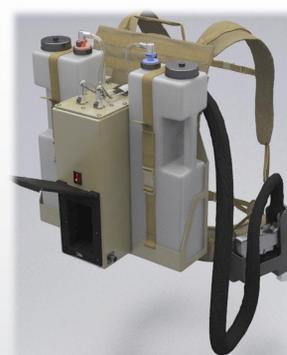


Chameleon: Contamination Indicator Decontamination Assurance System (CIDAS) Large Scale Applicator (LSA)

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Background



The Joint Project Manager Protection (JPM-P) and Edgewood Chemical Biological Center (ECBC) designed and fabricated prototype Contamination Indicator Decontamination Assurance System (CIDAS) Large Scale Applicator (LSA), also referred to as Chameleon.

The CIDAS LSA and colorimetric indicator solutions provide an applicator and indicator technology for visually indicating the presence of chemical warfare agents on vehicles, and equipment that may have been exposed to chemical contamination in hostile and non-hostile environments. The CIDAS will be used by personnel in Mission Oriented Protective Posture (MOPP) Level 4. The key features of the system are high user mobility, removable rigid bottles, dual diaphragm pump to achieve 1:1 ratio mixing with minimal dead volume, a system which is MOPP4 compatible, and operational from standard military batteries or vehicle power. The CIDAS consists of two reagent that when combined are yellow in color and change to red in the presence of agent.

Approach

The Chameleon LSA had to be designed to hold two separate solutions: an enzyme-based liquid, and a dye and buffer solution. The two solutions must remain separated from each other prior to application. They are mixed in the spray wand immediately before being sprayed. The “pot life” once mixed is only around 90 seconds.

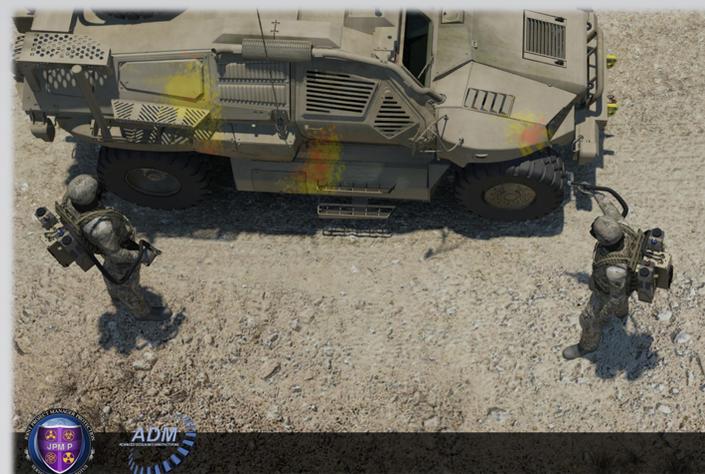
ECBC Advanced Design and Manufacturing (ADM) designed and fabricated two (2) prototype large scale applicators. The Chameleon can be either worn as a backpack by the Warfighter or placed on a tripod during use. The prototype systems leveraged commercially available parts such as spray wands, check valves and pumps. All designed parts included manufacturing level drawings for transition into production.

Approved for Public Release

Design

The Chameleon CIDAS LSA is comprised of the following six main subsystems:

- **Backpack:** The backpack utilizes a High Ground HG830 Modular Pack, consisting of a modular ruck with a flexed internal frame. Components can be attached to the system via MOLLE clips.
- **Frame:** The frame was designed by ECBC to be a housing unit for the battery, the pump, and the bottles. The frame is designed to attach to the backpack system via MOLLE clips. The battery and pump housing unit is designed to be waterproof by incorporating rubber gaskets.
- **Power System:** The Chameleon can be either battery powered or connected to a vehicle outlet via an electrical cable. The Chameleon utilizes a variety of military batteries, the primary being the BB-2590/U rechargeable lithium-ion battery. The battery conforms to MIL-PRF-32052/1.
- **Pump:** A KNF Neuberger 1.300 series dual head diaphragm pump is used in the Chameleon to promote the required 50/50 mixing of the Agentase solution. A Suco Technologies pressure switch is utilized to turn the pump off when the spray trigger is not depressed. Cut-off pressure is ~65 psi.
- **Spray System:** The spray system consists of the bottles, the tubing, fittings, and spray handle. The system is designed to operate at ~50 psi. The Chameleon uses braided tygon tubing with a pressure rating of 200 psi. The tubing will provide protection for the system pressure and against any abrasions. Each Chameleon will have two, one gallon bottles with molded handles, tethered bottle cap to prevent loss, clear finish, filter to minimize the intake of large particles, and a single strap secures each bottle to the frame. The custom designed bottles are blow molded polyethylene. The quick disconnect fittings are either polyethylene or nickel plated brass. The handle is a Spraying System TeeJet Lawn Spray Gun, part number SCP 25660-1.5. The spray gun has a maximum pressure of 200 psi.
- **Tripod:** An AT313 tripod by Induro is being used as the base system. ECBC selected and installed two arms that will be used to hold the Chameleon system on the tripod and provide an optional configuration for use.



Results

Two Chameleon CIDAS LSA prototypes have been delivered, and 30 production representative units are being produced for Operational Testing in support of the Contamination Indicator Decontamination Assurance System (CIDAS) Program of Record.



- HIGHLY MOBILE**
 - Backpack MOLLE mounted
 - Less than 42 lbs fully operational
- REMOVABLE RIGID BOTTLES**
 - Easy to fill and mix
 - 2 gallon total capacity
 - Visible solution levels and fill marks
- DUAL DIAPHRAGM PUMP**
 - Promotes 1:1 mix ratio
 - Allows dual feed lines
 - Minimal dead volume
- 24VDC ELECTRIC POWER**
 - Standard or rechargeable military batteries
 - 2+ hours continuous run time with BB-2590 battery
 - Up to 47 gallons dispensed on one battery
 - Optionally runs off tethered vehicle power
- SPRAY WAND**
 - MOPP gear compatible trigger
 - Optimized fixed spray pattern

Future Directions

Pine Bluff Arsenal (PBA) has been selected to produce 5000 production units. PBA and ECBC personnel have been working in close collaboration to produce the 30 test units, and to streamline production procedures in anticipation of the upcoming 5000 unit build.

Other variants of the Contamination Indicator Decontamination Assurance System (CIDAS) systems continue to be developed. A mid-scale unit for SOCOM use is in the early development phase.

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