

## Examining 3D GIS as Enabling Technology for On-campus Situational Awareness

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**ABSTRACT:** Recent developments, widespread availability and considerable decrease in the price of 3D technology like televisions, computer monitors and virtual reality headsets have resulted in renewed interest in 3D GIS in recent years. New 3D GIS software has appeared on the market, and several 3D tools have been added to existing 2D GIS software. 3D GIS incorporates geospatial representations that mimic real-world dimensionality rendering them powerful tools for understanding our surroundings with minimal cognitive load. This paper's research examined the capabilities of 3D GIS in aiding on-campus situational awareness (SA). SA goes beyond knowing and appreciating what is around us to include thinking about what might happen and how to respond. Facilitating SA has become more important on US campuses where at least 300 people have reportedly died and many others wounded in over 170 shootings since 2013. A new ArcGIS Pro software was used to explore the potential of 3D GIS to support SA at the University of Wyoming (UW) campus. The 3D GIS included a visually-compelling 3D model of UW, 3D viewshed analyses and siting of critical infrastructure, and least-cost navigational pathway analysis. The study revealed a great synergy between dynamically-linked 2D and 3D display windows when interactively exploring and understanding the virtual campus. There was limited latency when navigating the high-fidelity 3D campus owing to the 64-bit processing power of the software. Another attractive feature of this software is the capability to create and share intuitive and useful 3D web scenes of the campus with non-GIS experts. Although the 3D GIS software used in this study is yet to include the full range of spatial analytical functionality available in primarily 2D but robust GIS software, the study findings suggest that 3D GIS technology is coming-of-age.

**KEYWORDS:** 3D GIS, Situational awareness, Campus, 3D Geovisualization

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