

Title: Unmanned surface vehicles: From a hull design perspective

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Abstract: An autonomous [surface vehicle](#) (USV) offers wide applications and is a demanding technology in the fast-developing era. Even though comprehensive studies have been conducted, there is little consensus or established best practice within the USV design community on applying for specific conditions. Additionally, the USV's performance can be measured in terms of stability, [manoeuvrability](#), and adaptation to [hydrodynamic](#) influence. Therefore, this study reviews the latest research on the USV hull design, which can be categorized into physical experiments and numerical simulations. This article aims to answer the following research questions: (1) Which USV is suitable for each [sea state](#) level?, (2) What constraints must be considered when designing the USV hull?, (3) How do different hull design parameters impact the performance of USVs?, and (4) What are the current trends and advancements in USV hull design?. Findings show that stability, [manoeuvrability](#), [hydrodynamic](#), [payload capacity](#), and material are major factors that need to be considered when designing or developing a USV hull. Additionally, it was discovered that monohull-type USVs are the most studied compared to the catamaran and trimaran USVs, whereas the numerical simulation was mainly adopted in the USV hull design research and development process. Future research includes design optimization with [secondary structures](#) and its operational evaluation in multiple [sea state](#) conditions.

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