



## SETE 2024

### Aligning Strategy, Research, and System Development, Leveraging Model-Based Systems Engineering Techniques

Photi Karagiannis  
Shoal Group Pty Ltd

#### ABSTRACT

Research groups are challenged with ensuring that their activities are appropriately aligned to evolving strategic intent. This paper aims to address that challenge by describing an approach using Model-Based System Engineering (MBSE) techniques to bridge the gap between strategic intent and exploratory research activities such as Modelling and Simulation, and experimental prototyping.

As strategic intent evolves, so too should the research activities. However, it is often the case that as strategic intent evolves, areas of research become unaligned. Further, there exists updated strategic intent that is not supported by research or technology development activities.

To maintain alignment with strategic intent, this paper proposes an approach leveraging model-based systems engineering (MBSE) techniques. A metamodel was developed to capture and trace necessary information within the research program, such as the research programs structure, study questions, activities, prototypes, requirements and testing.

To demonstrate the approach, this paper presents a case study where a descriptive model was developed within CATIA Magic to:

- Capture the structure and activities of a research group
- Link the elements of that groups research program with strategic intent
- Trace the strategic intent to exploratory prototyping conducted by the research group.

Population of existing data in the model found gaps in all areas of the metamodel. With an understanding of gaps, better decision making could be achieved to ensure that research remains aligned with strategic intent.

© Shoal Group Pty Ltd 2024

