Vehicles Lite Companion 2

Kenneth Peters

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Contents

RUSSIAN VEHICLES

This chapter presents designs in the standard format used to describe vehicles in other ***GURPS*** books. Use these as a guide when creating your own vehicle designs.

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Vehicle Key

The following descriptions list components in an easy-to-use format:

Abbreviations: Those in use include Tur for turrets, Whl for wheels, OM for open mount, and Wng for wings.

Body and Subassemblies: The number following the body and each subassembly gives the bonus or penalty when attacking that particular part of the vehicle.

Power and Propulsion (P&P): Describes the size and type of all propulsion and lift systems, power plants, and energy banks.

Fuel: For fuel, gives the amount and type (with Fire number in parentheses).

Occupancy: Each number is followed by an abbreviation. CCS is a cramped crew station, NCS a normal crew station, and RCS a roomy crew station. Passenger seats use CS, NS, and RS for cramped, normal, and roomy positions, respectively. An exposed position is noted with an X (for instance, XNCS for an exterior normal crew station). Cycle crew stations will be listed as "cycle."

Cargo: Gives capacity in cubic feet. Each cubic foot generally holds 20 lbs.; exceptions are noted.

Armor: Vehicles without this notation have no armor. F indicates frontal armor, RL right and left, B back, T top, and U underbody. If the entire body or subassembly has the same armor, only one value will be listed. Any letters following PD/DR values indicate laminate (L) or composite (C) armor. Special circumstances will be detailed just below the tabular columns of armor values.

Weaponry: Vehicles without this notation have no integral weapons. For those that do, the location notation also gives the facing of the weapon, per *Armor.* Ammunition listings include all shots stored on the vehicle. Following each weapon is the bonus provided by the vehicle's targeting systems. For other weapon statistics, see the *Weapons Tables* (p. 00).

Equipment: Grouped by location, these are the gameplay-essential accessories to the vehicle; others will be described in *Design Notes,* below.

Statistics: *Dim.* is a *rough* indication of dimensions, usually length¥width¥height. *Payload* is the sum of the usual payload (occupants and cargo), fuel, and ammunition weights. *Price* is the full price excluding fuel and ammunition. *Lwt.* is loaded weight; the lowercase letter before a performance rating indicates a mode of travel; *g* is ground, *a* is air, *w* is water, e.g., *gSpeed* is top ground speed, and *aMR* is the aerial maneuver rating.

Design Notes: A compilation of everything else, the vehicle accessories and data that rarely come up in play, but are useful for reverse-engineering or modifying the design.

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Environmental Controls: Unless otherwise noted, Russian vehicles lack efficient air conditioning units, but they have quite good heaters! For this reason adjust the comfort temperature in hot weather down only 10° -- and that’s being generous in many cases!

Maintenance

Russian armored vehicles tend to be cheaply produced, with very uneven production standards and can be unreliable over time (hence the low HT of most Russian armored vehicles). But when it inevitably breaks down repairs are usually simple, require little on the way of specialized tools, and can be reliably done by even poorly trained personnel. The Russian principle of keeping maintenance simple has had a growing appreciation among customers who increasingly cannot afford the massive investment in contracting and supplies required by competing vehicles from the United States and Europe.

KURGAN BMP-1 IFV

Designed by the Isakov Design Bureau in the 1960s, the *Boevaya Mashina Pekhota*-1 (Obiekt 765) pioneered the infantry fighting vehicle concept and revolutionized Russian mechanized infantry tactics. Entering production in 1966, thousands were produced before production stopped in the 1980s; it remains in service with dozens of countries – including Germany, Sweden and Poland.

The BMP-1 has a three-man crew. The driver and commander sit in the main hull on the left side and the gunner sits in the small one-man turret. The commander has very limited situational awareness from his position behind the driver, even with his hatch open the turret blocks most of his vision. The gunner has the best view but is kept busy loading the 73mm cannon and locating targets. To fire the 9K11 Malyutka missile the gunner must retrieve the control panel from beneath his seat and lock them in place between his legs. After firing he then must try and keep the missile in view through his vision periscopes as he directs its flight using the standard joystick control. He can reload the missile rail by opening a hatch on the forward part of the turret and sliding a new missile onto the rail, this process takes 1 minute even for a trained individual (and of course he can do nothing else during this time).

The troop compartment sits eight individuals back-to-back in bucket seats that redefine the term "cramped." The troops exit the vehicle through two doors in the rear or through four hatches on the roof (two each side). The top hatches can be locked open for easy access or to fire weapons from inside the troop compartment (such as a surface-to-air missile). The rear doors are a safety hazard in combat as each one holds a fuel tank. There are nine vision blocks and firing ports in the troop compartment: one on the left rear door and four on each side of the hull. The ports have a vacuum exhaust to remove fumes and can be used without breaking the NBC seal in most cases (due to the overpressure effects).

The version listed here is the BMP Model 1970, which incorporates a number of minor changes over the initial production version, such as improved amphibious characteristics. The BMP-1 uses 7.84 gallons of diesel fuel per hour. A full load of fuel and ammo is $38,096.80. Visibility is poor. The turret rotates at 18° per turn.

BMP-1 Model 1970

Subassemblies: Body +4, full-rotation Turret +2, Tracks +3; full-rotation Open Mount -4.

P&P: 224-kW tracked drivetrain with 77.6-kW water drive; 224-kW std. turbocharged multi-fuel diesel; 8,000-kWs lead-acid batteries.

Fuel: 214 gallons diesel (fire 9).

Occupancy: 2 CCS (body), 1 CCS (turret), 8 CS (body). ***Cargo:*** 40 cf.

Armor	**F**	**RL**	**B**	**T**	**U**
Body:	6/70	4/50	4/45	4/16	4/15
Turret:	5/105	5/81	5/45	5/16	-
Tracks:	4/20	4/20	4/20	4/20	4/20
OM:	0/0	0/0	0/0	0/0	0/0

Weaponry

73mm LP cannon/2A28 [Tur:F] (40 rounds) +0.

7.62¥54mmR MG/PKT [Tur:F] (2,000 rounds) +0.

Equipment

Body: Medium-range radio; smokescreen; 11-man environmental control; 11-man NBC kit. *Turret:* 6¥ LLTV (gunner); 1-mi. IR searchlight. *Open Mount:* 0.25-mi. IR searchlight. External (on Turret): 25-lb. dry hardpoint.

Statistics

Size: 21'¥9'¥7' *Payload:* 4,992.15 lbs. *Lwt.:* 16.5 tons

Volume: 860 cf. *Maint.:* 57 hours. *Price:* $121,555.

HT: 12. *HP:* 1,200 *Tur:* 300 *Tracks:* 450 each *OM:* 3.

*gSpeed:*45 g*Accel:* 3 *gDecel*: 20 *gMR:* 0.25 *gSR:* 6

Ground Pressure Very Low. 4/5 Off-Road Speed *wSpeed:* 6

Design Notes

Vehicles Lite design. Body is 500 cf. with 60° F slope. Turret is 60 cf. with 30° slope on all sides. Tracks are 300 cf. Open mount is 0.1 cf. Structure is heavy and cheap. Armor is standard metal. Structure is sealed. Mechanical controls. 13.4 cf. of empty space in the body and 3.9 cf. in the turret. Empty weight is 28,001 lbs. Typical ammo mix for the 75mm cannon is 30 HEAT and 10 HE, stored in the body. The missiles are Malyutka-M (AT-3B). Design EWt. is within 2% of official unloaded weight of 12.5 tonnes and LWt. is within 10% of the official combat weight of 12.5 tonnes (which presumably includes the standard load of infantry weapons and ammo). Top ground speed is a bit higher then reported but is within reason for optimal conditions.

Variants: The BMP-1 is actually an improved version of the original BMP, which never entered production. The earliest models, also referred to as BMP-1 Model 1966, were different in minor ways, notably a slightly shorter body and somewhat less stable water characteristics.

The BMP-1K (1974) is the command version. It has a remodeled troop compartment capable of holding a map table and a medium range radio w/scrambler. The seats are removed and the firing ports are removed on the right side. There are only two roof hatches. 73mm ammo is reduced to 20 rounds and the gunner must load them by hand (double reload time). Two SA-7 or SA-14 missiles are carried for impromptu air defense. The BMP-1K1 and K2 have a second medium range radio w/scrambler. The 3K3 has long range radio w/scrambler (can only be used when stopped).

The BMP-1KSh (1979) is a staff command vehicle. It is similar to the BMP-1K except it has five medium range radios w/scramblers.

Russia also markets a number of upgrades for existing users of the BMP-1, such as the BMP-1G (1993). This version removes the hardpoint for the Malyutka and adds an open mount for a 119mm SACLOS ATGM/9M114 Fagot (AT-4) or 135mm SACLOS ATGM/9M113 Konkurs (AT-5) launcher with three rounds – the crew must exit the vehicle to reload the launcher. A 30mm AGL/AG-17 with 103 rounds is installed to the left of the 73mm cannon. The engine and drivetrain is uprated to 261-kW and an air conditioning system is added to the environmental controls.

The BMP-1M (1995) removes the turret and uses a Kliver drop-in replacement (p. 00) along with a 268-kW engine/drivetrain.

MOROZOV BUREAU T-54 MBT

The T-54 (Obiekt 137) was developed in the late 1940s as a follow-on to the disappointing T-44. Production started in 1947, and various upgraded models remained in production within Russia until 1981. Over 50,000 were produced in Russia, and thousands more were produced in China as the Type 59. Thousands were sold or gifted to Soviet client states over the decades, rebuilt examples still roam many battlefields and the gutted hulks of their unluckier brothers are a common sight around the world.

The T-54 has 4-man crew. The driver is seated in the hull with an access hatch and an escape system behind the seat while the commander, gunner and loader are located in the turret. The driver can operate the fixed machinegun located in the body using a firing switch on his right steering lever and both the commander and gunner can move the turret and fire the 100mm gun. Crew fatigue is a significant issue, especially in hot environments that overload the limited environmental controls. The tank operates well in cold environments, incorporating a compressed air starter system for frigid conditions. This system has enough charges for about six starts before needing replacement.

The version listed here is typical of the original series produced from 1947 to 1955. It uses 14.07 gallons of diesel fuel per hour. A full load of fuel and ammo is $14,216.80. Visibility is poor. The turret rotates at 17° per turn.

T-54 Model 1953

Subassemblies: Body +4, full-rotation Turret +3, Tracks +3, limited-rotation Open Mount -1.

P&P: 402-kW tracked drivetrain with ; 402-kW std. turbocharged multi-fuel diesel; 12,095-kWs lead-acid batteries.

Fuel: 214 gallons diesel (fire 9).

Occupancy: 3 CCS (turret), 1 CCS (body). ***Cargo:*** 0 cf.

Armor	**F**	**RL**	**B**	**T**	**U**
Body:	6/270	4/140	4/130	4/90	4/55
Turret:	4/570	4/420	4/180	5/100	-
Tracks:	4/30	4/30	4/30	4/30	4/30
OM:	0/0	0/0	0/0	0/0	0/0

Weaponry

100mm rifled gun/D-10T [Tur:F] (34 rounds) +0.

7.62¥54mmR MG/SGMT [Tur:F] (1,500 rounds) +0.

7.62¥54mmR MG/SGMT [Bod:F] (1,500 rounds) +0.

12.7¥108mm MG/DShKM [OM:F] (500 rounds) +0.

Equipment

Body: Smokescreen; 4-man environmental control. *Turret:* Medium-range radio; 7¥ telescope (gunner); 5¥ telescope (commander). *Open Mount:* Universal mount for 12.7mm machine gun.

Statistics

Size: 13'¥7'¥5' *Payload:* 3,949 lbs. *Lwt.:* 38.79 tons

Volume: 734 cf. *Maint.:* 21 hours. *Price:* $329,710.

HT: 7. *HP:* 900 *Tur:* 600 *Tracks:* 375 each *OM:* 20.

*gSpeed:*40 g*Accel:* 3 *gDecel*: 20 *gMR:* 0.25 *gSR:* 6

Ground Pressure Low. 2/3 Off-Road Speed

Design Notes

Vehicles Lite design. Body is 345 cf. with 60° F slope. Turret is 180 cf. with rounded design (treated as 30° top slope). Tracks are 207 cf. Open mount is 2 cf. Structure is heavy and cheap. Armor is standard metal. Structure is waterproofed. Mechanical controls. 8.6 cf. of empty space in the body and 11 cf. representing additional systems. Empty weight is 73,629 lbs. Typical ammo mix for 100mm gun is 13 APFSDS (5 in turret), 4 HE (1 in turret), and 16 HEAT (5 in turret). 12.7mm MG ammo is in turret. Design LWt. is within 4% of official combat weight of 34 tonnes. Most T-54's on the open market will be available for a fraction of the listed amount – as low as $10,000 cash in some areas (although it may require rust stripping and an engine overhaul).

Variants: The T-54 has innumerable variants and upgrades. The T-54A was introduced in 1955 and had partial gun stabilization and a compact fire suppression system. A few were later equipped with IR searchlights and viewers. The T-54AK command version reduces the ammunition supply and adds additional radios in the turret. The Polish command version is known as the T-54AD (D for *dowodca*, "command") extends the turret to add space for the radios.

Late-production T-54s have enough differences that they are described under the T-55.

MOROZOV DESIGN BUREAU T-72 MBT

Designed as an economical alternative to the T-64, the T-72 series of medium tanks has become one of the signature vehicles for the Russian military and the client states of the former Soviet Union. Cheap to produce, reasonably reliable, and heavily armed by all accounts it is an excellent design – but its combat history is mediocre at best. Typically poor crew training, bad tactics and uneven standards for indigenous ammunition production compound the flaws of the design, such as poor ergonomics and unreliable autoloader. The mauling the Iraqi T-72s (mostly early export versions) received during the first Gulf War at the hands of Coalition M1 and Challenger tanks forced the Russians to bend over backwards with public relations to potential customers and led to the renaming of the T-72BM1 to the T-90. In trained hands the later T-72 versions are very capable, but only the most apologetic can claim it has any parity with the most modern tanks. Whatever it's faults, thousands are in service around the world (an estimated 7,000 in Russia alone) and it will remain on the battlefield for at least the next decade.

The rear hardpoints have a quick-eject system and are capable of holding up to two 73-gallon fuel tanks. In addition, there is an external fuel cell on the right running board that can hold 130 gallons of fuel – the driver can select which tanks are to be used (usually the order is: drop tanks, external cells, internal tanks). Along the left running board is a lubricant tank and storage boxes for tools and personal effects. Two storage boxes are located on the turret, one directly to the rear and the second behind and to the right next to the commander's cupola. A snorkel is carried on the rear left of the turret – this takes 20 minutes to set up with the entire crew assisting and can be knocked down within 2 minutes if necessary.

The most common variant is the T-72B (Obiekt 184), which entered service in 1985. The T-72S Shilden (1987) is the functionally identical export version. The T-72 uses 21.91 gallons of diesel fuel per hour. A full load of fuel and ammo is $88,576.40. Visibility is poor. The turret rotates at 16° per turn.

T-72B/T-72S "Shilden"

Subassemblies: Body +4, full-rotation Turret +3, Tracks +3, limited-rotation Open Mount #1 +2; two Open Mounts #2 and #3 +2.

P&P: 626-kW tracked drivetrain; 626-kW std. turbocharged multi-fuel diesel; 27,200-kWs lead-acid batteries.

Fuel: 317 gallons diesel (fire 9).

Occupancy: 2 CCS (turret), 1 CCS (body). ***Cargo:*** 0 cf.

Armor	**F**	**RL**	**B**	**T**	**U**	
Body:	6/1,000L	4/250L	4/140	4/70	4/55	
Turret:	5/1,200L	5/405	4/220	4/220	-	
Tracks:	4/30	4/30*	4/30	4/30	4/30	
OM 1:	0/0	0/0	0/0	0/0	0/0	
OM 2/3:		0/0	0/0	0/0	0/0	0/0

* Plus DR 30L side skirts.

Weaponry

125mm smoothbore gun/2A46M [Tur:F] (39 rounds) +3.

7.62¥54mmR MG/PKT [Tur:F] (2,000 rounds) +0.

12.7¥108mm MG/NSV [OM:F] (300 rounds) +0.

Equipment

Body: Light amp. (driver); compact fire suppression; smokescreen; 3-man NBC kit. *Turret:* Full stabilization for 125mm gun and 7.62mm machine gun; medium-range radio with scrambler; 8¥ telescope (gunner); 5¥ telescope (commander); 6¥ LLTV (gunner); 1-mi. IR searchlight; laser rangefinder; dedicated targeting computer w/software for 125mm gun. *Open Mount 1:* Universal mount for 12.7mm machine gun. *Open Mount 2/3:* Two smoke/decoy dischargers. *External:* Bulldozer blade; two 500-lb. hardpoints.

Statistics

Size: 21'¥8'¥5' *Payload:* 5,228 lbs. *Lwt.:* 49.98 tons

Volume: 1,060 cf. *Maint.:* 17 hours. *Price:* $1,301,780.

HT: 7. *HP:* 1,200 *Tur:* 750 *Tracks:* 450 each *OM1:* 26 OM2/3: 12 each.

*gSpeed:*40 g*Accel:* 3 *gDecel*: 20 *gMR:* 0.25 *gSR:* 6

Ground Pressure Low. 2/3 Off-Road Speed

Design Notes

Vehicles Lite design. Body is 500 cf. with 60° F slope. Turret is 255 cf. with rounded design (treated as 30° slope on F and RL sides). Tracks are 300 cf. Open mount #1 is 3 cf. Open mounts #2 and #3 are 1 cf. each. Structure is heavy. Armor is standard metal except: turret F and body F is expensive laminate, body RL is standard laminate, track skirt is standard laminate. Sealed body and turret. Mechanical controls. 3.6 cf. of empty space in the body, 2.7 cf. in the turret and 0.55 cf. in open mount #1. Empty weight is 94,738 lbs. The 125mm gun is fitted as a gun/launcher. Typical ammo mix for 125mm gun is 12 APFSDS (5 in turret), 21 HE (15 in turret), and 6 HEAT (2 in turret). Six AT-11 missile rounds are carried in the body; these missiles use the statistics from ***Vehicles Lite***, but see below for a more detailed treatment. Only rounds in the body are considered "ready rounds" and placed into the autoloader; turret rounds must be manually transferred (triple reload time). Cost is in line with the export price. Design LWt. is within 2% of official combat weight of 44.5 tonnes.

Features: The driver has IR headlights (illuminates out to 60 yards). The commander's telescopic sight is also an IR viewer with 4¥ magnification (requires the use of the IR searchlights). The external fuel cells are a "special effect" component and not purchased separately; they are treated as DR1 ultralight fuel tanks (fire +2) and are hit 50% of the time on a successful attack against the top of the hull. The gunner's LLTV is part of the missile control system and can only be used for general observation if a missile has not been launched.

Reactive Armor: Many T-72s are fitted with first-generation *Kontakt-1* explosive reactive armor (ERA). A typical suite covers the entire front facing of the body and turret, but protects only half the right and left facings (protects on a roll of 1-3 on 1d6). The plates add 2.9 tons to loaded weight and cost about $291,670. A similar installation of second-generation *Kontakt-5* is 7 tons and $1.4 million.

Variants:.The original T-72 (Obiekt 172M, 1973) lacks the laser rangefinder, driver image intensification, decoy dispensers, and track skirts. It is armed with the 2A26M gun, which cannot fire the 9M119 missile – the earliest production models have only partial stabilization for the gun. Reduce front armor to 6/700L standard laminate and front turret armor to 5/800L standard laminate. Downrate the engine and drivetrain to 552-kW (19.32 gph). The export version (1975) differs in minor ways (number of stored rounds is 39 for example). The T-72K (1975) was the command variant; the model for company commanders adds a second medium-range radio with scrambler and the regimental/battalion commander's model adds a long-range radio with scrambler (can only be used when the vehicle is not moving).

The T-72A (1979) uses the T-72B statistics except reduce front turret armor to 5/900L standard laminate. The T-72AK (1979) adds a second medium-range radio with scrambler. The T-72M (1980) and T-72M1 (1982) export model is functionally identical but are rarely seen with ERA. The T-72AV (1985) adds Kontakt-1 ERA.

The T-72B1 (1985) and T-72S1 (1987) cannot fire the 9M119 missile; the T-72S1 is usually shipped with Kontakt-1 ERA. The T-72BM (1992) is fitted with Kontakt-5 ERA. The T-72M1 is different enough to be treated as a separate design.

The MTU-72 AVLB (Armored Vehicle-Launched Bridge) is a T-72 that has had the turret removed and replaced with a 15-yard vehicular bridge. The BREM-1 armored recovery vehicle lacks the turret – instead mounting a 13-ton crane, ST11,000 winch (110 tons), ST2,750 winch (27.5 tons), hitch, and strengthened structure (extra-heavy).

(((START BOX)))

TULA KBP TKB-799 KLIVER TURRET

The Kliver turret is a privately developed upgrade that can be installed on a number of vehicles – such as the BTR-80, BMP-1 and even T-72 hulls. The turret has also been marketed for installation on naval patrol craft.

The turret seats a gunner to the left, with the 30mm cannon in the center and ammo on the right. The four SACLOS Kornet missiles are mounted on the right and above the main turret housing.

A full load of ammo is $282,860. Visibility is good.

Subassemblies: Turret +3, Open Mount +2.

P&P: None.

Fuel: None.

Occupancy: CCS. ***Cargo:*** 0 cf.

ArmorF	**RL**	**B**	**T**	**U**
*Turret:*4/20	4/20	4/20	4/20	4/20

Weaponry

30mm autocannon/2A72 [Tur:F] (350 rounds) +3.

7.62¥54mmR MG/PKT [Tur:F] (2,000 rounds) +0.

Equipment

Turret: Full stabilization for 30mm autocannon and 7.62mm machine gun; 12¥ telescope [F]; 5-mi. thermograph [F]; laser rangefinder; dedicated targeting computer w/software for 30mm cannon. *External (on Open Mount):* 200-lb. dry hardpoint.

Statistics

Size: -- *Payload:* 1,162.6 lbs. *Lwt.:* 1.59 tons

Volume: 39 cf. *Maint.:* 54 hours. *Price:* $136,220.

HT: 12. *HP:* 225 *OM:* 32.

Design Notes

Turret is 35 cf. and open mount is 4 cf. Turret has a heavy frame with heavy compartmentalization. Armor is standard metal. Structure is sealed. 2.9 cf of empty space. Empty weight is 2,009 lbs. Four Kornet (AT-14) missiles in disposable tubes (50 lb. capacity) are fitted to the open mount hardpoint and are included in payload weight and cost.

Variants: Initial versions lack the thermograph, instead using a light amplification system.

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KAMOV KA-50 *CHERNAYA AKULA* ATTACK HELICOPTER

The Ka-50 Chernaya Akula ("Black Shark") is a modern close-support helicopter that has been heavily promoted by Russia for the export market. Known to NATO as the "Hokum-A", the Ka-50 was incorrectly assumed to be an air-to-air combat helicopter when it was first reported. Initially given the marketing name "Werewolf" it was officially changed to Black Shark after a Russian movie by the same name popularized the term.

The Ka-50 is a single-seat design with coaxial counter-rotating rotors. Two small wings are mounted midbody, each with two hardpoints and a countermeasures pod mounted on the tips. The hardpoints are unusual in that movable mounts can be attached – rotating down up to 12°. The body has an aggressive look, with retractable landing wheels and a streamlined fuselage with large windows. One of the most unique features of the Ka-50 is the pilot ejection seat: when activated, the rotor blades and canopy are explosively separated and the seat is launched, recovering even if it was launched while inverted.

The Ka-50 is one of the most advanced Russian helicopters in existence, but has had a number of troubling problems with pilot workload, compounded by the addition of advanced electronics but relatively primitive controls. The Russians have been aggressive in forming partnerships with France and Israel to upgrade the helicopters electronics and ease these problems.

It burns 228.62 gallons of jet fuel per hour. A full load of fuel and cannon ammunition is $5,935. Visibility is good.

Ka-50

Subassemblies: Body +4, two Multiple Main Rotors -1, two Stub Wings –2, three Retractable Wheels -1.

P&P: Two 1,600-kW MMR drivetrains; two 1,633-kW HP gas turbines; 4,800 kWs advanced battery.

Fuel: 485 gallons jet fuel (fire 13).

Occupancy: 1 CCS. ***Cargo:*** 0 cf.

ArmorF	**RL**	**B**	**T**	**U**
*Body:*4/15	4/15	4/15	4/15	4/15
*Wings:*4/15	4/15	4/15	4/15	4/15
*Rotor:*4/10	4/10	4/10	4/10	4/10

Wheels: 4/15	4/15	4/15	4/15	4/15	
Pilot Compartment:	--	4/65	4/65	--	4/65
Pilot Windshield:	4/20	--	--	--	--

Weaponry

30mm autocannon/2A42 [Bod:F] (470 rounds) +0.

Equipment

Body: Full stabilization for 30mm autocannon; three medium-range radios; long-range radio with scrambler; digital datalink with software; autopilot; military GPS; navigation instruments; IFF; inertial navigation system; HUDWAC; laser rangefinder [F]; laser spot tracker [F]; two advanced radar detectors [F/B]; laser sensor; computer terminal; small computer; flight recorder; compact fire suppression; ejection seat. *Wings:* Two advanced radar detectors; four smoke/decoy dischargers with 4 reloads (chaff or flare). *External (on wings):* Four 1,500-lb. hardpoints.

Statistics

Size: 53'¥24'¥16' *Payload:* 10,473.5 lbs. *Lwt.:* 13.79 tons

Volume: 402 cf. *Maint.:* 12 hours. *Price:* $2,722,010.

HT: 12. *HP:* 1,800 *MMR:* 396 each *Wings:* 180 each *Wheels:* 40 each.

aSpeed: 265 *aAccel:* 4 *aDecel*: 30 *aMR:* 7.5 *aSR:* 3

Stall speed 0.

Design Notes

Body is 350 cf.; each rotor is 7 cf.; each stub wing is 10 cf.; wheels are 17.5 cf. Body structure is extra-heavy, rest of frame is heavy. Body has heavy compartmentalization. Entire structure is made with expensive materials. No streamlining. Armor is standard composite on body, pilot compartment, stub wings, and landing gear – expensive composite on window and rotors. Structure is sealed. Electronic controls. Fuel tank is light, self-sealing. Empty weight is 17,120 lbs. Performance is without loaded hardpoints, with hardpoints loaded aSpeed drops to 260 mph. Realistic top speed is lower for fuel economy reasons (about 200 mph in most cases). 9.1 cf. empty space in body, 6.6 cf. empty in each wing. Typical ammo mix for 30mm gun is 240 AP and 230 HE. Ammo is stored in an anti-blast magazine. Actual export price will be 4-5¥ the amount listed. Movable pylons should be purchased as casemate mounts for the attached munitions.

ZSU-23-4 SHILKA SPAAG

The ZSU-23-4 Shilka ("Awl") was developed to protect against flying targets below 1,500 yards and was built cheaply – many of the parts are the same as on the SU-85 self-propelled gun and PT-76 light amphibious tank. It replaced the older ZSU-57-2 in 1966, beating out the competing ZSU-37-2 Enisei design, and has remained in service with dozens of countries and has spawned an entire market for upgrades and modifications.

Main armament consists of four AZP-23M 23mm cannons that can elevate to +85º and depress to -4º. The ZSU-23-4 can engage targets using only one or two of the four cannon. When firing, the high number of tracers (1 in 4) and gunsmoke creates an impressive fireworks show. The RPK-2 Tobol radar (NATO designation "Gun Dish") is mounted at the rear of the turret and can be folded down when not in use. An optical sight enables the weapons to be used in an ECM environment. Most of the weapon firing sequence is completely automated, the radar operator simply confirms a target as hostile and switches the radar to tracking mode – the targeting computer automatically adjusts the turret and gun angle -- and wait for the "target in range" tone before engaging.

The Shilka has proven itself in combat, but has not aged well as countermeasures were developed that exploited its vulnerabilities – notably the simplistic radar tracking system and limited range. The original Shilkas in Russian and allied service are slowly being replaced by upgraded variants and the 2S6M air defense gun/missile system. An unknown number from Russian mothball storage were gifted to the Afghanistan government in 2002. Over 7,000 were built from 1965 to 1983 from factories in Russia and Czechoslovakia.

The version listed here is the ZSU-23-4M, introduced in 1977. It features digital electronics and can be linked to a separate fire-control network. The guns also feature an armored covering and the RPK-2 radar can also be rotated separately from the main turret, which was not possible in earlier versions. The ZSU-23-4M uses 7.28 gallons of diesel fuel per hour when using the main engine, 2.1 gallons per hour if using the auxiliary generator. A full load of fuel and ammo is $10,079.20. Visibility is poor. The turret rotates at 70° per turn.

ZSU-23-4M

Subassemblies: Body +3, full-rotation Turret +3, Tracks +3, full-rotation Open Mount – 1.

P&P: 208-kW tracked drivetrain; 208-kW std. multi-fuel diesel; 60-kW std. multi-fuel diesel; 10,000-kWs lead-acid batteries.

Fuel: 66 gallons diesel (fire 9).

Occupancy: 3 CCS (turret), 1 NCS (body). ***Cargo:*** 0 cf.

Armor	**F**	**RL**	**B**	**T**	**U**
Body:	6/80	4/40	4/40	4/40	4/40
Turret:	5/37	5/25	4/25	4/25	-
Tracks:	4/20	4/20	4/20	4/20	4/20

Weaponry

4¥23mm Autocannon/AZP-23M [Tur:F] (2,000 rounds) +3.*

* Each pair linked, another link fires all four at once.

Equipment

Body: Compact fire suppression; navigation instruments; 4-man environmental control; 4-man NBC kit. *Turret:* Anti-blast magazine for 23mm autocannon rounds; partial stabilization for 23mm autocannons; universal mount for 23mm autocannons; medium-range radio with scrambler; digital datalink w/software; 4¥ telescope (gunner); dedicated targeting computer w/software for 23mm autocannons. *Open Mount:* 10-mi. nontargeting air-search radar; 8-mi. air-search radar.

Statistics

Size: 21'¥8'¥5' *Payload:* 3,196 lbs. *Lwt.:* 14.93 tons

Volume: 580 cf. *Maint.:* 41 hours. *Price:* $235,730.

HT: 11. *HP:* 900 *Tur:* 600 *Tracks:* 300 each *OM:* 20

*gSpeed:*35 g*Accel:* 2 *gDecel*: 20 *gMR:* 0.25 *gSR:* 4

Ground Pressure Low. 2/3 Off-Road Speed

Design Notes

Vehicles Lite design. Body is 280 cf. with 60° F slope. Turret is 130 cf. with 30° F slope. Tracks are 168 cf. Open mount is 2 cf. Structure is heavy and cheap. Armor is cheap metal. Sealed structure. Mechanical controls. 20.9 cf. of empty space in the turret and 30 cf. in the body for further upgrades; note that much of the turret "empty space" is actually taken up by radar electronics. Empty weight is 26,668 lbs. Typical ammo mix for 23mm autocannons is 1,500 SAPHE and 500 API. Design Lwt. is within 14% of the official combat weight of 22.55 tons.

Features: The driver has IR headlights (illuminates out to 60 yards). Both the driver and commander have IR viewers. The commander's cupola hatch can have a 0.2 mi. IR searchlight fitted. The auxiliary generator is not connected to the drivetrain.

Variants: The ZSU-23-4M Model 1985 adds an IFF system to the open mount. Late production units incorporate incremental improvements in the electronics and crew ventilation system that improves reliability and comfort.

During the war in Afghanistan, several Shilkas had their radars, targeting computer and datalink removed to increase autocannon ammo by 2,000 rounds. The gunner station was also fitted with a light amplification system. These vehicles were used for ground escort and antipersonnel duties.

Most early Shilka versions differ only in external fittings and styling. The ZSU-23-4 Model 1965 (preseries and initial production), ZSU-23-4V Model 1968, and ZSU-23-4V1 Model 1972 lack the digital datalink and the targeting computer – the original analog targeting computers capabilities are assumed to be part of the full stabilization bonus.

Iranian vehicles have an advanced laser detector and two smoke/decoy dischargers installed on the turret (the dischargers are in open mounts).

In 2002 the Polish company Osrodek Badawczo-Rozwojwy Sprzetu Mechanicznego w Tarnowie began advertising the ZSU-23-4MP *Biala*. This upgrade replaces a number of older subsystems with new components, as well as a major revamp to the fire control system. The Tobol radar is replaced with an electro-optical package consisting of a ¥10 LLTV, 6 mi.-thermograph and laser rangefinder in a full-rotation turret, with the sensors in a universal mount. One the sides of the turret are two limited-rotation cupolas, each with two Grom surface-to-air missiles. Navigation and fire control cueing is enhanced by the addition of a military GPS and the radio is upgraded to NATO standard. The 23mm cannons have been tested with APDS-T ammo. As of 2003 it remains in the prototype stage awaiting a purchasing decision from the Polish government.

The ZSU-23-4 *Donets* (2001) is a new vehicle with a modified ZSU-23-4 turret on a T-80 hull.

UAZ-469 UTILITY TRUCK

The UAZ-469 is a widely proliferated 4¥4 utility truck produced by the former countries of the Soviet Union. It replaced the older UAZ-69 beginning in 1973. Performance is mediocre but the vehicle can handle severe abuse and operate in frigid Russian weather.

It uses 2.08 gallons of gasoline fuel per hour. A full load of fuel is $31.50. Visibility is good.

UAZ-469

Subassemblies: Body +3, four off-road Wheels +1.

P&P: 52-kW all-wheel drive; 52-kW std. gas; 3,000-kWs lead-acid batteries.

Fuel: 21 gallons gas (fire 11).

Occupancy: 1 XNCS, 1 XNS, 3 XCS. ***Cargo:*** 20 cf.

ArmorF RL B T U

All: 3/5 3/5 3/5 3/5 3/5

Equipment

Body: 7-man environmental control. *External:* Hitch and pin.

Statistics

Size: 9'¥4'¥4' *Payload:* 1,926 lbs. *Lwt.:* 2.56 tons

Volume: 126 cf. *Maint.:* 123 hours. *Price:* $26,355.

HT: 12. *HP:* 450 *Wheels:* 75 each.

*gSpeed:*70 g*Accel:* 4 *gDecel*: 10 *gMR:* 1 *gSR:* 4

Ground Pressure High. 1/4 Off-Road Speed

Design Notes

Vehicles Lite design. Body is 105 cf. and wheels are 21 cf. Body and wheel structure is heavy. Armor is cheap metal. Mechanical controls. 3.69 cf. of empty space in the body. The exposed seats and the cargo area are covered with a ragtop. Cargo bay is open. Note that the actual production models are significantly cheaper then the cost here shows – they can be considered *cheaply built* for half cost, -1 HT and Maint. 87 hours.

Variants: The UAZ-469B is the export version with shoddier suspension and less ground clearance– use 1/6 Off-Road Speed.

MIL MI-24 ATTACK/TRANSPORT HELICOPTER

Commonly known by its NATO reporting name of 'Hind', the Mi-24 was designed in the 1960s to fulfil a requirement for an armed attack helicopter capable of carrying up to eight combat troops. Over 2,500 Mi-24s of various types were built, and new models remain in low-rate production. Hundreds more have been retrofitted with new components and there is a large market for manufacturers offering upgrade packages.

The Mi-24 has what is now considered a typical gunship configuration, with stepped tandem seating for the two crew and two stub wings for carrying weapons. The pilot sits above and behind the weapon operator, each with individual canopies and armored seats. The weapons operator is also a co-pilot and has a set of "fold-out" flying controls with retractable pedals for use in case the pilot becomes incapacitated. The body is wide to accommodate eight folding passenger seats, although troops are rarely carried – instead being used to carry two 225-gallon fuel tanks, additional ammunition, stretchers for casualty evacuation, or general cargo. There is a two-piece door in either side of the main compartment, hinged to open upward and downward respectively, with steps integrated into the lower piece. Four small windows with rifle rests and firing ports on each side allow small-arms fire from inside the vehicle.

The distinctive aggressive appearance made it one of the most recognizable aircraft in the entire world – and gave it nicknames such as Krokodil (Crocodile) and Gorbach (Hunchback) in Russian service.

The version described here is the Mi-24D, which entered production in 1977 and saw combat in Afghanistan, the Iran-Iraq war, Chad, and Angola. The export version is known as the Mi-25. The Mi-24D burns 200.76 gallons of jet fuel per hour. A full load of fuel, flares/chaff and cannon ammunition is $4,737.60. Visibility is good for the crew, poor for passengers. A full load on the hardpoints is 4,600 lbs. – note that this can exceed the vehicles lift if fully loaded with fuel and passengers.

Mi-24D Izdelie 246

Subassemblies: Body +4, limited-rotation Turret –2, Top-and-Tail Rotor +1, two Stub Wings +1, three Retractable Wheels +1.

P&P: One 2,860-kW TTR drivetrain; two 1,434-kW HP gas turbines; 12,000 kWs lead-acid batteries.

Fuel: 540 gallons jet fuel (fire 13).

Occupancy: 2 NCS, 8 CS. ***Cargo:*** 0 cf.

ArmorF	**RL**	**B**	**T**	**U**	
*Body:*4/10	4/15	4/10	4/10	4/30	
*Turret:*4/10	4/10	4/10	4/10	4/10	
*Wings:*4/10	4/10	4/10	4/10	4/10	
*Rotor:*4/10	4/10	4/10	4/10	4/10	
*Wheels:*4/10	4/10	4/10	4/10	4/10	
Crew Compartments:	--	4/30	--	--	4/30

Weaponry

12.7¥108mm 4-bar. minigun/YakB-12.7 [Tur:F] (1,470 rounds) +0.

Equipment

Body: Medium-range radio with scrambler; long-range radio with scrambler; 10¥ LLTV; 2-mi. searchlight [B]; autopilot; navigation instruments; IFF; inertial navigation system; 2-mi. thermograph; IR jammer –2; three smoke/decoy dischargers with 3 reloads (chaff or flare); flight recorder; compact fire suppression; duplicate maneuver controls; 0.5 man-day limited life support (crew only); 10-man NBC kit. *Turret:* Full stabilization for 12.7mm minigun. *External (on wings):* Two 950-lb. hardpoints; two 800-lb hardpoints; two untapped 550-lb hardpoints.

Statistics

Size: 53'¥24'¥16' *Payload:* 5,922.2 lbs. *Lwt.:* 12 tons

Volume: 667 cf. *Maint.:* 18 hours. *Price:* $1,210,265.

HT: 12. *HP:* 1,500 *TTR:* 360 *Turret:* 9 *Wings:* 120 each *Wheels:* 30 each.

aSpeed: 210 *aAccel:* 4 *aDecel*: 20 *aMR:* 5 *aSR:* 2

Stall speed 0.

Design Notes

Body is 600 cf.; rotor is 12 cf.; turret is 1 cf.; each wing is 12 cf.; wheels are 30 cf. Body structure is heavy, rest of frame is medium. Built with standard materials. Each crew station is armored separately (volume not totaled for calculating sf). No streamlining. Armor is expensive metal on body and crew compartments, expensive composite on rotor, and standard composite on wings, landing gear and turret. Structure is sealed. Mechanical controls. Fuel tank is light, self-sealing. Passenger seats are folding. Empty weight is 17,486 lbs. Performance is without loaded hardpoints. With hardpoints loaded aSpeed drops to 205 mph. 59 cf. empty space in body. Typical ammo load for 12.7mm gatling is 1,470 API.

Features: The 30-kW gas turbine APU that provides ground power is not bought separately, nor is the combat camera in the right wing and the SACLOS radio command link system in the nose. These additional systems have limited additional functionality.

IR Suppression: Many Mi-24s can install additional IR suppression systems that vent engine heat into the rotor downwash when they expect combat. This can be treated as modest IR cloaking (-1 to be detected by IR and thermographs) for 676.8 lbs. and $126,900.

<MANUFACTURER> 2A28 *GROM* LOW-PRESSURE CANNON, 73MM¥XXMM, RUSSIA, XX

The 2A28 Grom lacks rifling as the HEAT projectiles it usually fires would suffer reduced penetration due to the slight wobble imparted by the rifling. This is a common problem for all early TL7 rifled guns firing HEAT rounds. Note that although the projectiles are actually small, unguided rockets, they are not treated as missiles or as rocket-assisted munitions.

TULAMASHZAVOD AUTOCANNONS (2A42, 2A72, 2A38M), 30MM¥165MM, RUSSIA, VARIES

Designed by KBP Instrument Design Bureau, these autocannons all use a common round and share many mechanical similarities.

The 2A42 (1976) is a dual-feed autocannon in widespread Russian service, used by vehicles as varied as the BMP-2 IFV and Ka-50 attack helicopter. It has two selectable rates of fire: RoF 5* and RoF 9*.

The improved 2A72 (1990) incorporates an improved feed mechanism and is lighter overall but has a fixed rate of fire (RoF 5*) – it is used on the Patzyr-S1 air defense system, BMP-3 and BTR-80A, among others.

The twin-barreled, water-cooled 2A38M (19XX) was designed to equip the 2S6M Tunguska and the cancelled Czech/Slovakian *Strop* air defense systems. It has a much higher rate of fire (RoF 42*) as it can alternate barrels. Weight including cooling fluid (simple drinking water); emptying the water decreases weight by 62 lbs. and reduces the rate of fire to RoF 5*.

Differences from the base 2A42 statistics are noted below.

Weapon	Weight	Volume	Cost
30mm Lt. Autocannon (2A72; RU)	185	3.7	$14,500
30mm 2-bar. Autocannon (2A38M; RU)	430	8.6	$24,000

Machine Gun, Autocannon and Grenade Launcher Installation Table

Weapon	Weight	Volume	Cost	Power	WPS	VPS	CPS	TL
Automatic Cannons								
23mm Autocannon (AZP-23; RU)	176	3.52	$18,000	0	1	0.0067	$4(2)	7

23mm 2-bar. Autocannon (GSh-23; RU)	111	2.2	$18,000	0	0.76	0.0051	$3(2)	7
30mm Autocannon (2A42; RU)	253	5.1	$27,000	0	1.9	0.013	$7.6(2)	7
Grenade Launchers								
30mm AGL (AG-17; RU)	39	0.8	$9,000	0	0.84	0.0084	$3(6)	7

Ammo Type: (1) Solid bullets; also uses AP (¥3 cost) or API (¥4 cost). (2) SAPHE; also uses API (¥2 cost). (3) SAPHE; also uses APFSDS (¥4 cost), or APFSDSDU (¥6 cost). (4) HEDP. (4) HE; also uses APFSDS (¥4 cost). (6) HE.

Mortar, Liquid Projector, and Heavy Cannon Installation Table

Weapon	**Weight**	**Volume**	**Cost**	**WPS**	**VPS**	**CPS**	**Ldr.**	**TL**
Low-Pressure Cannon								
73mm LP cannon (2A28; RU)	253	5	$8,400	12	0.12	$48(1)	1	7

Ammo: (1) HE; also HEAT or HEDP (¥1.5 cost). (2)

Gun Statistics Table

Weapon	**Ammo**	**Malf.**	**Type**	**Damage**	**SS**	**Acc**	**1/2D**	**Max**	**RoF**
Gunner (Cannon)									

73mm LP cannon (2A28)	HE	crit.	exp.	6d¥4[6d]	20	10	(530)	3,300	1/8	
	HEDP	crit.	exp.	6d¥5(5)[6d]	20	13	(530)	3,300	1/8	
	HEAT	crit.	exp.	6d¥5(10)	20	13	(530)	3,300	1/8	

See weapon description