C.3. Capability Engineering for Industry 4.0

Capability Engineering for Industry 4.0. This stream invites submissions exploring how the application of Systems Engineering to Defence projects might need to evolve with CASG 2.0 aims to align the way Defence capabilities are acquired and sustained with the objectives, technologies, processes and tools used by Defence Industry to deliver those capabilities as part of Industry 4.0, also called the Fourth Industrial Revolution.

Lead: Marco Meloni
Domains: Defence

Submissions Summary:

1. **Leveraging Risk-Based Verification to Optimize Project Outcomes**
   Paperless Presentations
   Danny van Loon 1, Overmorrow Consulting, Chatswood West, NSW, Australia
2. **The Importance of Open Standards and Architectures for Integrated Digital Engineering Capabilities**
   Paperless Presentations
   JORDAN MARSHALL 1, QINETIQ AUSTRALIA, Mt Duneed, VICTORIA, Australia
3. **Is the Journey to the End of the Rainbow a Minimal Viable Capability (MVC)?**
   Paperless Presentations
   Kerry Lunney 1, Thales Australia, Sydney, NSW, Australia
4. **Data-Driven System Engineering approaches for relevant decision making**
   Paperless Presentations
   Varun Prakash 1, Jacobs CMS, Nunawading, VIC, Australia

21323 Leveraging Risk-Based Verification to Optimize Project Outcomes

Authors
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Provided Keywords
risk, verification, requirements
Natural Language Keywords
assurance, construction, insights, outcomes, project, projects, rbv, risk, risks, verification
Presentation format decision
Paperless - Presentation or Poster
Stream submitted
C.0. Emerging Digital Futures (multiple streams)
Stream proposed
C.3. Capability Engineering for Industry 4.0

Abstract

Overview:

In this presentation, we delve into the practical application of Risk-Based Verification (RBV) in construction projects. By showcasing a real-world use case, we demonstrate how RBV can optimize project outcomes by strategically aligning verification efforts with high-risk requirements, thereby minimizing project disruptions and enhancing resilience.

Context:

Requirement verification is an important part of assurance in rail projects in Australia. As part of the assurance process, verification of requirements is often a time-consuming exercise, causing a burden on engineering teams. At the same time, realized assets don't always perform as intended despite the elaborate assurance processes. In response to this challenge, the adoption of RBV offers a promising approach to reduce and prioritize verification efforts based on project risks, ultimately improving project efficiency and outcomes.

Purpose:

Our presentation aims to illustrate the tangible benefits of adopting RBV in construction projects. Through a real-life example, we seek to highlight how RBV can empower project teams to reduce their verification effort, and mitigate project risks effectively, ultimately driving project success.

Approach:

By using an example how RBV has been successfully implemented during the construction of an offshore windfarm, we will share the insights into the specific challenges addressed, the RBV strategy employed, and the resulting impact on project outcomes.

Insights:

Through our exploration of the theory and implementation in one use case, we uncover key insights into the transformative potential of RBV in project delivery. From optimizing the verification effort and increasing the risk assurance, RBV emerges as a strategic tool for mitigating project risks and delivering superior outcomes. By sharing these insights, we aim to inspire audience members to consider RBV as a valuable addition to their project management toolkit.

21235 The Importance of Open Standards and Architectures for Integrated Digital Engineering Capabilities

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Provided Keywords
Digital Engineering, Open Standards, Integrated, Data, Systems Engineering
Natural Language Keywords
capabilities, data, digital, engineering, future, need, open, presentation, standards, systems
Presentation format decision
Paperless - Presentation or Poster
Stream submitted
B.2. Future of Systems Engineering
Stream proposed
C.3. Capability Engineering for Industry 4.0

Abstract

Overview:

One of the challenging concepts in shaping the future of Systems Engineering and preparation of a Digital future includes the complexity associated with Tools and Data integration. [SE Vision 2035]

The complexity exists between many different types of tool sets and technologies used, and the effort required to exchange data between them. There is a Need to simplify this approach as much as possible.

One such method, which we will explore to accomplish this, is through the use of Open Standards and Open Architectures.

Context:

Such approaches to this problem, may include the adoption of common interface standards, languages, schemas and modular based architectures.

The presentation will provide a brief look into the relevant standards bodies; examples of existing open systems and languages, and how they may be utilised for developing Digital Engineering capabilities. Exploring the issues of stove piping, which typically inhibit the sharing of data openly across the system lifecycle.

Purpose:

This presentation will provide an outline of the challenges associated with closed systems, and a fresh look at the benefits of an open system in the context of implementing Digital Engineering capabilities. Outlining the key challenges associated with Tools and Data integration as described in the Systems Engineering vision for 2035. There is now a growing need and urgency to standardise our approach, in order to access, share, collaborate, and reuse data.

Approach:

By using Open Standards, the complexity of integration is reduced, resulting in a wide number of benefits, which this presentation will discuss in further detail.

Insights:

This is advantageous for the replacement of future Digital Engineering systems, which can then utilise those standardised interfaces and integrate easier.

From this presentation, we will recognise the need for such open standards to enable us to implement Digital Engineering capabilities now, and in the future.

20724 Is the Journey to the End of the Rainbow a Minimal Viable Capability (MVC)?

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Provided Keywords
minimal viable capability (MVC), digital transformation, agile, systems of systems (SoS), complexity
Natural Language Keywords
approach, capability, delivery, deployment, impacts, industry, mvc, needed, speed, successful
Presentation format decision
Paperless - Presentation or Poster
Stream submitted
C.3. Capability Engineering for Industry 4.0
Stream proposed
C.3. Capability Engineering for Industry 4.0

Abstract

Overview - With the growing interwoven dynamics of the world, speed to deployment is becoming more crucial. However, we often strive to deliver a perfect solution, sometimes warranted, sometimes not, potentially leading to cost and/or schedule overruns, and the introduction, or the appearance of poor quality systems at initial deployment. Adopting a Minimal Viable Capability (MVC) addresses this challenge, or does it? To understand the complexities for realising a successful MVC a number of interacting factors will be presented.

Context - A MVC approach supports the delivery of needed capability as soon as possible with further capabilities being incrementally incorporated. It is not however just about "descoping a project". MVC requires a lot of change and flexibility both in acquisition and sustainment. Development lifecycles, contracting models, operational scenarios, mission threads, agility, to name a few, all require to be modified under MVC. These impacts are often not understood resulting in sub-optimum MVC deliveries.

Purpose - To avoid/minimise the same problems preventing successful delivery of needed capability under a MVC, a holistic view must be taken. From this viewpoint,impacts of delivering MVCon development lifecycles, checkpoints, tailoring of practices, framework and tools, and technology evolutions must be addressed. Likewise, the importance of model-based engineering approaches increases. Underpinning these factors is being agile, particularly if speed to deployment is critical. This presentation provides the necessaryguidance to deliver a MVC.

Approach - A combination of government-industry discussions, workshops, and industry experience with real life examples are used to illustrate this topic. The adaptations identified in this presentation can be readily applied to both the acquirer and supplier.

Insights - The takeaways for participants are 1) understanding the value of MVC; 2) recognising the blockers; 3) steps needed to successfully adopt a MVC approach.

21326 Data-Driven System Engineering approaches for relevant decision making

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Provided Keywords
Natural Language Keywords
approach, approaches, based, data, decision, deliver, engineering, making, method, support
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C.0. Emerging Digital Futures (multiple streams)
Stream proposed
C.3. Capability Engineering for Industry 4.0

Abstract

Understanding and interpreting data, to support decision making could be done in various ways and is the foundation of Systems Engineering. The method chosen could be critical to deliver the project on time, as per schedule and within cost. While traditionally, artefact-based approach has served well so far, the rate of change of technology and relevance has resulted in evaluation of other methods and one additional method that could be complementary is the data science-based approach. In this presentation I highlight the key differences between the two approaches and propose frameworks to utilise one or the other, or both, based on the needs which can leverage data to inform decision-making at a faster pace as well as drive continuous improvement and support innovation and deliver value.