

Incorporating Contact Management and Marine Dynamics in Decentralized Auction Bidding for Autonomous Surface Vehicles

by

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Abstract

This research studies techniques that can be applied to practical multi-task multi-vessel marine applications to manage mission planning for autonomous surface vehicles (ASVs). This thesis investigated the use of a decentralized Consensus Based Auction Algorithm (CBAA) for marine autonomous vehicles while incorporating contact management and marine vehicular dynamics [1]. CBAA is a task allocation system that does not require a central agency. The task investigated in this thesis is to transit to a waypoint in a dynamic environment, including other moving vessels to avoid.

To reach the goal of this thesis, this methodology is implemented to assign a value to an auction bid given the contact environment and vehicle dynamics. The Mission Oriented Operating Suite with Interval Programming (MOOS-IvP) was utilized to demonstrate this capability and finally, this work provides an analysis of MOOS-IvP simulated data runs utilizing contact management and vehicular dynamics.

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