



# Fire Modeling Services Framework

As the wildland fire community strives to improve fire fighter safety amidst increasing wildland fire activity, providing support using aging IT infrastructures has become difficult. With the added challenges of cyber security, escalating IT costs, the need for collaboration with local and state governments, and cross-agency collaboration it has been challenging transferring new age science from the scientists to the users in the field. The Fire Modeling Services Framework (FMSF) is a 21st century approach of transferring knowledge and technology from research to the field supporting wildland fire behavior and effects modeling for decisions support systems for fire and fuels managers and researchers. The FMSF aims to solve unique challenges presented with fire modeling software today such as lack of access to super computers, inability to run simultaneous analyses, increasing costs of maintaining and supporting the IT infrastructure, and the ability to get access to updated software in a timely fashion to those who need it most.

## What is the FMSF?

The FMSF is part of a larger community of Service Oriented Architecture (SOA, Figure 1). The FMSF is a Model as a Service (MaaS) strategy that provides the ability to run unlimited wildland fire behavior and effects models and tools in the cloud. The benefits of this MaaS strategy are, the FMSF:

- operates on-demand only using resources when requested or needed
- provides a streamlined approach for maintaining, updating, and providing new models
- provides a structured framework through which the research community can apply the latest science in a truly one stop modeling location

This separation of the modeling enables other software, systems, and developers to innovate faster building work flows with scalable tools and software while not incurring the costs of supporting and providing wildland fire modeling to the community in each separate system.

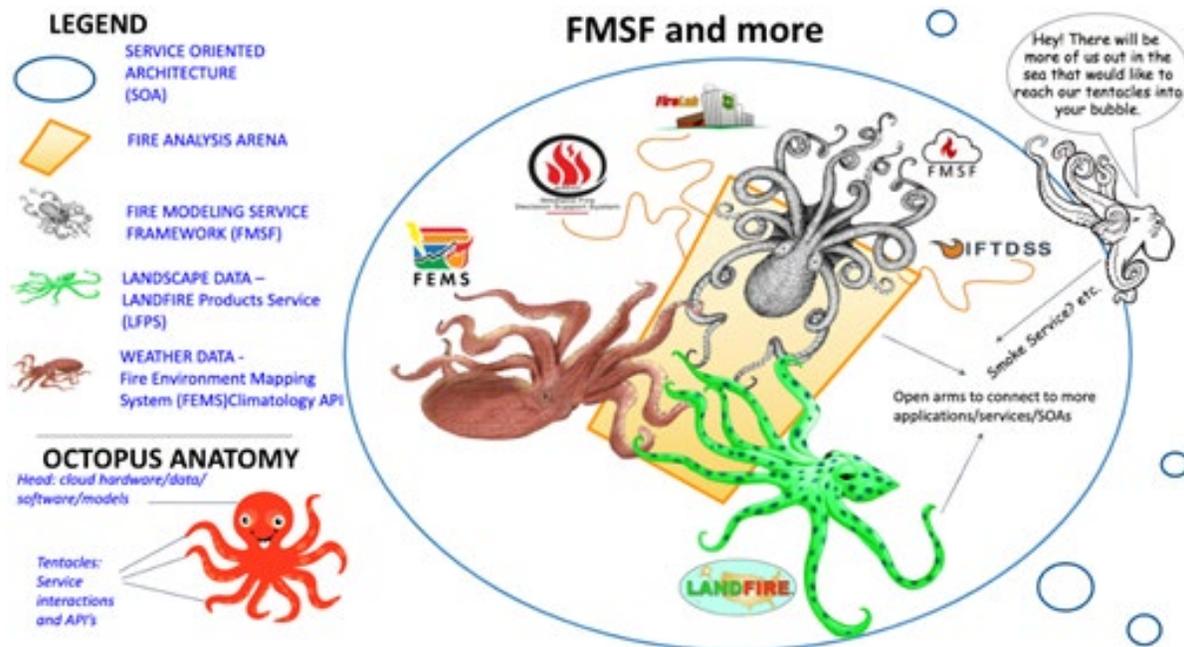


Figure 1. Representative view of the Service Oriented Architecture (SOA) and Fire Analysis Arena where “Services” (Fire Modeling, Landscape Data, and Weather) of APIs connect to support models, tools, or analyses of various applications (WFDSS, IFTDSS, etc.).

The FMSF is a RESTful web service, therefore general users do not access it directly, rather, the FMSF provides a programming interface that other systems/applications such as the Wildland Fire Decision Support System (WFDS) and Interagency Fuel Treatment Decision Support System (IFTDSS) can access. Users of these systems/applications have access to the latest science and cloud computing capabilities to complete assessments, analyses, or scenario planning. These systems/applications provide input information/parameters and receive outputs from the models/tools within the FMSF. Outputs currently generated in the FMSF include potential fire behavior (i.e., flame lengths, rates of spread, fire progression) and fire effects (i.e., tree mortality, fuels consumed, and emissions).

## FMSF Status

The FMSF began production in summer 2022 with IFTDSS connecting at that time. Plan is for NextGen WFDS to connect in 2023. Current models implemented and supported in the FMSF are:

- FlamMap
- MTT
- Randig
- FSPro
- FARSITE
- SpatialFOFEM Consumption and Emissions
- SpatialFOFEM Tree Mortality

The FMSF is planning for additional models in 2023.

## FMSF Team

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