A Decision Model for Automated Identification Technology Devices for Naval Seabasing

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Abstract

This research presents a decision model related to naval seabasing, which is loosely defined as supporting command and combat operations from the sea. Functionally, sea-based logistics requires vessel-to-vessel replenishment, selective offloading, dense storage, and ship-to-objective locations capabilities. These activities can be supported through identification technology devices and methods, such as RFID, barcoding, and GPS. We discuss these devices as alternatives to a multi-objective decision model with the goal of selecting the preferred device for seabasing logistics support. Criteria for this model include metrics and associated measures related to seabasing, which we identify and describe. Finally, we present the framework for a decision model to solve for the preferred identification technology device to support the functions associated with seabasing logistics. This is joint work with Dr. Jennifer Pazour (University of Central Florida).

Methodology

Multi Objective Decision Analysis (MODA)
- Decision analysis technique to model qualitative and quantitative inputs to a decision
- Framework measures trade-offs among objectives
- Incorporates uncertainties and risk preferences
- Creates repeatable and defensible decision recommendations

Process includes creation of a value hierarchy of decision criteria
- Criteria are metrics related to seabasing functions
- Value functions for each criterion
- Evaluate alternatives on each criterion
- Goal: Determine the best alternative to deploy into existing seabasing systems

Alternatives

- Radio-frequency identification device (RFID)
- Barcoding
- Short range GPS technology
- Long range GPS technology
- Do nothing, keep current state

Example & Next Steps

Example
Location Precision
- Based on the alternative, with what granularity are the items’ locations known when densely stored in the holds?
- Significant factor that affects the strike-up and strike-down response as well as reaction times

Item will be:
- a. On the ship
- b. In a hold
- c. In a specific portion of the hold
- d. In an exact location of the hold

Next Steps
- Elicit value functions from subject matter experts
- Calculate best alternative
- Provide final recommendation to Office of Naval Research

Seabasing Metrics

Registration of Inventory • Storage Density • Location Precision • Accuracy • System Setup Time • Maintenance and Upkeep • Security

Value Hierarchy

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