

# Switchblade: Modular Load Carriage Ecosystem Provides Mission Adaptability

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**Prepared by:**

Jake Pugh, Director of Sales & Marketing - Catoma - jpugh@catoma.com - Phone: 251-387-0117  
Doug Distaso, Principal - Navigators Global, Former Special Assistant to the Vice Commander of USSOCOM

**Summary:**

The modern soldier is faced with an array of challenges, not the least of which is carrying their individual load of both personal sustainment equipment and mission-specific gear. When soldiers' rucksack needs shift based on their mission set, the static nature of traditional load carriage solutions that focus on personal sustainment leave capability gaps. The Switchblade System offers the end user the ability to tailor their load to the mission set. This ecosystem of load carriage is modular in 3 ways: 1) The frameset is built on a rigid, carbon fiber framesheet and fitted with articulating shoulder straps and a waistbelt, meaning the frameset can be adjusted for torso length and width, repaired by replacing individual parts, and easily adapted for body armor compatibility. 2) The design offers the ability to mount multiple different rucksack and carriage components - including a versatile Molle Panel - onto this one ergonomic and dynamic frameset, meaning the user can have one reliable, well-fitted, and familiar frame for any mission and pack size. 3) The Frameset/Molle Panel combination can carry a variety of mission-specific gear, as diverse as the MOSs that require load carriage. This Molle Panel features attachment points that allow other components to be "Stacked" over the Molle panel and any gear loaded onto it. This approach allows the user to carry both mission specific and personal sustainment gear efficiently. This Modular Ecosystem is a modern take on load carriage that can increase mobility and lethality for users across the force.

**Company Contact Information:**

MMI Outdoor, Inc. (Parent Company of Catoma Branded Products)  
Cage Code: 1U7D0  
6101 Brewbaker Blvd. / Montgomery, AL 36116  
Phone: 334-286-0700

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## Switchblade Concept Diagram



### Problem Set Identification

The M240 machine gun is one of the most widely used weapons in the NATO arsenal. It has been fielded for over 4 decades in various formats and deployed to nearly every corner of the globe. The Assistant Gunner (AG) holds tremendous importance because of the different types of weapon support items he must carry. The need to carry ammo cans or loose belted ammo is not only difficult on the individual but has been a limiting factor on the speed and lethality of the weapon team, directly impacting the effectiveness of the Infantry at large. The Rangers of 3rd Battalion identified this problem and sought to do something about it and engaged with industry in 2015. Their SOPs dictated a gunner carrying his own munitions, tripod, and spare barrels for the M240. This is a particularly demanding load and posed a different set of problems than those faced by conventional line units who split the load between two or three soldiers.

Mortar teams also present a unique load carriage problem. They have traditionally figured out how to get munitions to their firing positions by any means possible. This approach often includes carrying individual rounds in their rucksacks, or spreading them across their squad, company, or platoon in various configurations. Mortar teams lack an effectively designed solution for hauling, protecting, and providing fast access to the rounds. These weapons teams face an even bigger challenge with the cannon and baseplate, often attaching the cannon to their rucksacks using improvised lashings for long marches. This carriage greatly reduces mobility and agility by creating unbalanced, unsecure loads that can shift during movement or create a physical profile that cannot fit into tight spaces within the operating environment.



Whether it is Electronic Warfare personnel carrying never-before-fielded specialty electronics, medics always looking for better ways to access critical care equipment, or Special Operations Forces tasked with a broad variety of mission sets, the problem remains the same at its core: “How do I get this heavy and awkward specialty equipment from point A to point B efficiently while maintaining agility, lethality, and personal sustainment along the way?”

## Research & Development

In 2015, Rangers at 3rd Battalion approached Catoma – a designer and manufacturer of soldier equipment in Montgomery, Alabama - to create an adaptation of an existing product in order to solve a capability gap in their current equipment. The Rangers needed a way to empower their Machine Gunners to have faster access to weapon components and ammunition as well as more mobility on the battlefield than offered by existing static rucksacks. Catoma had been the manufacturer of the Granite Gear Chief Patrol on the SPEAR contract, co-owning the patent for a potentially dynamic frameset design. A re-imagining of this platform could offer a modular concept to solve this problem.

The resulting initial invention - the MAG (Minimalist Assistant Gunner) Pack - solved the basic problem but left one glaring issue to be resolved. It could only do one thing: carry machine gun parts in a specific way. It had no way to carry personal sustainment gear, which is still a concern with most pack designs attempting to solve this problem set.



The MAG Pack included an inventive new upgrade on the traditional barrel bag that made carrying hot or cold spare barrels as well as the tripod in the pack more efficient. Based on the positive attributes the system did offer, the Rangers bought a few dozen units in 2016 and deployed them with the Machine Gunners, but the dynamic load carriage problem remained.



If the Machine Gun pack idea were going to transfer to larger applicability, the format would need to be more adaptable. In response, Catoma developed an ecosystem that allows the Molle Panel idea to reach its full potential. Over the course of 2016 and 2017, Catoma pioneered a removable, adaptable frameset and a series of components that interface with one another so that an end user can assemble and disassemble the combination that best fits the mission set at hand.

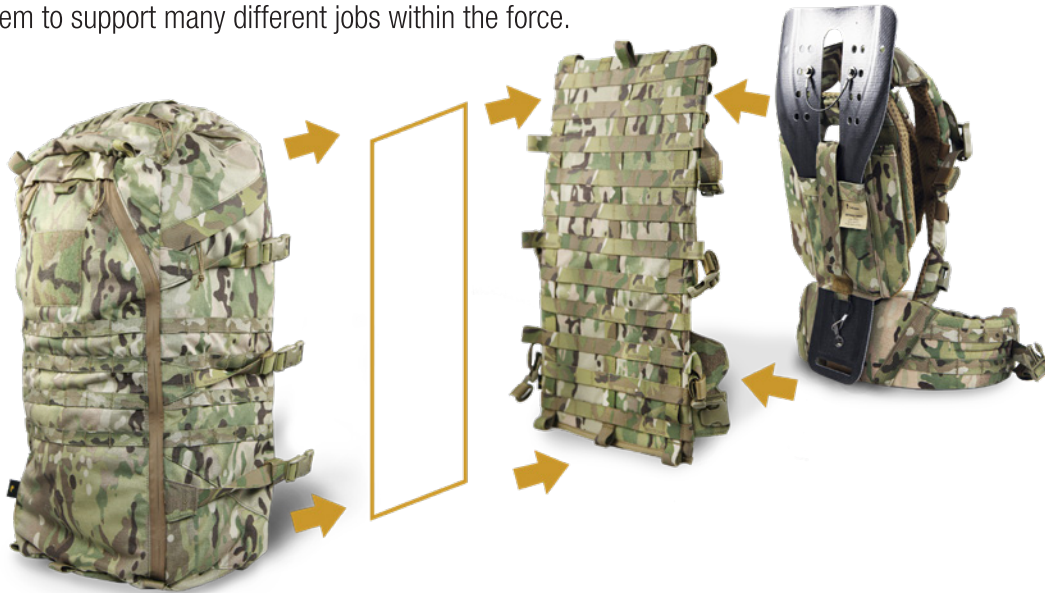
To test this new concept, Catoma partnered with 25th ID line units at 2nd and 3rd Brigades, who provided direct guidance on the Infantry Standard Operating Procedures that would affect the design. After receiving Machine Gun and Mortar teams' input, Catoma began working through the designs that would allow full customization across a 2-4 man team, with each soldier carrying specific equipment. 25th ID had received a directive for establishing mortar carriage SOPs within jungle environments, and this specific effort provided a fertile testing environment for the Switchblade concept. 1SGT Chris Wessling was a key player in this effort. He has since retired, but can still be reached for comment at [globalprovisions@gmail.com](mailto:globalprovisions@gmail.com) or by phone at 808-282-1224.



25th ID's load carriage needs for a modular system to field the full kit of equipment and ammunition for a 3-4 man Mortar team informed the development process Catoma undertook to create the Mortar Variants. This ultimately led to Catoma building a suite of products to outfit the mortar and machine gun teams for multiple Battalions within 2nd and 3rd Brigades at 25th ID through Darley Defense in 2018.

## Solution

After this season of working directly with end users to match the designs to SOPs, Catoma officially introduced a series of “stackable” components that work together to provide end users with the ability to customize their individual kits based on their missions. The standard Catoma Switchblade kit consists of 4 essential parts: 1) the frameset, 2) the Molle Panel mounted on the frameset, 3) various pouches and attachments mounted on the Molle panel for carrying mission-specific equipment, and 4) a rucksack-style bag mounted over the equipment for carrying personal sustainment gear. Catoma invented a patented ambidextrous buckle system called the Unibuckle (Patent# D815981) to make stackability more intuitive. This format allows the expansion of this system to support many different jobs within the force.



This pack ecosystem relies first and foremost on an ergonomic and durable frameset (Patents # US 8,678,258 B1 , US Patent No. D833749) made of composite carbon sheets and a durable, slightly flexible resin. Catoma re-shaped this framesheet from the original CHIEF model in order to reduce weight and increase functionality, then added articulating shoulder straps and waistbelt along with a removable frame pad for body armor compatibility. This new frameset provides the means of attaching and detaching components easily.



The combination of the frameset and Molle panel includes a unique kevlar-reinforced hanging method with 7 quick-detach attachment points: 2 side release buckles to attach the shoulder straps, 2 for the load lifters, 2 for the waistbelt, and one hook and loop tailpiece for attaching the tail of the framesheet to prevent lateral shift.

In order to match end-user SOPs, Catoma developed the 300-round pouch for the M240 and a series of attachments to carry the M224 60mm Mortar, Bipod, and Munitions. Catoma has adapted and expanded this offering to include a series of proprietary pouches that can support a huge variety of equipment.



Catoma then designed two sizes of rucksack bags (the Raid at 45 Liters and the Assault at 62 Liters) to attach over the Molle Panel or to stand alone as a well-designed static rucksack. The packs contain the same rear interface for attaching to the frameset as the Molle Panel, expanding the applicability of the system. This development allowed the Switchblade system to serve regular infantry and not just Heavy Weapons.



Both the Molle panel and rucksacks include straps along the side for connecting to one another. This connection allows users to load the Molle Panel with mission specific gear, attach their personal sustainment rucksacks over that equipment, access it quickly as needed, and even jettison the rucksack portions when approaching a firing position.



M240 Assistant Gunner Kit at Firing Position



M240 Assistant Gunner Kit Assembled



M240 Assistant Gunner Kit Exploded View



The stacking attachment points follow a common grid system with each component in the series having the same combination of attachments, which was especially critical for the M240 AG pack, as the AG needed the capability of carrying the barrel bag in addition to ammunition and his personal sustainment bag while also maintaining rapid deployment capabilities. The patented ambidextrous Unibuckle provides the best way to accomplish this stacking effectively.



With a suite of dynamic components following a specific design ecosystem now in production, the Switchblade system stands ready to be deployed by a variety of end users and to be adapted further to serve even more end users across the force.



## Proof of Concept

Upon completion of the R&D phase, 25th ID purchased roughly 200 packs in various formats and divided them up to be fielded by elements within 2nd and 3rd Brigades. Two sizeable purchases by Louisiana National Guard and Minnesota National Guard followed. These early orders led to a closer look from Natick, who initiated a Soldier Enhancement Program test of Mortar Carriage Packs in 2018. Adam Adams was the PM at Natick managing this effort and can be reached at [adam.n.adams.civ@mail.mil](mailto:adam.n.adams.civ@mail.mil). As a result of a successful Soldier Enhancement Program effort, the Switchblade System was issued NSNs for virtually all Switchblade Heavy Weapons Packs. A consistent string of orders at the Company and Battalion level have come through the NSN system over the last two years. Total number of packs fielded to date is around 1,000, to roughly 50 different end user entities across the Army, serving infantry machine gun, mortar, and Gustaf teams. More orders are being placed every week.

Below is a list of noteworthy, but not all, orders and POCs.

25th ID, 2nd Brigade in 2018 (via Darley Defense, POC Steve Moses, [SteveMoses@Darley.com](mailto:SteveMoses@Darley.com))  
1-12 Infantry in 2018 (POC at the time, Bo Dennis, [kirby.r.dennis.mil@mail.mil](mailto:kirby.r.dennis.mil@mail.mil))  
1-502 Infantry in 2018 (POC at the time, Matt Adamczyk, [matthew.t.adamczyk.mil@mail.mil](mailto:matthew.t.adamczyk.mil@mail.mil))  
Louisiana National Guard in 2018 (Related POC, 1SGT Daryl Easlick, [daryl.a.easlick.mil@mail.mil](mailto:daryl.a.easlick.mil@mail.mil))  
Minnesota National Guard in 2019 (via Darley Defense, POC John Heaton, [JohnHeaton@Darley.com](mailto:JohnHeaton@Darley.com))  
AFSOC DAGRE, Hurlburt Field in 2020 (POC, A-4 Patrick Meade, [patrick.b.meade.mil@socom.smil.mil](mailto:patrick.b.meade.mil@socom.smil.mil))

## Current State

- The Switchblade is a full product ecosystem directly applicable to most crew-served Heavy Weapons teams and being fielded regularly to end users at the unit level.
- The Switchblade ecosystem is a fertile product line for SOF applications with room for rapid product line expansion. Products currently being fielded could provide a significant capability increase for dynamic users.
- Catoma is pursuing jump approval through the Airborne Special Operations Testing Directorate and is currently seeking end user capability requests or Operational Needs Statements to initiate the process.
- Two additional pack sizes are in R&D stages now - a 90 Liter and 120 Liter - both under evaluation with Canadian Army and CANSOF elements.
- Fraction Pouches are a new product line addition that will allow end users to make effective use of the Molle Panel for carrying smaller items like batteries, comms equipment, and beyond.



## End State

The Switchblade System should be the specialty load carriage solution for the military because it provides an adaptable ecosystem for any job that requires cumbersome individual equipment. Furthermore, the cohesiveness of the system should further apply to the entire force, as it will consolidate the fragmented suite of current static rucksacks.

## Appendix A:

Kits currently being fielded



M240 Assistant Gunner Kit, carrying 600 rounds of belted ammo, spare barrels, tripod, and personal sustainment gear in a Raid Pack.



M240 Ammo Bearer Kit, carrying 600 rounds of belted ammo, and personal sustainment gear in a Raid Pack.



Mortar Gunner Kit, carrying cannon and munitions, and personal sustainment gear in a Raid Pack.



Mortar and Gustaf Assistant Gunner Kit, carrying bipod (mortar only) and munitions, and personal sustainment gear in a Raid Pack.



Mortar Ammo Bearer Kit, carrying baseplate and munitions, and personal sustainment gear in a Raid Pack.



Sniper Kit



Assault Pack Kit for wider application as a traditional rucksack.



Fraction Pouch Kit, offering a variety of different pouch combinations to divide the Molle Panel into efficient usable space for storing smaller mission critical items.

## Appendix B: Current NSNs

### SYSTEMS

| CAGE CODE | PART NUMBER | ITEM NAME (NSN SYSTEM DESCRIPTION MAY VARY)         | FSC  | NIIN      | AAC | FULL NSN         |
|-----------|-------------|---|------|-----------|-----|------------------|
| 1U7D0     | 98720-MC    | Switchblade M240 2-Man Team Pack System (2 Packs)   | 1095 | 016795467 | H   | 1095-01-679-5467 |
| 1U7D0     | 98725-MC    | Switchblade M240 3-Man Team Pack System (3 Packs)   | 1095 | 016818668 | H   | 1095-01-681-8668 |
| 1U7D0     | 98750-MC    | Switchblade Mortar 3-Man Team Pack System (3 Packs) | 1095 | 016796247 | H   | 1095-01-679-6247 |
| 1U7D0     | 98571-MC    | Switchblade Mortar 4-Man Team Pack System (4 Packs) | 1095 | 016796268 | H   | 1095-01-679-6268 |
| 1U7D0     | 98760-MC    | Switchblade Gustaf 2-man Team Pack System (2 Packs) | 1095 | 016818914 | H   | 1095-01-681-8914 |

### KITS

| CAGE CODE | PART NUMBER | ITEM NAME (NSN SYSTEM DESCRIPTION MAY VARY)  | FSC  | NIIN      | AAC | FULL NSN         |
|-----------|-------------|--|------|-----------|-----|------------------|
| 1U7D0     | 98722-MC    | Switchblade M240 Assistant Gunner Pack Kit   | 1095 | 016795480 | H   | 1095-01-679-5480 |
| 1U7D0     | 98721-MC    | Switchblade M240 Gunner Pack Kit             | 1095 | 016795475 | H   | 1095-01-679-5475 |
| 1U7D0     | 98727-MC    | Switchblade M240 Ammo Bearer Pack Kit        | 1095 | 016818873 | H   | 1095-01-681-8873 |
| 1U7D0     | 98752-MC    | Switchblade Mortar Gunner Pack Kit           | 1095 | 016795616 | H   | 1095-01-679-5616 |
| 1U7D0     | 98753-MC    | Switchblade Mortar Assistant Gunner Pack Kit | 1095 | 016796303 | H   | 1095-01-679-6303 |
| 1U7D0     | 98754-MC    | Switchblade Mortar Ammo Bearer Pack Kit      | 1095 | 016796350 | H   | 1095-01-679-6350 |
| 1U7D0     | 98762-MC    | Switchblade Gustaf Assistant Gunner Pack Kit | 1095 | 016818641 | H   | 1095-01-681-8641 |
| 1U7D0     | 98761-MC    | Switchblade Gustaf Gunner Pack Kit           | 1095 | 016818650 | H   | 1095-01-681-8650 |
| 1U7D0     | 98706-MC    | Switchblade Sniper Weapon Pack Kit           | 1095 | 016818953 | H   | 1095-01-681-8953 |

### COMPONENTS

| CAGE CODE | PART NUMBER   | ITEM NAME (NSN SYSTEM DESCRIPTION MAY VARY)    | FSC  | NIIN      | AAC | FULL NSN         |
|-----------|---------------|--|------|-----------|-----|------------------|
| 1U7D0     | 98669-MC      | SWITCHBLADE FRAMESET PENDING                   |      |           |     |                  |
| 1U7D0     | 98658         | Switchblade Assault Pack - Body Component Only | 1095 | 016820885 | H   | 1095-01-682-0885 |
| 1U7D0     | 98656         | Switchblade Raid Pack - Body Component Only    | 1095 | 016818332 | H   | 1095-01-681-8332 |
| 1U7D0     | 98651         | Switchblade Molle Panel - Panel Component Only | 1095 | 016818345 | H   | 1095-01-681-8345 |
| 1U7D0     | 98641         | Switchblade M240 300-round Pouch               | 1095 | 016818655 | H   | 1095-01-681-8655 |
| 1U7D0     | 98630-FLAP-MC | Switchblade M240 Barrel Quiver                 | 1095 | 016818367 | H   | 1095-01-681-8367 |
| 1U7D0     | 64509-HP-MC   | Switchblade HydroSleeve Water Bladder Pouch    | 1095 | 016818933 | H   | 1095-01-681-8933 |
| 1U7D0     | 98646-MC      | Switchblade Mortar Munition Pouch - Large      | 1095 | 016818351 | H   | 1095-01-681-8351 |
| 1U7D0     | 98645-MC      | Switchblade Mortar Munition Pouch - Small      | 1095 | 016818342 | H   | 1095-01-681-8342 |
| 1U7D0     | 98675         | Switchblade WR (Weapon Retention) Straps       | 1095 | 016818568 | H   | 1095-01-681-8568 |
| 1U7D0     | 98666         | Switchblade Mortar Baseplate Carrier - X-Flap  | 1095 | 016818628 | H   | 1095-01-681-8628 |