



## Argonne Wildfire Probabilistic Threat Model – Risk Assessment for Interdependent Power and Telecommunications Systems

### PURPOSE

The Argonne Wildfire Threat Model is a probabilistic model designed to assess the risk posed by wildfires to US electric and telecommunication infrastructures. It is intended to operate in tandem with Argonne's EPFAST and TELCOFAST tools, which model electric and telecommunications infrastructure, respectively, to estimate the loss of service during a disruption. The model has four basic functions:

- 1) Given a high-level description of the scenario, generate a detailed characterization of the wildfire threat (hazard) with detailed daily fire progression maps and embedded fire intensity data.
- 2) Generate fragility curves for determining asset damage levels given the fire intensity values.
- 3) Generate a list of possible at-risk electric and telecom assets that will constitute the first input to EPFAST and TELCOFAST tools. The tools will then generate impacts in terms of outage areas for their respective domains.
- 4) Employ a Monte Carlo simulation framework to capture the stochastic nature of the wildfire behavior and provide a probabilistic outcome (with confidence levels) for the final output.

### ARCHITECTURE

The model's architecture is shown in Figure 1 (page 2). The various components may be described as follows:

- 1) *Scenario Definition Module* that defines the bounding parameters for the postulated scenario.
- 2) *Database Module* that consists of: (a) empirical and synthetic wildfire hazard and progression maps, (b) generic wildfire fragility curves, and (c) electric and telecom infrastructure GIS layers.
- 3) *Data Management and Analysis Module* that probabilistically or deterministically calculates probable damage level of at-risk electric and telecom assets.
- 4) *Output Module* that contains the list of at-risk electric and telecom assets as determined by the data management module.
- 5) *EPFAST and TELCOFAST* simulation models to determine impacts in terms of outage areas.

