

**Mission.** The FSL conducts small- and large-scale fire testing in support of shipboard aviation fire protection, weapons protection, and Navy and Marine Corps shore-based fire protection. The laboratory consists of two primary facilities: the FSL Burn Room and the Carrier Deck Firefighting Test Facility (Mini Deck).

**Unique Features.** The FSL is the only Navy test facility that provides both small-scale testing in controlled weather conditions and full-scale fire testing on-site with jet fuel and full flight deck conflagration environmental conditions. These include mass fuel spill, complete hose station capability, wind generation, full-scale weapons and aircraft simulation, and P-25 firefighting vehicle.

### Combat Support

- Portable fire extinguisher extension wand currently in use aboard ship for fighting engine fires on V-22 Osprey
- Fire hose and nozzles currently in use on hangar deck of CVN ships
- Replacement agents for airfield Halon fire extinguishers
- Fire suppression systems for crew compartment in United States Marine Corps (USMC) high-mobility multipurpose wheeled vehicle (HMMWV or Humvee) for IED protection
- Unique “deck-edge” fire suppression system for the flight deck of USS *Seafighter* (FSF-1)
- Crew training techniques for reducing manning concepts for flight deck firefighting for USS *Seafighter*; these concepts are being adopted for all air-capable ships
- Commercial firefighting system for use at USMC forward expeditionary airfields
- Propane burner used to simulate burning rocket fuel to support fire protection studies for the NASA Vertical Assembly Building
- Test and development of firefighting and weapons cooling procedures for internal weapons bay on JSF

**Cost / Time Savings.** Use of the small-scale test capability in the Burn Room for hardware development and proof-of-concept prior to full-scale testing provides very effective cost savings.

### RDT&E

- **R&D.** Includes modeling, data analysis, and combustion chemistry support
- **FSL Burn Room.** Supports testing requiring small-scale burning (up to 5-SF pan fire) for many purposes, including combustion by-product evaluation, fuel burn characteristics, fire modeling hardware development and calibration, fire suppression agent and equipment proof-of-concept, and passive fire protection system evaluation
- **The Mini Deck.** Supports testing larger fires (up to 6,400-SF pool fire), flowing fuel fires, high-pressure spray fires, large water flow capability (suppression system development, simulated rain), and high wind conditions

**Size / Description / Scope.** 7,300 SF located on the China Lake North Range within 5 miles of the Main Site area. **Annual Test Events:** 5 to 8. **Plant Value:** \$1M+.



## Main Facilities

### Mini Deck

- Flight deck simulator used for large-scale pool fire tests (6,400 SF). Fire resistant concrete pad with 5,000-gallon capacity oil / water separator (2,000-gallon fuel capacity), two 35,000-gallon holding / settling tanks, 10,000-gallon batch mix tank, and 1,000 gallons per minute (GPM) water / aqueous film-forming foam (AFFF) trailer mounted pump.
- Debris pile, steel construction, 40 GPM cascading fuel flow with deep-seated fire. Simulates crashed fighter aircraft with collapsed wing, ruptured fuel cell, and fuselage debris.
- H-60 helicopter simulator, steel construction, internal and external spray fire, and engine compartment fire capability. Also capable of suspending mock ordnance, entry and rescue, simulated emergency engine shut down procedures, and adjustable fire threat.
- Wind generation capability up to 35-knot winds at all points on the test deck. One trailer mount with three gas driven wind generators and four individual trailer mounted wind generators with stackable capability.
- Control room, office space, and meeting room.

**Burn room.** 900-SF facility capable of 5-SF jet fuel pan fire or equivalent heat output, with air-scrubber and oil-water separator.

### Equipment / Instrumentation

- **Equipment.** P-25 shipboard firefighting vehicle, mobile and stackable wind generators, two CVN flight deck AFFF hose stations, 3,000 GPM turret, and mobile instrumentation trailer can be used at either test facility or other remote test sites.
- **Instrumentation.** Both FSL facilities are capable of supporting basic fire instrumentation, including thermocouples, flux gauge, FTIR spectroscopy, IR heat detection, local weather monitoring, deck level and multiple elevated camera locations for still and video, pressure transducers, decibel meter, water stream instrumentation, high-speed photography and video, real-time spectroscopy, and flash X-ray.

**Historical Significance.** The Mini Deck was constructed to support testing of improved firefighting equipment, agents, and tactics following several deadly aircraft carrier flight deck conflagrations during the Vietnam era (USS *Forrestal*, USS *Oriskany*, USS *Enterprise*, USS *Nimitz*). Original testing led to the development and acceptance of AFFF, which has become the world's standard in petroleum fuel fire agents. Significant modifications to the shipboard firefighting equipment, agents, and tactics were developed here. These developments are now the standard for all U.S. Navy ships and most war ships world-wide. **Year Opened:** 1970.

**Future Plans.** Enhanced waste management to improve test production time.

