# System of Systems Engineering Collaborators Information Exchange (SoSECIE)

***November 2, 2021***

***11:00 a.m. to Noon Eastern Time***

**Conceptual Models to Support Reasoning in Early-Phase Concept Evaluation**

***Siv Engen, University of South-Eastern Norway (USN)***

#### Abstract

This presentation presents an industry case showing how conceptual models can support the reasoning during early-phase concept evaluation in the subsea domain. Proposing concepts that are fit for purpose requires subsea companies to carefully balance conflicting needs in a complex system of systems. To support this balancing, there is a need to improve the understanding of how the needs affect the system through its life cycle. In the presentation, we will show results from a qualitiavtive study in a subsea company, exploring the engineers' system awareness.

Through a retrospective case, the presentation demonstrates how the conceptual models support engineers in reasoning about the impact of the key driver and design decisions. In this case, we use concept mapping to visualize the customer and subsea company drivers. We identify the key drivers and the tensions between them from the mapping. Furthermore, we use abstract workflows combined with timelines to explore how the design concepts will affect the key drivers throughout the systems life cycle.

#### Biography

Siv Engen received her master's degree in marine structures from the Norwegian University of Science and Technology in 2008. She is currently working towards a Ph.D. degree in Systems Engineering from the University of South-Eastern Norway. Her research interest includes early phase systems architecting, focusing on visualization and modeling to support reasoning and knowledge sharing. Siv has more than ten years of experience form the subsea industry. From 2008 she has been employed in TechnipFMC, a leading technology provider to the energy industry. Currently, she is working as a Systems Engineer in the concept and feasibility phase.

Supervisors for the Ph.D. research are Kristin Falk, professor in Systems Engineering and Subsea Technology at the University of South-Eastern Norway, and Gerrit Muller, professor in Systems Engineering at the University of South-Eastern Norway.