



# AGILE SYSTEMS INC.

## NAVAL STORAGE AND RETRIEVAL SYSTEM (NAVSTORS)

NAVSTORS with Missile Containers and Ready Service Weapons

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Topic Number: N00-038  
(NAVSEA; Carriers, ONR)

SBIR Investment: \$850K  
Project Revenue: \$3.93M

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### About the Technology

Originally conceived for PEO Aircraft Carriers, Agile Systems, Inc.'s Naval Stowage and Retrieval System (NAVSTORS) was designed for the automated handling of air-launched weapons in their bulk-stowage and ready-service forms. NAVSTORS is capable of accommodating palletized and containerized loads of many different sizes and shapes while, at the same time, improving stowage density and providing selective access to any one of the unit loads contained. The system employs a unique "moving floor" mechanism, based on slide-puzzle geometry. This geometry provides the highest possible three-dimensional stowage density of payloads within a given hold or magazine by permitting pallets and containers to be stacked right to the overhead and eliminating fixed aisles altogether.

Computer-controlled platforms called Payload Carriers, driven by linear synchronous motors, move stacks of pallets and containers weighing as much as 18,000 pounds within the stowage matrix. Material in almost any size or configuration is automatically and selectively indexed to and from stowage and vertical conveyance. The addition of a fleet of omnidirectional guided vehicles expands the scope of NAVSTORS to achieve an end-to-end intraship handling solution. Agile received follow-on funding from PEO Carriers, PEO Ships, ONR, and the AOE(X) replenishing ship program, to evaluate system throughput on CVN 21, study non-aircraft carrier applications aboard naval vessels, and to build and test full-scale and subscale system/subsystem prototypes. ONR is currently sponsoring a study that utilizes NAVSTORS technology as part of the High Rate Vertical to Horizontal Material Movement system. Agile is also building an automated weapons assembly system for PEO Carriers that uses the NAVSTORS high-capacity robot and moving floor system.

### Military and Commercial Significance

Increased weapons stowage density through the NAVSTORS indexing matrix, combined with manpower requirements. Since 2000, Agile Systems has identified applications related to all facets of shipboard material handling.

### About the Company

Agile Systems Inc. specializes in large-scale robotics and has conducted Navy research since 1998, ranging from automated stowage and retrieval, to the automated handling of package size provisions. Agile Systems has applied the NAVSTORS technology to surface combatant stores handling and CVN air-launched weapons de-containerizing and de-palletizing. The company has received two additional Phase II SBIR contracts to employ NAVSTORS subsystems to address shipboard material handling activities peripheral to automated stowage and retrieval.

### APPLICATIONS

- ONR Future Naval Capabilities/Operational Logistics - Integration Programs: Sea Base and Combat Logistics Force
- PEO Aircraft Carriers - Air-launch weapons
- PEO Ships and PEO Carriers: Air-launched weapons de-containerizing/ depalletizing
- Seabasing - Automated handling of modular and conventional 20-foot ISO containers and vehicles