

ARCHIVED REPORT

For data and forecasts on current programs please visit

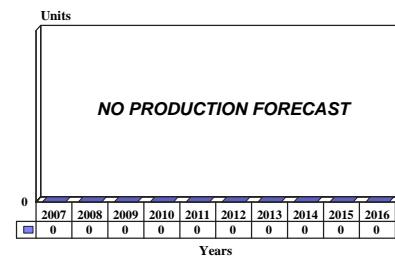
www.forecastinternational.com or call +1 203.426.0800

vzor 77 DANA 152mm and Zuzana 155mm Self-Propelled Howitzers - Archived 4/2008

Outlook

- 152mm vzor 77 DANA/Ondava production line remains dormant
- Low-rate serial production run of 155mm Zuzana for Slovak Republic procurement reportedly ended last year
- International marketing continues, despite minimal export potential in a glutted international market
- Production forecast reflects lack of any new prospects for the 152mm vzor 77 DANA/Ondava or the 155mm Zuzana

10 Year Unit Production Forecast
2007 - 2016



Orientation

Description. Wheeled 152mm and 155mm self-propelled artillery systems.

Sponsor. The Ministry of Defense of the Slovak Republic currently sponsors the development and production of these weapons systems.

Licensees. None

Status. Development through serial production.

Total Produced. Through 2006, we estimate the contractor produced 762 vzor 77 DANA and 92 Zuzana self-propelled artillery systems.

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

Price Range. In 2007 U.S. dollars, the 152mm vzor 77 DANA (in the 47-caliber Ondava configuration) would carry a unit price of \$2.893 million; the 155mm Zuzana would carry a unit price of \$3.503 million.

Contractors

Prime

ZTS-Dubnica nad Vahom AS, Zavody Tazkeho Strojarsva	http://www.ztsdubnica.sk , ulica Tovarenska 1, Dubnica Nad Vahom, 01841 Slovakia, Tel: + 421 42 442 00 33, Fax: + 421 42 442 00 33, Prime
--	--

Subcontractor

Oerlikon Contraves AG	http://www.rheinmetall-detec.de , Birchstrasse 155, Zurich, 8050 Switzerland, Tel: + 41 44 316 2211, Fax: + 41 44 311 3154, Email: info@ocag.ch (Fieldguard Fire Control System)
------------------------------	--

vzor 77 DANA 152 mm and Zuzana 155 mm

Tatra as	http://www.terex-tatra.com , Stefánikova 1163, Koprivnice, 742 21 Czech Republic, Tel: + 420 556 49 11 11, Fax: + 420 556 49 44 81, Email: tatra@terex-tatra.com (2-930-52 Diesel Engine)
-----------------	---

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

152mm vzor 77 DANA

Crew. Five: commander, gunner, loader, driver, and ammunition handler. **Breech Mechanism.** Horizontal sliding wedge.

Muzzle Brake. Modified multi-baffle type.

Ammunition. The vzor 77 DANA is compatible with all types of Russian-pattern 152mm ammunition. A line of indigenous 152mm ammunition is also available.

Recoil System. Hydro-pneumatic.

Dimensions. The following data reflect the original 152mm vzor 77 DANA. The Ondava configuration features a 47-caliber barrel.

	<u>SI Units</u>	<u>U.S. Units</u>
Length overall	11.16 m	36.61 ft
Width	3.01 m	9.87 ft
Height	2.85 m	9.35 ft
Combat weight	29.25 tonnes	32.24 tons
Fuel capacity	510 liters	135.64 gallons
Ordnance caliber	152 mm	6.0 in
Ordnance length	36.71 calibers/5.58 m	36.71 calibers/18.31 ft

Performance. The vehicular performance data reflect use on hard earth. The ordnance range reflects firing the EOFd High Explosive projectile; range with the EKK base-bleed projectile is in parentheses.

	<u>SI Units</u>	<u>U.S. Units</u>
Maximum range	740 km	459.5 statute mi
Step	60 cm	1.96 ft
Trench	2.1 m	6.89 ft
Slope	30%	30%
Gradient	62%	62%
Fording	1.4 m	4.59 ft
Elevation	+70°	+70°
Depression	-4°	-4°
Traverse (to each side)	225°	225°
Maximum ordnance range	20.08 (28.23) km	21,059.5 (30,872) yd
Maximum rate of fire	5 rounds/minute	5 rounds/minute
Sustained rate of fire	1 round/minute	1 round/minute

Engine. Tatra 2-939-34 air-cooled diesel engine. This powerplant generates 264.08 kilowatts (345 hp), with a power-to-weight ratio of 9.03 kilowatts per tonne (10.70 hp/ton).

Gearbox. Dual-range overdrive unit, with 20 forward and four reverse gear ratios. The vzor 77 DANA employs permanent eight-wheel drive.

Suspension and Running Gear. Coil-spring suspension, with hydraulic shock dampers and bump stops on all eight wheels. The power-assisted steering

controls the front four wheels. A central tire pressure regulating system supports the 15.00x21 T03 tires.

Fire Control. As the vzor 77 DANA is an indirect fire system, targeting data originates with the forward observer, passing through a fire direction center command post before reaching the individual vzor 77 DANA via radio. The fire control suite includes a ZZ-73 rocking bar sight collimated with the PG1 MD telescope for indirect fire. An OP 5-38-D sight enables the gunner to engage targets with direct fire as well.

vzor 77 DANA 152 mm and Zuzana 155 mm

155mm Zuzana

Crew. Five: commander, gunner, loader, driver, and ammunition handler.

Breech Mechanism. Horizontal sliding wedge.

Muzzle Brake. Modified multi-baffle type.

Ammunition. The Zuzana is compatible with all types of NATO-standard 155mm ammunition types, including Extended Range Full Bore/Base Bleed rounds.

Recoil System. Hydro-pneumatic.

Dimensions. The following data reflect the production-standard 155mm Zuzana.

	<u>SI Units</u>	<u>U.S. Units</u>
Length overall	12.97 m	42.55 ft
Width	3.02 m	9.91 ft
Height	3.53 m	11.58 ft
Combat weight	28.08 tonnes	30.95 tons
Fuel capacity	500 liters	132.97 gallons
Ordnance caliber	155 mm	6.10 in
Ordnance length	45 calibers/6.98 meters	45 calibers/22.89 feet

Performance. The vehicular performance data reflect use on hard earth; the ordnance range is with the Extended Range Full Bore/Base Bleed projectile.

	<u>SI Units</u>	<u>U.S. Units</u>
Maximum range	740 km	459.5 statute mi
Step	60 cm	1.96 ft
Trench	2.1 m	6.89 ft
Slope	30%	30%
Gradient	58%	58%
Fording	1.4 m	4.59 ft
Elevation	+70°	+70°
Depression	-3.5°	-3.5°
Traverse (total)	120°	120°
Maximum ordnance range	39.6 km	43,306.6 yd
Maximum rate of fire	6 rounds/minute	6 rounds/minute
Sustained rate of fire	1 round/minute	1 round/minute

Engine. Tatra 2-930-52 air-cooled diesel engine. This powerplant generates 264.72 kilowatts (355 hp), with a power-to-weight ratio of 9.03 kilowatts per tonne (10.70 hp/ton). A 26-volt electrical system supports vehicle operations.

Fire Control. As the Zuzana is an indirect fire system, targeting data originate with the forward observer, passing through a fire direction center command post before reaching the individual Zuzana via radio. The fire control suite features a land navigation system and digital ballistic fire-control computer, integrated with the Örlikon-Contraves Fieldguard fire control system. The Zuzana features the same indirect- and direct-fire sights as the vzor 77 DANA (see above).

Gearbox. Same as vzor 77 DANA.

Suspension and Running Gear. Same as vzor 77 DANA.

Variants/Upgrades

Variants. ZTS has been developing a number of variants, utilizing the basic Tatra T 815 chassis of the vzor 77 DANA/Ondava/Zuzana design.

<u>Designation</u>	<u>Description</u>
Tatrapan ACV	This armored command-post vehicle uses a 6x6 variant of the basic Tatra T 815 chassis. The first prototype rolled out in 1993; the vehicle is in production on an as-needed basis.
Ammunition Resupply Vehicle	Based on the Tatra 8x8 chassis, this vehicle can carry 120 rounds of 155mm ammunition, in support of Zuzana operations. This vehicle has not yet entered serial production.

vzor 77 DANA 152 mm and Zuzana 155 mm

In 1993, ZTS began investigating the integration of the Zuzana turret with the T-72 tank chassis, as an entry for India's 1995 self-propelled artillery evaluation. Despite the perpetually uncertain nature of this program, ZTS has expanded its efforts to investigate integrating the Zuzana turret with the T-54/55 tank chassis as well.

Modernization and Retrofit Overview. The only major retrofit program for the vzor 77 DANA involved integrating a 47-caliber ordnance. This program, which yielded the Ondava configuration, reached completion for Slovak forces in 1993. Firing a new-pattern 152mm projectile, the Ondava could achieve a range of

32 kilometers (34,995 yd). However, the increasing popularity of 155mm ordnance overtook the Ondava program, which ultimately attracted little international interest. The contractor ceased marketing the Ondava retrofit in the mid-1990s.

ZTS is currently developing a new 52-caliber 155mm ordnance, possibly for retrofit to the Zuzana.

Program Review

Background. The vzor 77 DANA (Delo Automobilny Nabijene Automackly) was long a unique wheeled self-propelled artillery system. The system originated from a 1976 requirement of the (then) Czech Army for a highly mobile 152mm self-propelled artillery system. Initial deliveries to the Czech Army occurred in 1981.

Description. The vzor 77 DANA is an 8x8 wheeled design, exhibiting a high degree of cross-country mobility, with the further advantages over tracked vehicles of relatively low fuel consumption and simplified maintenance requirements.

Unique Layout

The driver sits in the left-front of the Tatra vehicle cab; the commander sits to his right. Both stations feature single-piece hatch covers on the cab roof, armored windscreens, and firing ports for individual weapons. The commander's station features a night-vision device. The powerplant and gearbox mount in the rear of the vehicle chassis. The driver can employ three hydraulic stabilizing jacks to support the vehicle during firing.

The fully enclosed turret occupies the middle of the vehicle. This unique design actually consists of two separate compartments, with the ordnance mounted between. The left turret compartment houses the gunner and loading-system operator. The ammunition handler, responsible for setting the fuzes, occupies the right turret compartment. Both turret compartments feature

access hatches and vision blocks. The ammunition handler's station also features a pintle-mounted 12.7x107mm NSV machine gun on the turret roof.

Automatic Loading System

The ordnance features a hydraulically operated (off the main engine) automatic loading system with a powered rammer. This system can operate at all angles of cannon elevation. The system allows the gunner to select single shots or automatic fire. Ordnance elevation (+70°), depression (-4°), and turret traverse are hydraulically powered, with manual backup.

The vzor 77 DANA/Ondava/Zuzana can normally carry 40 rounds of ammunition. The left turret compartment houses the propellant charges; the right turret compartment houses the projectiles and fuzes.

Zuzana: Conforming to NATO

The Zuzana represents the integration of the vzor 77 DANA/Ondava with a 155mm ordnance component. Since the late 1990s, the contractor has devoted essentially all developmental and marketing attention to the Zuzana. In 1997, the Slovak Republic placed an initial order for eight production systems under the name Howitzer Model 2000. In May 1998, the contractor received a Slovak follow-on order for 40 systems. ZTS continues to actively promote the Zuzana on the international market, albeit with little success.

Significant News

Slovakia to Freeze Military Budget over Next Nine Years – Slovak Defense Minister Martin Fedor informed the media on May 16, 2006, that military spending will most likely not be increased over the next nine years. The Defense Ministry will receive 1.85 percent of GDP annually until 2010, and from 2010-2015 this share will marginally increase to 1.86 percent of GDP. As a NATO member, Slovakia has been asked to contribute at least 2 percent of GDP yearly to its defense budget, but many of the Alliance members fail to meet this request on an annual basis.

vzor 77 DANA 152 mm and Zuzana 155 mm

For Slovakia, what is more pressing is that as a former Warsaw Pact member it is undergoing a profound modernization effort both in terms of re-equipping its forces to meet NATO standards, and in restructuring its forces on a professional basis for more flexible operations. Conscription was banned on January 1, 2007, scaling the national forces from 27,000 to 17,500 personnel. The budget freeze comes at a time when Slovakia has been pushing its restructuring program through to meet its new SR Force 2010 model. It also occurs at a time when there is a pressing need for new transport aircraft following the crash over Hungary of an aging An-24 transport plane in January 2006, which killed all 44 passengers aboard. The troops were returning from a NATO peacekeeping mission in Kosovo. (CTK, 5/06)

Slovak Defense Budget Will Again Fall Short of NATO Requirements – The new government of the Slovak Republic under Prime Minister Robert Fico has drafted a defense budget that once again falls short of the NATO requirement stating that 2 percent of GDP be allocated towards defense matters. Under the new draft budget, the armed forces of Slovakia will only receive 1.7 percent of GDP over the course of the next three years; the Slovak military was only allocated 1.82 percent of GDP in 2006. Though the percentage allotted to defense is less than in the past, the overall amount still shows a total increase from around SKK27 billion to SKK30 billion. However, this amount will not be enough to fund Slovakia's defense equipment modernizations and new purchases.

Under the former Dzurinda government, an extensive arms procurement and modernization program was to be implemented in 2007 and 2008, but this went by the wayside when former communist Robert Fico led his leftist "Smer" party to victory in the June 2006 elections. Fico's government will focus more on social programs and spending, while the military is expected to be sidelined. The focus of Fico's campaign was rebuilding the welfare state which he believes was ripped apart by the Dzurinda government's economic reforms, which exacerbated divisions between rich and poor. Under Dzurinda, the Slovak Republic within only a few years became the hot spot of the EU in terms of foreign investment and economic growth. (SME, 8/06)

Slovakia Sets Iraq Pullout Date – The new government of Slovakia under Prime Minister Robert Fico has announced that it will pull the country's troops out of Iraq in February 2007. About 110 Slovak troops are currently stationed in the Polish sector of Hilla. These forces do not partake in front-line fighting, instead performing mine clearance duties. Three Slovak troops were killed in 2003 after an explosion occurred at an ammunition dump.

Fico visited Iraq in August, two months after being elected, and stated that the Slovak forces are ineffective in Iraq. During the electoral campaign, Fico pledged to withdraw the Slovak contingent as soon as possible once elected but instead has extended the troop commitment for another six months. Despite the withdrawal, Fico added that six Slovak soldiers will continue to serve at the Operation Iraqi Freedom headquarters and five additional officers will serve within the NATO training mission. A Bozena minesweeper is likely to be donated to Iraq security forces as well. (CTK, 10/06)

Slovakia Gifting Redundant Weapons to Afghanistan – Slovakia's Defense Ministry has taken the decision to send additional redundant weaponry to the fledgling Afghan government as a gift, though final approval by the government is still necessary. According to the ministry's plans, some 20 automatic rifles, two machine guns, 30 military compasses, and 1,000 rounds of ammunition will be provided to Afghanistan in order to help the country's security forces. The two countries had signed an agreement on redundant weaponry in early 2006. With that agreement in hand, the Slovak government shipped 2,200 tons of military equipment worth SKK500 million (\$18.9 million) to Afghanistan. Now the Slovak Defense Ministry wants to add an addendum to this previous agreement, whereby the redundant weapons are to be used by the Afghan Army and other security bodies in the country.

Presently, Slovakia has a 60-member sapper unit stationed in Afghanistan as part of the NATO-led International Security Assistance Force (ISAF). The unit has operated there since 2004. (CTK, 1/07)

Market Intelligence Service Subscribers: For additional news, go to the online E-Market Alert page located in the Intelligence Center at www.forecastinternational.com and click on the links to the products you subscribe to.

Funding

The Ministry of Defense of the Slovak Republic funds the development and Slovak procurement of the Zuzana.

vzor 77 DANA 152 mm and Zuzana 155 mm

Contracts/Orders & Options

Not available, as the Slovak Ministry of Defense and the prime contractor have not released contractual information (including for the Greek sale) regarding this program.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1976	Czechoslovakia initiates 152mm vzor 77 DANA development program
	1977-1979	Prototype fabrication and testing phase
Late	1979	Serial production begins
	1981	First production deliveries
	1991	Contractor announces development of 155mm Zuzana
	1992	First Ondava configuration of vzor 77 DANA rolls out
December	1992	First Zuzana prototype rolls out
	1993	Slovak Republic orders 10 pre-production Zuzana systems
June	1997	Slovak Republic places initial Zuzana production order
November	2000	Greece orders Zuzana
	2006	Low-rate Zuzana production run for Slovak procurement ends
	2007	vzor 77 DANA and Zuzana lines dormant; marketing continues

Worldwide Distribution/Inventories

Export Potential. The original 152mm vzor 77 DANA experienced a moderate level of success on the international self-propelled howitzer market. The 152mm Ondava ordnance retrofit program, however, never attracted sufficient retrofit business to be viable. The demise of the Warsaw Pact and the increasing popularity of 155mm systems simply overtook the 152mm DANA/Ondava. As a result, the 152mm vzor DANA/Ondava production line lies dormant, but remains available for any new orders.

In response to the changing environment, the Zuzana represents the Slovak entry in the international 155mm self-propelled artillery market. The Zuzana scored its first export success in November 2000, with Greece's order for 12 systems. The contractor completed deliveries on the Greek order by the end of 2001. However, given the glutted condition of the international 155mm self-propelled artillery market, the prospects for further export sales during the forecast period remain minimal.

Countries. **Czech Republic** (275 vzor 77 DANA); **Greece** (12 Zuzana – some or all may have been transferred to Cyprus); **Libya** (80 vzor 77 DANA); **Poland** (111 vzor 77 DANA); **Russian Federation** (158 vzor 77 DANA); and **Slovak Republic** (135 vzor 77 DANA, 78 Zuzana).

Forecast Rationale

For all intents and purposes, the 152mm vzor 77 DANA/Ondava and the 155mm Zuzana are out of production. The prime contractor, ZTS, reportedly maintains the production lines for any future orders.

Dwindling Prospects

Although the Slovak Republic had stated its intention to place a third follow-on order, budgetary constraints will likely preclude further procurement. Consequently, we consider Zuzana production for domestic Slovak Republic procurement as effectively complete, with a total procurement of 78 operational units.

ZTS continues to actively promote the Zuzana for export sales. However, the fact remains that the Zuzana faces stiff competition in a glutted international market. The Forecast International Weapons Group does not expect any significant sales of the Zuzana during the forecast period. Even in the reopened Indian self-propelled howitzer competition, the Zuzana is a long-shot, at best.

Nothing on the Horizon

Our 10-year production outlook reflects the lack of any known sales prospects for the 155mm Zuzana. Without

vzor 77 DANA 152 mm and Zuzana 155 mm

new Slovak Army procurement of export orders, completion of the production run last year likely marked the end of both the vzor 77 DANA and Zuzana programs.

We will continue to monitor this program for any new signs of life. However, if no new sales opportunities emerge within the next year, we will consider the program as effectively terminated.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

Ordnance	(Engine)	thru 06	High Confidence Level		Good Confidence Level			Speculative			Total 07-16	
			07	08	09	10	11	12	13	14		15
ZAVODY TAZKEHO STROJARSTVA												
VZOR 77 DANA (a)	2-939-44	762	0	0	0	0	0	0	0	0	0	0
ZUZANA (b)	3-930-52	92	0	0	0	0	0	0	0	0	0	0
Total Production		854	0	0	0	0	0	0	0	0	0	0

(a) The through 2006 production includes three DANA prototypes and the two Ondava prototypes.
 (b) The through 2006 production includes two prototypes and eight low-rate initial production systems.



vzor 77 DANA 152mm Self-Propelled Howitzer

Source: www.globalsecurity.org

vzor 77 DANA 152 mm and Zuzana 155 mm



Zuzana 155mm Self-Propelled Howitzer

Source: www.globalsecurity.org