

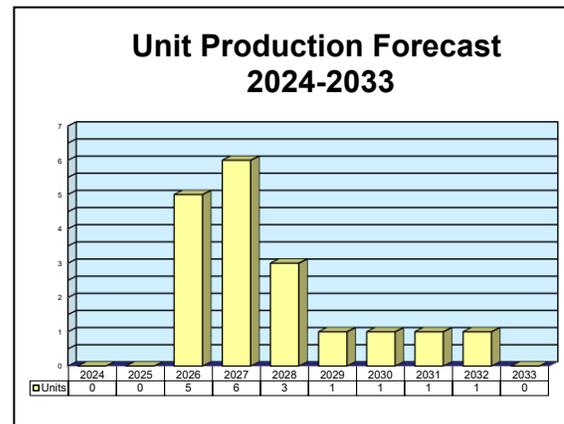
ARCHIVED REPORT

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M-71/839/845 and ATHOS 2052 155mm Howitzers

Outlook

- In 2006, Uganda ordered six ATMOS 2000 systems, and in 2011 it reportedly ordered an additional five
- In 2007, the IDF ordered 18 ATMOS 2000 systems
- Production line is currently dormant
- Forecast reflects minimal ATHOS 2052 and ATMOS 2000 production for potential IDF procurement and export sales



Orientation

Description. Towed and truck-mounted 155mm artillery systems.

Sponsor. The Israel Defense Forces (IDF) sponsored procurement of the M-71, 839, and 845 systems. Soltam is sponsoring the development of the ATHOS 2052 and ATMOS 2000 as private ventures.

Licensees. None.

Status. Development through as-needed serial production.

Total Produced. Through 2023, we estimate Soltam produced 269 of the M-71, 27 of the 839, and 63 of the 845 artillery pieces. The contractor has also produced 79 ATHOS 2052/ATMOS 2000 pieces.

Application. Indirect fire artillery support for maneuver forces at the battalion through division levels.

Price Range. In 1996 U.S. dollars, the M-71 carried a unit price of \$672,000; the 839 listed for \$788,000 and the 845, \$858,000.

In 2024 U.S. dollars, the ATHOS 2052 carries an estimated unit price of \$1,513,800.

Contractors

Prime

Elbit Systems C4I and Cyber	http://www.elbitsystems.com , 2 Ha'Machshev St, Netanya, Israel, Tel: + 972 9 889 8080, Fax: + 972 9 889 8231, Email: C4icyber.info@elbitsystems.com , Prime
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M-71/839/845 and ATHOS 2052 155mm Howitzers**Subcontractor**

Deutz AG	http://www.deutz.com, Ottostrasse 1, Koln-Porz (Eil), Germany, Tel: + 49 221 822 0, Fax: + 49 221 822 5850, Email: info@deutz.com (F4L/912 Diesel APU Engine)
Tatra as	http://www.tatratrucks.com, Areal Tetry 1450/1, Koprivnice, Czech Republic, Tel: + 420 556 49 11 11, Fax: + 420 556 49 44 81, Email: tatra@tatra.cz (ATHOS 2052 Truck Chassis)

Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 75 Glen Road, Suite 302, Sandy Hook, CT 06482, USA; rich.pettibone@forecast1.com

Technical Data**M-71****Crew.** Eight.**Carriage Type.** Split-trail.**Muzzle Brake.** Single-baffle.**Shield.** None.**Recoil System.** Hydropneumatic.**Ammunition.** In addition to all NATO-standard 155mm ammunition, the M-71 can also fire Tampella-pattern 155mm munitions.**Breech Mechanism.** Horizontal sliding wedge.**Dimensions.** The following data reflect the final production-standard piece.

	<u>SI Units</u>	<u>U.S. Units</u>
Caliber	155 mm	6.10 in
Length overall	10.8 m	35.43 ft
Barrel length	39 cal/6.67 m	39 cal/21.88 ft
Traveling width	2.58 m	8.46 ft
Firing width	8.0 m	26.25 ft
Traveling height	2.1 m	6.92 ft
Traveling weight	9.2 tonnes	10.14 tons
Firing weight	9.2 tonnes	10.14 tons

Performance. The ordnance range data reflect firing non-assisted ammunition. The M-71 can accommodate a maximum tow speed of 100 kmph (62.5 mph).

	<u>SI Units</u>	<u>U.S. Units</u>
Elevation	+52°	+52°
Depression	-3°	-3°
Traverse	42° right/42° left	42° right/42° left
Maximum range	23,500 m	25,699.6 yd
Maximum rate of fire	4 rd/min	4 rd/min
Sustained rate of fire	2 rd/min	2 rd/min
Muzzle velocity	820 m/s	2,690.28 ft/s

839**Crew.** Eight.**Shield.** None.**Muzzle Brake.** Single-baffle.**Ammunition.** In addition to all NATO-standard 155mm ammunition and Tampella-pattern 155mm munitions, the 839 can fire Extended Range Full Bore (ERFB) and Extended Range Full Bore/Base Bleed (ERFB/BB) munitions.**Recoil System.** Hydropneumatic.**Breech Mechanism.** Horizontal sliding wedge.**Carriage Type.** Split-trail.**Dimensions.** The following data reflect the final production-standard piece.

M-71/839/845 and ATHOS 2052 155mm Howitzers

	<u>SI Units</u>	<u>U.S. Units</u>
Caliber	155 mm	6.10 in
Length overall	10.8 m	35.43 ft
Barrel length	39 cal/6.67 m	39 cal/21.88 ft
Traveling width	2.58 m	8.46 ft
Firing width	8.0 m	26.25 ft
Traveling height	2.1 m	6.92 ft
Traveling weight	10.85 tonnes	11.96 tons
Firing weight	10.85 tonnes	11.96 tons

Performance. The ordnance range data reflect firing ERFB ammunition. The 839 can accommodate a maximum tow speed of 100 kmph (62.5 mph).

	<u>SI Units</u>	<u>U.S. Units</u>
Elevation	+52°	+52°
Depression	-3°	-3°
Traverse	39° left/39° right	39° left/39° right
Maximum range	31,000 m	33,901.6 yd
Maximum rate of fire	4 rd/min	4 rd/min
Sustained rate of fire	2 rd/min	2 rd/min
Muzzle velocity	820 m/s	2,690 ft/s

845

Crew. Eight.

Carriage Type. Split-trail.

Muzzle Brake. Single-baffle.

Shield. None.

Recoil System. Hydropneumatic.

Ammunition. Same as the 839 (above).

Brech Mechanism. Horizontal sliding wedge.

Dimensions. The following data reflect the final production-standard piece.

	<u>SI Units</u>	<u>U.S. Units</u>
Caliber	155 mm	6.10 in
Length overall	12.8 m	41.99 ft
Barrel length	45 cal/6.97 m	45 cal/22.88 ft
Traveling width	2.58 m	8.46 ft
Firing width	9.0 m	29.52 ft
Traveling height	2.1 m	6.92 ft
Traveling weight	11.7 tonnes	12.9 tons
Firing weight	11.7 tonnes	12.9 tons

Performance. The ordnance range data reflect firing ERFB ammunition. The 845 can accommodate a maximum tow speed of 100 kmph (62.5 mph).

	<u>SI Units</u>	<u>U.S. Units</u>
Elevation	70°	70°
Depression	-3°	-3°
Traverse	39 deg left/39 deg right	39 deg left/39 deg right
Maximum range	39,000 m	42,650.4 yd
Maximum rate of fire	4 rd/min	4 rd/min
Sustained rate of fire	2 rd/min	2 rd/min
Muzzle velocity	878 m/s	2,880 ft/s

M-71/839/845 and ATHOS 2052 155mm Howitzers**ATHOS (Autonomous Towed Howitzer) 2052****Crew.** Four.**Carriage Type.** Split-trail.**Muzzle Brake.** Single-baffle.**Shield.** None.**Recoil System.** Hydropneumatic.**Ammunition.** Same as the 839 and 845 (above).**Breech Mechanism.** Horizontal sliding wedge.

Dimensions. The following data reflect the current production-standard ATHOS 2052, with the 52-caliber barrel; data reflecting the 39- and 45-caliber barrels (respectively) appear in parentheses where different. The traveling weight includes the auxiliary power unit.

	<u>SI Units</u>	<u>U.S. Units</u>
Caliber	155 mm	6.10 in
Length overall	10.0 (9.0, 9.0) m	32.81 (29.52, 29.52) ft
Barrel length	52 cal/8.06 m 39 cal/6.05 m 45 cal/6.97 m	52 cal/26.43 ft 39 cal/19.83 ft 45 cal/22.88 ft
Traveling width	2.60 m	8.53 ft
Firing width	9.08 m	29.79 ft
Traveling height	2.10 m	6.92 ft
Traveling weight	9.8 (9.2, 9.4) tonnes	10.8 (10.14, 10.36) tons
Firing weight	12.6 (12.0, 12.2) tonnes	13.89 (13.23, 13.45) tons

Performance. The ordnance range data reflect firing ERFB/BB munitions from the 52-caliber barrel. The ATHOS 2052 can accommodate a maximum tow speed of 100 kmph (62.5 mph).

	<u>SI Units</u>	<u>U.S. Units</u>
Elevation	70°	70°
Depression	-3°	-3°
Traverse	39° left/39° right	39° left/39° right
Maximum range	41,000 m	44,837.6 yd
Maximum rate of fire	4 rd/min	4 rd/min
Sustained rate of fire	2 rd/min	2 rd/min
Muzzle velocity	907 m/s	2,975 ft/s



155mm ATHOS 2052 Howitzer

Source: www.israeli-weapons.com

M-71/839/845 and ATHOS 2052 155mm Howitzers

Variants/Upgrades

Variants. The M-71, 839, and 845 have no variants. While the ATHOS 2052 clearly exhibits its 839/845 heritage, it features enough design differences to merit consideration as a distinct system.

ATMOS 2000. The prime contractor has developed a self-propelled version of the ATHOS 2052, designated the Autonomous Truck Mounted Ordnance System (ATMOS) 2000. This system integrates the ordnance and components of the ATHOS 2052 with a 6x6 Tatra truck chassis. The ATMOS 2000 fire control suite reportedly enables an autonomous fire mission capability. The ATMOS 2000 is air-transportable via C-130 tactical transport aircraft.

ATMOS 2000 Sales Potential

In March 2006, reports surfaced that an unnamed African nation (later identified as Uganda) had awarded Soltam a contract worth \$10 million for an undisclosed number of ATMOS 2000 systems (later determined to be six). This marked the first reported sale of any kind for the ATMOS 2000.

In 2011, open source reporting suggested Uganda had ordered an undisclosed number (possibly five) of additional ATMOS 2000 systems. Deliveries under the \$24 million contract had reportedly commenced by the end of 2012.

In June 2006, the IDF revealed its intention to begin procuring 18 ATMOS 2000 systems in 2007. The IDF reportedly intends to deploy the ATMOS 2000 in three six-gun batteries.

Modernization and Retrofit Overview. The only modernization and retrofit program thus far involves integration of an auxiliary propulsion unit with the 839 and 845. The APU features a Deutz F4L/912 diesel engine, which generates 59.6 kilowatts (80 hp). The engine powers a hydraulic pump, which in turn powers hydraulic motors to drive the wheels. When equipped with this option, the piece carries a "P" suffix on its designation.

Program Review

Background. The Soltam family of 155mm towed howitzers traces its roots to development of the M-71 (IDF designation L39) as a replacement for the M-68 howitzer. In fact, the M-71 features the same recoil system, breech, and carriage as the M-68. The M-71 differs from the M-68 primarily in its longer-barrel 155mm ordnance and its compressed-air automatic rammer. The contractor completed the first M-71 prototype in 1974. The initial production pieces were rolled out in 1975.

Description. The M-71, 839, 845, and ATHOS 2052 share a common general design. Each succeeding model represents a further refinement of the overall M-71 design.

Common Design Characteristics

The recoil mechanism mounts under the ordnance; the counter-recoil system mounts on top of the ordnance. The elevating wheel mounts to the left of the ordnance; the traversing gear mounts on the right of the carriage.

The barrel exhibits a monoblock, autofretted construction, with a horizontal sliding breech mechanism. The barrel features a single-baffle muzzle brake with a fume extractor. The design allows the crew to load the ordnance from all barrel angles. The breech remains open after the return-to-battery position to

accept a new round of 155mm ammunition. The piece also features pneumatic equilibrators.

839: An Improved M-71

In the late 1970s, stories began to circulate that Soltam was at work – possibly in conjunction with the South African firm ARMSCOR (as it was then constituted) – on a new artillery piece, designated the L45. In fact, Soltam was developing the 39-caliber 839 and the 45-caliber 845 towed 155mm howitzers.

Soltam initially demonstrated the 839 in 1983. The 839 mounts the same 39-caliber ordnance as the M-71. Redesign of the saddle and carriage allows an ordnance elevation of +70°, some 18° greater than the M-71. The 839P model features a Deutz diesel auxiliary power unit, which generates 59.68 kilowatts (80 hp). The APU enables the 839P to achieve a road speed of 17 kmph (10.58 mph) and a range of 70 kilometers (43.5 stat mi). This APU mounts on the left trail; the driver's station mounts on the saddle, to the left of the ordnance.

The Deutz diesel engine powers a hydraulic unit, which in turn powers the wheels via hydraulic motors. A hydraulic ram controls the spread of the trails. The ram also lifts the piece off its wheels. An electric motor, powered by two batteries, provides emergency backup power.

M-71/839/845 and ATHOS 2052 155mm Howitzers

845: A 45-Caliber 839P

The 845 is essentially an 839P mounting a 45-caliber ordnance. This ordnance can reportedly fire an ERFB/BB projectile out to a maximum range of 39 kilometers (42,650.4 yd).

ATHOS 2052: Top-of-the-Line

Soltam began private development of the Autonomous Towed Howitzer 2000 (formerly known as the Towed Independent Gun 2000) in the early 1990s. It made its public debut in 1995. Broadly based on the 839/845 design, the basic ATHOS 2000 carriage can mount 39-, 45-, or 52-caliber ordnance as needed. The ordnance options differ only in the length of the interchangeable barrels; crews can switch the barrel and towing rod in the field.

The ATHOS 2052 (featuring a 52-cal barrel) can mount an auxiliary power/propulsion unit. The unit features an

unspecified diesel engine, generating 77.52 kilowatts (104 hp). In all other respects, the APU mounts and operates like the corresponding APU system of the 839P (see above).

Soltam designed the ATHOS 2052 for ease of operation, including towing and self-propulsion. The system is air-transportable by C-130 tactical transport aircraft. The ATMOS 2000 represents a truck-mounted variant of the ATHOS 2052, retaining the C-130 air transport capability of its towed cousin.

In October 2010, Elbit Systems acquired all the shares of Soltam Systems Ltd, Saymar Ltd and ITL Optronics Ltd held by Mikal Ltd and its subsidiaries. Elbit Systems now holds a 100 percent interest in Soltam and Saymar, and an 87.85 percent interest in ITL.

Funding

The Israel Ministry of Defense funded the development and IDF procurement of the M-71, 839, and 845 howitzers. Soltam is funding the development of the ATHOS 2052 and ATMOS 2000 as a private venture.

Worldwide Distribution/Inventories

Export Potential. While the growing popularity of 52-caliber 155mm ordnance worldwide effectively leaves the M-71, 839, and 845 systems by the wayside, the ATHOS 2052 is comparable to any 52-caliber 155mm towed howitzer available on the international market. However, with a unit price second only to the U.S. Army's M777, the ATHOS 2052 may simply be too expensive to attract significant sales in a glutted international market.

Countries. Cameroon; Chile; Israel; Singapore; Slovenia; Republic of South Africa; Thailand; and Uganda.

Forecast Rationale

Production of the 155mm ATHOS 2052 towed howitzer and ATMOS 2000 self-propelled howitzer occurs on an as-needed basis. Soltam continues to aggressively market both 155mm artillery systems for export.

The production lines for the M-71, 839, and 845 remain dormant. Soltam no longer offers these artillery pieces.

Corporate Shuffle

In October 2010, Elbit Systems acquired all the shares of Soltam Systems Ltd, Saymar Ltd, and ITL Optronics Ltd held by Mikal Ltd and its subsidiaries. Elbit Systems now holds a 100 percent interest in Soltam and Saymar, and an 87.85 percent interest in ITL.

Minimal Sales Prospects

While we believe the prime contractor will likely manage to secure at least some export sales, the Forecast International Weapons Group maintains that the high-end unit price of the ATHOS 2052 effectively negates the technological competitiveness of this howitzer in a glutted international market.

Nevertheless, the truck-mounted ATMOS 2000 variant of the ATHOS 2052 just might attract sufficient international interest to keep the program alive.

M-71/839/845 and ATHOS 2052 155mm Howitzers

Ten-Year Outlook

ESTIMATED CALENDAR YEAR UNIT PRODUCTION												
Designation or Program	Thru 2023	High Confidence				Good Confidence			Speculative			Total
		2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	
Elbit Systems C4I and Cyber												
Athos 2052												
	79	0	0	5	6	3	1	1	1	1	0	18
Total	79	0	0	5	6	3	1	1	1	1	0	18