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Systems engineering in the research and development environment

Ramdas, Ashlin

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ABSTRACT

The Research and Development (R&D) environment is characterized by high uncertainties due to the unprecedented nature of the work undertaken. The system engineering approach has been utilized to deal with complexity and technical risks to reduce associated cost and schedule implications. The aim of this research is to investigate *how the application of systems engineering reduces uncertainties and associated risks in the Research and Development environment?*

A case study approach was utilized and a research design was developed according to Yin (2009). The case utilized was the Square Kilometre Array Project as this project is done in an R&D context and applied systems engineering in the project.

It was found that systems engineering does reduce technical risk and uncertainties in an R&D environment. This is achieved through the application of systems engineering technical processes and the utilization of technical management to plan the processes in line with the level of risk. Systems engineering methods and tools are then utilized in the process during project execution. Examples from the case are presented to support this finding. A limitation to this claim, due to the fact that not the entire R&D spectrum was investigated, is that the application of these must be tailored to the associated level of risk. The formality of the process must also be tailored to the level of risk and the size of the project team.