



Complex Systems

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Charter Summary



WG PURPOSE/MISSION

The purpose of the Complex Systems Working Group is to enhance the ability of the systems engineering community to deal with phenomenology associated with complex and complex adaptive systems. The Complex Systems Working Group works at the intersection of complex systems sciences and systems engineering, focusing on systems beyond those for which traditional systems engineering approaches and methods were developed.

WG GOAL(S)

- Communicate complexity characteristics to systems engineering practitioners
- Provide knowledge and expertise on complex systems in support of other INCOSE working groups working in their systems engineering areas
- Facilitate the identification of tools and techniques to apply in the engineering of complex systems
- Provide a map of the current, diverse literature on complex systems to those interested in gaining an understanding of complexity.

WG SCOPE

The Complex Systems Working Group focuses on the challenges and opportunities presented by systems with large numbers of components, with even greater numbers of interactions distributed in scope across multiple scales and/or across large areas. Systems of interest are characterized by rich interdependence among diverse components, non-linearity, open systems boundaries, networks of causality and influence (vice linear causal chains), emergence, varied and changing system goals, self-organization, and multi-level adaptation. These traits limit the utility of traditional systems engineering paradigms, which are generally centralized, goal oriented, requirements driven, and reductionist in approach. These traits, however, are increasingly the norm and not the exception. The Complex Systems Working Group collaborates with the Systems Sciences Working Group to define the scientific basis of these characteristics.

Further, complexity is a characteristic of more than just a technical system being developed. The socio-technical ecosystem in which a system under development will be employed exhibits these attributes, as does the environment that gave rise to the challenge or opportunity to which the system was developed in response. Further, the design and development of technical systems is a complex endeavor itself. It is critical for systems engineers to understand the nature of the systems with which they are working,

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and of which they are a part, to be effective.

Planned Work for IW



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