

Systems Engineering Past, Present and Future

The increasingly sophisticated systems developed in the latter half of the twentieth century led to the development and maturation of the systems engineering methodology for the creation of complex systems. The first published standards for systems engineering appeared in the 1960's when the era of electronic control and communication was in its infancy. Over the last sixty years, as the capability of electronic technology and information technology has increased, the systems engineering methodology has provided a reliable basis for the production of complex systems that would have been unimaginable in the 1960's. However, since the turn of the century, economic pressures and increasingly capable technology have presented challenges to the systems engineering paradigm. We will examine the pressures that large projects face, including cost and schedule pressure from the customer, financial performance pressure on supplier corporations and the pressure to deliver increasingly complex systems made possible by new technology. In the presentation we will review the conventional systems engineering methodology, the changing economic and technical environment and the responses from government and industry, including new procurement practices, new processes and technical improvements that are changing everything. Looking further ahead, we will consider the possibility of future technological augmentation and automation of the systems engineering development process. We will re-examine the systems engineering process from first principles and identify technologies that are likely to underpin the systems engineering methodology of the future.

Paul Gorton

Paul Gorton is a consultant with extensive experience in the development of high value aerospace, defence and commercial information management systems. His knowledge and experience are particularly relevant to complex, technology-based businesses and programs. He spent most of his career with MDA Space as Manager of Research and Development, Director of Engineering and Vice President and General Manager of the Systems Division. Prior to joining MDA, he worked on airborne radar systems and precise aircraft positioning systems with Litton Systems (Canada) Limited and image formation processors for spaceborne and airborne Synthetic Aperture Radar (SAR) systems with Systems Designers plc in the UK. He has a PhD in Automatic Control from the University of Manchester (UK).

Class Exercise

A brief history of three projects will be available: the NASA Space Launch System (SLS); the Boeing CST-100 Starliner spacecraft and the Titan submersible. Participants will be asked to interpret the timelines of the projects in the light of the material presented in the seminar and identify the root causes of the problems encountered by the projects.