

## ABSTRACT

Since civilization emerged in Mesopotamia, sociological conflict and sometimes-nefarious behavior, hereafter referred to as anthropogenic threats, evolved along with the societies. In modern times, the presence of people with damaging and dangerous intentions in our societies is indisputable. Societal risk induced by anthropogenic threats is seen as a growing problem by public safety and intelligence agencies as well as owners and operators of designated critical infrastructure, e.g. bridges, ports, utilities, etc.

Use of geographic information systems (GIS) has become commonplace across a range of disciplines, including natural hazards and associated risk models but is not immediately useable for modeling anthropogenic threat phenomena due to their non-recurring and inconsistent nature. GIS, however, can be a powerful tool for communicating critical aspects of anthropogenic threats, particularly if a suitable symbology is available. This research applies well-established graphical semiology to produce a visual threat assessment language. This language is embodied in widely available GIS software, Google Earth, interoperating with landscape modeling (LM) software, Trimble SketchUp, in order to 1) visualize anthropogenic threats, and 2) consider environmental mitigations for those threats. A prototypical threat modeling application connects the two software applications.

The results of this research are threefold. First, a standardized symbology is designed for visualizing anthropogenic threats. Second, this symbology is demonstrated in commonly available GIS software. Third, a framework is established for coupling LM and GIS packages that immediately increases their value in emergency management and response planning.