

## **“Ready-to-Use” Building Layouts and Combustible Packages for 3-D Fire Simulations**

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### **Abstract**

In recent years, complex 3-D computational fire effects models have been widely used by fire protection engineers to simulate the consequences of fire and to assess effectiveness of fire mitigation options. This has happened in part because these tools have become increasingly user friendly. However, use of these tools still requires considerable time, both for users to create input data files, and for computers to produce the simulations. With respect to input files, independent of the description of the initial design-basis fire itself, information and data are lacking about the way the building itself should be described as input data, the degree of detail that is necessary in order to capture the elements that affect the validation of the simulation, and how to optimize mesh size so that critical elements can be properly incorporated without resulting in a prohibitively lengthy calculation time. In order to begin addressing these issues, this project aims to collect and make available to the entire fire community, representative building layouts for common occupancy groups, such as schools, offices in high-rise buildings, and hospitals, which can form a common basis for estimating, assessing and verifying building-related model parameters. In parallel to collecting building layouts, a set of ‘combustible packages’ representing 3-D objects such as chairs, couches, and beds, which contain heat release rate, chemical reaction, and toxicity properties needed for the simulations, will also be developed.