Project of wheeled armoured fighting vehicle 6x6 and 8x8

Currently all modern world armies are solving problem of wheeled armoured fighting vehicles substitution for new types, meeting all requirements. Slovak Republic Armed Forces is declaring this intention in Model 2015 Document. This intention was an impulse for working out this feasible study of wheeled armoured fighting vehicle in 6x6 modification manufacturing in Slovak Republic condition for Slovak Armed Forces needs and, prospectively, also for export purposes.

Introductory part of this study contains detailed analysis of wheeled armoured fighting vehicles around the word status. On the chosen sample of 10 wheeled armoured fighting vehicles, in 6x6 and 8x8 modification are analysed all technical and military – tactical parameters. Best parameters were reached by vehicles BTR-90 (Russian Federation), PANDUR (Austria) and GPV (USA).

Next part specifies tactical – technical requirements for 14 different versions of wheeled armoured fighting vehicles (WAFV), fulfilling military and non-military tasks (e.g. commander’s vehicle, logistic support vehicle, combat engineer vehicle, vehicle for mechanized infantry units decontamination, air defence vehicle, ambulance vehicle, etc.).

Main armament should be created by 30mm automatic cannon for engaging ground and flying targets from static and moving position with effective range up to 3000 metres as a minimum, 7,62mm coaxial machine gun for engaging uncovered live power with effective range up to 1000 metres. Study counts also with reactive grenade launchers and man portable short range air defence rocket completes utilization.

Vehicle devices communication make use of modern bus system CAN-BUS, crew can exploit several LCD monitors, projecting pictures around vehicle from cameras, combined day and night vision and thermo vision and others important information.

WAFV must – thru its construction – secure ballistic protection for transported personnel against hand held weapons fire and against artillery shell fragments.

Ballistic protection increment is possible thru additional armour installation. Hull floor and axles anchoring resists anti-personnel mines blast and minimalizes anti-tank mines effect also due to sloped hull floor.

Requirement is for air-conditioned crew and squad compartment, with heating possibility in cold environment. Crew consist of driver, commander, main gun operator and squad of 8 members.

Analysis of performance parameters comes from driving resistance on road and in heavy terrain, on different surfaces, with emphasis on high speed on road (cca 110 kmph) and in terrain (cca 50 kmph), sufficient dynamics, which will be secured thru powerful combustion engine Volvo D13A520 (382 kW, 2500 Nm) or electromotor Enova EDM 240 (240 kW, 1300 Nm) respectively, which was used during hybrid propulsion proposal. Concern was taken also about fuel consumption and environment considerateness. Using hybrid propulsion, similar parameters to classical combustion engine propulsion were reached.
Development works time schedule was worked out and also assessment of investments needed. Based on these calculations and numbers of vehicles produced estimation the vehicle price was predetermined.

Listed are Slovak factories, that are could participate on vehicle production and also subcontractors for components and parts needed. Slovak Republic has production potentiality and manpower for successful project realisation.

This feasibility study examines development and production possibilities of wheeled armoured fighting vehicle 6x6 in Slovak Republic. Study analyse current situation in Slovak Armed Forces and compare it with situation in NATO countries Armed Forces. Study postulates tactical – technical requirements and on this basement introduces most adequate solution. Study solves question of vehicle production, possible subcontractor companies and calculates assessed costs.

Proposed WAFV is one of possibilities of substitution for currently used tracked infantry fighting vehicles BMP-1 and BMP-2.

**Vehicle conception proposal**

Fig. 1 shows proposal of 6x6 vehicle with classical propulsion system interior furnishing. Combustion engine is located in front part of the vehicle. Engine is directly connected with gearbox. Auxiliary gearbox is located behind main gearbox and connects main gearbox with centre differential. Fuel tank is located between front and middle axle, on side. Fig. 2 shows upper view on vehicle interior furnishing.

![Diagram of vehicle](image)

**LEGEND:**
1. Combustion engine
2. Main gearbox
3. Auxiliary gearbox
4. Fuel tank

**Fig. 1: Proposal of vehicle with classical propulsion system interior furnishing**
Fig. 2: Upper view on vehicle interior furnishing

Fig. 3 shows proposal of 6x6 vehicle with hybrid propulsion system interior furnishing. Engine together with generator creates common block, electromotor with gearbox the second. Both blocks are located lengthwise in front part of the vehicle. Fuel tank is installed also in the front part, on the side. Batteries are placed in the rear part of the vehicle. They are placed equally on both sides of the vehicle. Their weight lightens loading of the frontal axle.

Fig. 4 shows upper view on vehicle together with description of individual propulsion components.

Fig. 3: View of the hybrid propulsion vehicle proposed furnishing
Vehicle 6x6 external appearance

Fig. 4 to 9 shows different views on proposed 6x6 wheeled vehicle. Design of external dimensions was detailed according maximal dimensions required; at the same time were accepted possibilities of internal compartment furnishing by transmission system. Internal compartment dimensions enable to settle eight-member squad in the rear part of the vehicle. Driver, main gun operator and commander are located in the middle part of the vehicle. On the roof are situated five hatchways for emergency exit, eventually for another usage. Rear part of the vehicle is fitted with large doors, which enables fast mounting or dismounting of the squad.
In the space between front hatchway and middle row of hatchways intended is weapon complete emplacement. Hull floor is $120^\circ$ sloped, for protection against mines blast or different explosive systems appliance.

**Fig. 7: Side view**

**Fig. 8: Rear view**

**Fig. 9: View from above**
**Alternative 8x8**

Proposed 6x6 wheeled vehicle is designed so that, in a case of interest, relatively thru small adaptations of driving system and transmission production of 8x8 alternatives with same appearance and same internal compartment layout and with same crew and squad members is possible.

This alternative is shown on pictures Fig. 10 and 11.

![Areal view](image1)

**Fig. 10: Areal view**

![Side view](image2)

**Fig. 11: Side view**