



International Aircraft Systems Fire Protection Working Group

May 23rd, 2012



Presentation Agenda

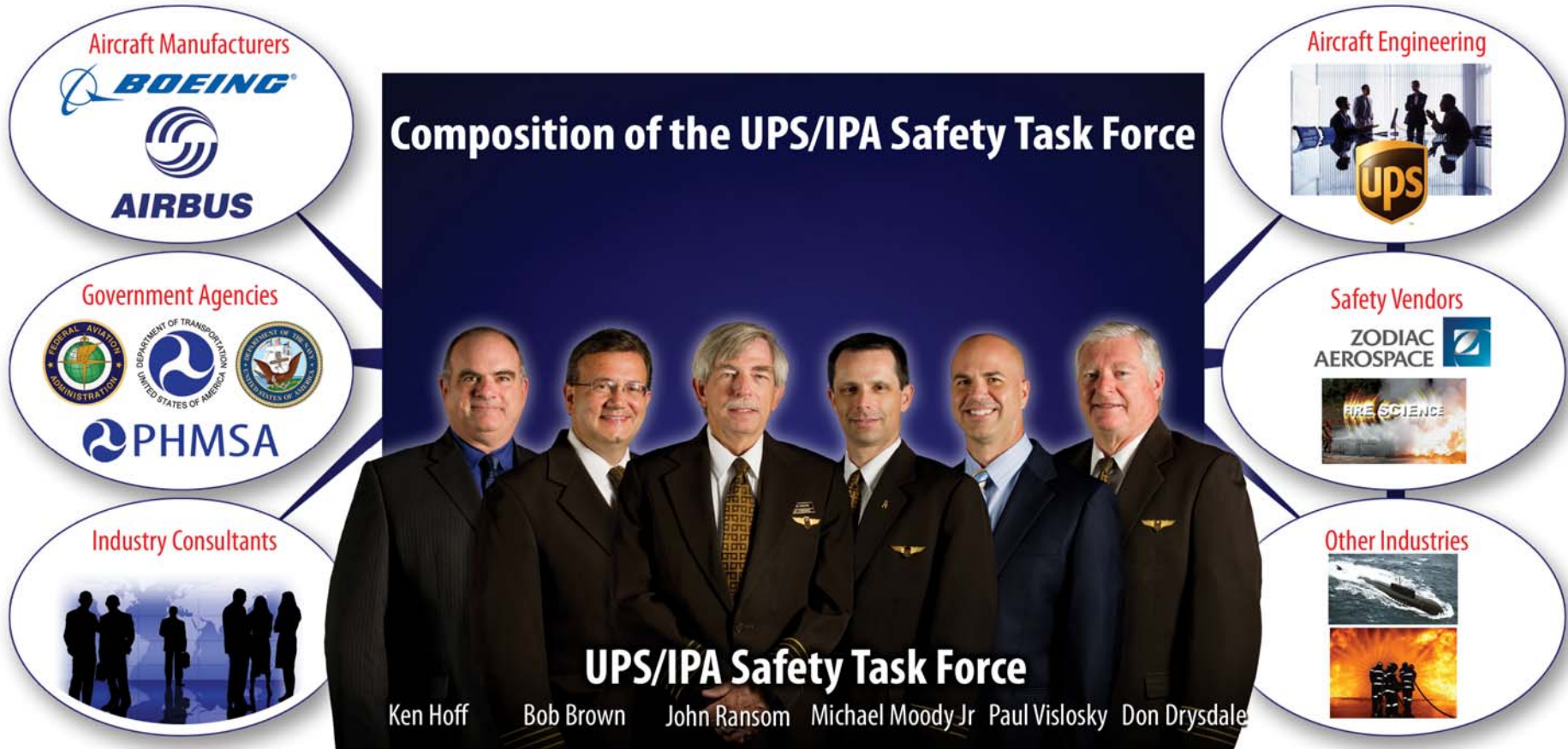
- **UPS/IPA Safety Task Force**
- **Air Transportation of Batteries**
- **Safety Task Force Strategy**

September 3, 2010

“A need to develop solutions to complex issues”



Composition of the UPS/IPA Safety Task Force



Mission Statement

“The Safety Task Force will provide solutions which increase safety by developing methods, evaluating technology and enhancing training for successfully managing smoke or fire events in an aircraft.”



The Goal

Develop a layered solution set which expands the time a crew has to address a smoke or fire situation.





The Issue of Air Transportation of Batteries



The UPS Air Business Model Has Changed

How has our Business Changed?

- A growing percentage of our payload involves technology
- Growing consumer demand

Why are we transporting more batteries?

Battery Energy Cost

- 1991 - \$3.17/ watt hour
- 2010 - \$0.18/ watt hour

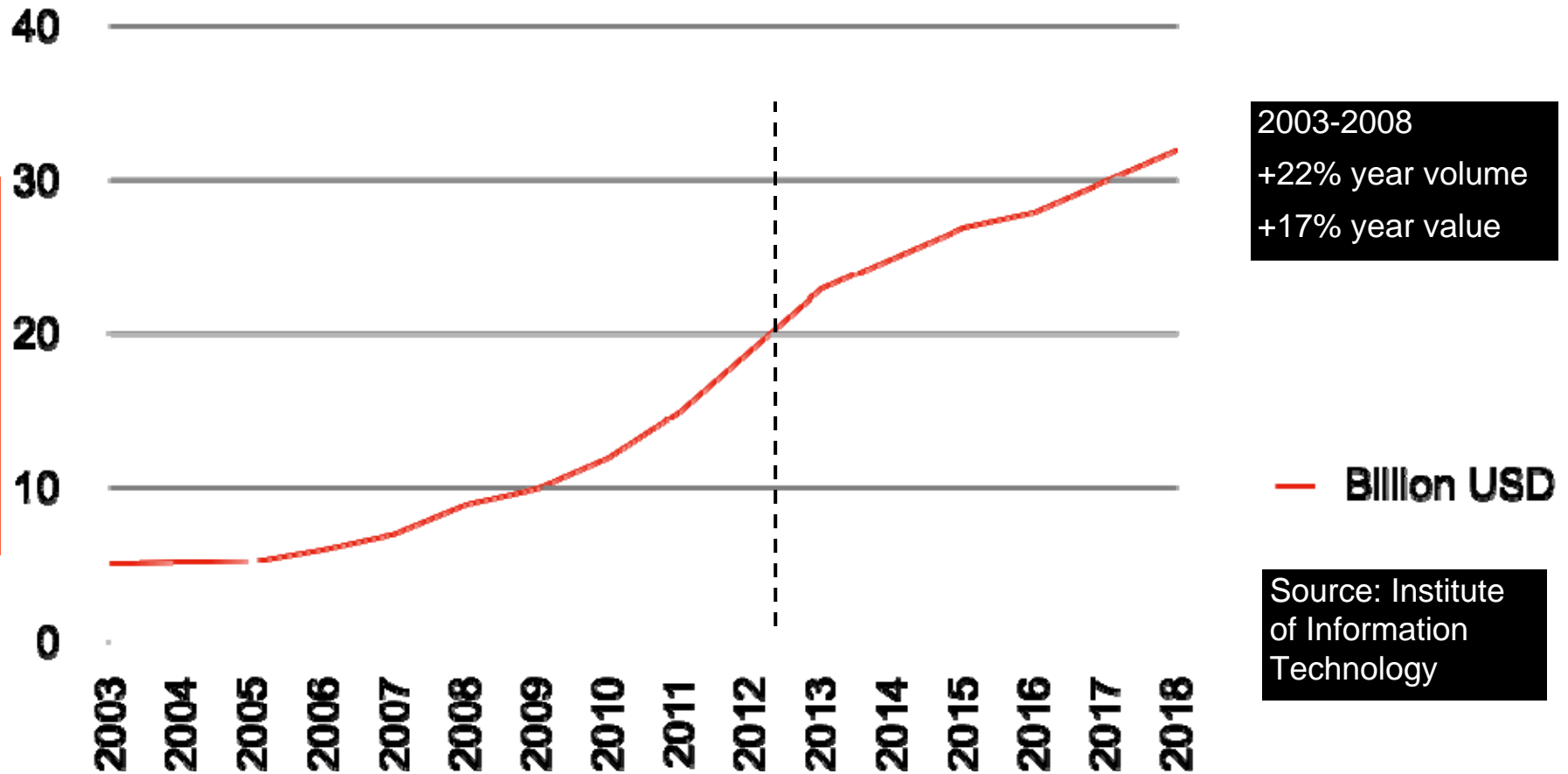
Bottom Line – Transportation of Batteries and Energy is Increasing

Then → Now



Global Lithium Battery Market in (\$US) Billions

Worldwide Lithium Batteries in U.S. Billions of Dollars





Safety Task Force Strategy



Safety Task Force Strategy

There is no
“silver bullet”



Short
Term

- EVAS
- Full-Face Oxygen

Medium
Term

- Checklists
- Training

Long
Term

- Detection
- Suppression



Protecting the Flight Deck

(Important facts about cockpit smoke)

- "Smoke is the leading defined cause of emergency landings for ETOPS (*Air Safety Week*)"
- "The time from first indication of smoke to an out-of-control situation may be very short."
(*Boeing Aero 14*)
- In-flight smoke events on transport jets are twice as likely as in-flight engine failures
(*ALPA Safety Report*)



The Combination of Two Technologies Greatly Improves Safety

**Full Face
Oxygen Masks**



**Emergency Vision
Assurance System
(EVAS)**



Full-Face Oxygen Masks

- Flight crews must be protected not only from smoke, but also from toxic fumes like sulfur dioxide
- Smoke goggles have been found to be ill-fitting for some eyeglass wearers
- Full-Face Masks don quicker, reduce operational complexity and allow a better fit and more effective mask purging



Emergency Vision Assurance System (EVAS)



Emergency Vision Assurance System

- Pilot vision during a smoke event is essential
- The pilot still relies on the oxygen mask for breathing and eye protection
- EVAS represents the last line of defense for the flight crew



Training Center and Checklists

- The Flight Training Center is beginning to emphasize the importance of training on aircraft emergency equipment
- Enhanced training courses and human factor friendly checklists are being developed to support each recommendation incorporated
- Our goal is to lead the industry in training to manage in-flight smoke/fire events



Fire Suppression

Multiple paths are being explored



Fire Containment Cover (FCC)

- Cover is designed to suppress a 1500 degree fire for four (4) hours
- Testing began June 2011
- FCC reengineered to increase durability in UPS system
- Phase 3 testing of redesigned cover underway



Container-Based Solutions are Being Evaluated

- Fire resistant container materials under evaluation
- Suppression agents are being tested
- More research and testing is necessary



Improved Temperature/Fire Detection

- Early notification of rising container temperatures allows for improved task management
- Container temperature data also allows a crew to confirm the effectiveness of fire suppression systems
- **During fire and smoke events every minute counts!**



