TU/e

iNNOVATION SPACE

Challenge name	MBSE value in Ship Building
Challenge owner	Razorleaf in combination with Damen
	X Company ◻ Research ◻ Student team
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Email challenge owner	
Phone challenge owner	
Preferred way to contact	X email ◻ Phone call ◻ SMS / what's app ◻ Other; …
Brief summary	If you are interested in working with one of the largest shipbuilders and the 2nd largest software vendor in Europe this challenge will be something for you. You will study the Model Based System Engineering concepts in complex structures, investigate where and how MBSE can bring the most value for a huge shipbuilder who is now confronted with more and more complex systems to be designed and built. Which value will it bring to Damen? Can these principles also be applied on digital engineering models? How do we enable circularity in ship building? These are questions that the group can be focusing on.

About the challenge owner

Razorleaf is a consulting & systems integrator specializing in product lifecycle management (PLM) to help the world's most innovative manufacturing organizations bring new products to market. We partner with our clients to connect products and processes across the digital enterprise to drive more value. Razorleaf offers comprehensive consulting, professional services, and proprietary software products focused on gaining business efficiencies around PLM, Design Automation, Integration, Test Automation and Model-Based strategies.

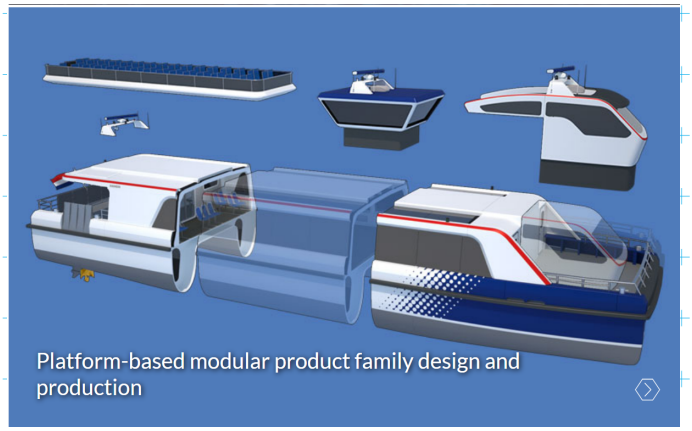
Challenge description

Together with Razorleaf (Product life cycle consultants and Damen Shipbuilding engineers) you will get the opportunity to be part of new technology in one of the world leaders in shipbuilding and using software of the 2nd largest software vendor in Europe (Dassault Systems).

The primary goal of this challenge is to look in different aspects of large vessel development. We will show the added value of using MBSE in the innovation process for designing, producing, and maintaining a ship. Currently systems of ships are getting more and more sophisticated with increasing complexity in all systems. In the traditional development process ships are not designed based on intelligent models but rather on existing knowhow. In the future this will change.

MBSE is a technical approach to systems engineering that focuses on creating and exploiting domain models as the primary means of information exchange. This is often seen as a very theoretical concept. The challenge will be to identify right MBSE principles in large ships design and show the value of the model. Traditionally MBSE is more applied in product design, and as more and more digital twin technologies gain importance, the question arises if practices that are often used in product definition can be applied to process definition, so the digital twin are based on the same models.

Prior the MBSE challenge there was a European project Navais (https://www.navais.eu) to find value added innovation to be implemented in European Shipbuilders. Today they have theoretically developed a platform-based modular product family approach supported by the 3DEXPERIENCE® integrated business platform. With this information we will find concrete cases implement this at Damen.



Platform-based modular product family design and production

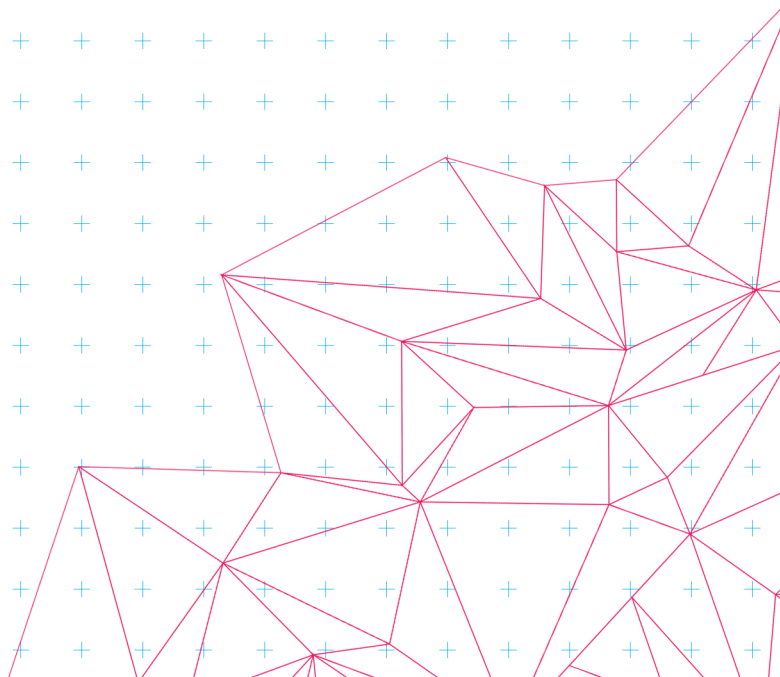
Input and involvement of challenge owner

As an implementation partner of Dassault Systems software , we can deliver the needed tools and knowledge to start building the MBSE knowledge. Our customer Damen will give you all the insights how ships are currently designed and produced. Combinations of both inputs will be foundation to build the MBSE model for Damen

Damen can use the outcome of this challenge to decide what the next steps will be in in the model digitalization, and we potentially can re-use this effort to replicate it with other customers,

Resources

We offer expertise, materials for prototyping, resources for the ideation phase, and we can have meetings at the Damen premises where students can see the current process of large shipbuilding first hand.



Roles of different disciplines (only for ISBEP)

Automotive Technology	The ships are engine-powered and its components need to be designed in a way that allows for a modular approach and easy dismantling of the ship as well to increase its circularity.
Biomedical Engineering	
Architecture, Urbanism and Building Sciences	
Computer Science and Engineering	
Data Science	
Electrical Engineering	There is a trend to have more and more electronics in the ships, so there is big need to understand the abstraction layer to translate requirements to models or systems.
Industrial Design	The design of several of the ships' components may need to be changed to fit the MBSE approach. The process of taking requirements into account for this design could be done by an ID student.
Medical Sciences and Technology	
Psychology and Technology	
Chemical Engineering and Chemistry	
Sustainable Innovation	The building of these large ships needs to become circular in the (near) future. An SI student can help us find ways to increase the circularity of the building process.
Industrial Engineering	
Applied Physics	When building a ship with modular components, this needs to be done in such a way that weight and pressure balances are optimal for a fluent composition. An AP student can help us with achieving this.
Applied Mathematics	When models are created for the building of large ships, there needs to be an overview of how different components could fit in each other and in what order they need to be placed. An AM student can create the mathematical equations that are needed for this modeling process.
Mechanical Engineering	The ships make use of tons of mechanical components that all need to be connected in a way, so having insights in which component types could be used for a modular approach in building large ships is needed. This knowledge can then also be translated in models for upscaling the production capacity.