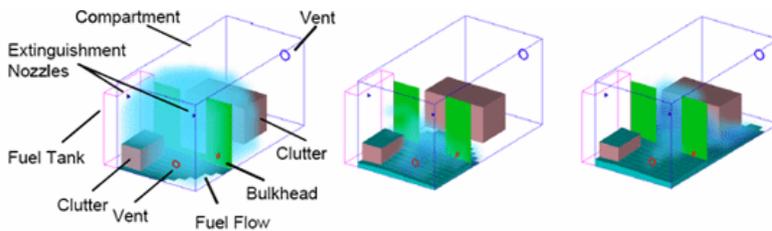
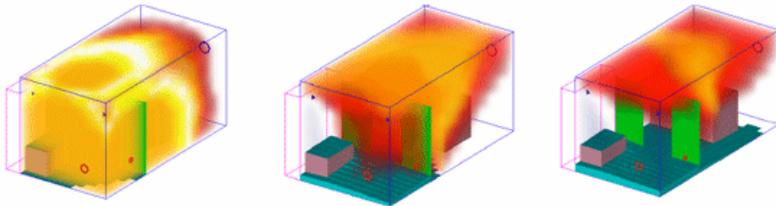


FIRE PREDICTION MODEL (FPM)

FLUID FLOW



TEMPERATURE



ABOUT FPM

The Fire Prediction Model (FPM) is a tool designed to assist analysts in simulating fire ignition, sustainment, and suppression for aircraft, ships, and ground vehicles. FPM is the primary physics-based fire simulation model in use for vehicle studies within the DoD's ballistic vulnerability community, representing the culmination of more than a decade of development. Principal sponsors include the Joint Aircraft Survivability Program Office (JASPO) and the U.S. Army Research Laboratory, with significant application support from the F-35, P-8, CH-33K, C-17, B-1B, JCA, and C-5 programs.

FPM supports traditional high-resolution, component-level vulnerability-related analyses. It provides the analyst and test engineer with a unique ability to investigate fire parameter sensitivities by conducting numerous runs that are not typically practical or cost effective to investigate by test.

ASSESSMENT USING FPM

FPM offers a wide range of user input options, including ignition source, ballistic threats, flammable liquids, target vehicle, fire suppression activation, fire suppression injection, and ullage initial conditions. The model has self-contained databases

that characterize common ballistic threats, flammable fluids, extinguishing agents, and vehicle materials. Model output includes probability of ignition, probability of a sustained fire, temperature profiles, heat flux, oxygen concentration, fire suppressant concentration, and ullage conditional data. The SURVICE-developed FPM 3D visualization tool then graphically displays the fire and its flow characteristics. In addition, computed sensor output data can be obtained and plotted for any specified location in the fire simulation.

FPM SUPPORT

SURVICE not only serves as the developer of FPM, but we also use the model for our own

studies, analysis, and test. Thus, we understand the capabilities of the tool and how it can be used to help assess complex fire issues. Additionally, through our SURVICE Fire Works Team, we can provide expert assistance for FPM training, model setup and execution, and application of the model to address a specific fire issue or a part of a larger vulnerability analysis.

APPLICATION

FPM simulates the entire fire event, starting with ballistic penetration and ending with fire extinguishment. This complete end-to-end analysis capability allows the model to support many applications, including:

TEST PLANNING AND ANALYSIS

- Shotline selection
- Pre-test predictions
- Post-test analysis
- Data collection needs

VULNERABILITY ESTIMATES

- Time to damage
- Ullage explosive overpressure rises
- Vulnerability model inputs
- Ignition/sustainment probabilities

VEHICLE DESIGN

- Heat flux for material failure
- Fluid flow effects
- Fire suppression design
- Hot-surface ignition prevention

PERSONNEL INJURY

- Burns
- Smoke inhalation
- Egress requirements