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Analysis of Alternatives for GPS-Denied Navigation for the Army's Small Unmanned Aircraft Systems

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Author Note: All authors of this document are cadets in the Systems Engineering Department at the United States Military Academy, West Point. The advisor for this project is Dr. Roger Burk, and the client is Mr. Lars Ericsson of Army Project Manager Unmanned Aircraft Systems (PM UAS). Any requests for information can be sent to luke.jenkins@usma.edu.

Abstract: Considering the increased reliance on GPS navigation for the Army's Unmanned Aircraft Systems, adversaries have invested in capabilities to deny our systems access to genuine GPS signals. Although significant effort has been put forth in the areas of anti-jamming and anti-spoofing in GPS receivers, a need for alternative navigation methods in a GPS denied environment has grown in importance. This report outlines the recommendation and analysis completed for Mr. Lars Ericsson of the Army Project Manager Unmanned Aircraft Systems (PM-UAS). The report includes background research in the domain space, comprehensive stakeholder analysis, derived system requirements and functional requirements, ending with alternative generation, value scoring, costing, and provided findings for a recommended alternative for future consideration.

Keywords: Small Unmanned Aircraft Systems (SUAS), GPS Navigation, GPS Alternatives, Systems Decision Process