

How to Find Effective Systems Engineers?

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Abstract

Over the years, many issues have complicated the tasks of systems engineers. These include evolving legacy and off-the-shelf components, contextual specificity, extensively large structures, and lack of clarity in multiple expectations and outcome. Thus, there is a need to develop an effective systems engineering workforce that can efficiently work in complex system problem domains. Two important questions that are not well defined in the existing body of literature: (1) What are the fundamental attributes of systems engineering that would impact the performance of individual system engineers? (2) What are the leading indicators for appraising the performance of an individual systems engineer? To answer the aforementioned questions, we conducted an extensive review of the literature on systems engineering to identify the fundamental attributes of systems engineering and the corresponding performance indicators that can measure each attribute. This review supports the development of a new systems engineering performance measurement tool that captures and assesses the performance of individual systems engineers. This performance is based on assessing the leading indicators of the fundamental systems engineering attributes. The outcome of this instrument will generate a unique profile for individual systems engineers and allows engineers to improve their systems engineering skills to better deal with the increasing intricacies of the design and operation of complex systems.

Keywords

Systems engineering, systems skill, effective system engineers, performance instrument, and complex system.

Biographies

Niamat Ullah Ibne Hossain is a doctoral student in the Department of Industrial and Systems Engineering at Mississippi State University. Prior to joining MSU, he received his BS in Mechanical Engineering from Khulna University of Eng. and Tech and MBA in Management Information Systems from Dhaka University, Bangladesh. His main research interests include systems engineering, systems resilience & Sustainability, systems thinking and systems simulation. His publication appeared in different reputed journals such as Reliability Engineering and System Safety , Computer and Industrial Engineering, International Journal of Critical Infrastructure Protection, Engineering Management Journal, and several conference proceedings and presentations at different academic conferences. He is working in different projects affiliated with National Science Foundation (NSF), Department of Defense (DOD), Industry, and other Research Laboratories.

Raed Jaradat is an Assistant Professor of Industrial and Systems Engineering Department at Mississippi State University and a visiting professor working with the Institute for Systems Engineering Research/MSU/U.S. Army Corps of Engineers. Dr. Jaradat received a PhD in Engineering Management and Systems Engineering from Old Dominion University in 2014. His main research interests include systems engineering and management systems, systems thinking and complex system exploration, system of systems, virtual reality and complex systems, systems simulation, risk, reliability, and vulnerability in critical infrastructures with applications to diverse fields ranging from

the military to industry. His publications appeared in several ranking journals including the IEEE Systems Journal, and the Computers and Industrial Engineering Journal. His total awarded projects exceed \$ 4.8 M including National Science Foundation (NSF), Department of Defense (DOD), Industry, and other Research Laboratories. Dr. Jaradat's work has been recognized in the IISE professional communities. He received three international awards from the 2018 ASEE National Conference including Industrial Engineering Division's (IED) Best Paper Award, the New IE Educator Outstanding Paper Award, and best paper for the Professional Interest Council 1 (PIC 1). Dr. Jaradat is elected as a Director of Networking and Outreach for the Modeling and Simulation (MandS) Board of Directors at The Institute of Industrial and Systems Engineers (IISE). Dr. Jaradat also serves as a Guest Lead Editor for the IEEE Transactions on Engineering.