



Contribution ID: 355

Type: Oral

Early lessons from the application of Systems Engineering at UKAEA

Tuesday 6 June 2017 17:40 (20 minutes)

UKAEA have now been applying Systems Engineering across a range of projects for a number of years, both directly and indirectly linked to fusion engineering. Systems Engineering has provided a unique perspective from which to solve these complex engineering challenges, bringing together insights from all aspects and disciplines involved. Fundamental functional requirements of the systems have been captured and used to develop “solution agnostic” designs (or architecture) of each system at the highest functional level. This has yielded two major benefits; Existing preconceptions of the design have been challenged and alternatives assessed against the abstract system architecture to determine the optimal combination of sub-systems. In addition, as the design evolves, it has been possible to check that it is still staying true to the original intent.

Systems Engineering has also provided a rigorous methodology for recording and tracing the system requirements and associated designs down through multiple hierarchical levels with associated acceptance tests. Great care has been taken in the specification of these tests to ensure that when the system is fully commissioned it will adhere to both the fundamental requirements as well as the chosen sub-system design solutions.

This paper will present the lessons learnt and the benefits seen from applying Systems Engineering in a range of projects at UKAEA. It will bring together the work being carried out at UKAEA in applying Systems Engineering to fusion engineering and beyond. It will present case-studies from the European DEMO, both in the overall design and integration of the power plant as well as within specific work packages. It will show how the top-level work has produced a new perspective on the power plant design. In the work packages of remote maintenance & breeder blankets it will discuss how functional preconceptions and assumptions have been challenged leading to improved designs. It will also draw on the experience RACE (UKAEA) have gained from applying Systems Engineering to create an optimised design for the European Spallation Source Active Cells project. Each case study will home in on the aspects of Systems Engineering which have been applied to greatest effect and consider both the short-term benefits already realised and the long-term benefits that are anticipated in the future.

In concluding, it will consider the application of Systems Engineering to the design of fusion power plants, within the wider context of the current trends in the Systems Engineering community and identify possible future avenues for the application of Systems Engineering to fusion.

Eligible for student paper award?

No

Author: WOLFF, Dan (UKAEA)

Co-authors: Mr BROWN, Richard (Eurofusion); Mr CURSON, Paul (UKAEA); Mr ELLIS, Rob (UKAEA); Mrs GALLIARA, Tanya (UKAEA); Mr HARRIS, Matt (UKAEA)

Presenter: WOLFF, Dan (UKAEA)

Session Classification: T.OP3: Project Management and Systems Engineering

Track Classification: Project management, systems engineering