Abstract

One of the key challenges in DoD acquisition today is to ensure the right capabilities and requirements are defined to develop, acquire and field effective material solutions for the warfighter in order to successfully accomplish mission objectives against varied threats within equally varied global theaters and operational environments. This challenge becomes more complex as you enter the System of Systems (SoS) space, which typically involves systems that are at various stages of development and may not have well-defined requirements to support them. It is especially difficult for a requirements analyst to look across the SoS to find gaps and redundancies in required SoS capabilities and functionality, given the fact that requirements are specified at many levels, are of different types (e.g. operational requirements, system requirements, directed requirements, operational need statements), use a variety of lexicons, have different owners, and are managed in a variety of documents, databases, and knowledge management systems.

In order to make SoS requirements analysis more effective, it is important to integrate requirements into one location so they can be analyzed across systems, with respect to traceability, to ensure the derived requirements are necessary and sufficient to fill SoS capability gaps. In addition, due to differences in lexicon, it is beneficial to map these requirements to defined references and standards (e.g. Joint Capability Areas (JCAs), Universal Joint Task List (UJTL), Army Universal Task List (AUTL), Joint Common System Function List (JCSFL)) to analyze systems from various perspectives.

This presentation discusses these challenges and shows how the Armaments Research, Development and Engineering Center (ARDEC) is addressing them through an effort sponsored by the ASA(ALT) System of Systems Engineering & Integration (SoSE&I), titled the Army Integrated Requirements Framework (Army IRF). If requirement providers are given a standard format to represent traceability to parent requirements (e.g. system performance requirements to key performance parameters (KPPs), key system attributes (KSAs), and additional performance attributes (APAs)), multiple sets of requirements can be linked to a common hierarchy. Similarly, specifying how to map requirements to standards (e.g. requirement to JCSFL Version and Function Identifier), will enable linking of requirements to those standards.

An integrated set of requirements will enable SoS analysts to find capability gaps and redundancies, which will assist leadership in making informed decisions regarding materiel solutions and determining the best candidates for common system functionality. The ultimate goal is to influence requirements generation processes to properly build the Common Operating Environment (COE), in order for systems to be built upon the COE construct and leverage the common functionality.
Biography
Mr. Edward J. Dooley currently serves as the Branch Chief for Requirements Management within the Systems Engineering Directorate, at the US Army ARDEC, Picatinny Arsenal, NJ. As a systems engineering practitioner, he specializes in the area of requirements engineering, to include requirements definition, requirements management, and requirements analysis. Mr. Dooley holds a Bachelor’s Degree in Computer Science from Drew University and a Master’s Degree in Software Engineering from Monmouth University, and is a certified Level III Acquisition Professional in Systems Planning, Research, Development and Engineering – Systems Engineering.