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A Preliminary Study on Design and Development of Unmanned Shallow Water Surface Surveillance Craft

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Due to Sri Lanka's ongoing economic crisis, the development of cost effective and advanced technological solutions for surveillance operations in Sri Lankan waters is crucial. This study focuses on unmanned remote-controlled surface vessels (USV), engineered for shallow water surveillance operations. While advanced USV models exist globally, our approach emphasizes creating a high-quality, low-cost alternative that is economically viable and better adapted to the unique maritime and environmental conditions of Sri Lanka. Catamaran type was chosen as the hull shape, as it provides a more stable and safe navigation in various maritime conditions efficiently. This was modelled by using the Rhino 3D modelling software and further analyses were done by Maxsurf Naval Architecture Software. The USV is equipped with an integrated water quality monitoring system iterated with Ph sensor, CCTV camera, and GPS module, utilizing Arduino technology for real-time data acquisition. The system detects toxic substances in water, triggering an immediate alarm and sending the live location to a mobile device via the GSM module. Additionally, the live CCTV camera enhances real-time surveillance capabilities. The USV's remote operation is facilitated by RC transmitter components, ensuring effective control over extended voyages. By addressing both economic constraints and environmental considerations, this study provides a robust, adaptable USV solution for Sri Lanka.

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