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Utilizing Model Based Systems Engineering Approach to Look at the Infantry Squad as a SoS Architecture

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Abstract

This presentation will cover the development of a proof of concept framework integrating SE best practices utilizing a model based approach to enable portfolio trade space and decision analysis. The intent of an integrated framework is to tie requirements, system architecting, modeling and simulation, and human system integration perspectives to inform multi-objective decision analysis to understand and baseline the problem space. The study aimed to model the Army IBCT Squad as a nine man formation, a complex System of Systems (SoS) to evaluate alternatives to increase Squad combat overmatch.

The framework enables upfront requirements analysis to continuously drive downstream SE and design activities to eventually support Squad Portfolio Management. The approach utilizes the traceability of the Warfighter gaps and requirements to system model(s) with complementary operational and system analysis activities to address the Measures of Formation Effectiveness (MoFE) across Material, Leadership, and Training capabilities. Optimizing the integration of separate phases of SE activities in a end-to-end lifecycle model enables efficient and effective reuse of data to build common architectures, repositories, and data exchange across all stakeholders.

The Natick Solider (NSRDEC) and Armament (ARDEC) Research, Development, and Engineering Centers are collaborating in an effort to develop operationally relevant scenarios to model and conduct trades across the Squad SoS perspective to better understand the implications to the MoFE as a result of new materiel, training, and/or leadership being provided to the individual Solider as it impacts the Formation. As new capabilities are introduced; functional and non-functional characteristics are captured through live, virtual, and constructive modeling and simulation to understand the impact of new capabilities. The study also investigated the integration of soldier-system performance into the SE process and how to incorporate human system integration metrics systems engineering activities.

Biography

Mr. David Chau currently serves as the Branch Chief for System Engineering Tools and Training within the Systems Engineering Directorate, US Army Armament R&D Engineering Center (ARDEC), Picatinny Arsenal, NJ. Mr. Chau received his MBA from the Florida Institute of Technology and his M.E. in Systems Engineering and B.E in Computer Engineering from Stevens Institute of Technology.

Ms. Dana Perriello is a Systems Engineer within the Systems Engineering Directorate, US Army Armament R&D Engineering Center (ARDEC), Picatinny Arsenal, NJ. She specializes in implementing Model Based System Engineering on projects and also serves as an ARDEC Project Officer. Ms. Perriello received her M.E. in Systems Engineering and B.E in Biomedical Engineering from Stevens Institute of Technology.