INTERNATIONAL AIRCRAFT SYSTEMS FIRE PROTECTION FORUM MEETING

May 8-9, 2018

Hosted by EASA, Cologne, Germany

TUESDAY, MAY 8, 2018

Certification of False Alarm Resistant Cargo Smoke Detectors – R. Ochs, PhD (FAATC)

CFR 25.858 Cargo Fire Protection, 2/10/1998 – this is the basis of the smoke detection requirement. Advisory Circular AC-25-91, 1/6/1994. TSO-C1e, 8/19/2014. ASO8036, 12/2013. AS8036 false alarm conditions are similar to theatrical smoke aerosols and is not working to trigger TSO-C1e detectors. A Task Group was formed to work on this issue. The Task Group meets in conjunction with the IASFPF or via WebEx. We need types and brands of smoke generators available. The Task Group met 11/2/2017 in Atlantic City after the last IASFPF meeting. The Scanning Mobility Particle Sizer (SMPS) seems to be the best choice to evaluate particle sizes, etc. It works in differential mobility analysis. FAATC is looking to procure SMPS for R&D Q3-4 2018. Related research at FAATC: TC-TT18-9 final report of Tina Emami's graduate thesis. Hariram: how does that relate to the FAA's old suitcase video? Ochs: we could do a suitcase fire again to simulate. We could do other fire sources, too. We could catalog several different fire sources.

False Alarm Resistant Smoke Detection and Smoke Generator Standardization – M Karp (C-Far)

Matt reviewed the background for this work. Matt showed the smoldering suitcase video referred to by Sham Hariram after the previous presentation. The Objective of this project and some of the targeted questions being considered were presented.
Theory Light Scattering: Mie Scattering Theory governs light scattering by sub-micron particles. Theory Blue and IR Light Scattering. FAATC did a lot of studies with the Aviator UL Smoke Generator – it uses white mineral oil,, smoke fluid 135, utilizes inert gases as a propellant. Matt uses three different test set-ups in the lab. Test Set-up 1: Plexiglas test chamber- 2'x2'x3' Plexiglas test chamber. He described the test procedure for this chamber and the results and conclusions of Test 1 in this test chamber.
Test Set-up 2: funnel from exit of smoke generator to 2.75" vane anemometer. Optical density meter. Detector. SGSA set-up was described. Results and conclusions were presented. What Matt did not expect: smoke transport due to Archimedes' principle is insignificant. Blue and IR signals were plotted against optical density. SGSA and the Aviator UL yield repeatable results over multiple

testing dates. The Blue light becomes saturated at greater than ~50% obscuration/foot.
Test Set-up 3: aft cargo compartment of DC10. 2000 +/- 100 cubic feet. Kidde smoke detector. MPS fire load was used. Small Scale to Large Scale Comparison: it does correlate. Blue and IR Signal Comparison was presented. The smoke transport was measured. Conclusions of Test 3: the higher heat creates of more consistent smoke density and detection time.
Questions addressed by project and Answers:
Does artificial smoke move like real smoke? The transport of artificial smoke can be adjusted by the addition or removal of heat. Others included in Matt's presentation available at www.fire.tc.faa.gov. Matt discussed what will be done moving forward. Canari: this is showing the detection times? Did you derive any recommendations from this testing? Karp: my detection time is not the same as the Kidde detector. To recommend a setting is difficult. You can make it as short as long of a detection time. I ask because we have projects where we have accepted 50psi. Hariram: is the FAA going to come up with a recommendation eventually of the smoke generators that can be used for certification testing? Ochs: we hope to lead to SGSA being mounted above any smoke generator to calibrate it to give you enough smoke to be in the real range. Hariram: will you be able to put out some direction? Karp: I would be interested in seeing if other labs could duplicate Freiling: how can we correlate the smoke detector technology from the smoke generator? How can we take into account what we have now for future technologies? Karp: we are working on the problem we have at this point. We cannot predict the future technologies. Ochs: we are willing to evaluate other detector technologies.

Improvements in Aircraft Fire Detection – R. Ochs, PhD (for J. Milke/S. Chin – University of Maryland)

This work has been done under a grant with FAATC. Motivation for this work: Need for timely fire detection in cargo compartments on board aircrafts. Full-scale tests are planned at the FAATC in late June 2018. Two phases: small-scale at UMD, and large-scale at FAATC (June 2018). A photo of the UMB test chamber was shown and described. They are testing a wide variety of fire and nuisance sources in the small-scale test and plan the same for the full-scale test. Chiesa: how much of the work is overlapping with Matt's work? Ochs: Matt is evaluating the current technology. UMD is supposed to looking into future technologies that could be implemented if there were a need for it. UMD is also looking at hidden spaces.

Smoke Generator Performance Assessment – Andre Freiling (Airbus)

Andre reviewed some previous work at Airbus: Smoke Generation Method using paraffin smoke oil generator. Summary: Program 5 resembles that of the flaming resin block (latest reference test fire scenario developed by FAATC).

Recent Studies: re-assessment of “reference curve”. We are still performing within this curve (Siemens generator). Smoke generator light obscuration shows good average match. Aviator Smoke generator could be achieved to match with the 2005 reference curve. Smoke Density Measurements in EN54 room environment – the results of smoke density measurements differ between the two generators. Smoke dynamics and spreading becomes visible in the enlarged room with higher dilution. Particle size distribution measurement: results of particle size distribution of the smoke generators (Siemens and Aviator) under test were shown. Summary: Siemens and Aviator smoke generators show good match in unventilated wooden aircraft cargo compartment mock-up. Different results for Siemens and Aviator smoke generator occur in a different environment (EN54 room). Particle size distribution matches well between Siemens and Aviator smoke generators. Next steps: discussion of feasibility of a standardized smoke generator calibration approach. International agreement on reference. Investigations on in-flight changes of smoke generator application (cabin pressure, cargo door leakage, etc.). Correlation to smoke detector responses. Hariram: in my experience, it depends on what time of the day you conduct a certification test (flight testing), I believe it is temperature and humidity that affect this. These variables may need to be considered. Freiling: yes, you are right. This is why I say there are so many parameters that have to be taken into account. Question: when you were testing in the EN54 room, what Aviator model did you use? Freiling: Aviator 440. Question: would the smoke characteristics from a lithium battery fire be addressed, how would you address this? Freiling: there are millions of different types of fires. Here we are talking about integration testing – one test that is agreed upon internationally that the smoke generator is in an agreed upon location. We are talking about the correct integration in this project.

Smoke Transport Modeling for Cargo Bay Applications – May Corn, United Technologies Research Center

Cargo Bay Detection System Development – a substantial number of tests required to develop and certify detection system. We proposed a model-based tool to augment and streamline certification process giving the ability to vary parameters. Many of these tests can be run virtually. May reviewed the model components: smoke source and smoke transport to the ceiling. Smoke generator is used for smoke source. We used Fire Dynamics Simulator (FDS) – a 3-D, unsteady solver from NIST (version 6.6.0). Simulation Tool and Set-up were reviewed. How should we model the injection of the smoke from the generator? Method 1: inject aerosol as a distribution of particles and Method 2: inject aerosol as a gas. Both injection methods produce similar profiles. Particle size information was collected in 20cmx20cmx20cm cubes. Particle size distribution parameters do not vary significantly with height. Results suggest that the particles follow the flow. Next, an air jet was added along the side. This scenario also suggests that particles follow the flow. Method 1 computational time: 3 to 9 hours. Method 2 computational time: 2 hours. These computational

times are related to these simulations with open air at the top. If we were to run these in a closed area in a cargo bay simulation, it would slow down the computational time. We need additional data to validate these models further. We have access to UTC Aerospace Systems Cargo bay simulator. Next steps: mature tool to encompass smoke generated from fire sources. Thomas Gehring: you are using this tool to help develop a smoke detection system in a cargo compartment, correct? Corn: we are just starting this process yes. Gehring: can this be used as a method of compliance in the future? Corn: I wouldn't say no tests would have to be done. It is more of an augmentation. Bell: We would like to use modeling as a certification tool. It may not be the only certification tool. We will go with the certification authorities. Question: did you do the 1.6 million cells based on a past study? Corn: we have had experience based on land-based applications.

Next Generation Fire Test Burner for Powerplant Fire Testing Applications – S. Summer (FAATC)

Current Status – Testing: previous round robin consisted of aluminum, PAN, and copper slug calorimeter. Searching for additional non-metallic materials to test in a round robin. Steve reviewed the materials previously evaluated at FAATC. Current work: composite panel design and initial setup concept (Spirit AeroSystems) – Steve gave a brief description of this work. Initial testing has been completed at NIAR that showed promising results with burnthrough times between 3-5 minutes, depending on configuration. Future tests will be done at NIAR, FAATC, and possibly one additional lab to ensure good reproducibility. Current Work: T/C Round Robin – initiated by Resonate Testing through the Task Group. Objective is to investigate effect on temperature readings caused by: external sheath diameter and wire gauge; exposed junction vs sheathed; thermocouple age. Currently in process of procuring thermocouples. Eight labs will participate.
Migration to SAE Committee: This Task Group will be moved to an SAE Committee. This will allow more formal engagement/collaboration amongst industry and authorities to develop guidance regarding the revision of regulatory documents. SAE A22 Fire Protection and Flammability Committee. Kelley: What is the status of the propane burner and is it still available for testing? S. Johnson: Right now, it has been fairly tied up as far as Change 1. It will be out for public comment very soon.

Assessment of the Ability of Plate Thermocouples to Check a Burner Flame – Camille Riera (DGA Aeronautical Systems)

Round Robin in 2014: Significant differences on burnthrough times – sonic settings produced more severe flame. Comparison: sonic burner vs old generation burners. DGA 2016: Camille reviewed the two conclusions. We wanted to evaluate another type of calorimeter after the RR 2014. DGA evaluated the Plate Thermocouple. Camille provided a description of the plate

calorimeter. Objective: assess the ability of plat thermocouples (PTc) to compare oil burner flames. Photos of the measurement devices were shown. Test Results were reviewed. Camille discussed the conclusions of the tests conducted at DGA and described the next tests that will be conducted. We would eventually like to conduct a Round Robin on plate thermocouples. Summer: have you seen any deterioration of the plate thermocouples over time? Riera: no, not so far.

Hydrogen Fuel Cells – S. Summer (FAATC)

The aviation industry is pursuing efforts to install hydrogen fuel cells on aircraft for a number of potential operations. One of the potential applications is to replace the APU, which brings up the question of introducing hydrogen into a designated fire zone. The FAA participated in FAA Energy Supply ARC Committee and EUROCAE/SAE WG80AE-7AFC. These groups have identified various areas of hydrogen research pertinent to fire safety. Test Proposal (through SAE committee): to evaluate a H2 fire under both a simulated leak and piping rupture condition. Photos of the FAATC test setup were shown. Question: is that a sharp-edge orifice or is there air mixing in there? Summer: it is essentially a sharp-edge orifice. We are working with the SAE committee to ensure the flow range is what they want to see. Dang: You said you need the ignitors to be moving in and out for the smaller nozzle; did you need it for the larger sized nozzle? Summer: not for the larger sized nozzle. Danker: do you think that the unsustainability is due to the wind currents? Summer: yes, we think that has something to do with it.

Engine Nacelle, Halon Replacement – R. Ochs, PhD (for D. Ingerson, FAATC)

CO_2 Distribution in the FAATC Nacelle Fire Simulator (NFS). Completed tests November 2017.
Near-Term Plans: complete data review; work with CO2 vs “high vent/pool fire.

SAE/ISO Standards on Fire Containment Covers & Fire Resistant Containers – R. Ochs, PhD (for D. Dadia, FAATC)

FAA Update – TSO-C90 ULDs - TSO-C90 Revision e was reviewed. TSO-C90 Revision f: FAA has not scheduled a revision to TSO-C90f. Future work: FCC and FRC implementation: results of data collected at October AGE-2A meeting will be shared at the October meeting in San Diego.

MPS Aircraft Cargo Compartment Halon Replacement Fire Suppression Systems Testing – Karsten Kirbach (Diehl) (for D. Dadia, FAATC)

Karsten reviewed the fire test scenarios used in this series of tests. An outline of the Diehl Aviation water mist/nitrogen fire suppression system was shown. Karsten described the water mist/nitrogen characterization. The Summary of

Test Results was presented. Test videos were shown. Summary: means of compliance was accomplished by the Characterization Tests. Canari: MPS Bulk Load Fire Test 3 Ceiling Temperatures – what is the interpretation of this slide? Kirbach: That is likely a question for the FAA. The FAATC will be preparing a Technical Report on this work. S. Johnson: Slide 13: the different temperature ranges, why is there a different temperature range for the bulk compartment vs the main compartment? Kirbach: we are measuring several effects in these compartments. In the main compartment, we had placed two nozzles while in the bulk compartment we only placed one nozzle. This is just to show means of compliance. Pugliese: how are you going to extrapolate this work? What is the route to certification on this project? Kirbach: There will be several different ways we can go. In our facility, we have a pressure vessel available to simulate flight altitude. Hariram: are you going to be proving this at altitude? You said you had an altitude chamber. Kirbach: yes, we have an altitude chamber and several other altitude simulators at our facility. Simpson: on your distribution system that you tested, did you have a separate delivery plumbing network for the water and the nitrogen? Kirbach: yes. Simpson: is that how it would be on the airplane? Kirbach: yes.

Challenge Fire Scenario for a Halon Replacement Agent in a Class C Compartment – Karsten Kirbach (Diehl Aviation) (for D. Dadia, FAATC)

TAD requested one additional test with a more realistic fire threat consisting of several conditions: palletized load of boxes with shredded paper, some boxes with lithium ion batteries, some boxes with flammable fluids, whole pallet wrapped in rain wrap. Karsten described the test setup and test. The test video was shown. Post-test photos were shown. Summary: successfully completed challenge fire test with a water mist/nitrogen system. FAATC will prepare a Technical Note about this test.

Proof of Concept Testing for Cargo Halon Replacement Agent – R. Ochs, PhD (for D. Dadia, FAATC)

Current work: testing an agent as a potential halon replacement. These tests are being conducted in an 11383-liter and a 21-liter pressure vessel test article. A schematic of the larger pressure vessel was shown. Baseline tests have been conducted in the larger pressure vessel – baseline test results were shown. Future work: complete testing to map flammability limits of agent in the small pressure vessel. Conduct testing in large pressure vessel with sub-inerting concentrations of agent.

EASA Rulemaking Activities – Enzo Canari (EASA)

Halon Replacement Status: DG-CLIMA maintains 2018 as the cut-off date for cargo compartment. RMT.0560, Opinion 08/2016 issued Title: Halon: Update of

Part 26 to comply with ICAO Standards. For EASA Rulemaking activities: Youri Auroque, Remi Deletain, Thomas Manthey.

Halon-free portable fire extinguishers: CS-ETSO Amendment 11 issued new ETSO-2C515 for halon-free portable fire extinguishers based on SAE AS6271 "Halocarbon Clean Agent Handheld Fire Extinguisher". EASA considers the installation of a new type halon-free portable fire extinguisher as a major change to the aircraft design. EASA has developed a MOC CRI to address the installation of portable halon-free fire extinguishers. The CRI clarifies that the extinguisher and its installation are required to meet the requirements of ETSO-2C515 and FAA AC20-42D.

EASA Proposed certification memorandum on smoke propagation testing: EASA has been working on this for a while. The purpose of this CM is to provide specific clarification and additional guidance regarding certification testing to be conducted to evaluate the entry of hazardous quantities of smoke into compartments occupied by the crew or passengers as a result of an in-flight fire event in the pressurized areas of the fuselage of a large airplane. EASA considers FAA AC25-9A to be the reference for smoke detection, penetration and evacuation tests conducted for the evaluation of the performance of fire protection systems of large transport airplanes. EASA intends to start the public consultation phase for the Proposed CM in Q3 2018. Coordination with the FAA is on-going with the objective to propose a policy that is fully harmonized. Pugliese: is there any quantity of smoke that is recommended? Canari: In the CM, we say that we would not accept the same amount of smoke that is generated for smoke detection. The hope we have is that the work that is being conducted by the FAATC will serve as a basis for the CM in the future. Freiling: is there a way of standardization – what is the amount of hazardous quantity? Canari: everyone has a different opinion on this. Through this memo, we want to take on the problem. This is a discussion starting point – a first step to understanding the problem. Hariram: we do smoke penetration tests and we put in the most amount of smoke possible in the compartment. We use a smoke generator at one end of the compartment and a camera setup at the other end of the compartment. Canari: there will be public comments on this. S. Johnson: what is the hazard with smoke in the avionics compartment? Canari: we don't want smoke to penetrate into the flight deck from the avionics bay.

EASA Continuing Airworthiness Review (CARI) on potential risk due to devices containing lithium batteries located on the flight deck: EASA has released to EASA TC holders a Continuing Airworthiness Review Item (CARI) to address the higher risk of in-flight lithium battery fires due to the increasing number of lithium batteries contained in equipment carried by the fight crew on commercial transport aircraft. Enzo reviewed what the TC holder is requested to do. Based upon the responses provided by the TCH, the Agency will liaise with the TCH to agree any further action(s).

ICCAIA Cargo Compartment Halon Replacement Advisory Group (CCHRAG) Update – Robin Bennett (Boeing)

Robin provided a brief background of this group. There are seven participants for Technical Assessment. Technical Assessment Criteria Categories were reviewed: fire fighting performance, physical agent properties, production/availability, environmental health and safety, and schedule, technology readiness by deadline. Final report to be provided at ICAO 40th General Assembly.

Cabin Altitude Discharge of BTP – R. Ochs, PhD (for H. Webster, FAATC)

The question was raised by the FAA Transport Directorate – examine the discharge characteristics of handheld 2-BTP fire extinguishers. Rob described the test setup. Photos of the Target Array and Remote Discharge mechanism were shown. The test procedure was reviewed. A video of Halon 1211 Baseline at 8000' was shown. A video of 2-BTP at 8000' was shown. Cold test @ -12 DegF Ext. Temp video. Hot test @ 147 DegF Ext. Temp video. Observations: vaporization appears to improve as cabin altitude is reduced.

WEDNESDAY, MAY 9, 2018

Status of the G-27 Lithium Battery Packaging Committee – T. Maloney, FAATC (for Doug Ferguson, Boeing)

The background for this group's work was reviewed. The SAE G27 committee has approximately 256 members. Initial outline of a performance standard was drafted by approximately 20 individuals from different stakeholder communities. This committee meets via telephone/WebEx and face-to-face multiple times per year. AS6413 Draft Content: this standard provides a test method to demonstrate and document control of the potential hazards from lithium metal batteries (UN 3090) and lithium ion batteries (UN 3480) when transported as cargo on aircraft. A photo of the FAATC battery test chamber was shown and some of the requirements for the chamber were described. The basic test method was described. Tom reviewed the additional contents of AS 6413 draft. Baker: is the idea that any lithium battery can be tested with this Standard? Maloney: yes. Hariram: does this apply to freighter airplanes only? Maloney: no one knows exactly how ICAO is going to use this Standard, so we are trying to move along with the assumption that it will be for passenger and cargo aircraft. Canari: this exercise started as a means of transportation of lithium batteries in passenger aircraft. I think that the discussion of external fire threat is a very important one.

Update of Tests Performed for External Fire Considerations of Battery Packaging – T. Maloney (FAATC)

SAE G-27 is creating a packaging standard to safely ship lithium batteries. The FAATC performed tests to evaluate the use of an external fire materials test. Tom reviewed the background for this type of test. A photo of the test setup was shown. Wozniak: is the 200 degrees at the low end or high end or middle of that variability? Maloney: I would say it's at the safe end. Roudebush: Once the package has become developed, how does it become certified to be used? Maloney: ICAO (International Civil Aviation Organization) commissioned this group, so it would be their regulation. Their regulation would point to this Standard. Summer: It would be a UN test Standard, so PHMSA would then regulate by calling out that test standard. Maloney: I think it something that no one really knows the answer to yet. Buston: is the FAA planning on doing any testing to check that the backside temp does not send cells into thermal runaway? Maloney: maybe we will in the future.

SAE G27 Packaging Tests – T. Maloney (FAATC)

The most common fail criteria that you have in the standard include a chamber that will fill up with battery gases. The gases in the chamber collect and eventually ignite. Motivation for this work was based on a few experiments that showed smoke stratification. Key question: is smoke stratification an indicator of flammable gas stratification? The test setup was described and photos shown. Summary: stratification of smoke is an indicator of hydrocarbon gas stratification.

Update of Tests Performed for Hazardous Flame and Particle – T. Maloney (FAATC)

This work was conducted at FAATC and will be presented to the SAE G27 Committee at its next meeting in June 2018. Four (4) options for hazardous/non-hazardous flame/particles. Use of cheesecloth and use of cardboard. Chiesa: how can you assess what is hazardous when you don't know what is around it, because this package may be in the cargo compartment with other unknown items around it? Maloney: the committee decided that this package is most likely shrink-wrapped. G27 is proposing Grade 60 cheesecloth and 440 grams per meter cardstock. Typical low speed results videos were shown: metal cells usually ignite the cheesecloth. Results: particles from metal cells ignited the cheesecloth every time. Chiesa: what was the distance? Maloney: 3" and 6" metal cells ignited the cheesecloth. Particles from lithium ion batteries did not ignite the cheesecloth. From these tests, we can say that particles from metal cells are more hazardous than particles from ion cells. Cardstock tests: particles from metal cells ignited the cardstock one of five times. There were occasions where the cheesecloth was penetrated without ignition. Every time cheesecloth ignited, it almost completely burned up. From the results, cheesecloth may be a suitable method to demonstrate hazardous flames and hazardous particles.

Chiesa: what about shrink-wrap for these tests? Maloney: since we established in past tests that cheesecloth was similar to shrink-wrap, whatever result we got for cheesecloth would be representative of shrink-wrap.

High-Energy Firefighting Training Enhancement (HEFTE) Working Group – S. Summer (FAATC)
This group is mainly focusing on handling lithium battery fires in the cabin. It is chaired by Candace Kolander (ALPA). There are 11 members. This group is made up of the folks that actually encounter these issues in flight. Group established to recommend updates/improvements to current training and guidance around response to high-energy fires that can occur in the occupied areas of the aircraft. HEFTE members did mock-up cabin fire tests at FAATC during their March 2018 meeting. FAA and HEFTE members learned a lot from this exercise. Concerns noted: problems donning PBE, gloves provided by FAATC not used, so ungloved hand used. Oestereich: yesterday we talked about this situation in the flight deck. Do you have any ideas on that? Summer: we know of some flight deck crew who carry 2 liters of water onboard for this reason. In this group, we have been talking about how this situation might be handled differently on the flight deck. Steve showed videos from the exercises that were done during the HEFTE meeting at FAATC in March 2018. Question: has there been any thought about informing passengers on what to do in these situations to help the flight crew? Summer: yes, absolutely.

FAATC Tablet Fire Extinguishing Testing – S. Summer (FAATC)

Background: SAFO 09013 was released in 2009 to provide guidance to operators on how to manage lithium battery fires in PEDs. Objective of this test program: Is the SAFO still the most practical means for handling a tablet fire in flight?
Test setup: Tablets were tested lying horizontally and on a stand at a near vertical (75°) position. Thermal runaway initiation: objectives in our TR initiation method were: keep tablet as closer to its original condition as possible. All tablets were in full functioning condition prior to start of testing. Extinguishment methods: halon extinguisher on hand to knock down any flames (not necessary on any of the tests); water applied through two different methods: two 16 oz drinking water bottles, and two 16 oz chemistry was bottles which allowed for water to be directed into tablets. Videos of tests were shown. Results of the tests for each tablet type were reviewed. Davis: have you run this type of test with ignitors in the vicinity? Summer: we did not run these tests with ignitors. Bowden: have you looked at the contents of the smoke and what is involved there? Could you get close to a laptop if you didn't have breathing equipment? Summer: yes, you could still get near it without breathing equipment to fight the fire for one device. It may be different in the flight deck. Summary: initial TR observed through forceful release of smoke with varying intensity. Flaming/burning only occurred during 1 of 16 tests. Philosophy of SAFO still holds, however, current wording may need to be adjusted. Oestereich: do you

plan to perform tests on other PEDs like power banks? Summer: At this time, we don't have any plans for that. Oestereich: do you have any information on flame propagation for metallic backside vs hard plastic backside? Summer: if we were to do any additional testing, we would look into that. Question: what about the accessories like gorilla cases that people often buy for their tablets? Summer: we did not look into that. Question: from the events that are occurring, is the data available? Summer: that is one of the discussions we have had in the HEFTE group.

Testing an Enclosure for the Safe Recovery of Damaged Electronics: Work for UK AAIB – Jonathan Buston (UK Health & Safety Laboratory)

Chiesa: what is the context of the use of this container? Buston: for light aircraft crashes those crashes where the state of the flight is held on a PED, they would have a need to interrogate that PED. In order to interrogate that PED, they would need to be able to plug it in and protect it to get the data out of it and wanted to be sure to contain the fire and the fragments that may happen when device was plugged in.

Next Meeting:

October 31-November 1, 2018 at Resorts Casino-Hotel, Atlantic City, New Jersey, USA

The IAMFTF (International Aircraft Materials Fire Test Forum meeting) will be held October 29-30, 2018 (starting 1 PM on October 29) at Resorts.