T-72

Outlook

- T-72 remains in service with at least 37 nations
- Serial production line in Russia remains dormant
- The last foreign new-production line, in Iran, fell dormant in 2012
- Center of gravity has shifted to modernization and retrofit worldwide

Orientation

Description. A main battle tank.

Sponsor. The Ministry of Defense of the Russian Federation, Main Automotive and Armored Materiel Directorate, continues to sponsor this legacy program of the former Soviet Union.

Status. Serial production lines are currently dormant.

Total Produced. Through 2012, we estimate that the prime contractor and various licensees produced at least 27,149 T-72 tanks in all models and variants.

Application. Armored mobile weapon system optimized for high-speed offensive and breakthrough operations as well as defensive fire support.

Price Range. In 2002 U.S. dollars, a new-production Russian T-72B1 carried a unit price of $3.21 million.

The unit prices of licensed-production T-72 tanks vary on the international market. In 2004 U.S. dollars, the Yugoslav M-84 carried a unit price of $3.45 million; the Polish T-72M1 currently carries a unit price of $3.35 million.

Contractors

Prime

PO Uralvagonzavod	http://www.uvz.ru, 28 Vostochnoye Shosse, Nizhny Tagil, 622007 Sverdlovsk, Russian Federation, Tel: + 7 3435 345 270, Fax: + 7 3435 345 470, Email: press@uvz.ru, Prime
Iran Defense Industries Organization (DIO)	http://www.diomil.ir, Pasdaran St, PO Box 19585-777, Tehran, Iran, Tel: + 98 21 22562883, Fax: + 98 21 22551961, Email: marketing@diol.org, Licensee
Yugoimport-SDPR (formerly Yugoslav State Factories)	http://www.yugoimport.com, Bulevar umetnosti 2, Beograd, 11150 Yugoslavia (Serbia, Montenegro), Tel: + 381 11 222 4444, Fax: + 381 11 222 4599, Email: office@yugoimport.com, Licensee

Subcontractor

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Allison Transmission Division, General Motors Corp	http://www.allisontransmission.com, PO Box 894, Indianapolis, IN 46206-0894 United States, Tel: + 1 (317) 242-5000 (XTG-411-6 Automatic Gearbox)
BAE Systems plc	http://www.baesystems.com, 6 Carlton Gardens, London, SW1Y 5AD United Kingdom, Tel: + 44 1252 373232, Fax: + 44 1252 383991 (T-72 Moderna Turret Stabilization System)

Barnaultransmash Holding OAO	http://www.barnaultransmash.ru, 28 Kalinin Prospect, Barnaul, 656037 Russian Federation, Tel: + 7 3852 77 20 13, Fax: + 7 3852 77 95 22, Email: om@barnaultransmash.ru (KD-34 Diesel Engine)
Cummins Inc	http://www.cummins.com, 500 Jackson St, Columbus, IN 47201 United States, Tel: + 1 (317) 610-2488, Fax: + 1 (812) 377-3334, Email: janet.williams@cummins.com (V8X 1000 Diesel Engine)
Defense Solutions LLC	http://www.ds-pa.com, 707 Eagleview Blvd, Suite 100, Exton, PA 19341 United States, Tel: + 1 (610) 833-6000, Email: hungary@defensesolutions.net (Hungarian-Iraqi T-72 Retrofit)
Denel (Pty) Ltd	http://www.denel.co.za, Nellmapius Dr, Irene, 0046 South Africa, Tel: + 27 12 671 2700, Fax: + 27 12 671 2751, Email: marketing@denel.co.za (Tiger New Generation Fire Control System)
Diehl Remscheid GmbH & Co KG	http://www.diehl-remscheid.com, Vieringhausen 118, Remscheid, 42857 Germany, Tel: + 49 21 91 976 0, Fax: + 49 21 91 976 208 (T-72 Improved Track Components)
Elbit Systems Ltd	http://www.elbitsystems.com, Advanced Technology Center, PO Box 539, Haifa, 31053 Israel, Tel: + 972 4 831 5315, Fax: + 972 4 855 0002, Email: elbit-systems@elbit.co.il (T-72 Improved Fire Control System)
Electromashina	http://www.electromashina.ru, 21, Mashinostroitelei, Chelyabinsk, 454129 Russian Federation, Tel: + 7 7351 255 22 33, Fax: + 7 7351 255 22 35, Email: inbox@electromashina.ru (Improved T-72 Turret Drive)
Elop Electro-Optics Ltd	http://www.el-op.com, Advanced Technology Park, PO Box 1165, Rehovot, 76111 Israel, Tel: + 972 8 938 6211, Fax: + 972 8 938 6237, Email: info@el-op.co.il (T-72 Improved Fire Control System)
Esterline Communication Systems Platform (Racal Acoustics Ltd)	http://www.esterline.com, Waverley Industrial Park, Hailsham Dr, Harrow, HA1 4TR United Kingdom, Tel: + 44 20 8515 6200, Fax: + 44 20 8427 0350, Email: commsystems.sales@esterline.com (T-72 CZ Vehicle Communications System)
General Dynamics Land Systems	http://www.gdls.com, 38500 Mound Rd, Sterling Heights, MI 48310-3200 United States, Tel: + 1 (586) 825-4000, Fax: + 1 (586) 825-4013, Email: info@gdls.com (T-72 Improved Suspension Components)
Horstman Defence Systems Ltd	http://www.horstman.co.uk, Locksbrook Rd, Bath, BA1 3EX United Kingdom, Tel: + 44 1225 423111, Fax: + 44 1225 447357, Email: esales@horstman.co.uk (T-72 Improved Suspension Components)
KBP Instrument Design Bureau	http://www.kbptula.ru, 59 Shcheglovskaya Zaseka St, Tula, 300001 Russian Federation, Tel: + 7 4872 41 0210, Fax: + 7 4872 42 6139, Email: kbkedr@tula.net (Arena Self-Protection System)
Kidde Deugra Brandschutzsysteme GmbH	http://www.kidde-deugra.com, Halskestrasse 30, Ratingen, 40880 Germany, Tel: + 49 2102 405 0, Fax: + 49 2102 405 111, Email: info@kidde-deugra.com (Fire Detection/Suppression System)
Konstrukta-Defence AS	http://www.kotadef.sk, Kvystavisku 15, PO Box 62, Trencin, 91250 Slovakia, Tel: + 421 32 7435 731, Fax: + 421 32 7431 930, Email: kotadef@kotadef.sk (T-72 Improved Fire Control System)
Letecke Pristroje Praha SRO	http://www.lp-praha.cz, Pod Hajkem 406/1, Praha 8, 180 00 Czech Republic, Tel: + 420 296 587 104, Fax: + 420 284 829 015, Email: homola@lp-praha.cz (T-72 CZ Land Navigation System)
Meopta Optika s.r.o.	http://www.meopta.cz, Kabelikova 1, Prerov, 750 02 Czech Republic, Tel: + 420 581 241 111, Fax: + 420 581 242 222, Email: meopta@meopta.com (T-72 CZ Night Vision Devices)
Mesit Pristroje Spol SRO	http://www.mesit.biz, Sokolovska 573, Uherske Hradiste, 68601 Czech Republic, Tel: + 420 572 522 200, Fax: + 420 572 522 602, Email: prodej@msp.mesit.cz (T-72 CZ Intercom System)
Nimda Co Ltd	http://www.nimda.co.il, Lev Pesech, North Industrial Zone, Lod, 71293 Israel, Tel: + 972 8 978 1111, Fax: + 972 8 978 1137, Email: info@nimda.co.il (Perkins Condor CV12 Diesel Engine)
Peleng Joint Stock Co	http://www.peleng.ru, PO Box 18, Saint Petersburg, 195221 Russian Federation, Tel: + 7 812 545 28 50, Fax: + 7 812 543 45 02, Email: mail@peleng.ru (Sanoet-2 Fire Control System)

Rheinmetall Air Defence AG	http://www.rheinmetall-defence.com, Birchstrasse 155, Zurich, 8050 Switzerland, Tel: + 41 44 316 2211, Fax: + 41 44 311 3154, Email: info@ocag.ch (20mm KAA-001 Cannon)
SELEX Galileo SpA	http://www.selexgalileo.com, Via Albert Einstein, 35, Campi Bisenzio, 50013 Firenze, Italy, Tel: + 39 055 89501, Fax: + 39 055 8950600, Email: galileoavionica@galileoavionica.it (T-72 CZ Computerized Fire Control Suite)
SOE Kharkiv Morozov Machine Building Design Bureau	http://www.morozov.com.ua, 126 Plekhanivska St, Kharkiv, 61001 Ukraine, Tel: + 380 577 57 41 44, Fax: + 380 577 57 41 01, Email: morozov@morozov.com.ua (120mm CN-120 Tank Gun Integration)
Sagem	http://www.sagem-ds.com, Le Ponant de Paris, 27, Rue Leblanc, Paris, 75512 France, Tel: + 33 1 58 11 78 00, Fax: + 33 1 58 11 78 50 (Sanoet-2 Fire Control System)
Societe Anonyme Belge de Constructions Aeronautiques (SABCA)	http://www.sabca.be, Chaussée de Haecht, 1470, Haachtsesteenweg, Brussels, 1130 Belgium, Tel: + 32 2 729 5511, Fax: + 32 2 705 1570, Email: info@sabca.be (Gunner's Thermal Imaging System)
TDA Armements SAS	http://www.thalesgroup.com, Route d'Ardon, La Ferté Saint-Aubin, 45240 France, Tel: + 33 2 38 51 63 63, Fax: + 33 2 38 51 63 97, Email: dpt.communication@tda.thalesgroup.com (Arena Self-Protection System)
Textron Marine & Land Systems	http://www.textronmarineandland.com, 1010 Gause Blvd, Slidell, LA 70458 United States, Tel: + 1 (985) 661-3600, Fax: + 1 (985) 661-3694 (T-72 Improved Suspension Components)
Urdan Metal & Casting Industries Ltd	http://www.urdan.co.il, 11 Haplada St, Industrial Area, Netanya, 42130 Israel, Tel: + 972 9 862 4525, Fax: + 972 9 861 1571, Email: sales@urdan.co.il (T-72 Improved Track Components)
V.A. Malyshev State Enterprise, V.A. Malyshev Research and Production Assn	http://www.malyshevplant.com, Plehanovskaya St, 126, Kharkov, 61037 Ukraine, Tel: + 380 57 739 30 08, Fax: + 380 57 766 87 33, Email: marketing@malyshev.kharkov.ua (Model 6TD-1 Diesel Engine)
Wartsila France SAS	http://www.wartsila.com, 100 Quai d'Alger, BP 1210, Mulhouse, 68054 France, Tel: + 33 389 666 868, Fax: + 33 389 666 830 (V8X 1000 Diesel Engine)
William Cook Cast Products Stanhope Plant (formerly ASTRUM (UK) Ltd)	http://www.william-cook.co.uk, Stanhope, County Durham, DL13 2YR United Kingdom, Tel: + 44 1388 528248, Fax: + 44 1388 528879, Email: info@cook-astrum.uk.com (T-72 Improved Track Components)
ZTS-Special Dubnica nad Vahom AS, Zavody Tazkeho Strojarstva	http://www.ztsspecial.sk, Areal ZTS c 924, PO Box 134, Dubnica nad Vahom, 018 41 Slovakia, Tel: + 421 42 448 53 00, Fax: + 421 42 442 28 33, Email: info@ztsots.sk (Antares/Vega Fire Control Suite)
Zaklady Mechaniczne "PZL-WOLA" SA	http://www.pzl-wola.pl, 11 Artyleryjska St, Siedlce, 08-110 Poland, Tel: + 48 22 634 4010, Fax: + 48 22 837 4513, Email: zarzad@pzl-wola.pl (PZL-WOLA S-1000 Diesel Engine)
Zaklady Mechaniczne Bumar-Labedy SA	http://www.bumar.gliwice.pl, ul Mechnaikow 9, Gliwice, 44-109 Poland, Tel: + 48 32 734 51 11, Fax: + 48 32 734 65 11, Email: hr@bumar.gliwice.pl (Explosive Reactive Armor)

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Technical Data

Crew. Three: commander, gunner, and driver.

Armor. The low-silhouette hull features conventional rolled homogeneous steel armor. Early models carried a maximum thickness of 20 centimeters (7.87 in) on the glacis; the T-72M1 carries 23 centimeters (9.05 in) of glacis armor, yielding protection equivalent to over 2 meters (6.56 ft) of conventional rolled homogeneous steel armor.

The turret is a single-piece casting with a maximum thickness of 45 centimeters (17.72 in). Explosive

reactive armor (ERA) modules can supplement the base and passive appliqué armor. In late-production T-72 tanks, a layer of radiation-absorbing armor has been added to the hull and turret roof.

Dimensions. The following data reflect the T-72BM with the ERA package. The width is with the armored skirts; the height is without the 12.7x107mm NSV machine gun on the turret roof. The fuel capacity data indicate the internal tanks, followed by the external tanks.

	SI Units	U.S. Units
Length	9.53 m	31.27 ft
Width	3.59 m	11.77 ft
Height	2.23 m	7.32 ft
Combat weight	44.52 tonnes	49.07 tons
Fuel capacity	1,000 + 390 liters	265.95 + 103.72 gal

Performance. The automotive performance data reflect use on a paved road; the range data are without/with the extra fuel tanks. With the snorkel attached, the T-72 can ford 5 meters (16.4 ft) of water.

	SI Units	U.S. Units
Maximum speed	60 kmph	37.3 mph
Maximum range	500/650 km	310.5/403.7 stat mi
Step	85 cm	2.79 ft
Trench	2.8 m	9.18 ft
Slope	40%	40%
Gradient	60%	60%
Fording	1.8 m	5.91 ft

Engine

Early Production (through 1980s). V-46 liquid-cooled diesel V-12 engine. This transverse-mounted powerplant generates 581.9 kilowatts (780 hp), with a power-to-weight ratio of 14.19 kilowatts per tonne (17.26 hp/ton).

Late Production. SV-84 multifuel V-12 engine. This transverse-mounted powerplant generates 626.64 kilowatts (840 hp), with a power-to-weight ratio of 14.07 kilowatts per tonne (17.11 hp/ton) in the T-72BM application.

The T-72 series features a 24-volt electrical system. Both engine configurations feature pre-heaters.

Gearbox. An unspecified, hydraulically assisted manual unit, with one reverse and seven forward gear ratios.

Suspension and Running Gear. Torsion bar suspension, with six diecast, rubber-tired dual road-wheels and three track-return rollers on each side. The drive sprocket mounts to the rear. The first, second, fifth, and sixth roadwheel stations feature hydraulic shock dampers. The track is the live type, featuring single-track pins and rubber bushings.

Armament

Main Armament. Early models mount the 2A26 125mm smoothbore tank gun; later production models mount the improved 2A46M D-81TM 125mm smoothbore gun. The fully stabilized ordnance features a thermal shield, muzzle reference system, and fume extractor. Elevation (+14°), depression (-6°), and turret traverse (360°) are electrically operated, with manual backup. After firing, the gun automatically returns to the index position for reloading.

The main armament feeds from the Korzina carousel-type automatic loading system. Projectiles store in a horizontal position in the bottom of the tank; propellant charges store in a vertical position in a ring mounted around the turret base. The T-72 carries 39 rounds of 125mm ammunition.

The 2A46 ordnance can achieve a muzzle velocity of 1,830 meters per second (6,003.9 fps) with Armor Piercing Fin Stabilized Discarding Sabot-Tracer (APFSDS-T) ammunition. Available Russian-design 125mm ammunition types include the following:

- 3VBM3, 3VBM6, 3VBM7, 3VBM8, 3VBM13, and 3VBM17 APFSDS
- 3VP6 APFSDS-T
- 3VBK7, 3VBK10, 3VBK16, and 3VBK17 High Explosive Anti-Tank (HEAT)
- 3VOF22 and 3VOF36 High Explosive-Fragmentation (HE-Frag)

The 2A46M D-81TM ordnance, also known as the Rapira-3, can also fire the 9M119M Svir (AT-11 Sniper) laser-guided HEAT missile out to a range of 5 kilometers (5,468 yd). The T-72 carries six 9M119M munitions.

Secondary Armament. One coaxially mounted 7.62x54mm PKT (SGMT) machine gun; one

pintle-mounted 12.7x107mm NSV machine gun on the turret roof. Each side of the turret mounts six 81mm smoke grenade launchers.

Fire Control. The T-72 system originally featured a TPD-2 coincidence rangefinder; later models feature the TPD-K1 laser rangefinder, the TPD-2-49 gunner's sight, and the TPN-1-49-23 infrared periscopic night sight. A TShS-49 telescopic sight serves as a backup in some versions of the T-72. Still later models of the T-72 feature the 1A40-1 sight group, which includes the TPD-K1 laser rangefinder and 1K13-49 night sight of the 9K120 guided weapons suite for the 9M119 Svir. The T-72 uses an unspecified ballistic computer.

The 2Eh42-2 gun stabilization equipment features a combined electrohydraulic (vertical) and electric (horizontal) drive system. The commander's station features five TNP-165 vision blocks and a TKN-3 day/night binocular-type periscopic sight with infrared capability. For day use, this device provides 5.0-power magnification at 10° field of view; for night use, it provides 4.2-power magnification at 8° field of view. An L-2 Luna infrared/white light searchlight mounts to the right of the main armament; the commander's cupola mounts a secondary infrared/white light searchlight.

Variants/Upgrades

Variants. The following table provides information on currently available variants of the T-72 main battle tank.

Designation	Country	Function	Remarks
BREM-1	Russian Federation	ARV	Armored Recovery Vehicle. In production as needed
BLT T-72	Russian Federation	AVLB	Armored Vehicle-Launched Bridge. 12 delivered to India
IMR-2	Russian Federation	CEV	Combat Engineer Vehicle. In production as needed
MID	Poland	CEV	Based on WZT-3 ARV; three prototypes completed; available for export
MT-72	Slovak Republic	AVLB	One prototype completed
MTU-72	Russian Federation	AVLB	In serial production
MTU-90	Russian Federation	AVLB	One prototype completed
PMCz-90	Poland	AVLB	One prototype completed; offered for export
SJ 09	Poland	Training Tank	At least four in service with Polish Army
VT-72B	Slovak Republic	ARV	In production. In service with Czech Republic, India, Russian Federation, and Slovak Republic
M-84ABI	Croatia	ARV	Similar to WZT-3
WZT-3	Poland	ARV	In production. In service with Croatia, India, and Poland

T-72 as a Self-Propelled Artillery Chassis. India's longstanding requirement for 600 units of a 155mm/52-caliber self-propelled artillery system has encouraged a number of players to integrate their 155mm artillery systems with the T-72 chassis, which is available in India through licensed production. The most prominent 155mm/52-caliber offerings are as follows:

- The Artillery System 90/Braveheart turret by BAE Systems
- The T-6 by Denel (Pty) Ltd, employing the G6 turret
- The 155 GCT turret by Nexter (formerly Giat Industries)
- The Zuzana turret by Zavody Tazkeho Strojarstva

To date, India has yet to award a procurement contract for this program.

Modernization and Retrofit Overview. In 1998, the NATO Land Group 2 met to discuss the various upgrade programs for the T-72, especially as they pertained to NATO interoperability among the newer members – specifically, the Czech Republic, Hungary, and Poland. More recently, an increasing number of international players have been developing and offering T-72 upgrade packages, with an emphasis on enhancing interoperability within NATO. The following is a brief review of the various modernization and retrofit efforts under way for the T-72 tank.

Armor Enhancements. The Russian Federation offers several different levels of armor enhancements for the

already well-protected T-72. These enhancements include:

- Several levels of appliqué explosive reactive armor (ERA)
- Additional levels of glacis armor
- Interior neutron-absorbing armor
- Armored skirts

ZTS Dubnica nad Vahom of the Slovak Republic and Zaklady Mechaniczne Bumar-Labedy SA of Poland each offer ERA, as well as additional appliqué armor packages. The Polish ERAWA-1 and ERAWA-2 packages both use 394 modules. Poland has also developed new-design side skirts for its license-produced version of the T-72.

ERA and other appliqué armor are also available from a number of firms in France, Germany, Israel, Italy, and the United Kingdom.

Powerplant Enhancements

Engine. As the burgeoning number of upgrades adds weight to the basic T-72, a new engine with an improved power-to-weight ratio becomes a necessity. An automatic gearbox is also a desirable feature for an upgraded T-72. Since the mid-1990s, several firms have been offering 745.7-kilowatt (1,000-hp) engines and gearboxes. Among these upgrade offerings are the following:

- Cummins Wartsila/SACM Diesel offers the V8X 1000 engine (745.7 kW/1,000 hp) and ESM 350 automatic gearbox. The upgrade also replaces the steering tillers with a steering wheel.
- Nimda offers the Perkins Condor CV-12 diesel engine (745.7 kW/1,000 hp) and the Allison XTG-411-6 automatic gearbox.
- Malyshev State Enterprise offers the Model 6TD-1 diesel engine (745.7 kW/1,000 hp) and the 6TD-2 diesel engine (894.84 kW/1,200 hp).
- Barnaultransmash has developed the KD-34 diesel (745.7 kW/1,000 hp) for the T-72 application.

Engine Starter. The Russian Electromashina firm offers an improved starter motor for the V-84 diesel engine.

Turret Drives. Electromashina offers improved turret drives for the T-72. These more modern components have greater power, improving slewing rates.

Suspension & Running Gear

Suspension Components. Several international firms offer improved or alternative designs and components. Among these are Horstman Defence Systems Ltd, General Dynamics Land Systems, and Textron Marine & Land Systems. Players in the Czech Republic, Poland, and the Slovak Republic have also developed improved suspension components for the T-72. The prime contractor, PO Uralvagonzavod, also offers a number of improved suspension components.

Tracks. A growing number of non-Russian firms are offering or developing new tracks for retrofit to the T-72. Among these firms are Diehl Remscheid, Urdan Industries, and ASTRUM (UK) Ltd (formerly William Cook Defence). The prime contractor, PO Uralvagonzavod, also offers improved track components.

Active Defense Systems

Shtora-1. The first system of this type to enter this market segment, the TShU1-7 Shtora-1 modular protection system uses infrared guidance technology to provide protection against anti-tank missiles. The Shtora-1 system includes the infrared sources, power supply, and related control equipment.

Arena. In the first real Russo-European partnership on tank technology, TDA Armements teamed with the Russian KBP organization to market the Arena tank self-protection system. When the Arena radar detects an incoming missile or anti-tank warhead, the Arena computer fires the appropriate defensive munition from the launchers mounted around the turret. The defensive munition detonates downward at a predetermined height, producing a hail of ballistic fragments that intercept the threat munition. The Arena, also known as the Kazt, is automatic in operation and has a reaction time of half a second. It is available for purchase for new-production T-72 tanks or for retrofit to existing tanks.

Fire Control System Upgrades. The various players currently offer seven major fire control system upgrade packages for the T-72. In fact, upgrades to the fire control system constitute the most fertile ground in the T-72 modernization and retrofit market segment.

Antares/Vega. ZTS, in conjunction with Société Anonyme Belge de Constructions Aéronautiques (SABCA) of Belgium, offers Antares as the first phase of the T-72 Moderna program. Antares interfaces with the existing TPD-K1 sighting system; it requires only minimal alterations to the turret.

The Antares package features the Vega thermal imaging system from SABCA for the gunner. The commander's station also features a VS 580 stabilized day sight; this unit has a 360° capability. A two-axis gyroscopic stabilizing unit integrates with the main armament.

Sanoet-2. PO Uralvagonzavod developed this fire control upgrade in association with the Peleng firm in

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Belarus and Société d'Applications Générales d'Electricité et de Mécanique (Sagem) of France. The complete equipment consists of a new gunner's sight with a thermal imaging component, various sensors, a new fire control computer, two-axis stabilization, two electro-optic monitors, and related control equipment. This fire control upgrade is available as a separate package, or as a part of the larger T-72 upgrade package offered by the Russian prime contractor.

Westernized T-72. Konstrukta of Trencin, Slovak Republic – in conjunction with Elbit Computers Ltd and Elop Electro-Optics Industries Ltd, both of Israel – has developed improved components for the fire control suite and gun stabilization system. The Elop thermal elbow sight significantly enhances the night fighting capability of the T-72. Other equipment includes a thermal elbow sight, an electronic control unit, and a display unit for the gunner; a commander's display is an option. The contracting team has offered to integrate its upgrade with one tank at no cost to the Slovak government.

Wolf. Zaklady Mechaniczne Bumar-Labedy SA of Poland offered an upgrade package that included a PEO day/night sight for the gunner and a new communications system. This fire control upgrade package eventually evolved into a complete T-72 system upgrade program known as the Wolf.

Tiger. Under the auspices of Denel (Pty) Ltd, Lyttleton Engineering Works, Kentron, and Eloptro have developed and are now offering a drop-in modular fire control suite for the T-72. The Tiger New Generation Fire Control System is a hunter/killer type that greatly enhances the fighting quality of the T-72, providing a day/night fire-on-the-move capability. Second-level maintenance facilities can install the Tiger system, which requires no modification to the T-72 turret.

The basic components of the Tiger system include the GS72T/N stabilized gunner's sight with integrated laser rangefinder and thermal imaging component; the CS65N commander's stabilized panoramic sight, which mounts in a new commander's cupola; the Tiger fire control computer, with inputs from 11 sensors; and the required interface wiring and related equipment.

SAVAN-15 MP. This Sagem digital fire-control system, part of the T-72 MP upgrade program, includes a two-axis stabilized sight with integral laser rangefinder; it can accommodate a thermal channel. The commander's station features a Sagem VS/MVS 580 two-axis roof-mounted stabilized sight; it can accommodate a thermal channel and a laser rangefinder. The fire control system employs a digital computer, possibly of French design.

T-72AG. The collaboration of Kharkiv Morozov Machine Building Design Bureau and the Malyshev enterprise has teamed up with Nexter (formerly Giat Industries) to offer a T-72 upgrade that retrofits a version of the 120mm CN-120 tank gun. This upgrade includes the French ordnance, a new bustle-mounted automatic loading system, and a fire control suite appropriate for the 120mm ordnance. The contract team also offers the option of retaining the 125mm 2A46 ordnance, integrated with the new supporting components.

The fire control element of this upgrade package includes a new digital ballistic computer, a two-axis stabilized 1G46 day sight, a vertically stabilized TPN-4 night sight for the gunner, and a TKN-4S Agat day/night sight for the commander. The overall package also includes appliqué (including ERA) armor, the Shtora-1 active defense system, a new communications suite, and a new crew and engine compartment cooling system. The package also features a retrofit 6TD-1 or -2 diesel engine.

Comprehensive Modernization. In addition to the various component upgrade programs, a number of major upgrade programs have emerged, each of which upgrades the complete T-72 weapon system.

Lyra/T-72 Moderna. ZTS offers the T-72 Moderna upgrade for existing T-72 tanks, as well as for new production. The T-72 Moderna features the following upgrades:

- ERA has been added to the turret and hull, and appliqué armor under the driver's position
- The driver's seat has been suspended from the hull roof
- The Antares/Vega fire control suite has been integrated
- A BAE Systems (Marconi Radar and Control Systems) turret stabilization system has been integrated
- Two Oerlikon-Contraves 20mm KAA-001 guns are mounted on the turret, one on each side
- A new frequency-hopping radio and a vehicle intercommunication system have been integrated
- A new Kidde-Deugra fire detection and suppression system has been integrated
- A vehicle air conditioning system has been integrated
- The existing engine and gearbox have been changed to the 633.85-kW (850-hp) configuration

For the purposes of this report, the T-72 Moderna program provides a good indication of the depth and breadth of the comprehensive T-72 modernization programs.

Czech Upgrade Program. In August 1995, the Czech Republic awarded contracts for T-72 modernization to the following contractors:

- Galileo Avionica SpA of Italy (computerized fire control suite)
- Nimda of Israel (Perkins CV-12 engine and Allison XTG-411-6 automatic gearbox)
- Racal Acoustics (vehicle communications system)
- Kidde-Deugra of Germany (fire detection and suppression system)

In addition, the following Czech firms secured contracts under this program: Letecke Pristroje Praha (land navigation system), Meopta Optika (night vision devices), and Mesit Pristoje (intercommunications system).

The Czech Army originally intended to modernize 140 to 250 tanks of its 541-tank T-72 inventory over a 10-year period. The first upgraded T-72CZ was rolled out in 1997. The Czech Republic offers the T-72CZ as a modernization and retrofit option or as a new-build tank.

Since initiating this program, fiscal realities have forced the Czech Republic – like so many other European nations – to reduce its MBT inventory. The Czech Army will reportedly reduce its T-72 fleet to 150 tanks, of which 120 will be in reserve. The remaining 30 tanks will represent the best of the remaining T-72M1s; these tanks will undergo modernization to the upgraded T-72M4CZ configuration.

Indian Upgrade Program. In 1997, the Ministry of Defence awarded a $334 million contract to the Defence Research and Development Organization (DRDO) to begin a T-72 upgrade program, designated Operation Rhino. However, problems soon cropped up, leading the Ministry of Defence to open negotiations with the Russian Federation, as well as a number of Western contractors, for the upgrade program.

The Indian modernization program includes the following elements:

- A new fire control suite
- A new land navigation system
- A communications suite
- A laser warning system
- A nuclear, biological, and chemical (NBC) protective suite
- A new powerplant, possibly the Polish WOLA (745.7-kW/1,000-hp) diesel engine

This program is not fully under way. Despite the apparent demise of the Arjun MBT program, the new Karan tank program and the licensed co-production of the T-90 tank will likely limit the T-72 modernization program to around 200 units.

Iraqi Upgrade Program. The Iraqi government issued a contract to the Polish firm Zaklady Mechaniczne Bumar-Labedy SA to retrofit at least 100 surviving Iraqi T-72M1 tanks to the Polish PT-91 Twardy configuration. The upgrades reportedly include:

- A PZL-WOLA 895-kilowatt (1,200-hp) powerpack
- A computerized fire control system
- Thermal imaging units and a laser rangefinder
- European optics
- Fully stabilized main armament
- Explosive reactive armor

The program allows the new Iraqi Army to equip three tank battalions for service in three regions of the country.

Russian Upgrade Program. The PO Uralvagonzavod organization remains the prime contractor for the T-72 program, at the Vagonka tank plant located in Nizhny Tagil (Zavod 183). The PO Uralvagonzavod upgrade program is engaged in the following:

- Integrating the improved 2A46M1 main armament
- Integrating the Shtora TShU1-7 or Arena defense system
- Integrating the Sanoet-2 fire control upgrade
- Retrofitting the 9K120 package for the 9M119 Svir (AT-11 Sniper) laser-guided anti-tank missile to earlier T-72 models
- Installing a remote (under armor) sighting and operating system for the 12.7x107mm NSV machine gun at the commander's station
- Integrating a new fire detection and suppression system
- Integrating a new collective NBC defense system
- Integrating an uprated diesel engine and improved suspension components
- Installing one of several ERA options

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By the late 1990s, the Russians realized they were failing to exploit the increasingly lucrative T-72 upgrade segment of the international market. In 1998, they formed a consortium of semi-privatized and privatized firms and other organizations to consolidate the Russian Federation's T-72 upgrade options.

The consolidated modernization program offers the above-listed elements. In addition, the program seeks to attract NATO interest by offering the following:

- Signature reduction paint
- Redesigned ammunition storage
- Fire/explosion-inhibiting foam-filled fuel tanks
- A 745.7-kilowatt (1,000-hp) powerplant and gear-box with computerized controls
- An 18-kilowatt (24.12-hp) auxiliary power unit
- An upgraded suspension

Further, the Russians are developing enhanced fire control components in conjunction with Western firms.

Lucrative Retrofit Market

The various players have only recently begun to exploit the modernization and retrofit opportunities of the T-72 tank. The truncated Czech program is now under way; Poland, the Slovak Republic, Bulgaria, and Hungary have yet to fully fund their T-72 upgrade programs. The Indian program will likely have a very limited shelf life. Nevertheless, these upgrade programs have opened the door for second- and third-level Western contractors to exploit this potentially lucrative market segment.

Downfall: Iraqi T-72M1 during Operation Desert Storm (1991)

Source: U.S. Department of Defense

Program Review

Background. The T-72, along with the T-64, represents the second generation of Soviet (Russian) tank development since World War II. The T-64 represented the higher-cost, more technologically sophisticated, higher-risk design; the T-72 represented a lower-cost, less technologically sophisticated, lower-risk design. Development began around 1953. The pre-production developmental versions entered low-rate pre-serial production in 1968.

Teething Troubles

From the first pre-serial production tanks, the T-72 has mounted the 125mm 2A46 ordnance. While the T-72 reportedly had fewer developmental troubles than the T-64, it did incorporate the then-innovative automatic loading system with a three-man crew. While this mechanism was some two decades ahead of any NATO counterpart, it initially proved troublesome, with the

rather disquieting habit of "loading" the gunner's right arm into the main armament breech. Gaining on the learning curve, the Russians have steadily improved the T-72 over the years; the current model T-72 remains a world-class tank.

Description. The basic T-72 design exhibits a fairly conventional three-compartment internal layout.

The driver sits in the front center of the hull; the engine and gearbox mount in the rear compartment. The driver's station features a single-piece hatch cover, a TVNE-4E observation periscope, and two FG-125 driving lights. The cast turret occupies the center of the vehicle. The commander sits to the right of the main armament; the gunner sits to the left. The commander's and gunner's stations both feature single-piece hatch covers and TNPA vision blocks. In addition, the operating handles of the TKN-3 rotate the cupola and operate the searchlight and other observation systems.

Optimized for NBC Environment

The standard PAZ overpressure NBC protective suite consists of a radiation detector, dust separator/blower, and filtering system. The tank also features a lead-based foam cloth lining for neutron absorption. This lining helps to eliminate electromagnetic pulse; it also reduces interior noise and spalling.

Other features include a centralized fire-extinguishing system, an OPVT snorkel, and extended-range external fuel tanks. All T-72 tanks can accommodate a front-mounted dozer blade or the KMT-6 mineclearing roller system. The T-72 can also easily mount the PW-LWD rocket-deployed explosive hose and similar mine clearance equipment.

Extensive Production Line

The following table lists the known Russian development and production models of the T-72, as well as the major T-72 clones.

Obiekt 140	Original developmental tank (1953); also known as T-54M
Obiekt 167	Developmental tank (1961), featuring 9M14 Malyutka (AT-3 Sagger) ATGM
Obiekt 167GTD	Developmental variant (1965), replacing standard diesel engine with a vehicular gas turbine
Obiekt 172	Major redesign (1968), featuring a T-64-style hull, small turret, and IR searchlight to the left of main armament; no 12.7x107mm NSV machine gun at commander's station
Obiekt 172M	Definitive prototype (1970), featuring 2A26 main armament, Korzina automatic loading system, IR searchlight to the right of the main gun, 12.7x107mm NSV machine gun, and gill-type armor over the running gear
Obiekt 172-2M	Pre-serial-production T-72
T-72	Initial production model (1973); also known as T-72 Model 1973
T-72K	Command tank version (1973)
T-72 Model 1975	Initial export model, with differences in armor suite and ammunition storage capacity
T-72A	First major modernization program (1979), integrating 2A46 ordnance, thickened turret front armor, Kasetka automatic loading system, L-4 Luna IR searchlight, and enhanced sights
T-72AK	T-72K command tank, upgraded to T-72A configuration
T-72M	Export version of T-72A (1980), with differences in armor suite and ammunition storage capacity. Possibly also known as Obiekt 174
T-72M1	Modernized T-72M, with an additional 16 mm (.588 in) of armor on glacis
T-72AV	T-72A retrofitted with first-generation ERA (1985)
T-72B	Significantly modernized T-72A (1985) featuring 2A46M1 main armament, redesigned turret, additional armor, and improved fire control suite; capable of firing 9M119 Svir (AT-11 Sniper) ATGM
T-72BK	Command version of T-72B
T-72B1	Complete T-72B without 9M119 Svir (AT-11 Sniper) capability
T-72S	Export version of T-72B, also known as T-72M1M Shilden; produced under license in Iran
T-72S1	Export version of T-72B1 (1987)

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T-72BM	Improved production model (1992) featuring second-generation ERA and SV-84 engine
M-84	Yugoslav licensed version of T-72 (1983)
M-95 Degman	Croatian tank, broadly based on M-84; see "M-95 Degman" report in this book
TR-125	Romanian licensed version of T-72; production dormant
PT-91	Polish version of T-72; see "PT-91 Twardy" report in this book
Wilk	Polish version of T-72M1

Resurrection: T-72 of the New Iraqi Army's 2nd Brigade, 9th Mechanized Division

Source: U.S. Department of Defense

Related News

Syrian Rebels Refurbish Captured Tanks – Rebels in Syria are refurbishing weapons captured from government security forces. Syrian President Bashar al-Assad is trying to hold on to power in the face of a rebellion that is over 22 months old. Rebels are attempting to put captured tanks back into action, repairing the damaged gearbox on a T-72, for example. The rebels remain very short of heavy weapons and cannot afford to ignore any opportunity to improve this situation.

The rebels also are manufacturing their own mortars and ammunition. The rebels continue to complain of a shortage of ammunition, which sometimes forces a halt to offensive operations. In addition, many rebels still say they have no defense against Assad's combat aircraft. (Terra, 1/13)

India to Upgrade T-72 Tanks – The Indian Army plans to upgrade some 1,600 T-72 tanks with advanced night fighting electro-optical equipment. Indian tanks have only 20 percent night fighting capability, Pakistan has an 80 percent capability, and China has 100 percent. The 1,600 T-72s in service are the backbone of the Indian Army's tank force.

The Indian Army is pushing for procurement of 700 thermal imaging standalone systems and 418 thermal fire control systems for its T-72 tanks, which will cost about $230 million. Thermal imagers are to be acquired for infantry units as well.

Bharat Electronics Ltd is the biggest supplier of night vision equipment to the Indian armed forces. (International News Network, 12/12)

Funding

The Ministry of Defense of the Russian Federation continues to support this legacy program of the former Soviet Union.

Timetable

Month	Year	Major Development
	1953	Original development begins
	1968	Introduction of Obiekt 172
	1973	Low-rate serial production of Obiekt 172M begins
	1973	T-72 Initial Operational Capability
	1974	Development of initial export ("monkey model") version of T-72
Oct	1977	USSR publicly reveals T-72
	1979	Licensed production begins in Czechoslovakia
	1981	First Polish T-72 tanks rolled out
Early	1984	Licensed production of M-84 begins in Yugoslavia
	1985	Licensed production begins in India
	1987	Licensed production of TR-125 begins in Romania; T-72S debuts
	1991	M-84 production goes dormant
Early	1990s	Croatia restarts M-84 production
	1995	Iran begins licensed production of T-72S
Mid-	1990s	Federal Republic of Yugoslavia restarts M-84 production
	1998	Production goes dormant in Russian Federation
Nov	2005	Hungary donates 77 T-72 tanks to Iraq
	2009	Serbian M-84 production run reportedly complete
	2012	Iranian production line falls dormant; several modernization and retrofit programs ongoing worldwide
	2013	Production dormant; several modernization and retrofit programs ongoing worldwide

Worldwide Distribution/Inventories

Export Potential. The T-72 enjoys wide distribution on the international market, with at least 37 nations currently maintaining various versions of the tank in their inventories. The modernization and retrofit packages available will ensure continued use of the T-72 throughout the forecast period.

Countries. The following inventory data reflect Forecast International's information through 2012.

Africa	Angola	47
	Algeria	295
	Ethiopia	207
	Libya	260
	Sudan	Unknown
Asia	Azerbaijan	101
	India	1,500
	Kazakhstan	630
	Kyrgyzstan	210

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	Tajikistan	40
	Turkmenistan	40
	Uzbekistan	97
Europe	Armenia	102
	Azerbaijan	147
	Bosnia-Herzegovina	39
	Belarus	1,756
	Bulgaria	433
	Croatia	49 (a)
	Czech Republic	542
	Finland	160
	Georgia	31
	Hungary	161
	Macedonia	32
	Poland	809
	Romania	30
		11 (TR-125)
	Russian Federation	13,020
	Slovak Republic	272
	Slovenia	44 (M-84)
	Sweden	5
	Ukraine	1,105
	Yugoslavia (Serbia)	99
		359 (M-84)
Middle East	Iran	538
	Iraq	596
		6 (M-84)
	Kuwait	194 (M-84)
	Syria	1,506
North America	United States	42
South America	Venezuela	25

(a) Includes some M-84 tanks.

In addition, international arms merchants reportedly hold "several hundred" T-72 tanks in various conditions.

The status of the remaining Iraqi T-72 inventory remains unclear in the wake of Operation Iraqi Freedom. The Polish ZM Bumar-Labedy SA firm reportedly upgraded at least 100 surviving Iraqi T-72M1 tanks to the PT-91 Twardy configuration.

Forecast Rationale

Production of the T-72 main battle tank in the Russian Federation remains dormant. The T-90 MBT has superseded the T-72 in serial production for the Russian Army. The Rosoboronexport organization continues to offer the remaining Russian T-72 tank inventory for export.

The T-72 enjoys wide distribution on the international market, with at least 36 nations currently maintaining various versions of the tank in their inventories. The modernization and retrofit packages available will ensure continued use of the T-72 throughout the next decade.

Licensed Production Ceases

All new licensed T-72 production is now also dormant. The T-72 production run in Iran was reportedly completed in 2012. With the completion of the Iranian licensed-production programs, we expect no new T-72 production.

Focus on Modernization & Retrofit

As the level of modernization and retrofit activity related to the T-72 tank has been growing in the past several years, the Russians are becoming more active in this potentially lucrative market segment. The center of gravity for the T-72 program has clearly shifted to the development of various modernization and retrofit

packages, many of which rationalize the T-72 with NATO MBT requirements.

However, T-72 modernization and retrofit programs will soon reach the point of diminishing returns as they add sufficient cost to the bargain-basement T-72, placing it in direct competition with high-end MBT designs such as the Leopard 2 and M1A1 Abrams. At some point, the T-72 will clearly lose any advantage on the international market.

While the T-72 will remain in service throughout the next decade and beyond, its days as a significant force in the international MBT market are clearly numbered.

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