INTERNATIONAL AIRCRAFT SYSTEMS FIRE PROTECTION WORKING GROUP MEETING

MARCH 27-28, 2001

Hosted by Boeing, Long Beach, California

TUESDAY, MARCH 27, 2001

Systems Fire Protection Presentations/Disucssion

Overview of ARAC – R. Hill

Dick explained some of the work and discussions of the ARAC on Fuel Tanks group and the timeframe in which this group is to complete its assignment.

B-747 Project (FAATC Fire Safety Section) – R. Hill

The FAATC Fire Safety Section purchased a decommissioned B-747 aircraft from United Airlines. This aircraft will be flown to the FAA Technical Center in the near future.

1). Planned FAATC B-747 Ground-Based Inerting Project – R. Hill

Further Ground-Based Inerting research will be conducted using the B-747 test article once it is in place at the FAATC test facility. Research will also be done on the distribution system using this test article.

2). Planned FAATC B-747 On-Board Ground-Based Inerting System Development – R. Hill

FAATC is requesting assistance/ideas from International Aircraft Systems Fire Protection Working Group member organizations in the design, loan or purchase of this type of system. Inerting must take place in 60 minutes. FAATC is expecting/projecting this project to take approximately one year to complete.

Ground-Based Inerting Proof of Concept Flight Test in Conjunction with the Boeing Company – B. Cavage

Bill described the inerting system, the use of the on-board oxygen analysis system, the flight tests conducted, and presented some of the data collected during the flight tests under various conditions. A copy of Bill's presentation is available on the FAATC Fire Safety Section website. A report about this project will also be published.

Fuel Load Effects on Inert Ullage for Ground-Based Inerting – B. Cavage

Bill reviewed the following areas of this project: Background (equipment, test article, etc.), Inerting Level Data, Agitation Data, Manifold Data, and Preliminary Altitude Data. Future Work will include: validation of existing data with repeat testing, studying the effect of accent rate on oxygen evolution at altitude, studying the effect of stimulation method on oxygen evolution at altitude, measuring [THC] time evolution, and repeating manifold experiments with 98% NEA (nitrogen enriched air).

(FAATC) Fuel Tank Ignition Experiments – S. Summer

Objectives: Determine Lower Oxygen Limit of Flammability (LOLF) at altitudes varying from 0-40 kft. Steve described the design of the pressure vessel apparatus, the location of the thermocouples, and the test program. Steve also updated the group on the progress to date and the future plans for this project.

Update on Aircraft Fuel Tank Flammability Model – I. Thomas (Chief Scientific and Technical Advisor to the FAA on Fuel System Design)

There are 3 Models currently being used: the Fuel Air Ratio Model (uses ASTM D-2887 Curve), the Flammability Exposure Model (attempted to look at flammability exposure to find a way to characterize a fuel tank as a way of saying: 'is this fuel tank more likely to be flammable or less likely to be flammable?'), and the Fuel Tank Inerting Model. A New "Ignition Risk" Model is currently under development.

FAATC Fire Safety Section Website – R. Hill

Dick presented and explained all the information provided on the FAATC Fire Safety Section website and how to navigate the website to locate specific information FAATC Technical, Reports, location of upcoming meeting details, and October 2001 Conference information/schedule.

NASA Aviation Safety Program Accident Mitigation Project – B. McKnight (Acting for Doug Rohn)

The NRAs (NASA Research Announcements) will be out in a few weeks for proposals combining OBIGGS and OBOGS systems. This is a focused research program slightly different than NASA's usual research program. Phase I will be design/detailed plan on paper. Phase II participants will be downselected from Phase I participants. Phase II is expected to take approximately 1 ½ years to complete. Working Group members are encouraged to contact Bob McKnight or Clarence Chang at NASA with their comments.

WEDNESDAY, MARCH 28, 2001

Development of a Minimum Performance Standard for Replacement Agents for Halon 1211 Handheld Extinguishers – R. Hill

Underwriters Laboratories in Northbrook, Illinois, has the test fixture. UL has delayed working with the test due to the death of William Carey. UL has assigned Emil Mischko to the hidden fire test. UL will begin familiarization tests in April 2001. Dick reviewed the Seat Fire/Toxicology Test Status. He also discussed the Task Group formed to determine the best way to run toxicology tests of additional agents (it is difficult to replicate the test set up).

Halon Replacement Lavex Bottle Tests – R. Mazzone

Rich presented results of tests conducted at the FAATC facility in mid-December 2000. There were four candidate agents tested during this test series. Rich also reviewed the results of this series of tests. A recommendation was made for a revision to the MPS that the MPS wording match the actual test as conducted at the FAATC during these December 2000 tests so that future tests are exact replications of these tests. This recommended revision to the MPS wording will be discussed with FAATC Fire Safety Section personnel. Dick suggested that Boeing forward a write up of their recommended changes to the MPS to Tim Marker for review.

Engine Nacelle Halon Replacement – R. Hill

The progress/current status of the Nacelle Halon Replacement project was presented for both the fire extinguisher and the test section. An overview of the modification of Halonyzer II was provided. HFC 125 and CF_3I will be tested. The lack of a working analyzer to accurately measure the gases is holding up the test program. All of this information is available on the FAATC Fire Safety Section website.

Discharge Simulation for the Nacelle Fire Extinguishing System – R. Hill

Draft guidance material was passed to the FAA Northwest Mountain Region headquarters for action in December 2000. FAA Technical Note #DOT/FAA/AR-TN99/64 provides the history and basis for this concept. Once this guidance material is implemented, discharging Halon 1301 for the purpose of demonstrating acceptable compliance with FAA regulation will be illegal. This is based on compliance with the United States Environmental Protection Agency (EPA) regulatory activity.

Cargo Compartment Work Update – R. Hill

Dick provided updated information on the tests conducted at the FAATC since the December 2000 Working Group meeting. The Cargo Compartment Task Group will meet to discuss future work required. John Reinhardt is currently testing a zoned water mist system in the TC-10 test article cargo areas. As tests are completed and the results of these tests are analyzed, they will be posted to the FAATC Fire Safety Section website.

FIREDETEX Program Update – T. Grabow

FIREDETEX = New Fire/Smoke Detection and Fire Extinguishing Systems for Aircraft Applications. The FIREDETEX consortium is comprised of 13 partner companies and government agencies in Europe. Thomas reviewed the three goals of the Fire Detection and the Fire Suppression portions of the program. He presented a diagram of the 'Combination of Water Mist and Gas System'. The program began in January 2000 and is scheduled for completion in January 2003. The program is currently in the hardware development and testing phase. Thomas also explained the expected results of this program.

Detection Systems Program Update – R. Hill

Dave Blake is working closely with NASA on a program to determine ways of reducing false alarm rates in cargo compartments. The main problem is how to certify new detection systems. Sandia National Labs is currently doing modeling work related to this project. Dave will present an update on this program at the July 2001 Working Group meeting.

Alternative Agents Update – R. Hill

The halon options report is now on the FAATC Fire Safety Section website for comments.

International Environmental Update – T. Cortina

The Halon Technical Options Committee meeting was held in February 2001. The methanol issue was a major concern/discussion during the HTOC meeting. Methanol is added into recycled halon around the world. The ASTM standard was revised to require measurements for methanol in halon. The HTOC will publish something on the methanol issue in recycled halon. B. Glaser: Our (Walter Kidde) first generation of cargo systems did have methanol in them to prevent moisture beyond what is allowable. We use a separation process of fractional distillation to remove the methanol from the halon. In our second generation

of cargo systems we eliminated the methanol and use a refrigeration dryer to take the moisture out. If anyone has information on the methanol issue, please send it to Louise Speitel at the FAATC Fire Safety Section or to April so she can forward it to Louise. There are use restrictions on halon going into effect in Europe. There will be a yearly review of the critical use list in Europe.

Active Fire Protection in Hidden Areas – T. Marker

This is a new research program at the FAATC aimed at looking at all the other areas in the cabin that are not protected from fire (hidden areas such as the overhead, E&E bays, and cheek areas). How can we actively protect these areas using detection/suppression systems? Tim presented photos from a number of recent incidents/accidents involving fire in hidden areas.
Tim presented an outline of the phases of this project:
Phase I: Characterization of Hidden Areas (E&E Bay, Cabin Overhead Space, and Cheek Areas).
Phase II: Development of Suitable Test Rig(s).
Phase III: Development and Characterization of Fire Test Scenarios (Ignition Sources, Fire Growth, Hazard Spread).
Phase IV: Development/Testing of Various Fire Detection/Suppression/Extinguishment Systems/Technologies (Smoke, Thermal, Gas Analysis, Optical, or Visual Detection? Combination?).
Phase V: Formulation of Certification Criteria for Suppression Systems.
A Task Group is currently being formed to provide information for project research for this program. The first Task Group meeting will be held today.

R. Hill: The FAA has programs investigating raise the standards for all materials in the hidden areas to the new thermal acoustic insulation standards. There is also a program investigating arc fault circuit breakers.

Task Group Meetings

1. Agent for Testing in Cargo Compartments and Engine Nacelles Task Group

2. Active Fire Protection in Hidden Areas Task Group (formed 3/28/01)

3. Fuel Tank Protection Task Group

Task Group Reports

1. Cargo Task Group: Discussed CF_3I and toxicity and the group will look at toxicity data (data will be provided by Bill Meserve). The group will also assess water mist systems and Envirogel as well.
2. Hidden Areas Task Group: Discussed fire detection/suppression in the E&E bay, cheek areas, and cabin overhead areas. The group will begin with an in-depth look and investigation into the E&E bay area including obtaining dimensions of E&E bays types of possible detection/suppression systems and potential procedural changes related to these systems in this area. Task Group members are asked to continue to think about fire detection/suppression in these areas.
3. Fuel Tank Protection Task Group: Discussed plans for B-747 test article due at FAATC in the near future and discussed best way to deliver NEA to the system. The group also discussed a construction of a possible plywood-type scale model to assist in design of distribution system prior to actual testing using B-747 test article.

Working Group Member Presentations

Hidden Area Fire Detection and Location – J. Brooks (International Aero)

John explained recent work done by International Aero on a wireless smoke detector for hidden areas in the aircraft.

Next Meeting

The next Working Group meeting will be hosted by Walter Kidde Aerospace in Wilson, North Carolina, USA, on July 17-18, 2001. A packet including hotel and area information has been provided by Walter Kidde. This information was distributed to March 2001 meeting attendees. If you would like a copy of this information, please email your request to April Horner (April.CTR.Horner@tc.faa.gov) providing your mailing address (this information will not be posted to the website). She will mail this information to you when she receives your request.