
BlazeTech Corporation

Our services to the aircraft industry include R&D, testing, model and simulation, safety audits, consulting, accident investigation/reconstruction and product/technology assessment. Our products include FuelShield™ that protects fuel tanks against ullage explosion and hydrodynamic ram; unique laser light scattering instrument, mass flux gage and pyrometer to characterize flows containing aerosols; and a variety of fire, explosion and structural damage software such as BlazeTank™ for fuel tank explosion calculations.

Lecturers

Dr. N. Albert Moussa, Course developer, main instructor and Technical Director of BlazeTech with over 35 years of experience in fire and explosion in civilian and military aircraft. His credentials include: William Lockwood Memorial Lecture Award, Engineer of the Year by the NE Section of AIAA, AIAA Distinguished Lecturer, Best Papers by SAE and ASEI, and several ASME citations. He served on national committees and was Associate Editor of an ASME Journal. He authored one book and over 150 publications and reports. He investigated the major aircraft fire accidents since 1996. His forewarning about aircraft fuel system vulnerabilities has gained him prominence in the media, including CBS and BBC. He received a B.S. from Stanford University and M.S./Ph.D. from MIT, with both dissertations on fire.

Mr. Chuck Leonard, former NTSB Senior Investigator and a consultant to BlazeTech. He has investigated over 200 aircraft accidents around the world. He was a pilot with the Air Force and a major air carrier, accumulating over 17,000 flight hrs. He has taught professional courses on aircraft accident investigation at the FAA Academy and universities.

Dr. Vijay Devarakonda, Vice President of BlazeTech. His areas of specialization include fuels and combustion, fire and explosion effects, fire detection and suppression, reaction kinetics and optical instrumentation. He has more than 50 publications in related areas. He received his Ph.D. From The University of Kentucky

Occasionally guests will lecture on specific issues.

BlazeTech

14th Offering of our Course:

Aircraft Fire & Explosion

Investigation/Vulnerability/Protection

in

Accidents, Combat & Terrorist Attacks

19 – 22 June 2012
Register for Any or All Days



Lecturers

Dr. N. Albert Moussa
Mr. Chuck Leonard
Dr. Vijay Devarakonda

Course Benefits Those Who Are:

responsible for commercial/military aircraft, helicopters or Unmanned Aerial Vehicles including design, operation, prevention, maintenance, testing or management of fire and explosion safety, combustible fluids, material specifications, certifications, detection and suppression systems, bomb threats and security, structural analysis, survivability, vulnerability, safety management system, accident investigation, risk mitigation team and risk analysis.

BlazeTech

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Course Objective & Organization

Expect comprehensive evaluation of aircraft fires and explosions in accidents, combat and terrorist attacks. We present a unified treatment of these situations with the fundamentals introduced as needed. This approach is tailored to professionals and enables effective treatment of diverse situations for both commercial and military aircraft. We discuss what governs the initiating event, accident evolution, system survivability, protection methods and forensic implications. The course is illustrated by videotapes and photographs of real events and bench/full-scale tests by FAA, NTSB, DOD, NASA and BlazeTech. Attendees benefit from:

- Fundamental grasp of key issues and how to treat new situations
 - Knowledge of available quantitative methods which enables better use of Subject Matter Experts
 - Dynamic class exchange of current problems
- Course is organized into four one-day modules that are standalone, yet complementary. Aircraft systems and related accidents, tests and analyses are discussed on Days 1 to 3 while the formal investigative process is presented on Day 4. A certificate of completion will be given. Each day is equivalent to one Continuing Education Credit Unit.

Day 1. Vulnerability to Combat/Terrorism

1.1. Threats Characterization

- Projectile, explosive & hazardous materials
- Blast from spherical vs. cylindrical charges
- Internal explosions and hydrodynamic ram
- Toxic: chemical and biological agents
- Pocket green laser pointers

1.2. Response to Threats

- Shock tube, air/ram gun & flyer plate tests
- Penetration and perforation
- Local deformation vs. complete collapse
- Dry bay fires; cook-off and blast (PAN AM 103)
- MANPADS/DHL A300 in Baghdad

1.3. Survivability Improvements

- Aircraft hardening
- Fire detection and suppression (AV8-B)
- Concealed explosives and their detection
- Lessons learned and trade-offs
- Implications to Homeland Security
- First principle vs. engineering models

Day 2. Fluids-Related Fire and Explosion

2.1. Flammability of Fuels, Oils and Hydraulics

- Current and alternate compositions, additives
- Vapor pressure, flash/ fire points, flame speed
- Deflagration vs. detonation

2.2. Fuel Tank Safety

- SFAR 88: lessons learned (TWA 800)
- N₂ Inerting: 9% vs. 12% O₂ (FRS 747)
- Predict fire/overpressure using BlazeTank
- Debris impact (Air France Concorde)

2.3. Engine Fires

- Engine burst (UA232, Sioux City, IA)
- Hot surface vs. auto ignition temperatures (full-scale tests on F-16, F-18 and AV8-B)
- Fire detection vs. false alarm
- Suppression: Halon replacement, clutter effects

2.4. Post-Crash Fires

- Pool fire: anti-misting fuel (Air France, Toronto)
- Postcrash fire in buildings (Sept. 11)

Day 3. Materials-Flammability and Related Fires

3.1. Polymers, Composites and Metals

- Thermal degradation, ignition, flaming, smoldering, smoke, toxicity, flame retardants
- Testing and predictive methods
- Composites vs. Aluminum structures; Mg

3.2. Flammability of Assemblies

- Acoustic insulation
- Seats fabrics/foams and panel materials
- FAR 25.853 test methods

3.3. Cabin Fires

- Breached fuselage vs. burn-through
- Flashover (full scale FAA tests)
- New materials: Magnesium, composites
- Passenger evacuation (Manchester, UK)

3.4. Fires in Cargo and Hidden Areas

- Wire problems, electrical fires, Lithium ion battery fires, (Swiss Air 111; Saudi, Riyadh)
- Fire detection and suppression
- ValuJet, Everglades and FedEx, Boston

Day 4. Accident Investigation

4.1. From Accidents to Regulations

- Accident/incident databases
- Statistics/lessons learnt
- AC, AD, NPRM, FAR

4.2. Investigative Process

- NTSB and corresponding agencies overseas
- On-site protocols (ICAO Annex 13)
- Forensic tools
- Timeline and pathline reconstruction

4.3. Fire/Explosion Pattern Recognition

- In-flight vs. ground fires: broomstrawing and splatter (Air Canada, Cincinnati)
- Pre- vs. post-crash fires (Com Air, Lexington, KY)
- Explosives vs. fuel vapor explosions
- NFPA 921
- Use of scale tests & computational models

4.4. Human Factors

- Safety Management System & risk matrix (United, Salt Lake City)
- Organizational issues (Columbia Shuttle)

Location and Schedule

Location in Woburn, MA to be announced to confirmed registrants. 8am-5pm each day. For near-by hotels, see Directions/Hotels at www.blazetech.com.

Register* for Any Combination of Days

Check the box for each day you wish to attend.

one day: \$1,200. two days: \$2,100.
three days: \$2,850. four days: \$3,300.
Selection: Day 1 Day 2 Day 3 Day 4

Rates for U.S. Government Only

one day: \$800. two days: \$1,400.
three days: \$1,900. four days: \$2,200.
Selection: Day 1 Day 2 Day 3 Day 4

Discount \$50/day if paid by check 1 month in advance. Fill out, fax and mail payment to BlazeTech.

Name: _____

Title/Position: _____

Company: _____

Address: _____

City, State, Zip: _____

Country: _____

Phone/Fax: _____

E-mail: _____

How did you hear about the course? _____

Payment: Check Credit Card Wire

Card Number: _____

Expiration Date: _____ Amount: _____

Name on Card: _____

Signature: _____ Date: _____

Billing Address for Card: _____

* Registration cancellation fee: \$150 if within 2 weeks of course starting date. We reserve the right to cancel course.