Reconsidering Readiness for The Egyptian Navy
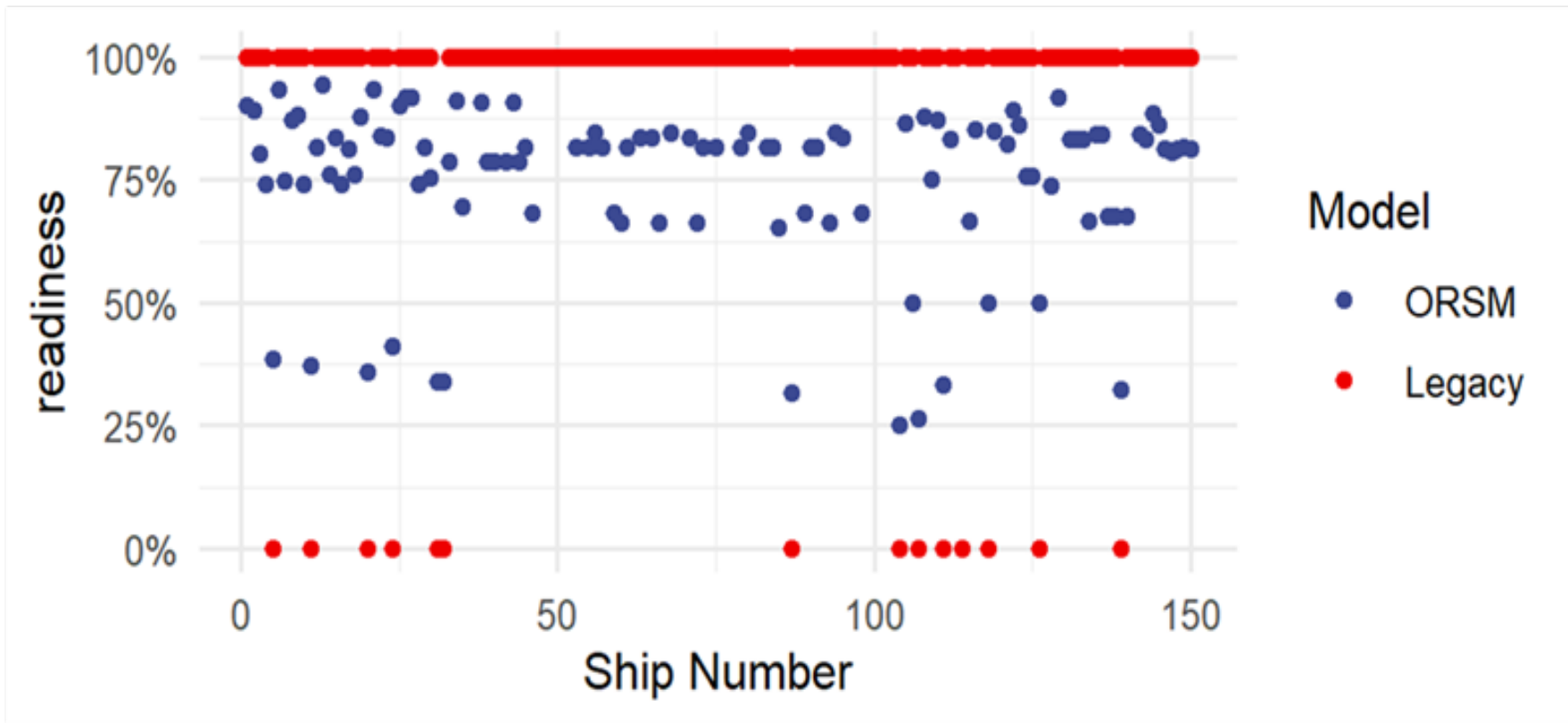
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Abstract

This study introduces the Operational Readiness Score Model (ORSM), a mission-based alternative to the Egyptian Navy's binary readiness system. Unlike the current approach, which marks ships as either fully ready or not based solely on their ability to sail, ORSM assigns readiness scores based on the percentage of assigned missions a ship can complete. Using a stochastic simulation with hypothetical data, ORSM demonstrated improved accuracy, better alignment with mission demands, and enhanced maintenance and deployment decisions.
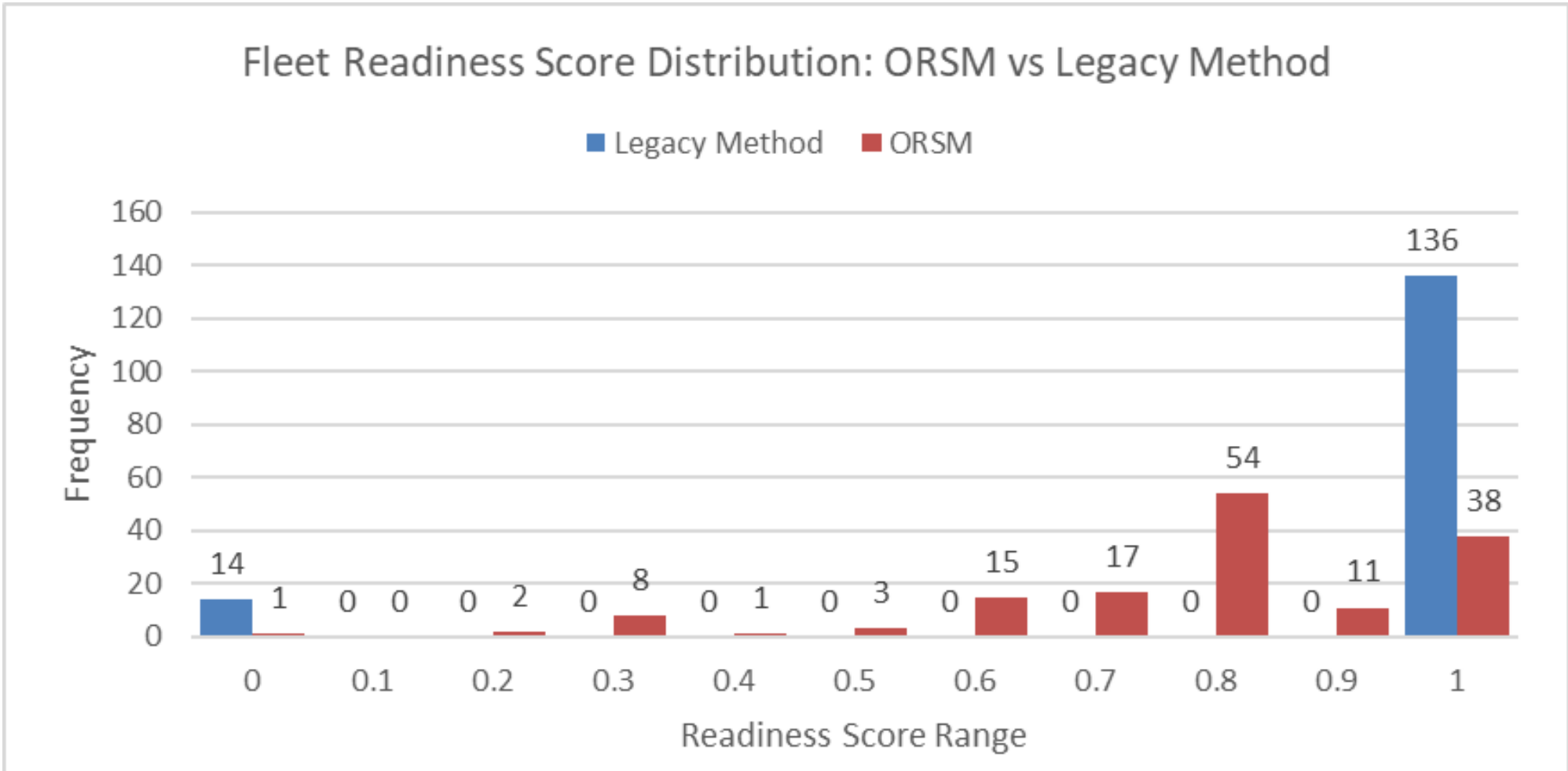
Methods

We compared the legacy binary readiness system to ORSM using a small-scale stochastic simulation developed in Excel and R. Due to classification constraints, hypothetical data was used to model realistic mission profiles and maintenance scenarios. The simulation introduced variability in system performance and mission demands to assess which model more accurately reflects actual fleet readiness.
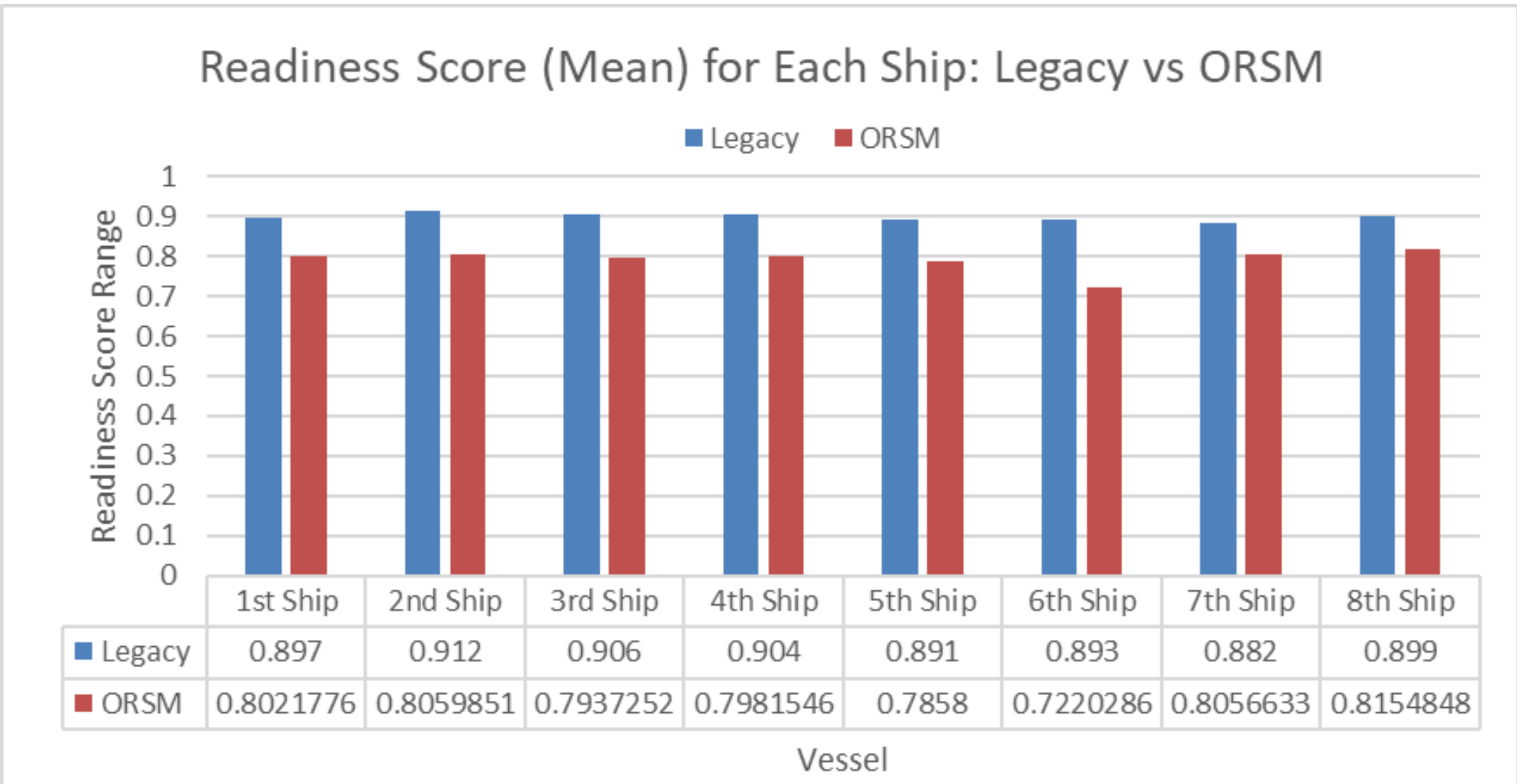

Results & Impact

Fleet Readiness Score Distribution: ORSM vs Legacy Method

Fleet Analysis: The legacy model inflates readiness across the fleet, often classifying ships as fully mission-ready when they're not. ORSM, by contrast, captures a range of operational capabilities, offering more realistic and mission-relevant readiness scores. It reduces inflated expectations and supports better strategic planning. Fleet-wide, ORSM improves consistency, minimizes planning uncertainty, and enhances resource allocation by accurately reflecting each ship's actual contribution to mission success.

Individual Ship Insights: Analyzing eight representative ships revealed that the legacy model often misclassified high-failure vessels as "ready." ORSM identified actual performance gaps, exposed urgent maintenance needs, and distinguished between moderate and high risk. It also pinpointed ships better suited for support roles. These insights improve maintenance prioritization, mission assignments, and overall fleet efficiency based on real mission capability.

Readiness Score (Mean) for Each Ship: Legacy vs ORSM

Vessel	1st Ship	2nd Ship	3rd Ship	4th Ship	5th Ship	6th Ship	7th Ship	8th Ship
Legacy	0.897	0.912	0.906	0.904	0.891	0.893	0.882	0.899
ORSM	0.8021776	0.8059851	0.7937252	0.7981546	0.7858	0.7220286	0.8056633	0.8154848

Operational Insights

The ORSM model enables commanders to make mission-specific deployment decisions by identifying not only which ships are ready, but how they are best utilized. Rather than sidelining moderately ready ships, ORSM supports strategic reassignment, deploying them in support roles such as logistics, reconnaissance, or coastal defense. This operational flexibility maximizes fleet utility, preserves high-readiness assets for critical missions, and aligns with global best practices in adaptive force employment and multi-domain naval operations.

Future Research

To improve readiness and sustainment, ORSM should guide predictive maintenance, asset reassignment, and logistics strategies. High-risk ships need urgent repairs, while moderately ready vessels can support auxiliary missions. Future development should integrate ORSM with AI, cyber readiness metrics, and multinational planning tools. Embedding ORSM into war-gaming, crew training, and supply chain systems will enable smarter decision-making and strengthen the Egyptian Navy's adaptability to evolving strategic and technological environments.

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