New Large Aircraft Composite Fire Fighting
(Potential Upcoming Project – Not Currently Active)

The Federal Aviation Administration (FAA) Airport Technology R&D Branch’s Operation of New Large Aircraft Research Program is exploring Aircraft Rescue and Fire Fighting (ARFF) procedures related to composite materials. Composite materials are being used more commonly in aircraft construction to reduce weight. Aircraft composite materials consist of fine fibers and resins that are bonded together to form a strong material. NLA are being designed with higher percentages of composites than ever before. The Airbus A380 will be 25% by weight composites including 23% carbon fiber-reinforced polymer and 3% GLARE fiberglass reinforced aluminum. Airbus has plans to expand the use of composites on future aircraft, which would further change the fire extinguishing characteristics of the aircraft. The Boeing 787 Dreamliner is pushing the envelope with a total composite of 50% by weight, including the integration of an all composite fuselage, wings and tail.

Aircraft structures made of metals are well known and understood on how they burn, however very little information is known on how composite materials react to fire. Research conducted to date shows that some composite materials sustained significant damage after only 10 seconds of heat exposure.
Composite fires tend to be deep seated (similar to a charcoal fire), continue to smolder internally and require copious amounts of water to fully extinguish. Tests conducted by the Air Force have shown that fires can continue to burn internally even when the exterior fire has been fully suppressed. If not completely cooled, the epoxy resins in the composite will smolder, which can potentially reignite fuel and other flammable materials in the area. Firefighters need to receive instruction specific to composite materials so that they can learn to identify composites on aircraft, train to effectively extinguish these fires and determine when the interior has been cooled below the reignition temperature. The FAA is initiating several new areas of research specifically to address issues related to ARFF response to composite fires including:

- What is the best extinguishing agent?
- What is the best extinguishing method?
- How much agent is required?
- How long do agents need to be applied to extinguish such a fire?
- Does any additional hazard exist for fuel stored in composite aircraft wings?
- Do ARFF personnel possess the correct tools and equipment to mitigate a composite fire?