

Leading research, education, and delivery excellence in Digital Engineering

Our mission is to enable and accelerate industry and societal digital transformation by creating next generation **systems engineering practices and models**, harnessing advances in **decision science**, and incorporating **technological innovations** into an integrated **collaborative problem-solving** approach. We will create and deliver the **education and learning** required to build digital engineering competencies at all levels.





How can we support your Digital Engineering initiative?

How can we support the design of your future workforce for digital transformation?

Digital technologies are already reshaping the future workforce. New skills and abilities are needed to create and manage new interfaces between digital, physical, and social systems (INCOSE Vision 2035). We offer Training and education solutions targeted to build your future workforce digital engineering competencies from foundational to advanced level.

We will work with you to identify your future workforce needs and propose educational solutions that meet your learning and organisational goals.

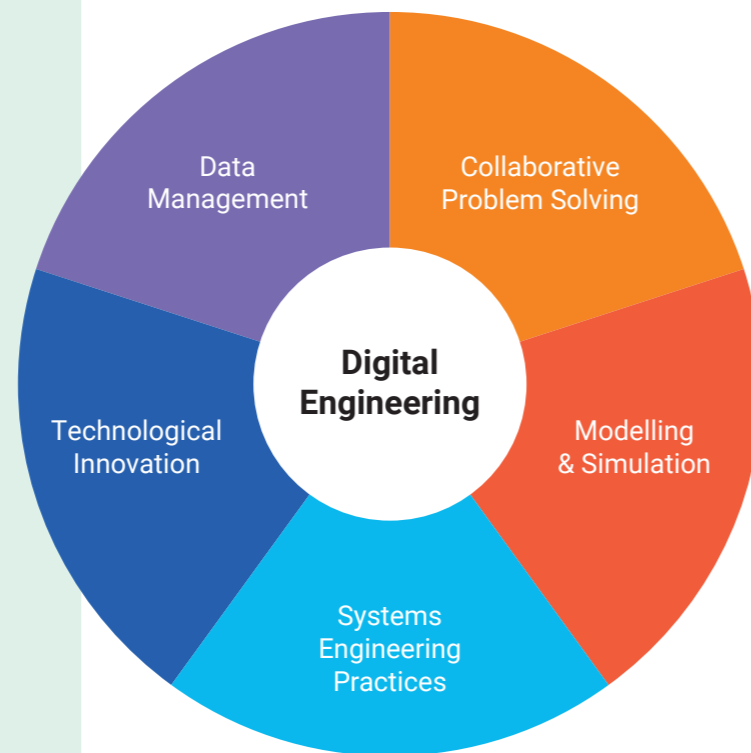
- Model-based Systems Engineering
- Evidence based decision making
- Data and decision analytics
- Systems thinking
- Critical thinking
- Computational modelling
- Socio-technical enterprise analysis

What is Digital Engineering?

Digital Engineering provides an **integrated digital approach** that uses authoritative sources of systems data and models as a continuum across disciplines to support lifecycle activities from concept through disposal (U.S. Department of Defense, 2018).

Digital Engineering is a holistic approach which is equally concerned with the **technical** as well as the **behavioral** and cultural aspects of designing, developing, and deploying complex systems.

Digital Engineering is a **stepping stone towards Industry 4.0**, an era characterized by digital technologies being seamlessly integrated with our physical and social world, and changing how we connect, understand and navigate our environments.



Expected benefits of Digital Engineering

- Informed decision making, improved communication and reduced risk.
- An effective and efficient use of data and models through fluid use of digital artefacts.
- Savings of cost, time and resources through rapid and agile capability development.

In our research and development projects, we **weave knowledge from multiple disciplines with real-world domain expertise** to support the design and implementation of your digital engineering strategy, such as:

- Design and implement Single Source of Technical Truth (SSTT) studies to inform coherent and fluid use of data and models.
- Design Digital transformation roadmaps to define your digital engineering capabilities and implementation pathways.
- Design and implement systems engineering methodologies to incorporate the engineering principles and practices into the digital enterprise.
- Design and deliver Collaborative Integrated Modelling Environments to enable automated decision support.
- Design frameworks and processes to support your organisation to develop and maintain a digital engineering ecosystem with internal and external stakeholders.

Digital Engineering drives key shifts to enable enterprise digital transformation

- Shift from confined and ad-hoc use of models for immediate benefits to continuous and coherent use of models across the lifecycle to drive and accelerate organizational outcomes.
- Shift from use of data and models to address piecemeal questions to end-to-end digital representation of the enterprise to address long-standing challenges associated with complexity, uncertainty, and rapid change in deploying and using systems.
- Shift from technology-focused acquisition to whole ecosystem view to support all enablers for genuine transformation, including workforce readiness and awareness of the legal and policy environment.
- Shift to collaborative model-based problem solving practices to enable stakeholders at various organizational levels to interact with digital technologies and solve problems together in new ways. This drives culture transformation and organizational commitment to 'single source of truth'.

Case studies for applying Digital Engineering

Digital engineering is **reshaping the landscape of how capabilities, assets and projects are designed and managed** across many industries including Defence, transportation, construction, and healthcare delivery. For example:

- The US Department of Defence uses digital engineering to produce digital tools and representations in the process of acquiring, sustaining, and maintaining critical systems whose missions evolve over time. The use of system models provides an authoritative source of truth that the Department uses to manage all weapon and supports systems throughout the lifecycle (Possehl et al., 2022).
- New South Wales Government manages complex construction projects where massive amount of data are collected from various sources, including emerging technologies. NSW Government uses digital engineering to establish a consistent, structured and reusable approach to the way data is created and maintained throughout the projects lifecycle. This reliable data has become a key enabler of informed decision making and better project outcomes, standardising and simplifying processes across the transportation system (Transport for NSW, 2022).

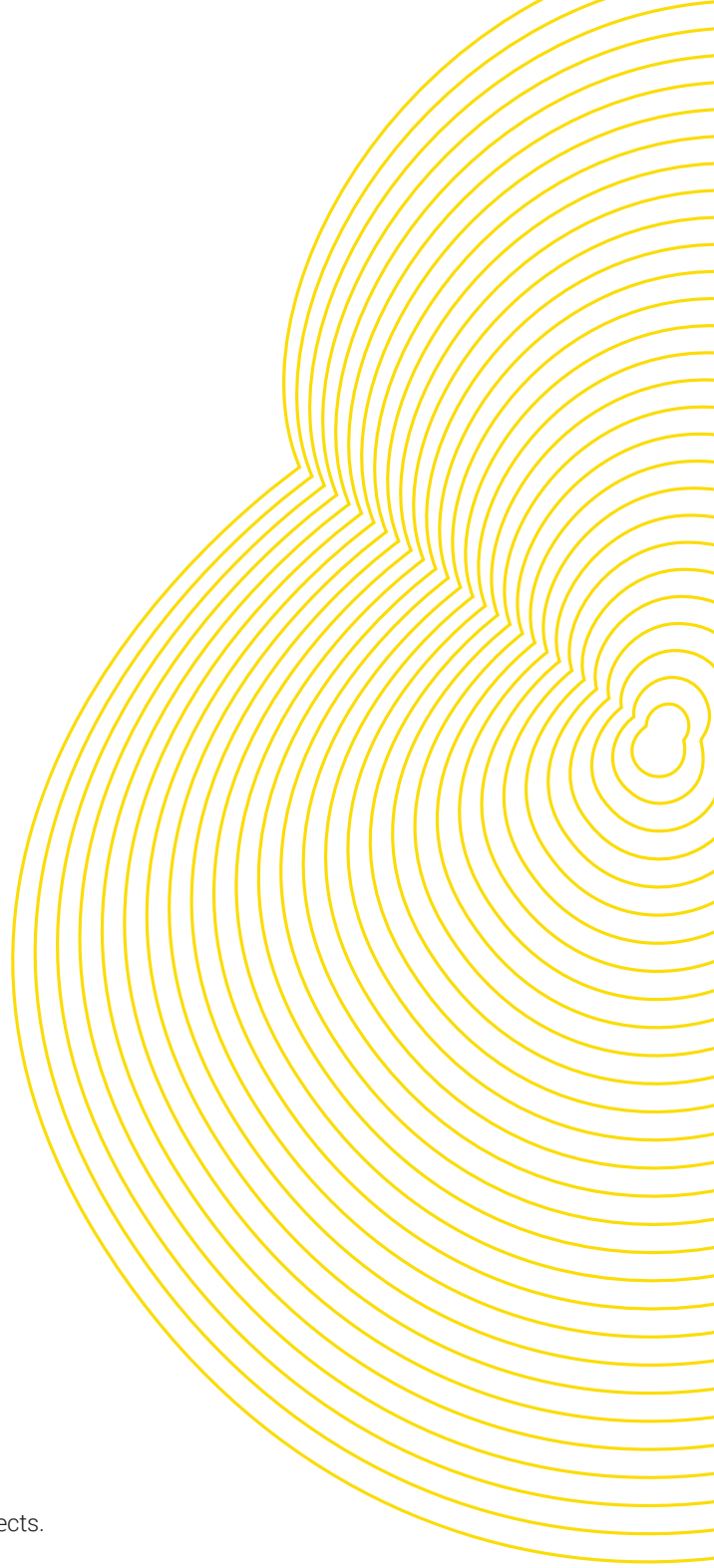
References

INOCSE Systems Engineering VISION 2035.

Possehl, S.L., Zimmerman, P., Gilbert, T. and Salvatore, F., (2022). On the Road with Digital Engineering. *INSIGHT*, 25(1), pp.8-11.

Transport for NSW (2022) Digital Engineering Framework Supporting Projects.

US Department of Defense (2018) Digital Engineering Strategy.



Interested to know more about us?

Contact capabilitysystems@adfa.edu.au

