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**HULC™ with Lift Assist Device**  
Exoskeletons Provide Performance Enhancement for Sustainment Capabilities







PD151-038

**Lightweight, Power-assisted Straps Act as Arms**

## HULC™ with Lift Assist Device

Military logistics and sustainment missions often require personnel to repetitively lift and carry heavy loads for several hours a day. These activities significantly increase muscular-skeletal stress on the body, potentially leading to injuries.

HULC is a lower-body, electro-hydraulically-powered exoskeleton designed to lift and carry heavy loads. It transfers weight through the machine's frame to the ground, significantly reducing operator fatigue and exposure to injury. Additionally, HULC's self-contained power supply eliminates external power cords or hydraulic lines that restrict deployment.

The HULC Lift Assist Device allows single operators to safely lift heavy loads that currently require two or more people. The Lift Assist Device, easily mounted on the back of the HULC exoskeleton, maintains users' normal lifting and motion range. This lightweight, power-assisted device has multiple end-effectors that are quickly and easily exchanged to enable lifting and carriage of various boxes, containers and munitions.

The device's counter-balance weight keeps the center of gravity close to the operator to maintain balance and positive control. Using gripping and winch sensors, an onboard micro-computer ensures the exoskeleton moves in concert with the individual to maintain balance and accurate object placement.

Lockheed Martin continues to research and develop exoskeleton capabilities, including more efficient power systems and additional designs for industrial, medical and a wide range of mission specific applications.



PD151-032

**Design Permits Deep Squats**



PD151-083; PD151-094; PD151-095



**Allows One Soldier to Lift Loads, Maintains Normal Lifting Range of Motion and Keeps the Center of Gravity Close to the Soldier**

## Specifications

- |                    |   |
|--------------------|---|
| <b>Power</b>       | • Lithium polymer batteries   |
| <b>Electronics</b> | • Flexible, expandable electronics architecture                     |
|                    | • Custom single-board microelectronics housed in a sealed enclosure |
|                    | • Heat sinks on actuators. No fans used or needed.                  |
| <b>Hydraulics</b>  | • Efficient low-flow hydraulic system                               |
|                    | • Standard hydraulic fluid  |

## Features

- Lift Height: Cargo lifted to individual Soldier's height
- Payload: Up to 150lb; carries front loads
- Multiple end-effectors enable lifting of various load types
- Fits Warfighters' height range of 5'4" to 6'2"

## Extensibility

- Wide variety of mission specific attachments
- Capable of serving as backbone for integrated systems such as armor, heating or cooling systems, sensors and other custom attachments

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Front top: PD151-037; Front bottom: PD151-096