Battery System Concepts for Fully Electric Vessels

Introduction

Dear SEABAT Community,

Welcome to the seventh edition of the SEABAT newsletter. This issue serves as the final update before our upcoming final event.

Can we drastically reduce the cost of batteries for ships?
That's the question we have aimed to answer over the past four years with the SEABAT project. We are excited to share that the answer is **yes**! Our work has led to the development of a battery system for ships that, in case of an E-tugboat, is **13% cheaper**, **30% more energy-efficient**, **19% smaller**, and **30% lighter**. Additionally, we have prioritized customization, integration, sustainability, and scalability for mass production, ensuring a comprehensive solution for the maritime sector. And it's not just a concept—we are currently testing the prototype in France!

Curious about how we achieved these results? A significant innovation has been the modular combination of energy storage and power electronics, but there is much more to the story.

That's why we are pleased to invite you to the **SEABAT Final Event** on **November 13th in Antwerp**, where we will share all the details and insights about the future of maritime energy solutions. Expect a demo tour, presentations, technical deep dives, a panel discussion, and the chance to connect with the experts and key figures behind this groundbreaking project.

The agenda for the event will follow soon. Attendance is free, and we would be thrilled to have you join us. **Click on the image below** to attend this special event!

Jeroen Stuyts, Project Coordinator, SEABAT Project

For more information, visit our website.

14 Key Features of the SEABAT Concept

In our ongoing efforts to revolutionize battery systems for maritime applications, it's important to spotlight some of the standout features offered by the SEABAT concept. While these features may not be entirely new, the true contribution of SEABAT project lies in demonstrating their feasibility within a larger ship system.

1. Elimination of Large DC-DC Converters|
The SEABAT system eliminates the need for bulky DC-DC converters between the battery system and the DC grid, simplifying the overall architecture.

2. Versatile Battery Usage
The same battery system can accommodate various DC bus voltages, ranging from zero to the maximum design voltage, enhancing flexibility and adaptability.

3. Controlled Output Voltage
When connected directly to a DC link, the system maintains a controlled output voltage. Connected converters are not required to be rated for a wide voltage range due to the voltage variations that occur between fully charged and discharged batteries.

4. Advanced Power Flow Management
The SEABAT system can effectively control power flow both in and out of individual modules within the same string, as well as manage power flow in each parallel string. This capability allows for the maintenance of equal state of charge (SOC) across all modules, regardless of factors such as aging or other performance variations.

Explore all 14 key features on our website.

HESS and TRA test modules completed

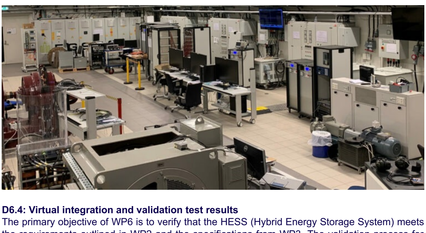
We have great news! A few weeks ago, the HESS *(Hybrid Energy Storage System)* system was transported to CEA in France for its final testing campaign.

The assembly of the BTMS and the validation of the HESS and TRA *(Testing and Reliability Assessment)* test modules have been completed at IMECAR.

We are pleased to announce that Work Package 5 has now been successfully finalized.

Attached are two pictures of the assembly and piping system of the HESS. During the final event, IMECAR and FM will present a video about the battery system —make sure to attend to be the first to see it!

Deliverable report



D6.4: Virtual integration and validation test results
The primary objective of WP6 is to verify that the HESS (Hybrid Energy Storage System) meets the requirements outlined in WP2 and the specifications from WP3. The validation process for the HESS involves two steps: a power-hardware-in-the-loop (P-HIL) virtual integration and validation test, and a performance test of the entire battery system.

The public summary of Deliverable 6.4 will soon be available for review.

An overview of the already published deliverable reports can be found here.

Publications

There are currently no new publications, but there are two on the way. You can read them in the next edition of the SEABAT newsletter.

You can find an overview here of all published articles so far.

Upcoming events

Please note the following upcoming events in your agenda:

- Final General Assembly meeting: November 12th, 2024 in Antwerp, Belgium.
- Final event: November 13th, 2024 in Antwerp, Belgium.

SEABAT Partners

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