



Kill-Chain Operational Analysis for Precision Fires in an Urban Environment

by

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With rapid urbanization today, precision fires are commonly employed in the urban environment. The urban environment is cluttered with networks of roads and buildings which limit the line of sight for target observation. Hence, the artillery observers are faced with uncertainties on the target during the execution of kill chain. These uncertainties affect the ability of the artillery observers to make the engagement decision. To minimize these uncertainties, the artillery observers are required to gain information to make the best decision.

The kill chain is modeled with the use of Qualitative Probabilistic Network (QPN). By using QPN, the kill chain will include probabilistic reasoning. This reasoning allows the artillery observers to pinpoint which phase would be critical for orchestrating the kill chain. The QPN shown that Find, Fix, and Track phase are critical before target engagement. Current sensors and potential future sensory technologies are examined to provide insight into how to reduce uncertainties faced by the artillery observers quickly and accurately. For instance, the employment of terahertz imaging and facial recognition for target detection. By doing so, the time required to engage the adversaries could be shortened. Currently, the U.S. Department of Defense (DOD) Non-Lethal Weapons Program has developed an 81mm Non-Lethal Indirect Fire Munition (NL-IDFM), a mortar bomb with a payload of 14 flash bang, to disorient personnel and reduce collateral damages.

Future Works:

To further investigate the potential usage of facial detection and terahertz imaging in target acquisition equipment. This former allows rapid detection in the cluttered urban environment and the latter will allow the artillery observers to detect target though most obstacles e.g. walls.