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Using an Augmented Reality Human Machine Interface to Improve Depot Maintenance: A Business Case

D. Newell, D. Davis, D. Lee, M. Lysek, and J. Snider

Department of Systems Engineering
United States Military Academy
West Point, NY, USA

Corresponding author's Email: daniel.newell@usma.edu

Author Note: CPT Daniel Newell is an instructor in the Department of Systems Engineering at the United States Military Academy at West Point. Dashawn, David, Makenzie, and Joe were First-year cadets at USMA who recently graduated in May, 2018.

Abstract: The current airframe repair environment is largely dependent on mechanic expertise, with minimal use of technological aids to improve the efficiency of depot-level repairs. As such, repairs are perhaps slower and more costly than what they could be with supporting technology. Using the Systems Decision Process (SDP), a systems thinking approach utilized in the Department of Systems Engineering at West Point, this research developed a business feasibility proposal that evaluates the costs and benefits of using augmented reality (AR) to improve airframe repairs for the client, Lockheed Martin. In particular, the study examines the cost and technological feasibility of a series of currently available AR alternatives that meet all stakeholder needs. The Modernized Target Acquisition Designation Sight/Pilot Night Vision Sensor (M-TADS/PNVS) served as the primary case subject, although the findings suggest a broad application of AR technology to support aircraft repair. Analysis indicates that the Microsoft HoloLens, DAQRI, and Meta 2 meet all requirements and are the final candidate solutions for selection within our business proposal. After evaluating the three candidate solutions for both cost and sensitivity, the Microsoft HoloLens provides the highest value and is therefore the final recommendation to the client.

Keywords: Augmented Reality, Aircraft Maintenance, Business Case Analysis