

Tactical Ram Air Parachute Systems

The MT-1 SERIES

The MT-1 series of tactical gliding parachute systems was specifically designed and engineered for conventional military and special operations, including military free-fall [HALO] and stand-off [HAHO]. These systems, in various configurations, are in service in over 40 countries worldwide and have been live tested at altitudes up to 30,000 ft MSL [9,144 m].

The MT-1 series use gliding parachutes in both the main and reserve compartments. The main and reserve parachute combinations along with the harnesses and containers used, make up the individual systems, which are essentially similar. They are available in a range of configurations for freefall and/or static line deployment [MT-1SS, MT-1XS, MT-1XX].

The main parachutes manufactured by Para-Flite are covered by one or more of the following US patents and their foreign equivalents: US Patent No.s 3,724,798; 4,406,433; 4,470,567; 4,730,796.

MT-1S PARACHUTE

The MT-1S main and reserve parachutes are available in a 5-cell configuration. The MT-1S is a ram air pressurized gliding canopy equipped with a slider reefing system. The canopy size is 270 sq ft [25.1 m²]. These canopies have the capacity to carry 270 lbs. maximum. The airfoil selected for the MT-1S is the high lift low drag proprietary Lissaman 7808, which offers reasonably high forward speed, easy handling and docile stall characteristics. The MT-1S can be safely deployed from 2,000 ft AGL [610m] up to 30,000 ft MSL [9144m] and at indicated airspeeds up to 150 KIAS.

MT-1X PARACHUTE

The MT-1X main and reserve parachutes are available in a 7-cell configuration. The MT-1X is a ram air pressurized gliding canopy equipped with a slider reefing system. The canopy size is 370 sq ft [34.8m²]. These canopies have the capacity to carry 360 lbs maximum. The airfoil selected for the MT-1X is the high lift low drag proprietary Lissaman 7808, which offers reasonably high forward speed, easy handling and docile stall characteristics. The MT-1X can be safely deployed from 2,000 ft AGL [610m] up to 30,000 ft MSL [9144m] and at indicated airspeeds up to 150 KIAS.

MC-4 RAM AIR PARACHUTE SYSTEM

The MC-4 Ram Air Free-Fall Personnel Parachute System [NSN 1670-01-306-2100] was acquired by the U.S. Army as a modified Non-Developmental Item [NDI] using Para-Flite's MT1-XX design as a basis. The modification work and acceptance testing was conducted by Para-Flite, Inc. under Natick Research, Development and

Engineering Center [NRDEC] Contract No. DAAK60-85-C-0001. The design modifications resulted in one of the few gliding parachutes that can function reliably in the severe environmental conditions military operations are subject to. The MC-4 features the proven MT-1X 7-cell, 370 sq. ft. spanwise constructed main and reserve canopies. The proven Para-Flite reserve deployment system, 7 point adjustable harness, provisions for a main ripcord release [FF-2] or reserve automatic ripcord release [AR2, Cypres] are standard features. The harness/container system, with adjustable waistband and 4 equipment rings, will accommodate all current oxygen bottles, radios, navigation aids, weapons, rucksacks, equipment bags and lowering lines.

MC-5 RAM AIR PARACHUTE SYSTEM

The MC-5 Ram Air Parachute Assembly [NSN 1670-01-367-0304] combines the operationally proven features of the popular Para-Flite MT-1XX [Interim Ram Air Parachute System, NSN 1670-01-212-3335], the MC-4 Ram Air Free-Fall Personnel Parachute System [NSN 1670-01-306-2100] and the MT-1 series freefall/static line convertible systems. In conjunction with the U.S. Marine Corps and the U.S. Navy, Para-Flite adapted the double deployment bag/sleeve concept to ram air parachutes, and made static line operations from high altitudes and military transport aircraft possible. By modifying the MT1-XX design, a Static Line/Freefall Convertible Parachute Assembly was produced which was thoroughly tested by the U.S. Naval Air Warfare Center Weapons Division, China Lake, CA. The system was type-classified by the U.S. Marine Corps as the MC-5 Ram Air Parachute Assembly, and later, adopted by the U.S. Navy Special Warfare Command as the MT-2 XX S/L Ram Air Parachute Assembly. The upgraded, reinforced, spanwise constructed 7-cell, 370 sq. ft. MT-1X canopy is used as both a main and reserve. These identical, interchangeable canopies reduce the logistics of maintaining separate main and reserve canopies, and reduce the cost and complexity of training, maintenance and operational use of a different size/configuration reserve canopy.

MT-1Z PARACHUTE

The objective of developing the MT-1Z was to double the offset distance capability of the MT-1X type canopy from the $20\pm$ km range to the $40\pm$ km range without sacrificing handling docility and tight drop zone landing capabilities. The MT-1Z system provides the user far greater offset capability than what the current in-service equipment delivers, and by using the full capabilities of the MT-1Z system, a doubling of mission offset distances is possible with an increase in load carrying capability [MT-1Z 370 ft² all up load carrying capacity is 450 lbs.].

The MT-1Z canopy is available in two different sizes to meet varying AUW [All Up Weight] requirements: 308 ft² - 360 lb. [main or reserve canopy] and 370 ft² - 450 lb. [main canopy only]. The unique features of the MT-1Z canopy that are responsible for the increased glide performance, in order of importance are [1] a modified ram air intake based on patented [U.S. Patent No. 4,406,433] modification of the leading edge, applied to both the upper and lower surfaces, [2] materials, specifically the use of zero porosity coated fabric on the top surface and [3] a non-rectangular planform. Additionally, the MT-1Z in the standard slider reefed freefall

mode enjoys soft to moderate opening shock as a result of a patented [U.S. Patent No. 5,005,785] special "lipped" slider.

The MT-1Z can be deployed in both the standard freefall or static line mode. The MT-1Z System harness container is similar to that of the MC-5. The system includes parts and subassemblies that allow it to be assembled as a freefall system and/or as a static line operated system. The reserve parachute assembly remains the same whether the system is assembled for freefall use or static line operated use.

The main parachute assembly when assembled for freefall use will be deployed with a special patented sail slider reefing system packed into a deployment bag, which is extracted by a spring launched pilotchute via a bridle. The main parachute assembly when assembled for static line activation is deployed with the aid of two deployment bags, a static line, and a sail slider reefing that's aided by a springless pilotchute.

The MT-1Z main canopy in its present format evolved over a period of four years of research, development and testing. Live jumps have been accumulated on the MT-1Z main canopy ranging from near zero speed deployments to full terminal deployment by rucksack equipped personnel, with deployment altitudes ranging from 3,000 ft. AGL to 30,000 ft. MSL. The MT-1Z [308 ft²] canopy has been structurally tested in the freefall deployment mode as well as the static line deployment mode with 432 lbs. suspended load at an indicated air speed of 200 MPH at near sea level density altitude.

The MT-1Z canopies provide for glide performance which is approximately 50% better than those in service. This improved glide performance exhibits itself mostly through a slower rate of descent which translates to additional performance benefits in the form of softer landings under all circumstances. Even though the glide performance of the MT-1Z is significantly greater than existing parachutes in service, this was not obtained through an increase in aspect ratio, which could have further improved glide performance but at the expense of handling docility and accuracy capabilities.

The use of zero porosity fabric on the top surface has permitted a greater load carrying capability without increasing the size and bulk of the canopy. In the instance of the 370 ft² version, a 25 percent increase in the load carrying capacity has been attained over the systems presently in service.

The MT-1Z canopy can be deployed like existing main parachutes from existing harness/container systems, which results in offset distance capability equal to existing parachutes, but from an altitude that is low enough to eliminate the need to pre-breathe oxygen, or significantly greater offset distance from the same altitude. The MT-1Z main canopy with its unique static line activated deployment system can be installed in any static line operable harness/container system in service now, thereby extending the offset glide capability by 50% to 70% with minimal expense and little or no additional training of users.

PARIS [Parachute Insertion System]

The PARIS [Parachute Insertion System] was developed through an innovative

combination of parachute and paragliding technology, offering significantly greater offset capability. The PARIS offers the ultimate in improved glide performance while maintaining handling docility and ease of use. It provides Special Operations elements a specific HAHO [high altitude high opening] mission parachute.

The chordwise constructed, elliptical, 17-cell 380ft² ram air canopy is deployed through conventional means and used as a "main only" canopy. A glide ratio of approximately 6:1 is achieved by a judicious association of the ultimate parachute and paraglider design techniques and the utilization of zero porosity coated nylon ripstop fabric in the top surface and ribs.