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155/52 APU SBT-1 155mm Howitzer

Outlook

- Serial production for initial Spanish Army order complete
- Export potential remains bleak in a glutted international market
- Possible renewed production for Spanish Army follow-on procurement remains only realistic prospect for this weapon system

Orientation

Description. A towed 155mm artillery system.

Sponsor. General Dynamics Santa Bárbara Sistemas sponsors the development of the 155/52 APU SBT-1 as a private venture.

Licensees. None.

Status. Development through as-needed low-rate production.

Total Produced. Through 2023, we estimate the contractor produced one prototype and 97 operational pieces.

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

Price Range. In 2024 U.S. dollars, the 155/52 APU SBT-1 carries an estimated unit price of \$3.996 million.

Contractors

Prime

General Dynamics European Land Systems, Santa Bárbara Sistemas

<http://www.gdels.com>, Via de los Poblados 3, PE Cristalia Edificio 7/8, Madrid, Spain, Tel: + 34 91 585 04 55, Fax: + 34 91 585 02 18, Email: info.sbs@gdels.com, Prime

155/52 APU SBT-1 155mm Howitzer**Subcontractor**

Amper SA, Amper Programas Electronica Y Comunicaciones	http://www.grupoamper.com , 3 PTM Tres Cantos, Madrid, Spain, Tel: + 34 91 724 30 00, Fax: + 34 91 724 30 10, Email: comunicacion@grupoamper.com (Communications Equipment)
Iveco SpA Defence Vehicles Division	http://www.iveco.com , Via Volta 6, Bolzano, Italy, Tel: + 39 0471 905111, Fax: + 39 0471 905444, Email: dvdbzcom@iveco.com (Artillery Prime Mover Vehicle)

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

Crew. Six.

Muzzle Brake. Multi-baffle, three stage.

Recoil System. Hydropneumatic.

Breech Mechanism. Interrupted-screw stepped-thread.

Obturation. Bange-type plastic pad.

Carriage Type. Split-trail.

APU. The 155/52 APU SBT-1 employs an air-cooled diesel engine as an auxiliary power/propulsion unit. This 78-kilowatt (104.6-hp) engine drives a hydraulic mechanism for propulsion and system power.

Shield. None.

Ammunition. The 155/52 APU SBT-1 is compatible with all NATO-standard 155mm ammunition, including Extended Range Full Bore/Base Bleed (ERFB/BB) projectiles.

Dimensions. The following data reflect the latest prototype 155/52 APU SBT-1 howitzer with a 52-caliber barrel.

	<u>SI Units</u>	<u>U.S. Units</u>
Caliber	155 mm	6.10 in
Length overall	12.7 m	41.67 ft
Barrel length	52 cal/8.12 m	52 cal/26.64 ft
Traveling width	2.8 m	9.18 ft
Firing width	8.3 m	27.23 ft
Traveling height	2.31 m	7.57 ft
Traveling weight	12.9 tonnes	14.22 tons
Firing weight	12.9 tonnes	14.22 tons

Performance. The maximum ordnance range data reflect firing ERFB/BB projectiles. The 155/52 APU SBT-1 accommodates a maximum tow speed of 90 kmph (55.9 mph).

	<u>SI Units</u>	<u>U.S. Units</u>
Elevation	+72°	+72°
Depression	-3°	-3°
Traverse	40° left/40° right	40° left/40° right
Maximum range	40 km	43,744 yd
Maximum rate of fire	8 round/m	8 round/m
Sustained rate of fire	2 round/m	2 round/m
Muzzle velocity	820 m/s	2,690.25 ft/s

The 155/52 APU SBT-1 has a rated barrel life of at least 1,870 equivalent full charges.

155/52 APU SBT-1 155mm Howitzer

Program Review

Background. In the early 1980s, the (then) state-owned Empresa Nacional Santa Bárbara, in conjunction with a number of other organizations, began developing a new towed artillery system to replace the 155mm M114 in Spanish Army service.

Designed for Spanish Army

By December 1997, Santa Bárbara had completed the first preprototype 52-caliber 155mm artillery system, conforming to the standards of the Quadrilateral Ballistics Agreement.

Following initial firing trials, the Spanish Army ordered six preproduction pieces for operational testing and evaluation. Santa Bárbara delivered the six 155/52 APU SBT-1 pieces in late 1999 and early 2000. Six additional preproduction pieces followed.

While the Spanish Army continues to maintain a procurement objective of 220 pieces, the initial procurement ended at about 100 pieces.

Santa Bárbara specifically designed the 155/52 APU SBT-1 to meet the following operational criteria:

- High fire power/destructive power
- High rate of fire
- Solid and rugged construction
- 40-kilometer range with ERFB/BB ammunition
- High firing stability
- Simple operation
- High cross-country mobility
- Autonomous positioning

The resulting 155/52 APU SBT-1 exhibits a thoroughly modern, high-performance design at a competitive, mid-range unit price.

In 2001, General Dynamics acquired Santa Bárbara; the firm now operates as General Dynamics Santa Bárbara Sistemas (GDSBS).

Description. Santa Bárbara divides the complete 155/52 APU SBT-1 into the following nine major assemblies:

1. Recoil mass, including the 52-caliber barrel with muzzle brake and breech assembly

2. Cradle assembly, mounting the supports for the flexible body cylinders, W-700 C muzzle radar, and inertial navigation system
3. Flexible body, composed of the recoil and counter-recoil components
4. Ramming system, composed of the flick rammer and associated components
5. Upper assembly, with the traverse and elevation (T&E) mechanisms, trunnions, and associated components
6. Lower assembly, composed of the carriage, trails, and running gear
7. Auxiliary power/propulsion unit (APU), with associated drive and control components
8. Navigation system, composed of the inertial unit, odometer, GPS receiver, and display screen
9. Ballistic computer

The 52-caliber, autofrettaged, chrome-plated ordnance features 60-groove rifling with a constant 1-in-20 right-hand twist; the chamber has a capacity of 23 liters (1,403.46 cu in). The breech assembly is a modified Wellin step-thread mechanism with a Bange-type plastic obturating ring. Primer feed is automatic from a 10-round magazine.

The independent hydropneumatic recoil system includes the recoil brake and the recuperator/counter recoil mechanism. An electronically controlled hydraulic flick rammer loads projectiles into the breech via a loading tray mounted on a swivel arm.

The fire control suite consists of the M137 telescopic sight, M138 direct aiming sight, SKS muzzle centering device, gunner's display unit, and associated wiring. All components are self-illuminated for night operations.

Deployable and Mobile

The 12.9-tonne (14.22-ton) 155/52 APU SBT-1 can accommodate sling-loading under heavy transport helicopters such as the Sikorsky CH-53. The ordnance is also air transportable via C-130 tactical transport aircraft. A 5-ton truck can tow the 155/52 APU SBT-1. The APU can move the piece at a speed of 18 kmph (11.2 mph), as well as up 30-percent-grade slopes.

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Rapid Operation

A trained six-man gun crew can employ or recover the piece in less than a minute. The ordnance is semi-automatic after manual loading of the first round. Upon

firing, the breech automatically opens at the end of the recoil stroke. The flick rammer lifts and aligns the next round to the breech prior to manual ramming. An average crew can achieve a burst rate of fire of around three rounds in 15 seconds.

Funding

General Dynamics Santa Bárbara Sistemas funds the development of the 155/52 APU SBT-1 as a private venture. The Spanish Army is sponsoring the current procurement program.

Contracts/Orders & Options

In October 2005, the Spanish Army awarded General Dynamics Santa Bárbara Sistemas an eight-year contract, worth \$216.2 million, for the production of 70 155/52 APU SBT-1 howitzers.

Worldwide Distribution/Inventories

Export Potential. Although the Spanish Army committed to procure the 155/52 APU SBT-1 in quantity, the prospects for export sales in the glutted international market are still not good. Thus far, the program has only scored one export sale. At least 13 other new-production towed 155mm howitzers are currently available, in addition to existing systems in active service worldwide. In short, a modern 52-caliber 155mm towed howitzer at a mid-range unit price is hardly unique in the present market.

Country. Colombia; Spain.

Forecast Rationale

Although the 155/52 APU SBT-1 production line fell dormant in 2010, the Spanish Army continues to maintain -- at least in theory anyway -- a procurement objective of 220 pieces. The Forecast International Weapons Group believes there remains at least a slim chance the Spanish Army might still place a follow-on order at some point.

However, the Spanish defense budget simply does not provide enough flexibility to purchase further new equipment, much less maintain the Spanish Army's existing weapons systems at this time.

The Only Game in Town?

On the international market, the 15-tube procurement by the Colombian Army remains the only export sale of the 155/52 APU SBT-1.

Despite Spanish Army procurement and the export order from Colombia, the sales potential for the 155/52 APU SBT-1 howitzer in a glutted international market is definitely not promising. Thus, the program will continue to rely on the Spanish Army for its ultimate survival.