Autonomous Pallet Loader (APL)

stratom

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Topic Number: N191-002

SYSCOM: Marine Corps Systems
Command (MCSC)
www.marcorsyscom.marines.mil

Program Sponsor: Combat Support
Systems (CSS)

Other Potential Programs: USMC
Program Executive Office Land Systems,
Marine Logistics Group (MLG), US Air Force
Aerial Port of the Future (APoF), Air Mobility
Command (AMC), Rapid Defense
Experimentation Reserve (RDER), US Army
Program Executive Office Combat Support &
Combat Service Support (PEO CS & CSS), US
Transportation Command (USTRANSCOM), US
Indo-Pacific Command (INDOPACOM), US
Central Command (CENTCOM, Combined Arms
Support Command (CASCOM), Military Sealift
Command, Naval Air Systems Command
(NAVAIR), U.S. Agency for International
Development (USAID)

Current TRL: 7

Projected TRL: 8 / Q3 2027

Keywords: Autonomous Pallet Loader,
Contested Logistics, 463L, Cargo, CH-53K,
Forklift, Austere, Material Handling

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THE CHALLENGE

Currently, no system exists that allows for autonomous loading/unloading of palletized cargo on full or half size 463L pallets and ISU containers in tactical/austere environments, which results in a reliance on manpower (including fire teams) for unloading tasks in unsecured locations. Manual handling of cargo increases the time aircraft is on the ground in the Landing Zone and increases exposure of personnel. Traditional material handling equipment (MHE) is less space efficient to fly with air transported cargo, and Combat Offload Methods can delay operational readiness of forward operating positions without sufficient material handling capability in theater.

THE INNOVATION

A lightweight, autonomous material handling system with a near 1:1 vehicle weight to payload ratio was developed to be carried internally on common military cargo aircraft, including the CH-53K heavy lift helicopter. The Autonomous Pallet Loader's (APL) compact footprint and reduced vehicle weight enable expeditionary cargo movement in austere environments with reduced manpower demands by leveraging autonomous navigational and cargo handling functionality to improve defense logistics operations to increase material handling speed, flexibility, efficiency, dependability, and safety. This innovation was developed with support from the US Marine Corps Systems Command (MCSC), Combat Support Systems (CSS), Logistics Combat Element Systems (LCES), and U.S. Air Force Aerial Port of the Future (APoF) programs.

THE NAVY BENEFIT

The APL reduces manpower needs while loading/unloading aircraft and can be directly operated via wireless remote control or autonomously, leveraging integrated perception sensors to navigate through the environment while avoiding obstacles and impassable terrain. Defense logistics operations benefit from increased material handling speed, flexibility, efficiency, and dependability and reduced contested logistics risk and cost. Minimizing exposure to human and logistics assets, while enhancing capabilities to move 10,000 lb pallets, containers, and other heavy cargo elements, provides a significant competitive advantage to Naval warfighters.

THE FUTURE

Stratom is actively demonstrating APL with multiple defense logistics programs while maturing the platform for optimization to support the broadest contested logistics use cases across Marine Corps, Navy, Air Force, and Army operations. Stratom is seeking transition funding and partnership opportunities to support validation and certification activities in preparation for transition of APL to initial production and fielding.