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SCARE-S2 and the Utility of Geospatial Abduction in Military Operations

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Abstract: Throughout the wars in Iraq and Afghanistan, the United States military faced the unique difficulties of counterinsurgency operations, attempting to engage an enemy that strikes asymmetrically and then disappears into the civilian population. The prevalence of these ambushes, frequently involving improvised explosive devices (IEDs), created a significant need to identify the location of enemy weapons caches and command and control (C2) cells that service such attacks. The capabilities of Geospatial Information Systems (GIS) provide a viable method for solving these source-identification problems. Military analysts can use geospatial abduction to combine observations with other domain knowledge to identify feasible source locations for enemy activities. This paper builds on the work of Shakarian & Subrahmanian (2011) by examining the potential courses of action for augmenting the geospatial abductive engine that they developed for operations in Afghanistan. Additionally, this paper describes how their methods for geospatial abduction can be integrated into Army doctrine for Information Preparation of the Battlefield (IPB) through Distributed Common Ground System-Army (DCGS-A). Finally, this study addresses additional military applications of geospatial abduction and discusses how a flexible planning tool can meet those needs.

Keywords: Military Terrain Analysis, Geospatial Abductive Reasoning, Military Intelligence