NIST Research on Kitchen Fire Prevention and Nuisance Alarms

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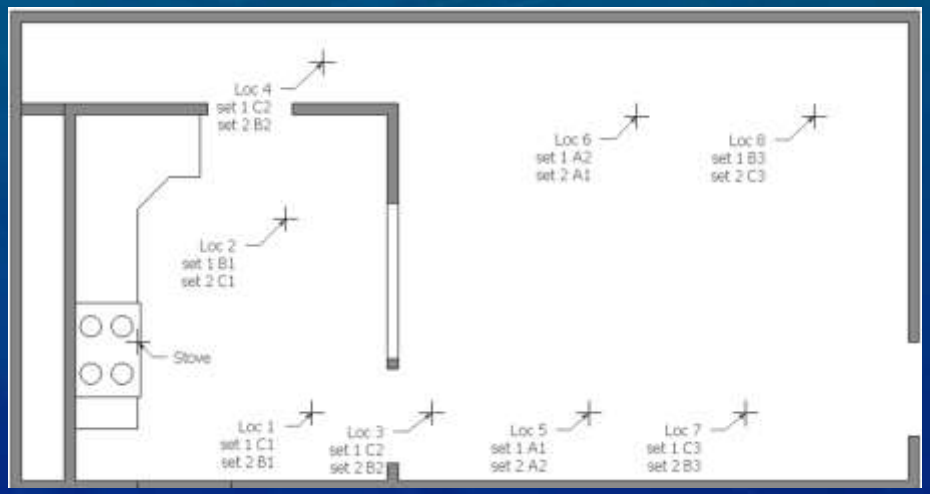
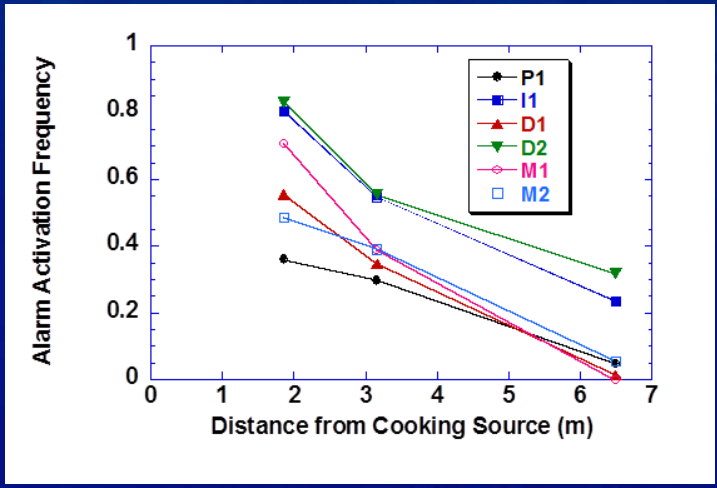
Kitchen Nuisance and Fire Experiments

Kitchen Mock-up

Floor Plan, Alarm Locations



Aggregated results for
10 range top, oven and
toasting activities
(each repeated six times).

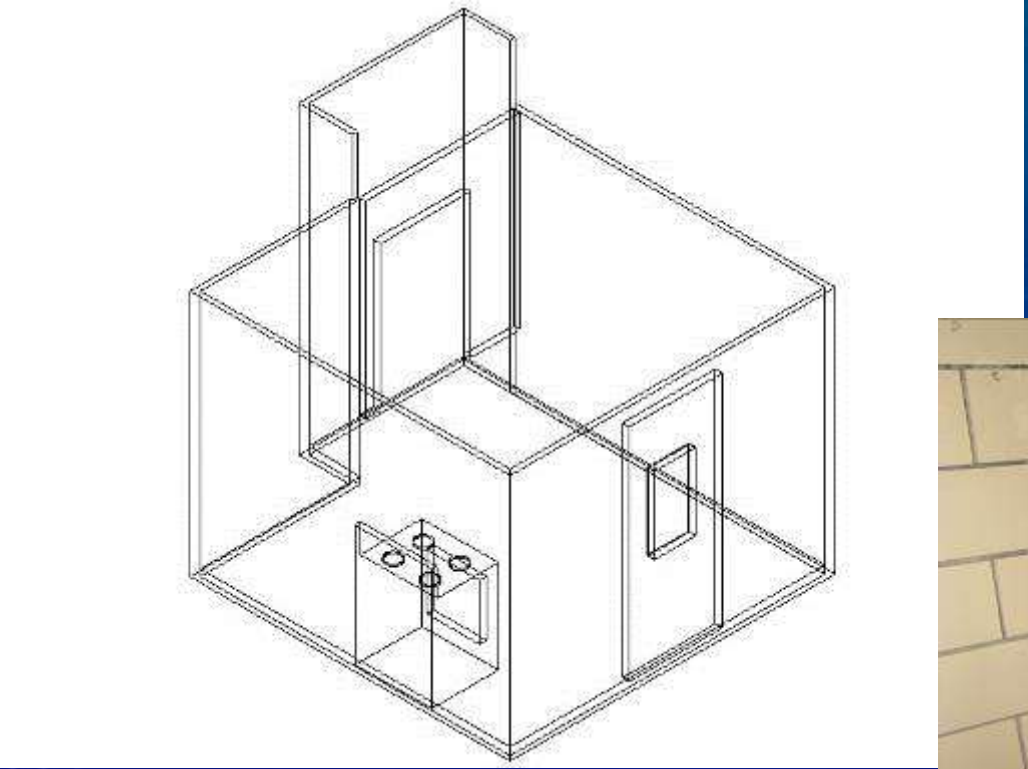


Kitchen Pre-fire Detection Objectives

- (1) To determine the levels of smoke produced and other signatures, and corresponding times before ignition of cooking fires that existing measurement technologies can utilize to sense pre-fire conditions.
- (2) To provide the sensitivities and operating parameters for kitchen-deployable unattended cooking pre-fire detector that could interrupt power to offending appliances and/or alert consumers allowing intervention to prevent ignition of unattended cooking fires.

Kitchen Pre-fire Detection

To be conducted in NIST Fire Detection Room



Planned Experiments

- Unattended cooking fire scenarios will include:
  - heating vegetable oil
  - frying chicken or potatoes with oil
  - frying bacon
  - caramelizing sugar among others
- Some heavy smoke-producing normally/attended cooking scenarios (e.g., broiling meat, and stir frying) will be included to differentiate cooking activities that most-likely will not ignite and spread fire.

Measurements

- Smoke concentrations (extinction, mass concentration, analog smoke alarm)
- CO and CO_2
- Thermal (surface and ceiling air temperature)

(With and without range hood running)

Synergy with Nuisance Alarm Research

- We will be able to gather data on alarm activations and smoke concentrations prior to an excessive cooking time.
- With the data, we will be able to examine the boundary (in measured variables) between nuisance alarm activations and pre-fire conditions.