# OPTIMAL DEPLOYMENT OF BLOOD IN THE BATTLEFIELD WITH DRONE TECHNOLOGY THROUGH DEVS SIMULATION

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Time 1:30 – 3:30 pm on 4/30/2025

Room: Engineering Building, J7

**Zoom Link:**
https://binghamton.zoom.us/j/93002051539?pwd=DB6qQNDaSAng9vbGKkwyvvQCwQpGZW.1

## Abstract

This research proposes an effective deployment of blood supplies in active combat zones using drone technology, with a specific focus on optimizing delivery through the application of Discrete Event System Specification (DEVS) simulation methodologies. The approach utilizes an advanced logistics solution to explore the critical challenges of timely medical supply in battlefield environments. By integrating probabilistic modeling into the simulation framework, the research evaluates the likelihood of successful casualty saves based on variables such as drone size, fleet composition, and the probability of drones being shot down during missions. These shot-down probabilities are calculated using advanced algorithms that incorporate specifications of modern military firearms and recent drone technologies across multiple size categories. The probability of saving a casualty was 0.0195, 0.0137, and 0.0108 for small, medium, and large drone fleets, respectively. After adjusting the hit probability to account for a farther distance, the probabilities of casualty survival increased to 0.0238, 0.0207, and 0.0198 for small, medium, and large drone fleets, respectively. This adjustment highlighted smaller drones' greater ability to save more casualties throughout the analysis. The analysis identifies optimal configurations for drone fleets of varying sizes, assessing their effectiveness in maximizing casualty survival rates while minimizing loss of technology and blood. Simulation outcomes highlight the precision and adaptability of the model, offering a valuable tool for strategic decision-making in military decisions. Furthermore, this framework lays the foundation for future enhancements, including broader applications to various medical supplies, as well as the assessment of additional drone fleet parameters and the integration of combat zone severity levels to enhance readiness and efficiency in battlefield environments.