

CBRNE Consequence Analysis Methodologies using Fuzzy Cognitive Mapping Techniques

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Abstract: The Defense Threat Reduction Agency (DTRA) is the Department of Defense's (DOD) official Combat Support Agency for countering weapons of mass destruction. DTRA focuses on weapons of mass destruction and mitigating the consequences of a chemical, biological, radiological, nuclear and high yield explosive threat (CBRNE). The initial immediate effects of a CBRNE incident are well defined. However, the second and third order effects are complex. Consequence Analysis is the practice of analyzing the effects of CBRNE events and is used to assist in predicting the second and third order effects. However, there is currently no tool to accurately predict the effects. Fuzzy Cognitive Mapping (FCM) is a tool that has the potential to provide the means to identify and evaluate the complex relationships, which produce the second and third order effects. The goal of this research is to model these effects and interrelated entities involved in a CBRNE event.

Keywords: System Design, Forecasting, Simulation, Fuzzy Cognitive Mapping, CBRNE, DTRA, Consequence Analysis, Consequence Management