The U.S. Navy has been confronted with budget cuts and constraints during recent years. This reduction in budget compels the U.S. Navy to limit the number of manpower and personnel. Reducing the total ownership cost (TOC) had become a major topic of interest for the Navy as plans are made for current and future fleets. Based on previous research (GAO, 2003), manpower and personnel costs are the largest contributor to the TOC. In order to reduce the TOC, the Navy attempts to implement sophisticated technologies into their systems. This research focused on tradeoff analysis and cost estimation between manpower and new technology implementation. Utilizing concepts from system dynamics modeling (SDM), system dynamics causal loop diagram had been built to identify major factors when implementing new technology, and then stocks and flows diagram had been built to estimate manpower cost associated with new technology implementation. The SDM base model reflects 18 months period for technology implementation, and then compared different technological implementation for different scenarios. This SDM had been tested by the data from Department of the Navy budget estimates. The objective of this research was to develop a SDM to estimate manpower cost and technology tradeoff analysis associated with different technology implementation. This research will assist Navy decision makers and program managers when objectively considering the impacts of technology selection on manpower and associated TOC and will support managers with better understanding of hidden cost associated with new technology adoption. Recommendations were made for future study in manpower cost estimation. In a future study, one particular type of data should be located to test the model for a specific studying purpose.

Major: Modeling and Simulation, Industrial Engineering

Educational Career:
Bachelor's of Mechanical Engineering, BS, 1993, Nanchang Aeronautical University
Master's of Modeling and Simulation, MS, 2012, University of Central Florida

Committee in Charge:
Dr. Waldemar Karwowski, Chair, Industrial Engineering and Management Systems
Peter Kincaid, Institute for Simulation & Training
Lauren Reinnerman-Jones, Institute for Simulation & Training
Tareq Ahram, Industrial Engineering and Management Systems

Approved for distribution by Dr. Waldemar Karwowski, Committee Chair, on April 10, 2013.

The public is welcome to attend.