# Swissair 111 Sensors Could Have Made A Difference

#### In-Flight Smoke/Fire/Fume Events: The need for improved aircraft systems.

Captain H.G. 'Boomer' Bombardi Air Line Pilots Association, Intl. In-Flight Fire Project Team Leader

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 Disclaimer: This presentation does not attempt to 'second guess' any crewmember, manufacturer, or operator mentioned in conjunction with a Smoke Fire Fumes (SFF) event.

 Any crewmembers, manufacturers, or operators mentioned in this presentation, used the best procedures they had available at the time of the event.



Swissair 111 02 September 1998 229 Souls On Board Peggy's Cove, Nova Scotia

# THERE WERE NO SURVIVORS





 Some may ask: "Why use Swissair 111 as an example? There have been other Smoke/Fire/Fumes accidents/fatalities."

An aircrew needs to know the nature and seriousness of any emergency in order to take the proper actions to deal with the emergency.

Even though corrective measures were taken in other SFF accidents, the issue of being able to identify, extinguish, and monitor a hidden fire has not been resolved.

• Swissair 111 is the most recent example and hence, was used in this presentation.







UTC Time	Elapsed Time (minutes)	Impact (minutes)	Event
110:38:00	0:00	20:40	Unusual smell detected in the cockpit
113:14:00	2:36	18:04	Smoke assessed as visible at some location in the cockpit; no smell reported in cabin
114:15:00	3:37	17:03	SR 111 radio call: "Pan Pan Pan"; diversion requested naming Boston
115:36:00	4:58	15:42	Decision made to divert to Halifax, Nova Scotia
124:42:00	14:04	6:36	Emergency declared
125:41:00	15:03	4:57	Recorders stop recording
131:18:00	20:40	0:00	Impact with water





# **Could They Have Made It?**

- MD 11 Simulator.
- MD 11 Captain in left seat.
- Non qualified pilot (me) in right seat.
- Simulator configured the same as Swissair 111.
- Simulator crew knew they had a serious SFF issue.
- Simulator crew made 'aggressive' diverts to Halifax.



### **Test Case #1**

- The simulator was placed on the 264 degree radial, 95 miles from Halifax FL 330. This approximated the first indication Swissair 111 had of their problem which occurred at 0110:38. The configuration was: Idle, speed brakes out, max airspeed, fuel dumping, no winds.
- RESULT: Simulator landed on Runway 05 Halifax\* approximately 16 minutes later, speed 169 kts.

\* (At the time of the accident the runway at Halifax was 06. It is now 05.)

 From 0110:38, SwisssAir111 struck the water approximately 20 minutes and 40 seconds later at 0131:18.



### **Test Case #2**

- We used Swissair 111 time of 0115:36 when the crew asks to divert to Halifax. The simulator is on the 238 degree radial, 60 mi from Halifax FL 330.
- This time the simulator crew makes a more aggressive descent. Configuration: Idle, Speed brakes out, Gear down, Fuel dump, Speed at times exceeding max speed limits.

RESULT: The simulator landed on Runway 05 Halifax approximately 10 minutes 15 seconds later, speed 169 kts.

• From 0115:36, SwisssAir111 struck the water approximately 15 minutes and 42 seconds later at 0131:18.





• Same configuration as Case #2. This time we added tailwinds. We used a tailwind of 60 kts from FL330 to FL200. 30 kts from FL200 to 6K'. 100/10 from 6K' to touchdown.

**RESULT:** The Simulator landed on Runway 05 Halifax approximately 9 minutes 47 seconds later, speed 169 kts.

• Once again, from 0115:36, SwisssAir111 struck the water approximately 15 minutes and 42 seconds later at 0131:18.





• Same set up as Case # 2 & 3. This time we used a less aggressive descent. Delaying gear extension, no fuel dumping, do not exceed max airspeed(s).

**RESULT:** The simulator landed on Runway 05 Halifax approximately 9 minutes 19 seconds later, speed 169 kts.

 Once again, from 0115:36, SwisssAir111 struck the water approximately 15 minutes and 42 seconds later at 0131:18.





- Same set up as Cases # 2, 3 & 4. This time even less aggressive. Didn't use gear until the last minute to slow down.
  - **RESULT:** The simulator landed on Runway 05 Halifax approximately 9 minutes 19 seconds later, speed 169 kts.
- Once again, from 0115:36, SwisssAir111 struck the water approximately 15 minutes and 42 seconds later at 0131:18.



## What has been done?

# **SFF Steering Committee**

- Accomplished to date:
  - Standardized SFF checklist, definitions and philosophy
    - Emphasis on consideration of landing

• FAA research on material flammability



### What needs to be accomplished?

- A non-alerted SFF event of unknown nature and intensity is the worst scenario a pilot can face.
- Standardized SFF checklist still requires knowledge of the nature and intensity of the SFF event.
- Current aircraft systems do not provide adequate protection, detection or feedback.



# WHY?





# Tombstone Mentality



History has shown that there has **NOT** been a major safety initiative that was NOT predicated by a significant aircraft accident / fatalities.





# Tombstone Threshold



























# Swissair 111





# Legacy of Swissair 111?

#### • SFF Checklist Template

- Boeing / Airbus implementation but yet to be industry-wide
- Not mandated by FAA

# FAA research on material flammability Insulation Changes



### HOWEVER

 Pilots still do not have system feedback regarding aircraft status during a SFF event.

 No FAA aircraft mandates for SFF detection, protection, monitoring systems.



# CONCLUSION

 Data from the simulator testing clearly indicates that SFF sensors could have made the difference with Swissair 111.





### RECOMMENDATION

• The time has come to be PROACTIVE instead of REACTIVE when it comes to inaccessible aircraft fires.













