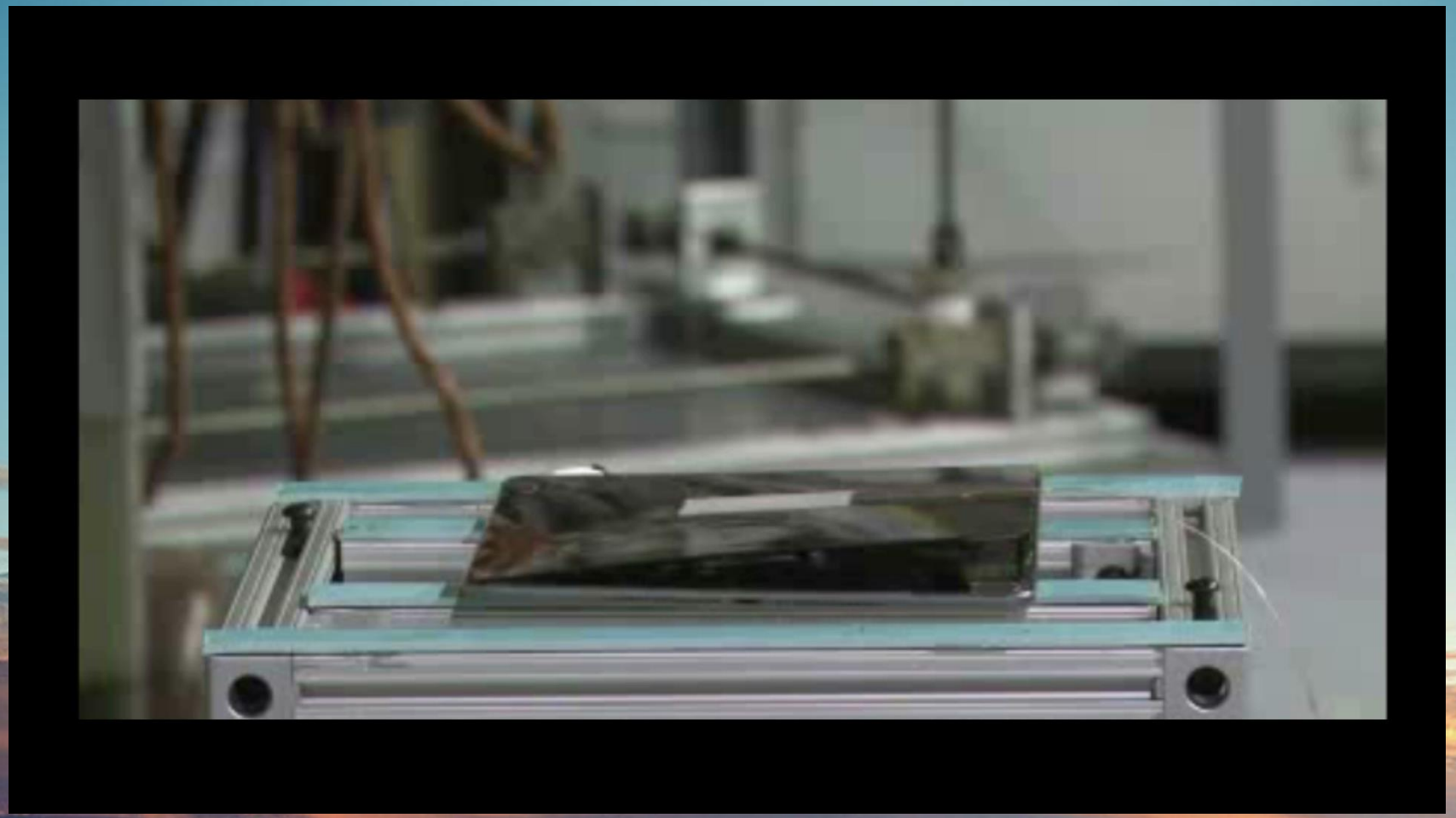
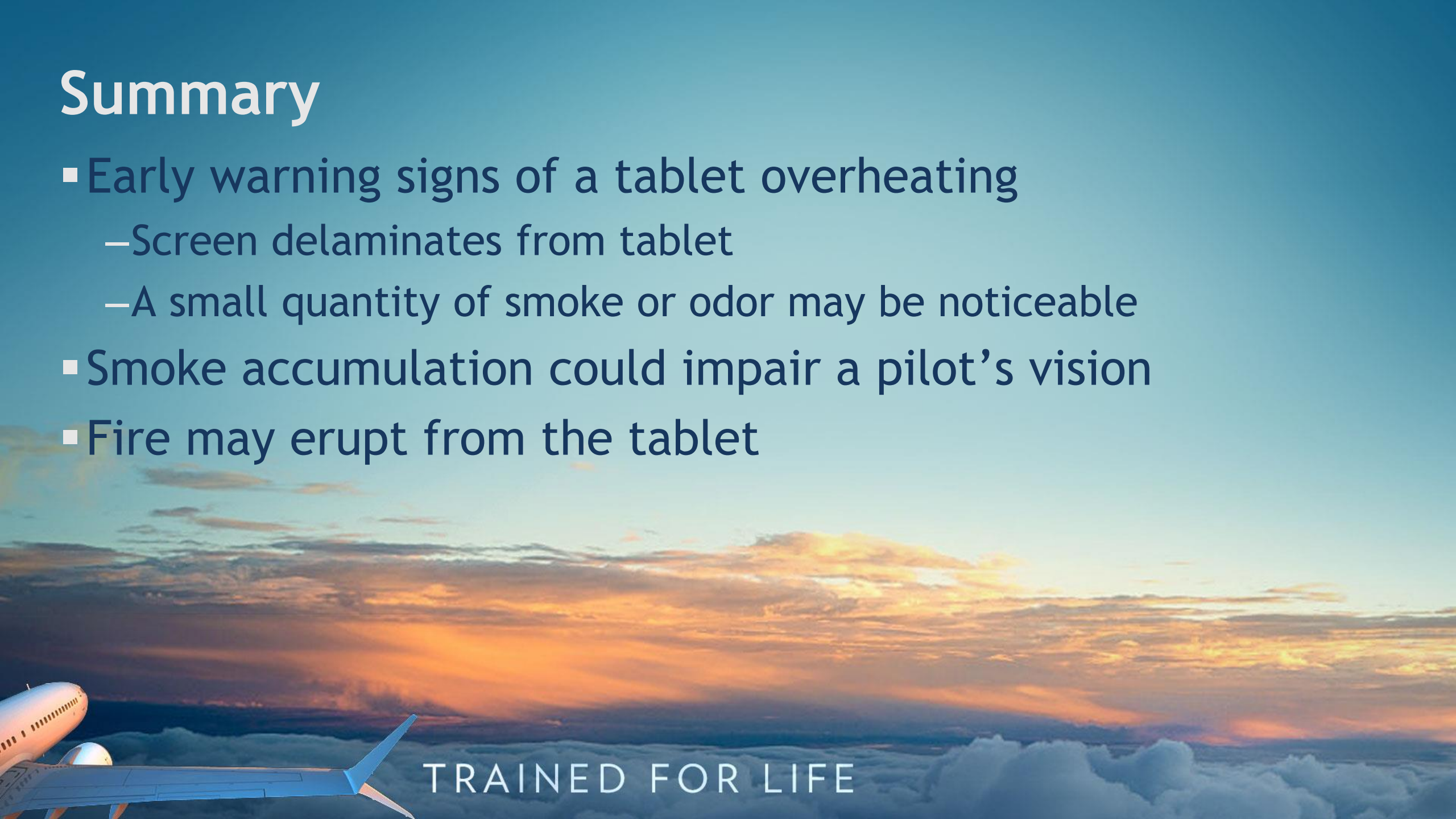


Summary

- Early warning signs of a tablet overheating
  - Screen delaminates from tablet
  - A small quantity of smoke or odor may be noticeable
- Smoke accumulation could impair a pilot's vision
- Fire may erupt from the tablet



Summary - Extinguishment

- Horizontal Position
  - Dousing tablets with water had virtually no effect
- Vertical Position
  - Dousing tablets with water had some measurable effect, but temperatures had a tendency to rebound
  - Directing the water into openings formed during TR had a sustained effect of cooling all cell and surface temperatures

Conclusion

- Tests have shown that even with a very high ventilation rate (1 air exchange/minute), a typical COTS Li-Ion battery could pose a significant hazard within the flight deck environment and could potentially present a catastrophic risk.

QUESTIONS?