Scribe3D: An Advanced Tabletop Tool

iSAFE
Interns for Security, Arms control and Force protection Engineering

Mario Morford-Oberst
University of New Mexico
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Manager:
Dominic Martinez
6835

Project Mentor:
Todd Noel, 6835

Scribe3D is a software platform that uses 3D models of physical security systems created using LIDAR. Scribe3D is used to evaluate the effectiveness of these systems, find potential weak points in these systems, and strengthen them. This tool is used to run different tabletop scenarios that use probabilities and other simulation features to most accurately represent the course of events in the case of an attack on a nuclear site.

What is a Tabletop Exercise?

Security is a diverse discipline that relies on a variety of different practices to be implemented correctly in order for it be ensured. One of these practices is a tabletop exercise. Tabletop exercises are very similar to small scale drills where the capabilities of a system are evaluated using simulated emergency situations. In our case, we are trying to evaluate the capabilities of physical security systems.
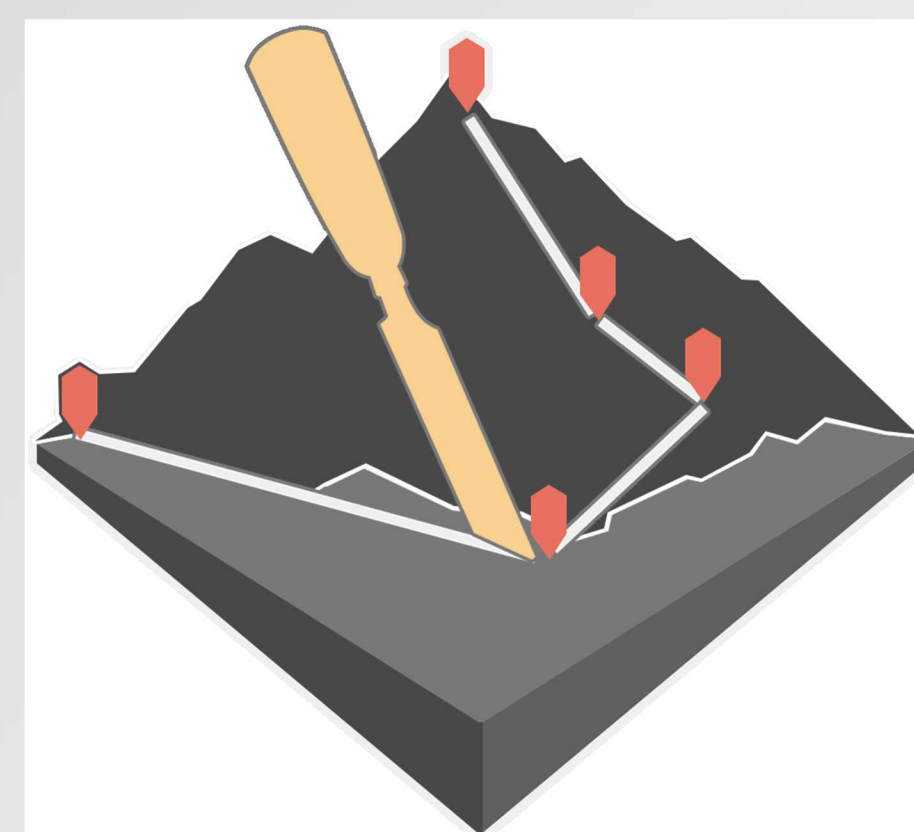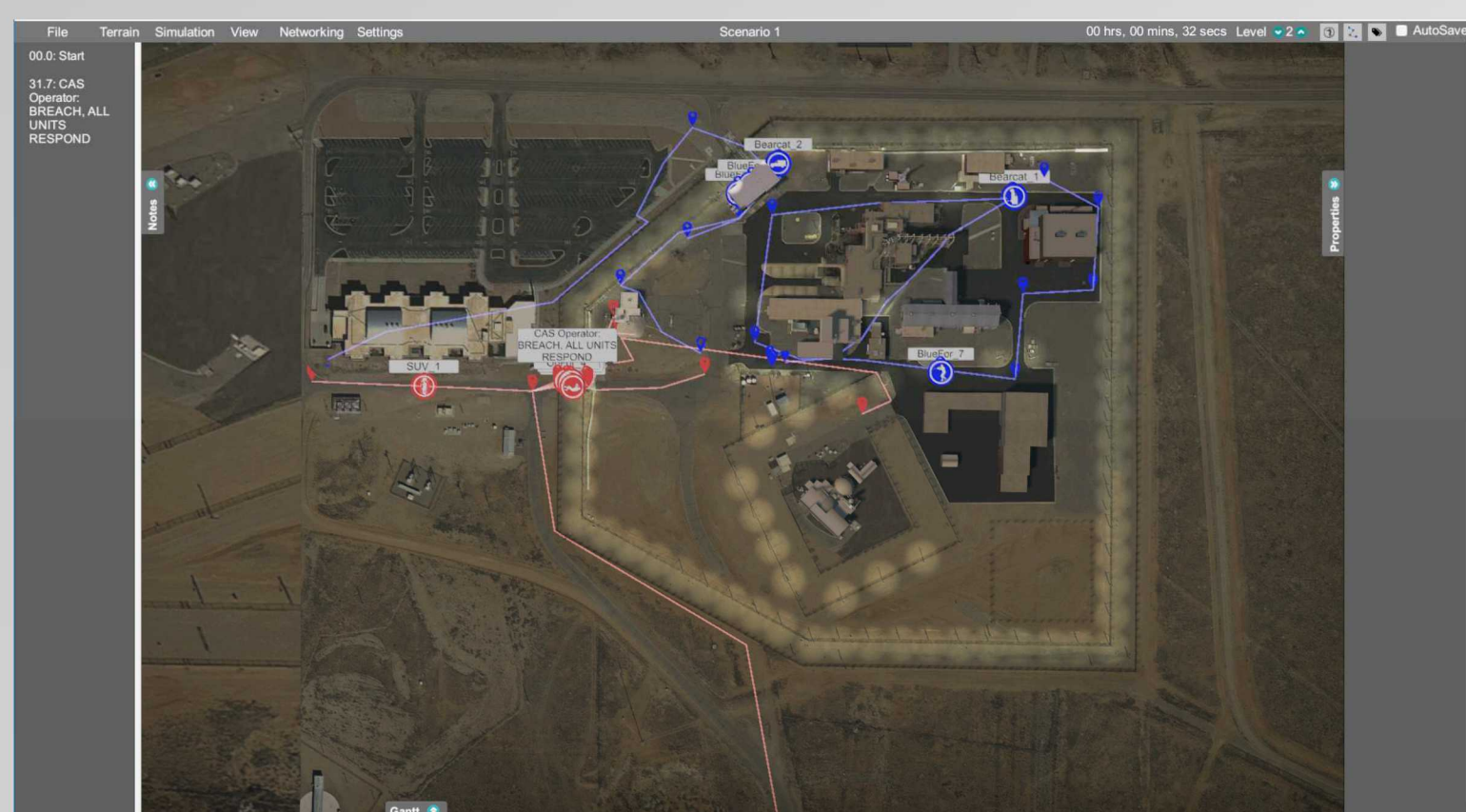

Figure 1: Scribe3D Logo

Why do we need Tabletop Capabilities?

One of Sandia's missions is to ensure nuclear nonproliferation. In order to execute this mission, the development and testing of physical security systems is essential. In 6835, we help create and test these security systems and we engineer tools that are used by other agencies to execute these processes as well. Scribe3D brings tabletop tools to a new level by providing increased convenience and capabilities. Traditionally, tabletops were done on a map with yarn, dice, and a scribe in charge of recording the events that took place during the exercise. With Scribe3D, we provide increased accuracy, better visualization, and even simulation based results. This will allow for better development and testing of physical security systems.

Figure 2: Top Down View of the ISF Model

Scribe3D in Action

In the past Scribe3D has been used in multiple practical applications including by NATO, South Africa Radiological Security, DOE NNSE International Nuclear Security (INS) Secure Transportation Engagement Methodology (STEM), INS Transportation Security Analysis, IAEA Nuclear Security Conference, IAEA Radiological Security Conference, the IAEA International Training Course, and the Design of a Hypothetical Electrochemical Pyro Processing Plant. In the near future, it will be used in Romania for tabletop exercises. We will continue to expand this software package, test its capabilities, and put them to use as we see a need for them in real world applications.

Figure 3: Image of the ISF Model used for testing here at Sandia

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Simulation Capabilities

Scribe3D's simulation capabilities rely on many different components. Objective tasks are the most important component to using the simulation capabilities. Objective tasks are created using waypoints. Waypoints instruct entities what to do and help inform them about how critical certain tasks and objectives are to the mission completion. Tasks can include breaking through barriers, taking out security equipment such as sensors, and disabling security forces. Scribe3D allows users to account for events like these through the waypoints features. Once the user has set up their scenario and accounted for all of the appropriate events, they will have an option to run the simulation. Users can decide how many run-throughs the simulation should make, and after how much time the simulation should timeout in the event that neither the defensive forces, nor the attacking forces achieve victory. The results of the simulation are recorded and presented to the user.
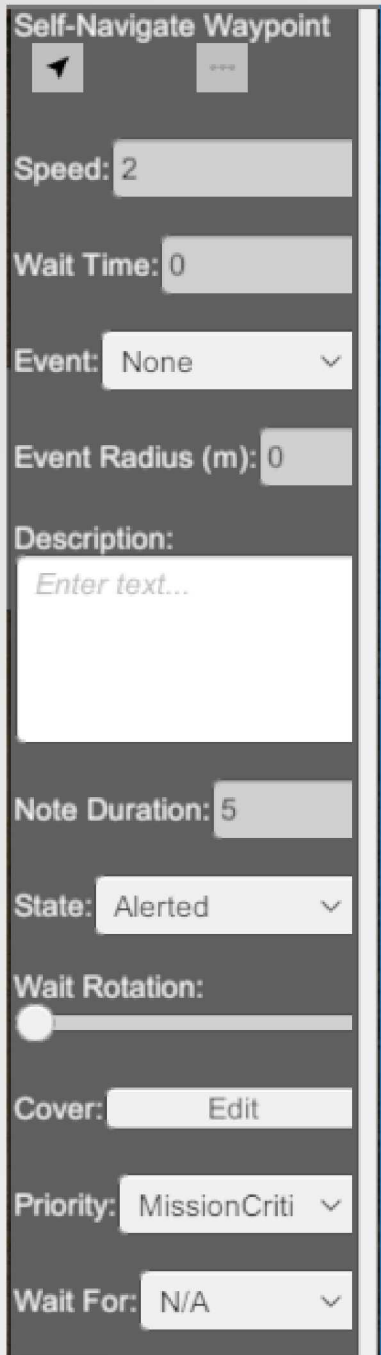
Figure 4: The waypoints menu allows users to set different objectives with differing levels of importance.
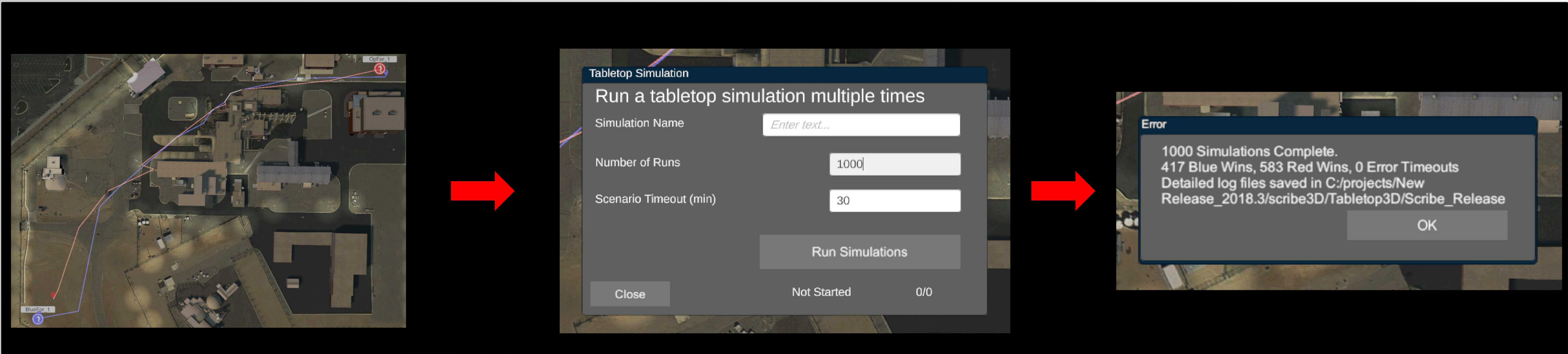
Figure 5: Step by step example of simulation capabilities

PHPK System

The PHPK System is a feature unique to Sribe3D. PHPK, also known as Probability Hit Probability Kill, helps bring more realism into tabletop exercises. One common flaw with tabletop exercises is the lack of realism. PHPK helps bridge that gap. Effectively, this system draws data from data plots containing information about the probability of a hit during an engagement with an enemy force. Data is categorized using different weapons and distances. Then, in the case of a hit the system looks at probabilities of a kill based on where the individual was hit and what weapons and distances the hit occurred with.
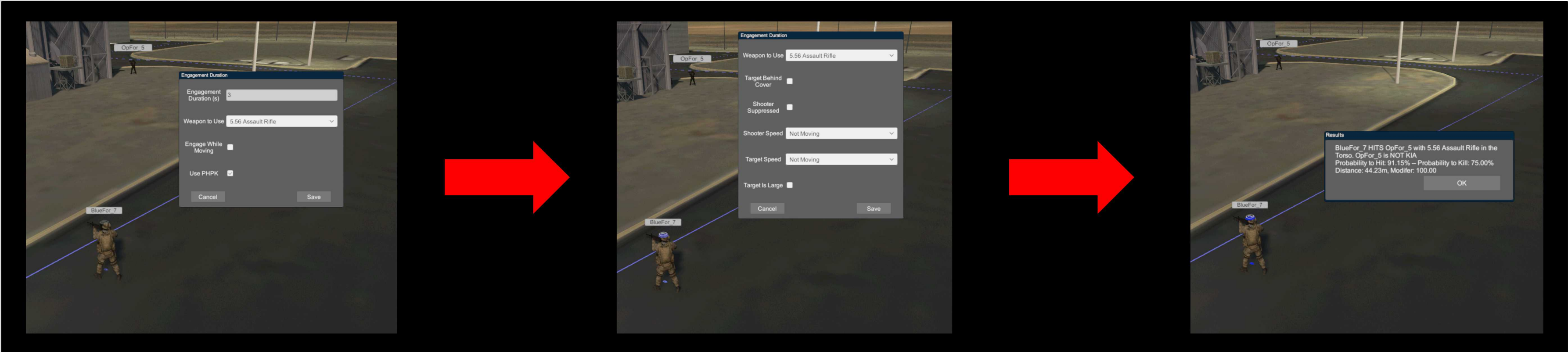
Figure 6: PHPK Use and Features