A Comprehensive Sensitive Site Exploitation and Crime Scene Device With 3D Mapping Capability

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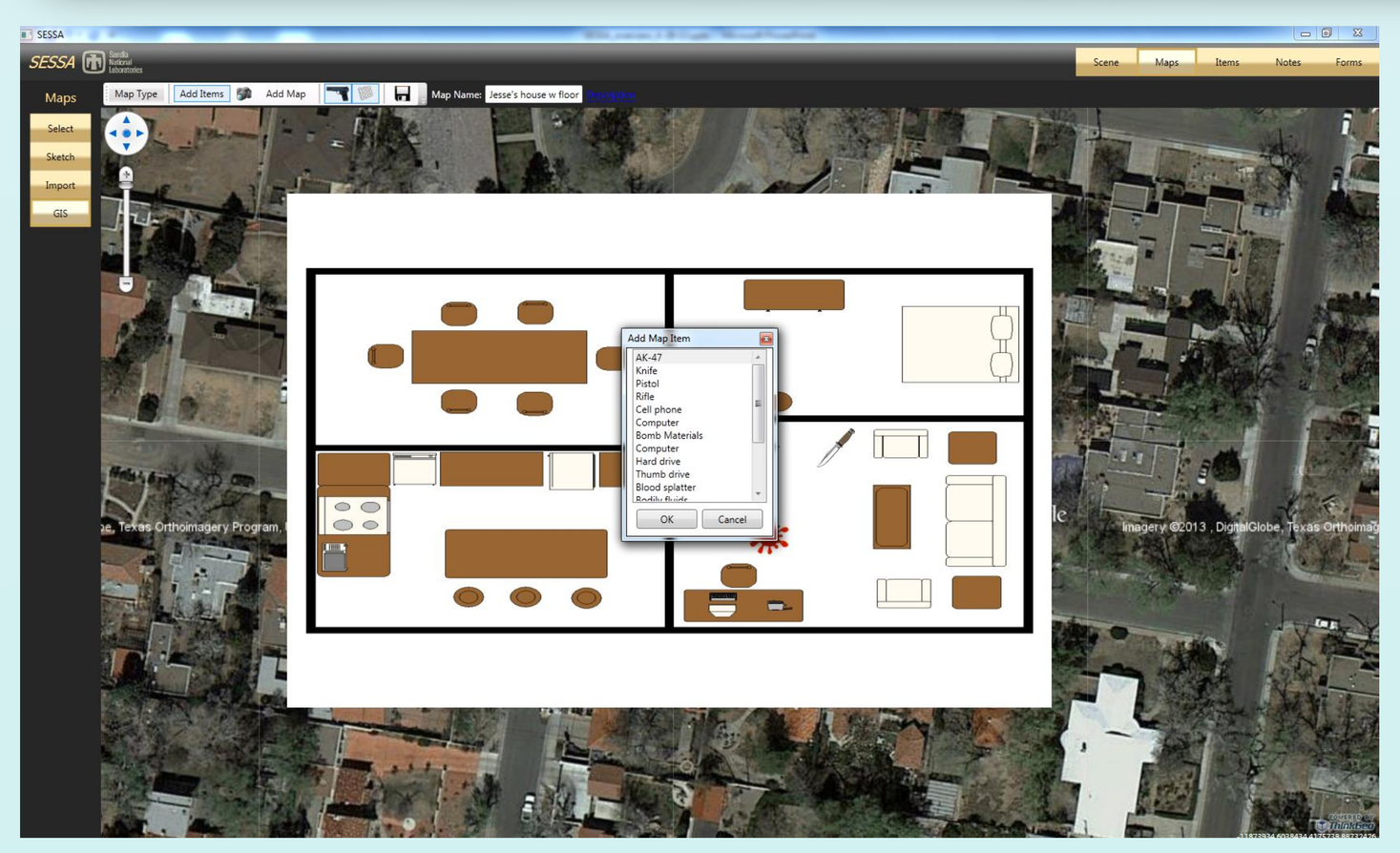
Forensics

Sandia has developed a comprehensive Sensitive Site Exploitation (SSE) system for forensic crime scene investigations called the Site Exploitation System for Situational Awareness, or SESSA.

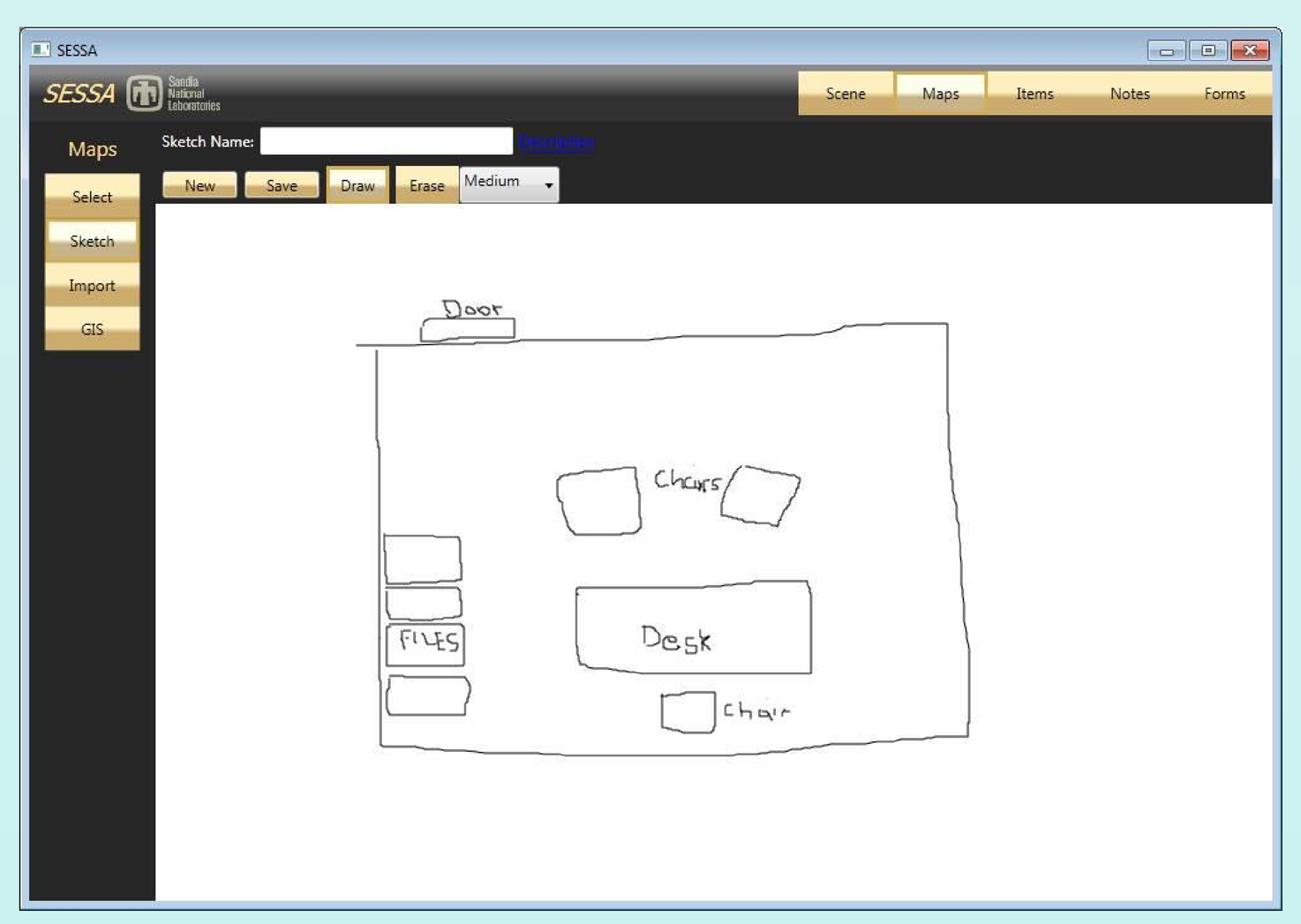
SESSA is optimized for deployment with tablet computers



SESSA has the following attributes:

- Efficient production of crime scene forms and reports, minimizing redundant data inputs
- Comprehensive database
- Built-in Geographical Information System (GIS)
- Integration of data from multiple crime scene investigators

SESSA also has a sketch pad capability, an important tool for forensic investigations

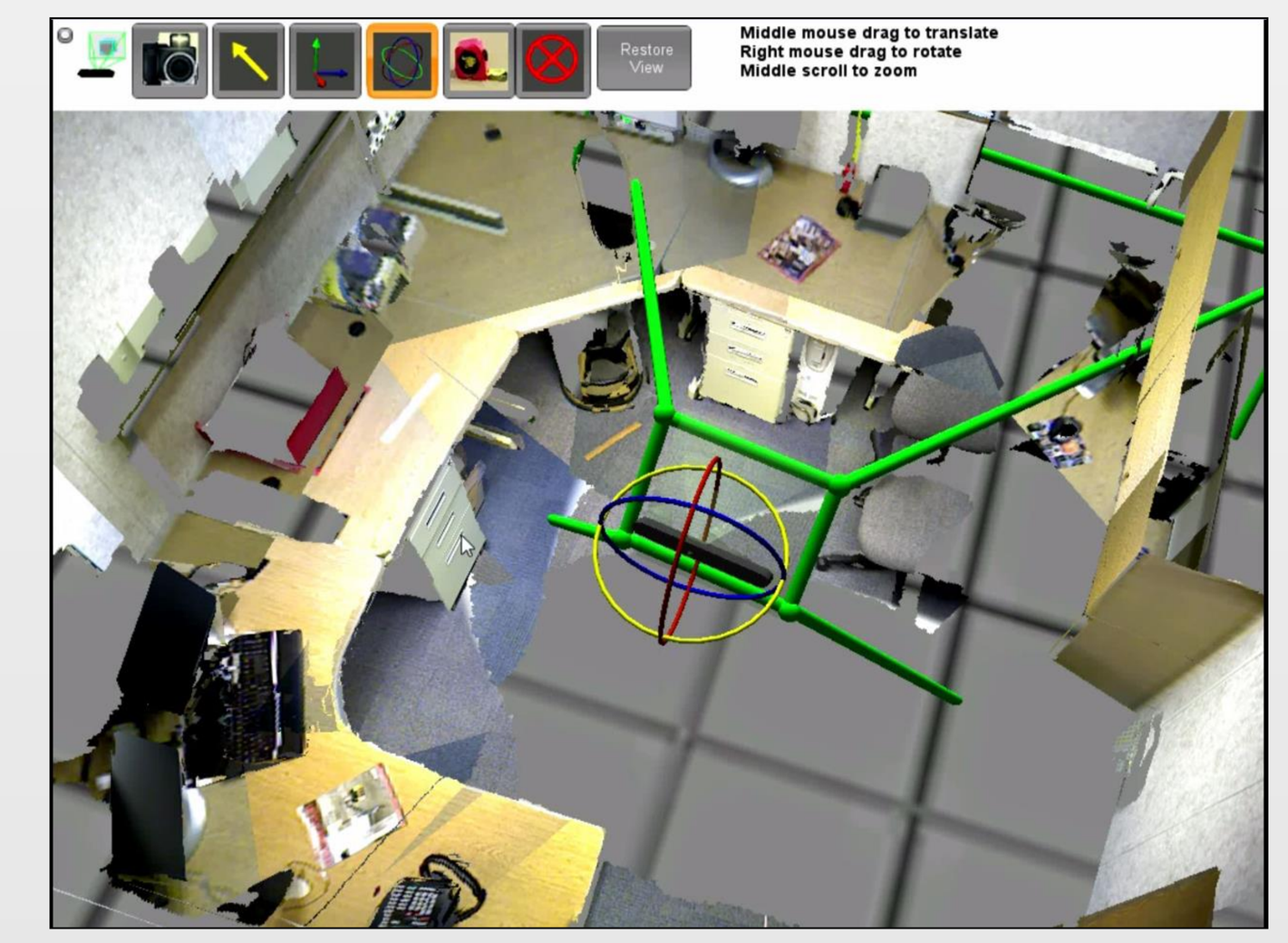


3D Mapping

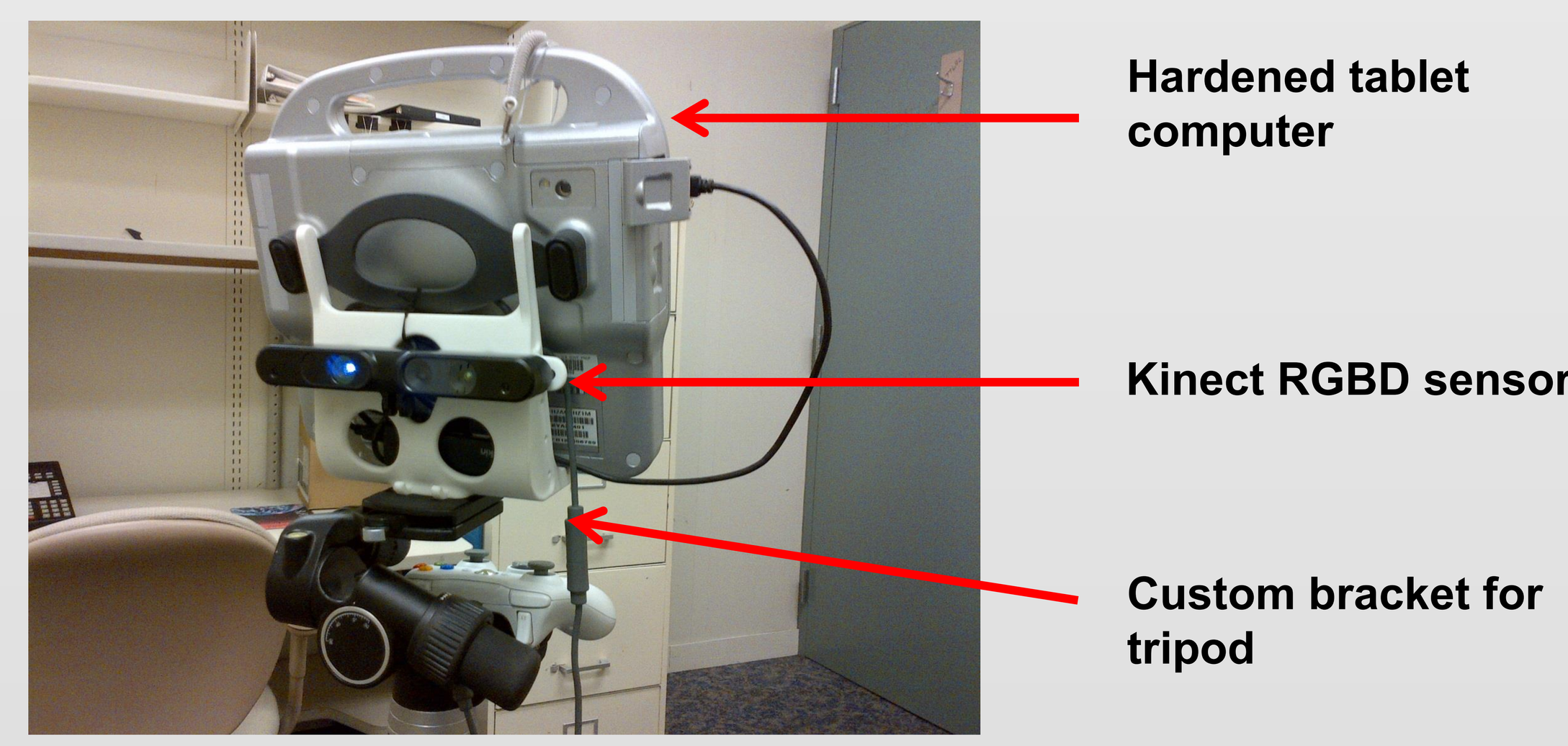
Developing 3D virtual maps of indoor spaces is possible with current laser-based systems that cost $45K to $100K+. These systems are too expensive and too complicated to put into common use.

A low-cost system is desired.

The Microsoft Kinect Sensor provides a low-cost (<$200 per device) alternative that could provide a new paradigm for developing 3D virtual walk-throughs of indoor spaces.



Sandia's unique application captures still-frame imagery and uses custom SLAM algorithms to 'stitch' the 3D map together, thereby reducing processing time and data storage.



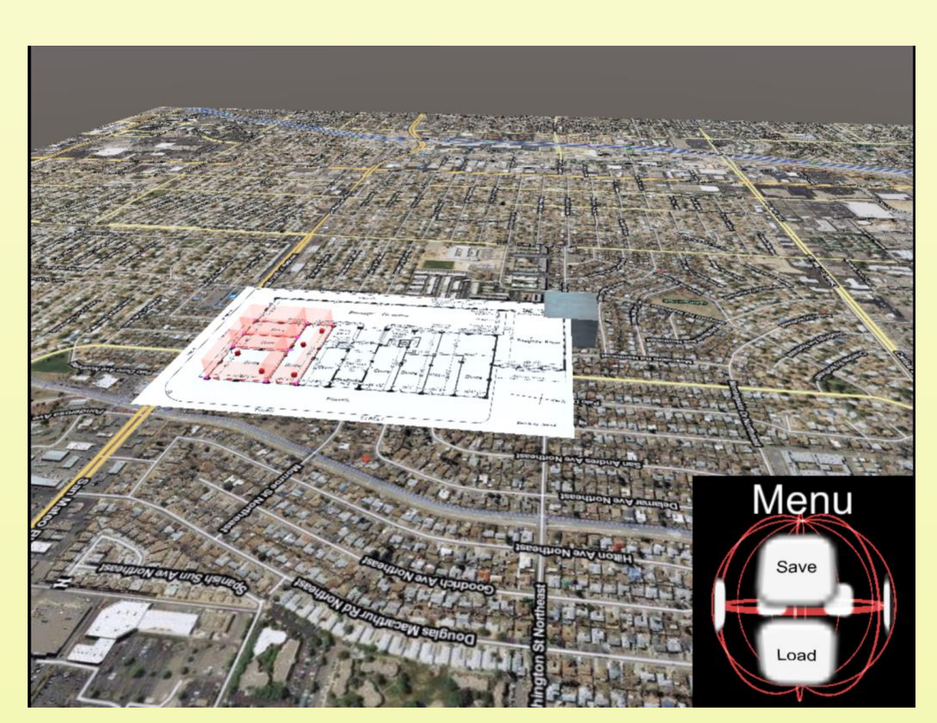
The software also allows the user to take measurements within the 3D map, including room measurements to be used to construct building maps.

The Kinect sensor utilizes red-green-blue light (for visual data collection) and infrared (for depth data collection), and is referred to as a visual-depth sensor. Data are collected either as video (30 fps) or still-frame, and processed with Simultaneous Localization and Mapping (SLAM) algorithms to produce a 3D virtual maps.

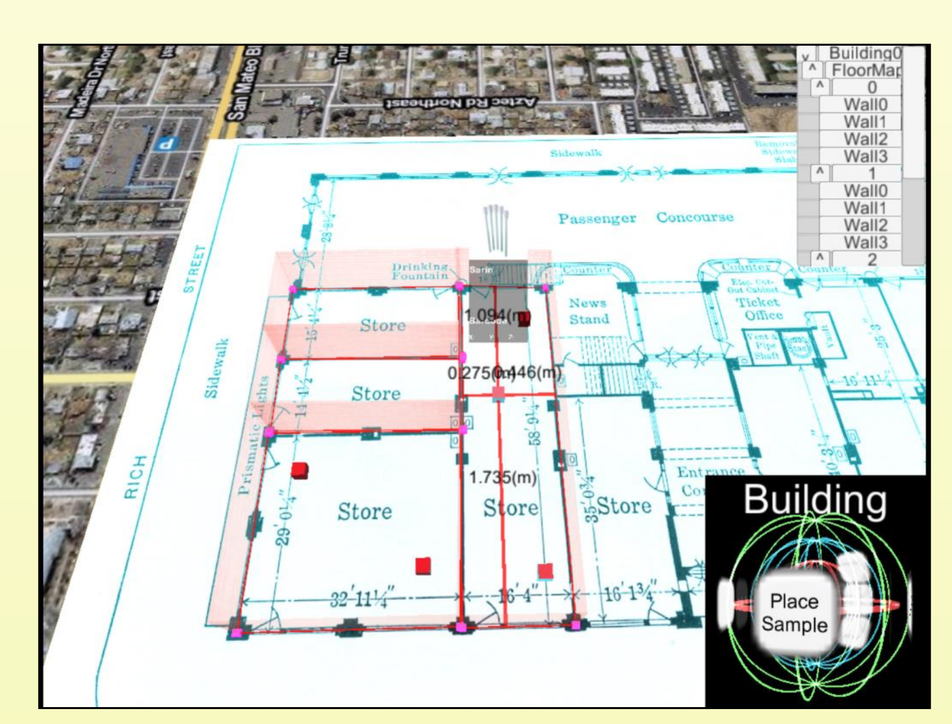
Training on the prototype system was performed with personnel from the Military Criminal Investigation Organizations (MCIOs) at the Federal Law Enforcement Training Center (FLETC) in Georgia.

CBRN

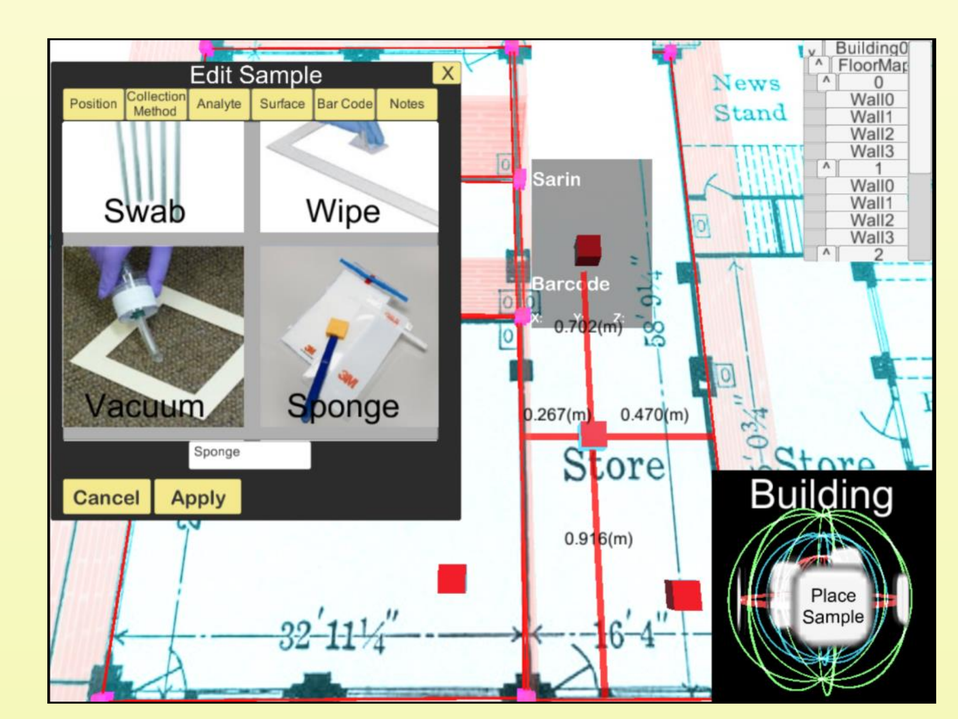
Currently, SESSA is undergoing an extensive modification to add the ability to address chemical-biological-radiological-nuclear incidents. This effort relies heavily on work done previously with Sandia's BROOM tool. The new platform will allow the use of multiple types of hardware (e.g., Windows, Android and iOS tablets, smartphones) in an integrated fashion. There is also a web-based component to facilitate integration of data.



The tool allows the user to predefine a scenario with multiple buildings and floor plan layouts



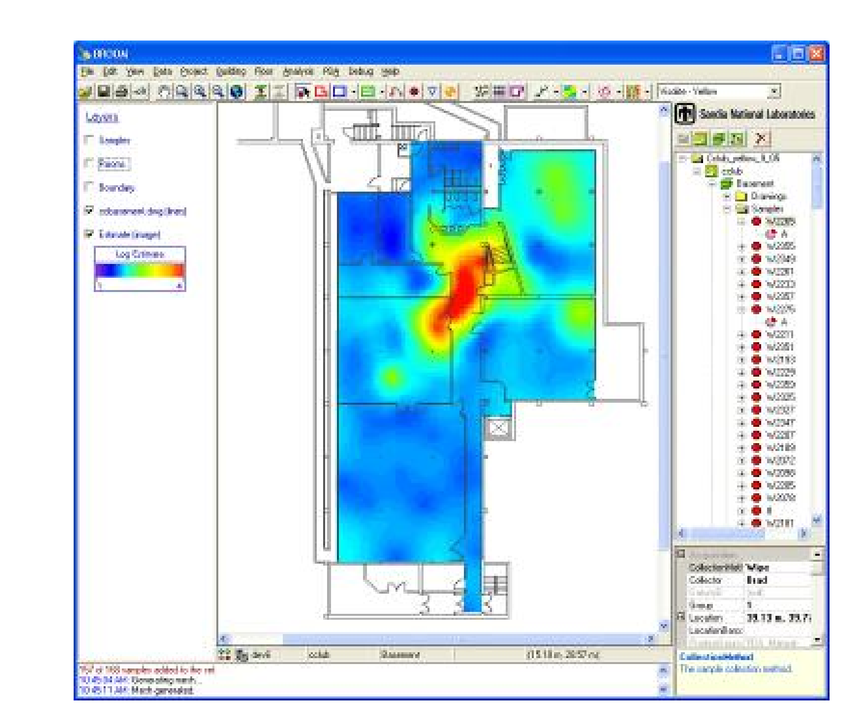
The tool allows the user to develop building sampling plans



The tool has a comprehensive data acquisition module to document the sampling process, much of which is influenced by the extensive lessons learned from Sandia's BROOM system

BROOM Legacy

Sandia developed a comprehensive data acquisition, data management, and data analysis decision support tool over 10 years ago. The tool was used for many years by first responders, including Civil Support Teams and EPA, for 16 separate aerosal release tests, with nearly 8,000 samples logged and processed, never losing a single sample. The tool was called the Building Restoration Operations Optimization Model, or BROOM. Many of the features of BROOM are being incorporated into SESSA.



BROOM has unique geo-spatial analysis tools, which will be added to SESSA.

Acknowledgements

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