



Unmanned Ocean Logistics Vessel-based Disruption-Tolerant Network

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Objectives

The mobility of ships, along with fluctuating sea surfaces, makes maintaining end-to-end connectivity between ships highly challenging. We wish to propose an alternative to costly satellite links for communications in the maritime environment and study the performance of our approach based on message delivery ratio, latency and overhead.

Main Research Idea

We propose the use of unmanned vessels performing logistics operations to concurrently act as ferry nodes to store, carry, and forward messages from ship to ship, forming a disruption-tolerant network (DTN) for communications.



Research Results

We use the ONE simulator to simulate the use of ferry nodes in sparse networks of varying sizes. The results show that our approach has low overhead at the cost of low message delivery ratio and high latency.

Benefits and Potential Applications

Our approach can be suitable for maritime networks that are power-constrained and where delivery of messages is not time-critical nor mission-critical. Examples of such networks are ocean observing systems where a low overhead ratio that corresponds to a reduced need for power replenishment may be more important than the timeliness and availability of data. Navies and commercial shipping companies that are embarking on the use of unmanned vessels for logistics operations would likely benefit from this research.

Follow-up Research

A similar performance study can be done using unmanned underwater vessels to form a DTN for communications. Such a study will benefit the implementation of underwater ocean observing systems.