NAUTILUS

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NAUTILUS

D6.2 – Drawings and layout for Design on Battery Container

Project Acronym:	Nautilus
Project Title:	Nautical Integrated Hybrid Energy System for Long-haul Cruise Ships
Project coordinator:	Dr. Asif Ansar, Deutsches Zentrum für Luft – und Raumfahrt (DLR)
Programme:	Horizon 2020 Framework Programme
Topic:	LC-MG-1-8-2019 Retrofit Solutions and Next Generation Propulsion for Waterborne Transport
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Deliverable D6.2 – Drawings and layout for Design on Battery Container

Short summary: The main object of WP6 is the design, construction and operation of a modularised functional demonstrator consisting of 2 parts: one battery container with a power of 20kW and one fuel cell unit with a power of 60kW. Focus of this deliverable document is the description of electrical hardware design and communication signals of the different power components of battery container, including technical drawings and layouts. Design, interconnection and automation details of the power components such as the battery rack system, the power electronics units, the energy management system (EMS), the main container control unit, as well as measuring and network devices are provided.

Due date: 30/05/2024

WP, leader: WP6, MAN ES

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Dissemination Level

PU	Public	☐
PP	Restricted to other programme participants (including the Commission Services)	☐
RE	Restricted to a group specified by the consortium (including the Commission Services)	☐
CO	Confidential, only for members of the consortium (including the Commission Services)	☒

Document history

Version	Date	Name	Chapters edited	Reason for change
V0.1	24/04/24	Dr. Fabian Grimm	All	Document prepared
V0.2	30/04/24	Margarita Kalogeropoulou	All	Document prepared
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4	Ecole Polytechnique Fédérale de Lausanne (EPFL)	CH
5	GRANT Garant (GG)	CZ
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1 Introduction

The shipping industry is facing the challenge of drastically reducing greenhouse gas (GHG) emissions. According to International Maritime Organization, based on the 2023 IMO GHG strategy, the goal for year 2050 is to reach net-zero emissions from international shipping [1]. In addition to alternative fuels, the focus is on hybridizing energy provision through batteries and/or fuel cells.

The increasing interest in fuel cell systems, particularly in high-temperature fuel cell systems (SOFC – Solid Oxide Fuel Cells), can be attributed to their very high overall system efficiency (up to 90%; [2]), low emissions* [3] and flexibility regarding the fuel used. The fact that this promising technology has not yet been deployed on a large scale is due to the low power capacity of commercially available SOFC systems, limitations in terms of load flexibility, and high CAPEX costs per kW.

However, this drawback of low dynamics can be mitigated through additional hybridization with batteries: high load transients can be covered by the battery, allowing the SOFC to operate within its specification range (low load change rate per minute).

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