

# CLPE: Configured Load Planning Engine

## Intelligent Ammunition Storage and Transportation

### Planning for Efficient and Compliant Space Utilization

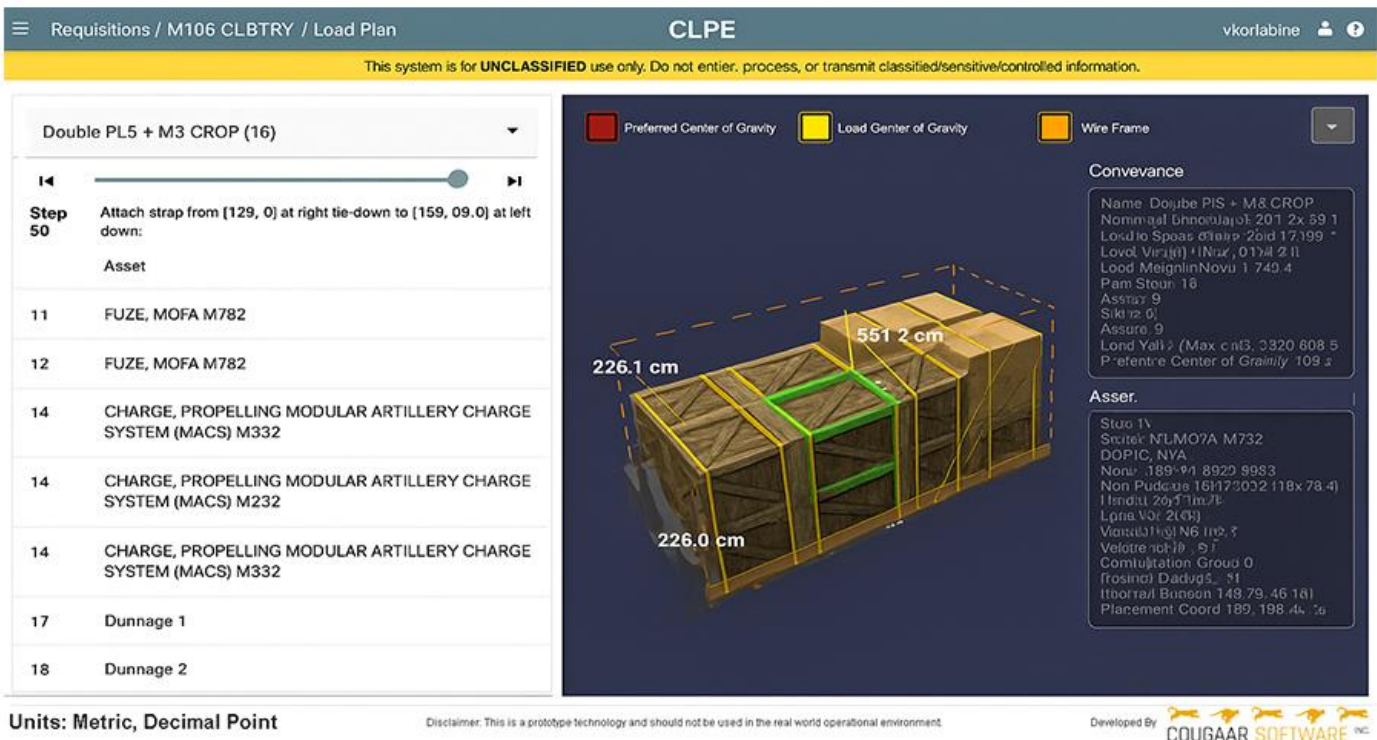
## Summary:

- CLPE is designed for ammunition storage managers, load planners and maneuver units that benefit from automated load planning, efficient space utilization and transportation compliance.
- CLPE uses artificial intelligence (AI) and machine learning (ML) to optimize the arrangement and positioning of ammunition within storage spaces and transportation assets, maximizing capacity and ensuring safe weight distribution.
- CLPE optimizes ammunition storage and transportation. Using 3d spatial knowledge and advanced algorithms to analyze dimensions, weight, hazard compatibility and other factors, CLPE facilitates faster, more accurate and cost-effective ammunition storage and transportation decisions.



## Objective:

CLPE's validated application of automation eliminates time-consuming manual processes, quickly and efficiently developing storage plans for ammunition pods and load plans. Using AI and ML, CLPE develops optimal load configurations that take into consideration a comprehensive set of ammunition cargo and transportation factors, including regulatory and procedural constraints. Efficient use of cargo space results in fewer conveyances, containers, pallets, or storage areas being required.



Requisitions / M106 CLBTRY / Load Plan **CLPE** vkorlabine

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Double PL5 + M3 CROP (16)

Step 50: Attach strap from [129, 0] at right tie-down to [159, 09.0] at left down: Asset

11	FUZE, MOFA M782
12	FUZE, MOFA M782
14	CHARGE, PROPELLING MODULAR ARTILLERY CHARGE SYSTEM (MACS) M332
14	CHARGE, PROPELLING MODULAR ARTILLERY CHARGE SYSTEM (MACS) M232
14	CHARGE, PROPELLING MODULAR ARTILLERY CHARGE SYSTEM (MACS) M332
17	Dunnage 1
18	Dunnage 2

226.1 cm, 551.2 cm, 226.0 cm

Conveyance: Name Double PL5 + M3 CROP, Nominal Dimensions: 201.2x 59.1, Load Space: 201.2x 59.1, Load Volume: 1194.2, Load Weight: 1749.4, Pam Stow: 18, Assay: 9, Side: 0, Assure: 9, Load Yell: (Max c/d: 3320 808.5, Preferred Center of Gravity: 109.2)

Asset: Stow IV, Serial: NLM07A M732, DOPIC: N/A, Name: 189-91 8920 8883, Non Packed: 16173032 118x 78.4, Height: 201.2, Load Vol: 2(0), Velocity: N6 (10.7, Velocity: 0.9, Computation: Group 0, (rosind) Dadvg5, 31, (borrad) Bunch 148.79, 46.181, Placement Coord: 189, 198.4, 26

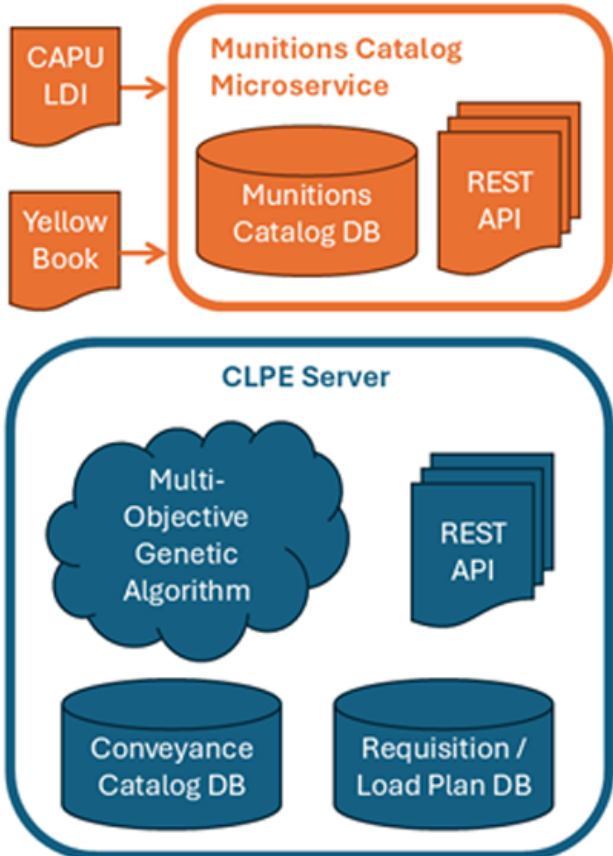
Units: Metric, Decimal Point Disclaimer: This is a prototype technology and should not be used in the real world operational environment. Developed By **COUGAAR SOFTWARE INC.**

## Capabilities:

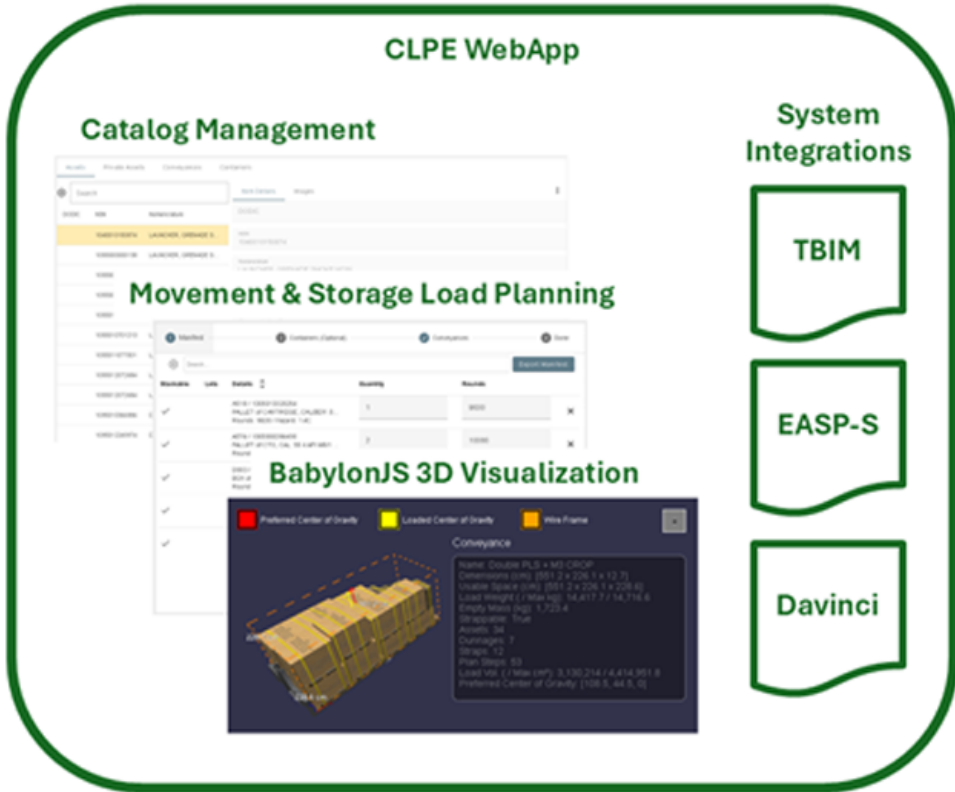
- Provides virtual representations of load plans for quick analysis without the need for physical trial and error
- Automates ammunition load planning, reducing time-consuming and error-prone processes and allowing for faster decision-making and planning
- Increases operational effectiveness and reduces storage and transportation costs
- Improves space utilization in storage areas and transportation assets, resulting in fewer transport vehicles, containers, or pallet requirements
- Ensures compliance with space, weight, and safety regulations for storage and transportation
- Quick creation and editing of custom items and containers for load configuration and mode of transportation

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Planning for Efficient and Compliant Space Utilization



## Configured Load Planning Engine (CLPE) Architecture



## Technologies:

The Configured Load Planning Engine (CLPE) capability combines state-of-the-art storage and load planning with sophisticated 3D visualization. At the core of the planning engine lies a custom multi-objective genetic algorithm that optimizes space utilization, center of gravity, strapping and dunnage, and cargo priority while respecting constraints such as maximum weight, hazard/compatibility, and stacking restrictions. The planning engine allows for a wide range of user customization from adjusting preferences for grouping (e.g. by DODIC or Lot Number), to changing the hazard/compatibility restrictions or using custom cargo definitions. CLPE displays a planned load in both tabular and fully interactive 3D views that allow the user to see the plan in rich step-by-step detail while visualizing how it would look in real life.

## Benefits & Status:

CLPE is in Year 3 of development under a US Army Other Transaction Agreement (OTA) with the National Advanced Mobility Consortium (NAMC).

## POCs:

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