

# Modeling Fire Growth and Spread in Houses

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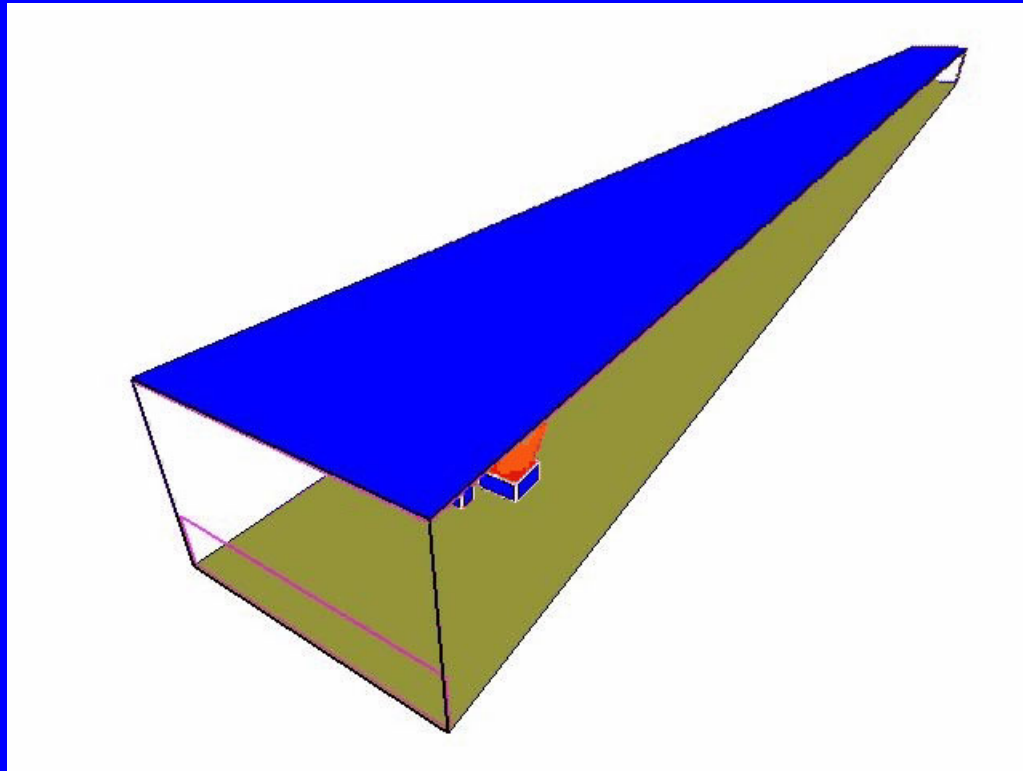
National Institute of Standards and Technology

Technology Administration

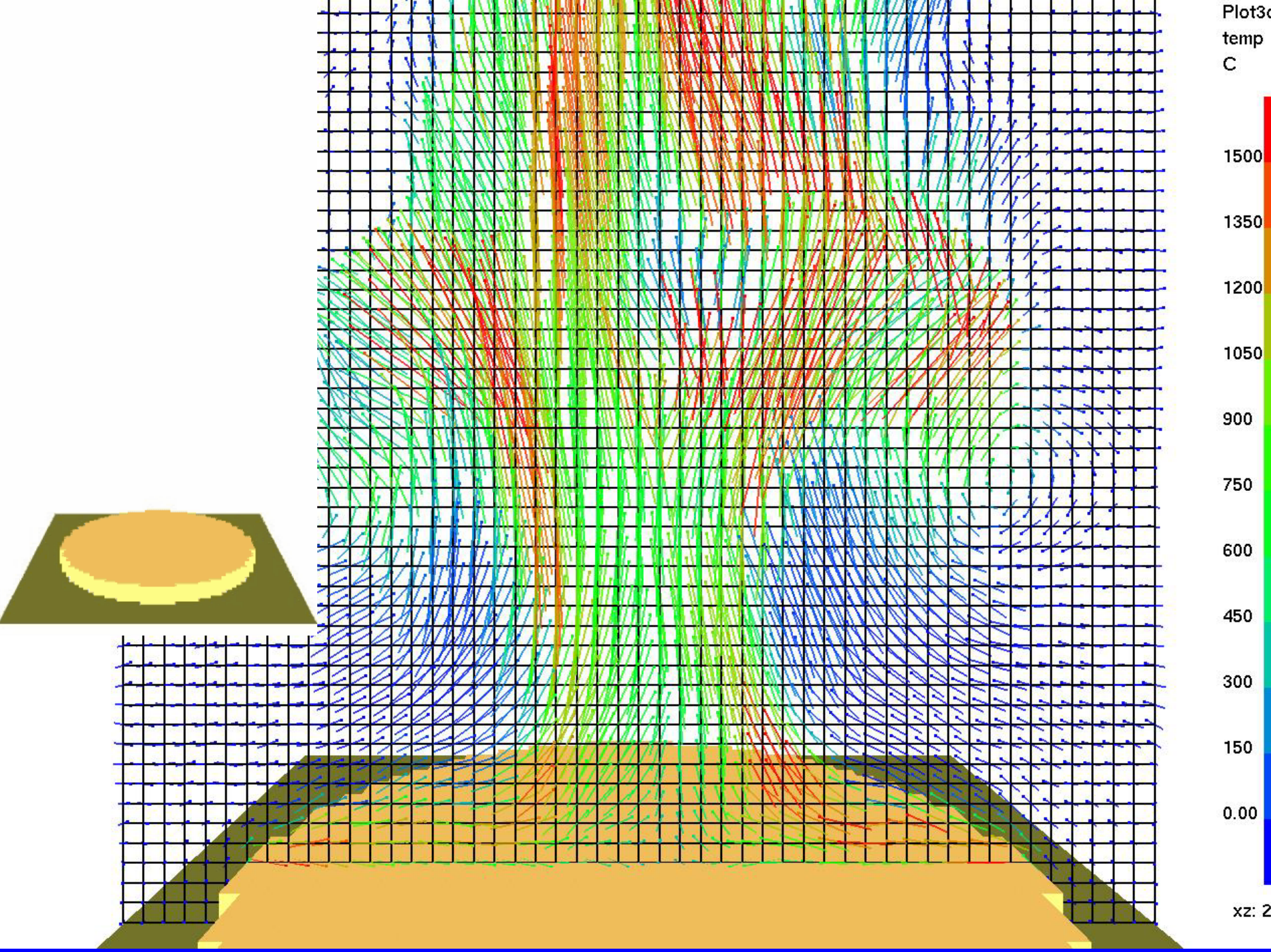
US Department of Commerce

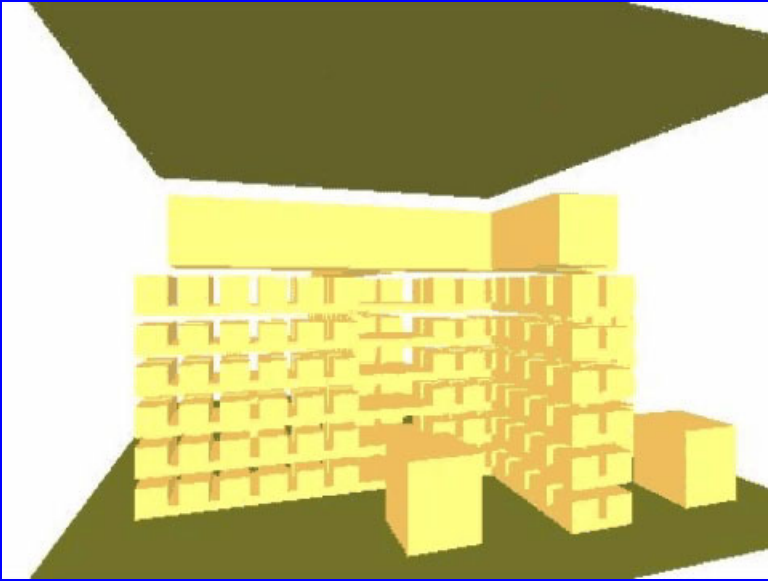


**Burning a Strip of Tissue Paper**



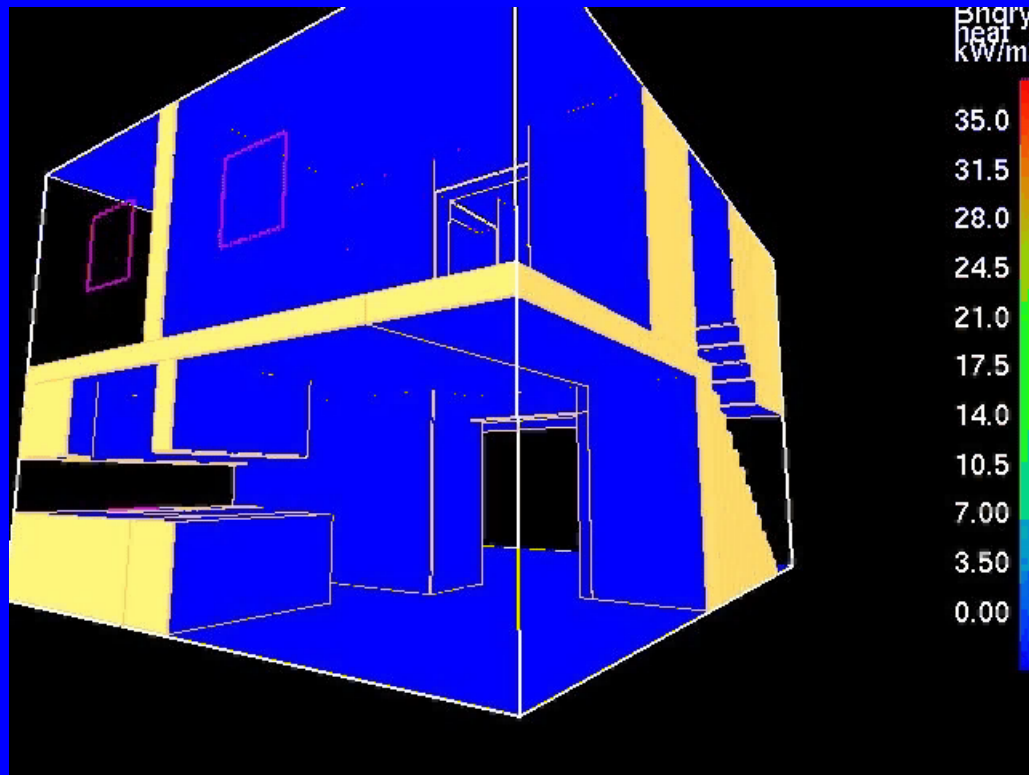
**Steiner Tunnel**





## Rack Storage Fire





**Glenn Forney's Townhouse**



Front View

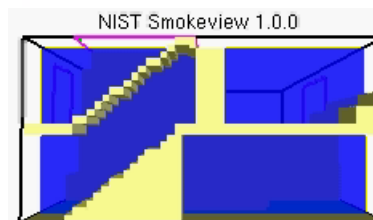
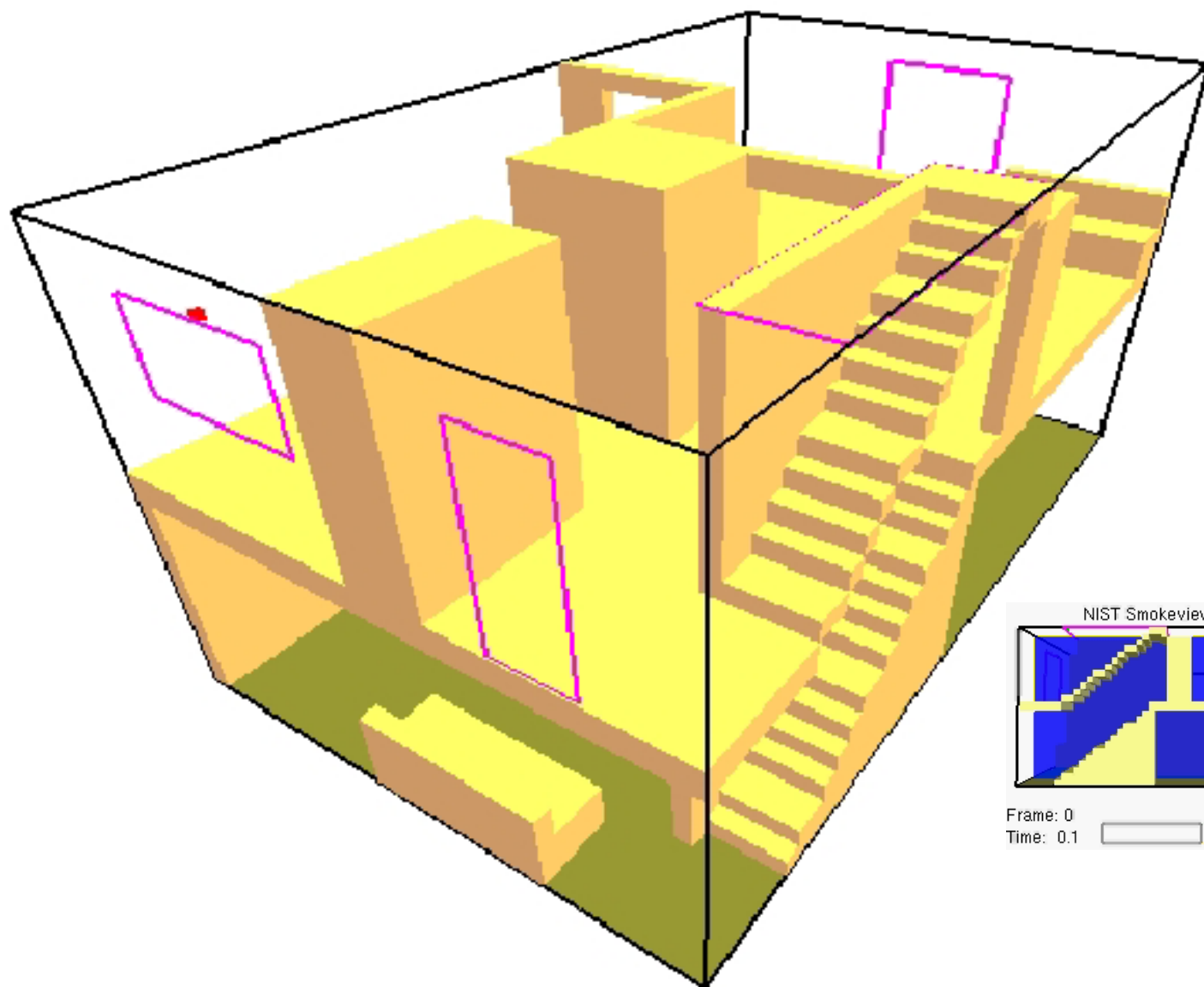


Rear View

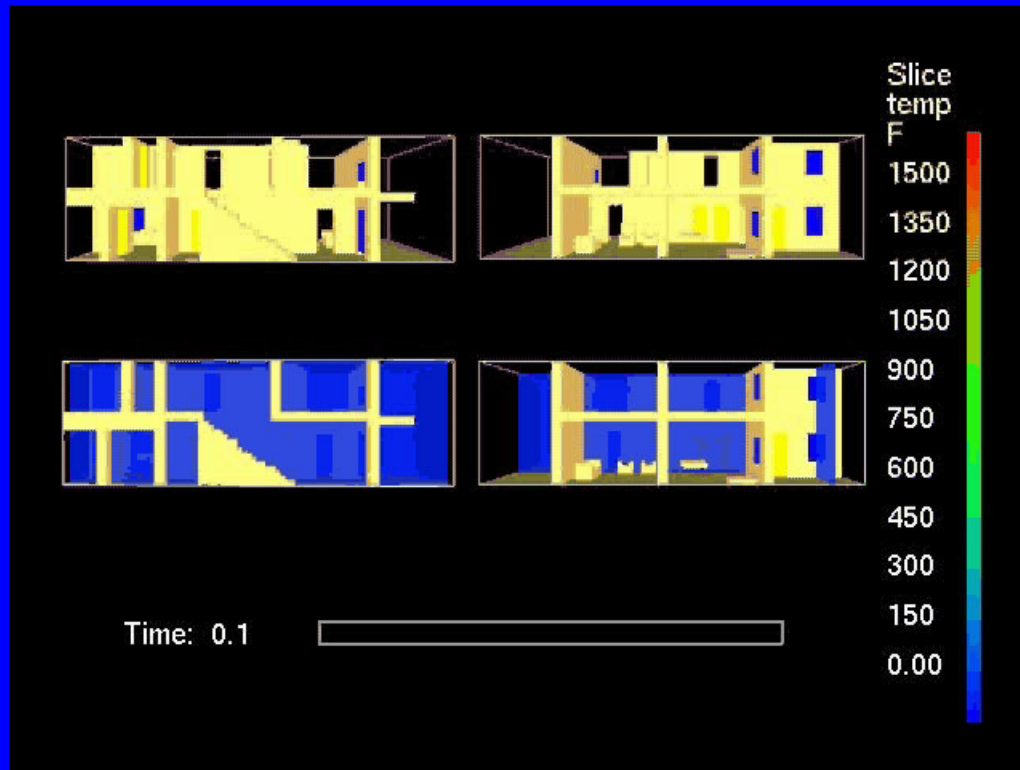




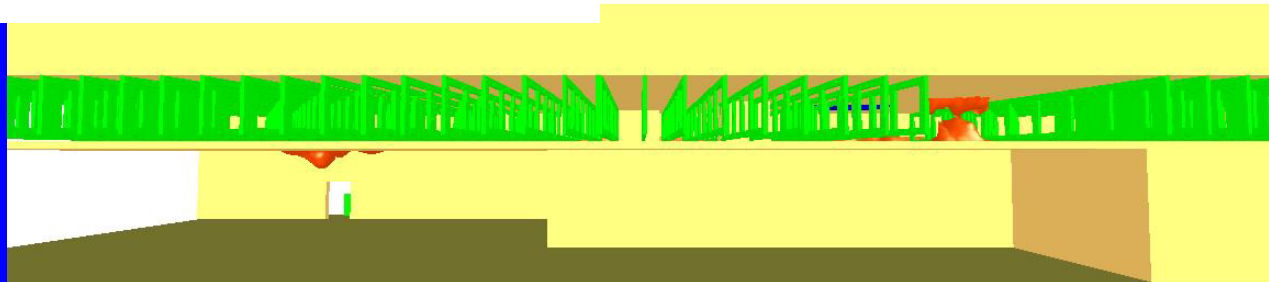
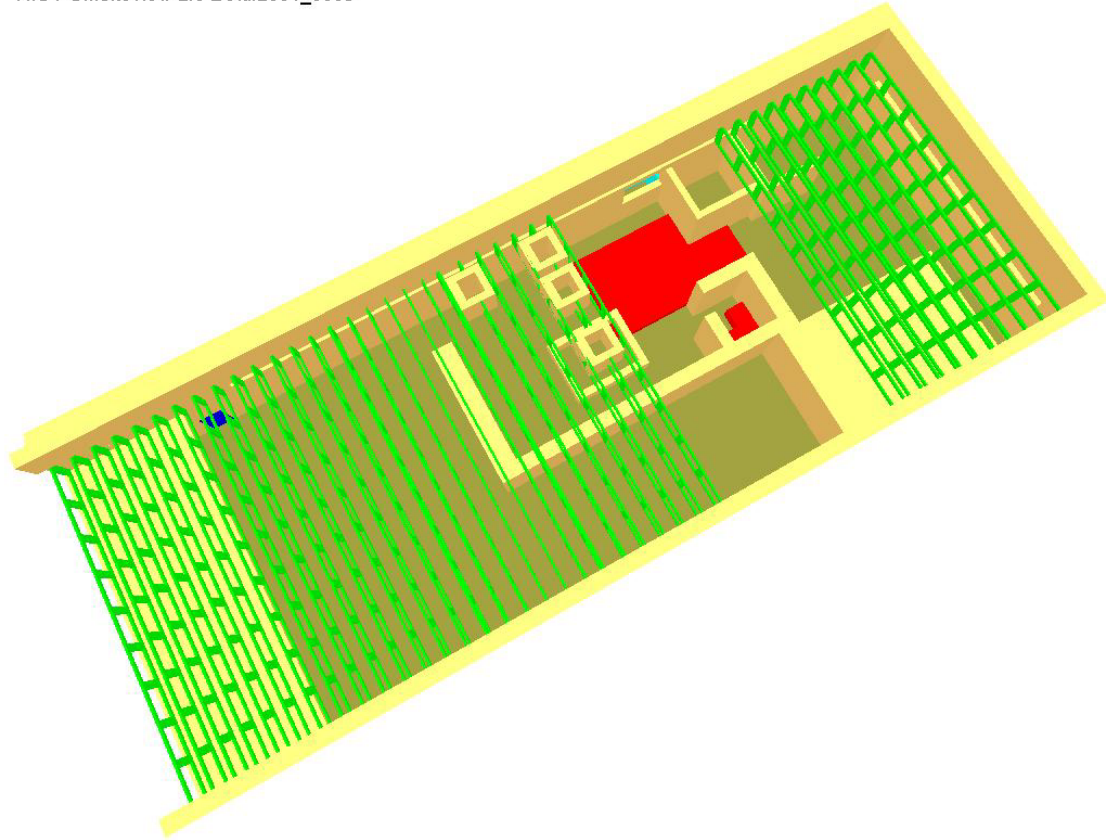
NIST Smokeview 1.0.1A



Frame: 0  
Time: 0.1



**Iowa House Fire, courtesy Glenn Forney  
and Doug Walton**



# Restaurant Fire, courtesy Bob Vettori



# Mixture Fraction Combustion Model

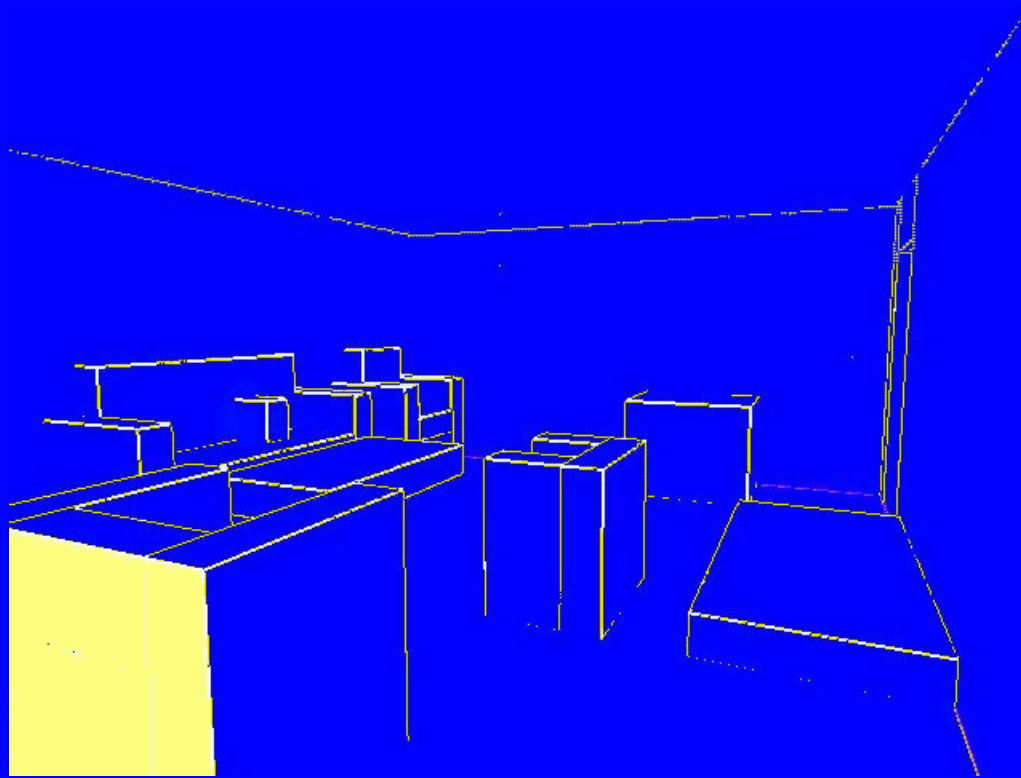
Mixture Fraction Combustion Model for Fire

Convective and Radiative Flux to Surface

$$\hat{s} \cdot \nabla I(x, \hat{s}) = \kappa(x) [I_b(x) - I(x, \hat{s})]$$

Pyrolysis of Fuel linked to Heat Transfer from Gas Phase

FDS Single Room Flashover Simulation



# **ATF Room Flashover Experiment**