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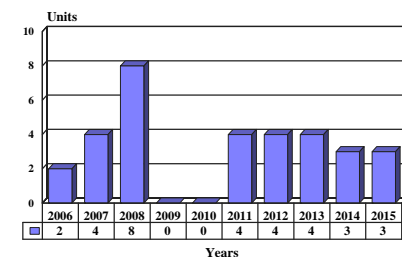
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GH N-45 155mm Howitzer - Archived 7/2007

Outlook

- Production line remains dormant, with no reported sales since completion of the Thai follow-on order in 1998; marketing continues
- Despite its advanced design and relatively low unit price, the GH N-45 remains hindered by its lack of 52-caliber ordnance
- Production forecast reflects contractor's expectations for at least some export sales during the forecast period

10 Year Unit Production Forecast 2006 - 2015



Orientation

Description. A towed 155mm artillery system.

Sponsor. T&T Technology Trading Limited, Noricum Division (Zurich, Switzerland) currently sponsors the GH N-45 as a private venture.

Licensees. None. Before its demise in the early 1990s, Engenheiros Especializados SA of Brazil had a license to produce the GH N-45 and the Extended Range Full Bore/Base Bleed ammunition.

Status. Development though serial production. The production line under T&T/Noricum is currently dormant.

Total Produced. Through 2005, the contractors produced 669 GH N-45 systems.

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

Price Range. In 2006 U.S. dollars, the GH N-45 carries a unit price of \$566,200.

Contractors

Prime

T&T Technology Trading Ltd,
Noricum Division

Splugenstrasse 12, Zurich, 8002 Switzerland, Tel: + 41 1 281 0281,
Fax: + 41 1 281 0282, Prime

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Subcontractor

Porsche Inter Auto GmbH & Co KG	http://www.porsche.co.at , Vogelweiderstrasse 69, Salzburg, 5020 Austria, Tel: + 43 662 8071 0, Fax: + 43 662 8071 5090, Email: porsche.salzburg@porsche.co.at (236-6.9 APU)
NOTE(S): Other than for the APU, T&T/Noricum acts as the sole-source contractor for the GH N-45 howitzer.	
Comprehensive information on Contractors can be found in Forecast International's "International Contractors" series." For a detailed description, go to www.forecastinternational.com (see Products & Samples/Governments & Industries) or call + 1 (203) 426-0800.	
Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 22 Commerce Road, Newtown, CT 06470, USA; rich.pettibone@forecast1.com	

Technical Data

Crew. Six

Muzzle Brake. Multi-baffle.

Recoil System. Hydro-pneumatic.

Breech Mechanism. Interrupted screw stepped-thread.

Carriage Type. Split trail.

APU. A Porsche Austria 236-6.9 spark ignition 4-cylinder engine propels the gun's four wheels via a hydrostatic drive. This APU generates 89.48 kilowatts (120 hp), providing a maximum speed of 30 kilometers

per hour (18.63 mph) on a paved road. With the unit, the GH N-45 can climb a 45-degree slope at 5 kilometers per hour (3.11 mph). The unit provides the GH N-45 a range of 150 kilometers (93.15 statute mi) on paved roads and 100 kilometers (62.1 statute mi) off-road. This unit is available for retrofit to existing pieces.

Shield. None

Ammunition. The GH N-45 is compatible with Extended Range Full Bore/Base Bleed (ERFB/BB) projectiles and all NATO-standard 155mm ammunition.

Dimensions. The following data reflect the production-standard GH N-45A1. Data for the GH N-45 mounting the Porsche auxiliary propulsion unit (APU) are in parentheses where different.

	<u>SI units</u>	<u>U.S. units</u>
Caliber	155 mm	6.10 in
Length overall	13.97 m	45.83 ft
Traveling length	9.73 m	31.92 ft
Barrel length	45 calibers/7.046 m	45 calibers/23.117 ft
Traveling width	2.49 (2.75) m	8.17 (9.02) ft
Firing width	9.93 m	32.57 ft
Traveling height	2.26 m	7.41 ft
Firing height	2.26 m	7.41 ft
Total weight	10.07 (12.38) tonnes	11.10 (13.65) tons

Performance. The ordnance range data reflect firing Charge 3 Zone 6 and the Mark 10 Mod 2 ERFB/BB projectile.

	<u>SI units</u>	<u>U.S. units</u>
Elevation	+72 deg	+72 deg
Depression	-4 deg	-4 deg
Traverse	40 deg right/30 deg left	40 deg right/30 deg left
Maximum range	39.6 km	43,306.6 yards
Maximum rate of fire	7 rounds/min	7 rounds/min
Sustained rate of fire	2 rounds/min	2 rounds/min
Muzzle velocity	897 m/sec	2,942.88 ft/sec

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Variants/Upgrades

Variants. None

Modernization and Retrofit Overview. The contractor has thus far incorporated improvements, such as an optional automated ammunition handling device (which operates off the APU), to the GH N-45 as production cut-ins. The GH N-45A1 represents the latest production standard.

The Forecast International Weapons Group considers it likely T&T Technology/Noricum will, at some point, investigate integrating 52-caliber ordnance with the basic GH N-45 platform in order to keep the GH N-45 competitive on the international 155mm artillery market.



155mm GH N-45 Howitzer

Source: www.hrvatski-vojniki.hr

Program Review

Background. The GH N-45 towed howitzer is essentially a refined version of Space Research Corporation's unique GC-45 artillery system and Extended Range Full Bore ammunition. For more information on the GC-45, see our "G5 155mm Howitzer" report in this tab. The designation GH N-45 stands for "Gun-Howitzer Noricum 45 calibers."

Adapting a Foreign Design

In 1979, Noricum/Voest-Alpine began redesigning the various components of the GC-45 to improve handling

and performance. The contractor placed emphasis on the development of a new, lighter, and stronger carriage. A new hydraulically assisted jack and float assembly facilitates handling the trail assemblies. The redesign efforts reduced the overall width of the piece by 21 centimeters (8.27 in). A five-tonne (5.51-ton) vehicle can tow the GH N-45 at speeds of up to 105 kilometers per hour (65.2 mph) on paved roads or 50 kilometers per hour (31.1 mph) cross-country.

During contractor and operational testing, the GH N-45 ordnance achieved ranges of 39 kilometers (42,650 yd),

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firing ERFB/BB projectiles. While Noricum/Voest-Alpine projected a minimum service life of 1,500 rounds per barrel, one piece fired over 3,000 equivalent full charges without malfunction. The high-pressure breech assembly carries a recommended chamber pressure rating of 3.16 tonnes per square centimeter (22.5 tons/sq in). During testing, one piece sustained a pressure of 5.34 tonnes per square centimeter (38 tons/sq in) without failure.

Failures and Revival

By mid-1985, Engenheiros Especializados SA of Brazil had secured licensed-production rights for the GH N-45 and its associated ERFB/BB ammunition. The licensee was to produce the towed system with the auxiliary propulsion unit. In addition, the contractor planned to integrate the 45-caliber ordnance with a new turret and the chassis of the EE-T1 Osorio tank, forming a new self-propelled artillery system. When the bankrupt Engenheiros Especializados firm ceased operations in 1993, the license agreement expired with it.

In 1991, Noricum/Voest-Alpine Maschinenbau und Handel GmbH abandoned the ordnance business, after an attempt to start licensed production of the GH N-45 and the ERFB ammunition in Iran fell through. Legal

issues with the Austrian Ministry of Interior had plagued this Iranian deal since at least 1987. Following the completion of another export sale to Thailand, the GH N-45 production line fell dormant in 1989.

In 1994, the Swiss firm T&T Technology Trading Limited – which had purchased the Noricum Division with its GH N-45 production rights, 24 unsold GH N-45 pieces, 100 barrels, and 1,700 tonnes (1,874 tons) of spare parts – began offering the GH N-45 on the international market. Sometime in 1995, Thailand placed a follow-on order for 18 GH N-45 pieces, along with two orders for GH N-45 spares.

Established Production Infrastructure

Assembly and testing of completed GH N-45 systems now occurs in Switzerland. T&T Technology Trading had (or has) agreements with firms in five different European nations for GH N-45 production. Fabrication of the 45-caliber barrel still occurs in Austria. As an indication of the technological prowess of T&T Technology, we note that the Slovak Republic firm Zavody Tazkeho Strojarsstva (long an established artillery designer and producer) requested T&T assistance in designing the 155mm barrel for its Zuzana self-propelled howitzer.

Significant News

Switzerland May Again Be Interested in Israeli Arms – Switzerland could end its ban on purchasing Israeli defense equipment, according to a government announcement. Restrictions were put in place three years ago after the Israeli Army reoccupied the Palestinian refugee camp in Jenin.

Swiss officials are interested in normalizing relations with Israel. The Swiss Information Service said Berne expressed interest in buying SFR150 million (\$130 million) worth of Israeli-built components for a telecommunications system in February. Defense sales account for about three percent of all Israeli exports to Switzerland. Israel may also offer Switzerland new unmanned air vehicles (UAVs). Switzerland has mentioned an interest in purchasing medium- and long-endurance UAVs. The Swiss military already operates the Ranger UAV system. (FI, 3/05)

Switzerland Cutting Defense Spending in 2005 – The Swiss Ministry of National Defense announced in late 2004 that it would implement massive cuts to Switzerland's armed forces owing to the shrinking defense budget. The cuts would affect all branches of the Swiss armed forces; however, the Army will bear the largest cuts. Defense Minister Samuel Schmid and Army chief Christoph Keckeis unveiled the "first phase" plan as a necessary measure after the Swiss Parliament cut the expected budget from SFR4.3 billion to SFR4 billion for 2005.

The Army, which already operates on a lead budget, was expected to lose 564 professional posts and a further 1,100 regular positions by the end of 2005. Obligatory military service would be reduced from 300 to 260 days. The dramatic cuts are indicative of a general trend across Europe to bring force levels more in line with current threats. With the Soviet Union no longer threatening the security of Europe, large ground forces are no longer necessary. This sentiment has caused cutbacks in the force levels of almost every military across Europe. Swiss, and European militaries in general, are concentrating their efforts on creating highly trained and specialized rapid-reaction forces capable of being deployed on short notice for action in any theater. (FI, 4/05)

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Funding

The Noricum Division of T&T Technology Trading Ltd. privately funds the development and production of the GH N-45.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Early	1979	GH N-45 development begins
	1980	Initial GH N-45 test firings
	1981	GH N-45 mobility tests
September	1981	Operational tests in Middle East
Late	1981	Serial production commences; Voest-Alpine assumes all Space Research Corporation International production
Late	1991	Production ends
	1994	T&T Technology Trading purchases the GH N-45 program
	1995	Thailand orders 18 GH N-45 pieces
May	1997	Thailand places follow-on order for 18 pieces
	1998	Thai follow-on order complete
	2006	Production line dormant since completion of Thai orders; available for new-production orders; marketing continues

Worldwide Distribution / Inventories

Export Potential. The GH N-45 has simply not lived up to its full sales potential on the international market. Although the GH N-45 has enjoyed a significant number of sales to various Middle Eastern countries, these countries have generally failed to document the performance of the GH N-45 in combat – leaving the GH N-45 without a documented combat record.

Thailand placed a follow-on order to supplement the 12 GH N-45 pieces already in service. T&T Technology/Noricum completed this order in 1998. However, this represents the only recent order for the GH N-45. Like the Denel G5, the GH N-45 represents state-of-the-art technology for a relatively low unit price. Yet, given the current glutted condition of the international market, there are simply no buyers at this time.

Countries. **Austria** (6 evaluation pieces), **Iran** (132; various estimates range from 80 to 610), **Iraq** (96 of original 200 pieces from Jordan; current status unknown), **Libya** (possibly 160), and **Thailand** (48). Finally, the **United Kingdom** and the **United States** each reportedly hold several GH N-45 systems, war trophies from Operation Desert Storm (1991) and Operation Iraqi Freedom (2003-present).

Forecast Rationale

Since the prime contractor completed deliveries under the Thai follow-on order in 1998, the 155mm GH N-45 towed howitzer production line has reportedly remained dormant. Indeed, while the Noricum Division of T&T Technology Trading Ltd maintains the production line is available for new orders, reports indicate the contractor may still hold six pieces of its original 24-piece inventory in stock, available for sale.

Advanced Design, Irrelevant Product?

Despite its advanced design, the GH N-45 is in danger of falling by the wayside in an international market increasingly dominated by 52-caliber 155mm ordnance designs. Without a barrel upgrade, the GH N-45, even with its Extended Range Full Bore ammunition, may simply be unable to compete in a glutted international market of 52-caliber ordnance designs firing readily available NATO-standard munitions.

Even the howitzer's sales record has proven a hindrance to its viability on the international market. Despite a

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record of healthy sales in the Middle East, the fact remains that these customers have generally failed to document the combat performance of the GH N-45 howitzer – leaving the GH N-45 without a proven combat record to promote.

Hope Springs Eternal

Our ten-year production outlook reflects only the expectations of T&T Technology Trading/Noricum Division for at least some export sales. In fact, the

Forecast International Weapons Group has found no evidence of any serious sales prospects for the GH N-45 howitzer.

If T&T/Noricum pursues integration of 52-caliber ordnance, the GH N-45 may indeed capture some moderate level of sales during the forecast period. On the other hand, if T&T/Noricum does not attempt to upgrade the GH N-45 to the new international standard, prospects for future sales of the 45-caliber howitzer remain minimal at best.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

Ordnance	(Engine)	thru 05	High Confidence Level				Good Confidence Level			Speculative			Total 06-15	
			06	07	08	09	10	11	12	13	14	15		
NORICUM														
GH N-45 (a)	NO ENGINE	669	2	4	8	0	0	4	4	4	4	3	3	32
Total Production		669	2	4	8	0	0	4	4	4	4	3	3	32

(a) The production includes two prototypes.