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Integrated Ship Design and CSI Modeling: a New Methodology for Comparing Onboard Electrical Distributions in the Early Stage Design

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In recent years, the MVDC distribution has been proposed as a viable solution for the redesign of the ship-board Integrated Power System (IPS). Indeed, there are relevant advantages promised by the innovative DC concept, among others a desirable reduction in the electric power system size. For providing a virtual proof-of-concept of this technology, parametric and interactive 3D models can be developed by a new Computer System Integrator (CSI) software. The latter may give the possibility to quantify the expected onboard benefits (i.e. increase of pay load) already during the early-stage design, thus opening interesting evaluation since the very first stage of ship design. By exploiting the capabilities offered by the integrated design methodology, a comparative analysis between a conventional MVAC electrical distribution and an innovative MVAC/MVDC hybrid system is performed in this paper. In particular, a significant Main Vertical Zone of a large cruise ship is modeled by the CSI software for providing a detailed comparison (volumes/weights) among the two power distribution architectures (MVAC vs hybrid MVAC/MVDC)

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