MASTER OF SCIENCE
IN
OPERATIONS RESEARCH

A MULTI-COMMODITY NETWORK-BASED HEURISTIC FOR THE SHIP-TO-OBJECTIVE MANEUVER

William B. Lambert-Major, United States Marine Corps
B.A., University of California, Los Angeles, 1989
Master of Science in Operations Research-March 2001
Advisor: Alexandra M. Newman, Department of Operations Research
Second Reader: Siriphong Lawphongpanich, Department of Operations Research

The Marine Corps is responsible for developing amphibious doctrine and techniques, and conducting amphibious operations. The most critical phase of an amphibious operation is the Ship-to-Objective Maneuver (STOM), the scheduling of which must account for heterogeneous transport aircraft and serials, varied ship-to-shore distances, limited numbers of ship deck spots, and diverse capacities of landing zones ashore. This complex planning is currently done without computer assistance. To expedite the planning and scheduling of the aviation portion of the STOM, this thesis presents the Air Plan Construction Heuristic (APCH). Given a commander's scheme of maneuver and available aircraft, the APCH schedules routes, loads, and departure and arrival times for all aircraft. This heuristic attempts to minimize the time required to deliver all serials, subject to aircraft and ship deck spot availability, and the capacity of helicopter landing zones ashore.

To illustrate the operational planning potential of the APCH, an Air Plan for a MEU scenario is generated, and then compared to a manually-generated schedule. To demonstrate the prospective use of the APCH as an analytical tool, we evaluate the time required to deliver all serials ashore as a function of ship-to-shore distance.

DoD KEY TECHNOLOGY AREA: Modeling and Simulation

KEYWORDS: Amphibious Operations, Ship-to-Objective Maneuver, STOM, Multi-commodity Network