

Prototype of a Graphical CONOPS (Concept of Operations) Development Environment for Agile Systems Engineering

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The weakest link in systems engineering is often the link between what the war-fighter or analyst need and what the development team “thinks” they need. The DoD requires that the needs of future users be collected and translated into system requirements. Collection of stakeholder requirements is typically documented in a Concept of Operations (CONOPS), a document describing the characteristics of a proposed system from the viewpoint of its users.

The current process for producing CONOPs creates a separation between the actual users and system developers, leaving much room for misunderstanding and miscommunication that can lead to system requirements that do not reflect the users’ needs. Additionally, the current lack of commitment to maintaining the CONOPs as a “living” document reduces its potential for use as a link to the evolving needs of system stakeholders and significantly impairs its ability to be reused in future system developments.

RT03 was a 2009-2010 SERC research task aimed at studying the current state of practice in CONOPs development and introducing potential methods, processes and tools for improving this crucial phase in systems development. RT03 resulted in identification of the CONOPs elements present in current CONOPS standards, the development of the Stakeholder-Assisted Agile CONOPS Development Process for CONOPs creation, and recommendations for the development of a graphical CONOPS tool. The goal of these recommendations were to leverage established development and visualization technologies to create a graphical CONOPS creation tool. This software program would allow future system users to interact with each other directly through a 3D immersive, collaborative, drag and drop style interface to build a graphical model of a CONOPs from its constituent parts. Having the stakeholders actively participate with system developers in the building of a CONOPs could result in system requirements that more accurately reflect user needs and would provide a model of a CONOPs, reducing the work required to update the CONOPs throughout development and allowing it to be easily reused in future system developments.

This presentation will describe the research and development that has taken place under RT30, a follow on to RT03 with the goal of creating a limited functionality CONOPS Engineering System (CES) prototype for the collaborative development of a graphical CONOPs model. The presentation will describe the current development environment, desired prototype functionality, an established CES system architecture and ongoing software development and research efforts, along with lessons learned and future goals of graphical CONOPs research.