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The Police Development and Protection of Soft Targets

Martin Hrinko, David Palička, Leoš Hájek and Petr Kubický

Abstract

This paper describes the function and development of the requirements for modern and high-quality equipment and accessories and also equipment used by the specialized units of the police force of the ČR with a practical example. This is offered in the form of a draft requirement for a transport means – a multifunctional special vehicle, intended specifically to intervene in situations against demonstrators, extremists, and football hooligans. At the same time, this paper briefly describes the system of collecting information regarding other modern means used by other security forces and also those which are available on the market, which are then (if suitable and also upon experience from abroad) proposed for development and use under the conditions of the Czech Police practices.

Keywords: police force, protection of soft targets, police development, usability of special vehicles, multifunction vehicle

1. Introduction

In 2016, the Public Order Police Headquarters, Czech Police Presidium (“ŘSPP”), submitted a proposal to the establishment of working teams of police officers from regional police directorates, who are under the coordination of the highest methodical body of the Public Order Police “ŘSPP.” Following this proposal, the Police President Order No. 286/2016 was created. This act established a working team called Blesk (Lightning) [1], intended for assessment of the current security situation and to evaluate the current needs regarding service tactics for use by the Police of the Czech Republic (hereinafter referred to as the “Police ČR”) during actions taken against dangerous crime offenders and to be included in procedures used by intervention units of regional directorates of the Police ČR and also the special unit guarding nuclear power plants in the Czech Republic, Temelín and Dukovany. The next Police President Order No. 38/2017 has the same purpose, it was established by the Evoluce (Evolution) [2] working team and as with the previous order focuses on material security of police officers, but in the case of riot police officers (which means special riot units of police regional directorates (4) and riot units of regional police directorates (12)), taking into account the tendencies of the security situation. Police President’s orders allow the coordinator and the team to invite experts from other workplaces of the Police ČR, but also consultants from companies and suppliers to meet and investigate the latest trends in this field of the market. Team workers have the opportunity to be sent to exhibitions and seminars where a particular technology is presented and where they can find out foreign products and compare them with the means which are currently available to

the police. No such conceptually formed teams had existed until these teams were formed. Policemen' proposals or requirements were not often listened to or they were strongly misrepresented in other resulting documents. One of the successful projects was dependent primarily on the personal erudition of only one policeman from a special department, who created the future final document regarding the requirements of his work – (training polygon in Zbiroh [3]) literally in the garage.

2. Research on multifunctional special vehicle

One of the tangible proposals was the future acquisition of a service vehicle primarily intended for use by riot units. According to the Evolution Team's proposal, this vehicle would be used also by other Police CR units and it will be possible to be deployed for use as an Integrated Rescue System as well. The vehicles concept draft, as presented by ŘSPP, is the result of the team's work over several years. During this preparation, the requirements of the leaders and commanders of riot units were addressed, and the possibility of vehicle production in domestic and foreign companies was discussed, including visits to riot units abroad. Upon these findings, modification possibilities of already functioning vehicles were evaluated. However, no vehicle, which would at least meet the majority of workgroup requirements, was found within this phase. Then a professional discussion with several representatives of domestic companies took place, wherein the technical possibilities of the vehicle in terms of construction were addressed. During these, professional discussion possibilities of desired vehicle construction and concerning its future activities were agreed. Several companies within the European Union would be technologically capable of developing and subsequently producing the desired vehicle. From the team's point of view, the best possible way would be through the development and production of a prototype with participation of the work team and then to the subsequent performance testing in operation service. Only then the production of other vehicles would be ordered.

2.1 Usability of new special vehicles

The Police CR have been using a type of special vehicle with water cannon for a long time. This vehicle type had been widely used before 1989 when they served as coercive means to forcibly end demonstrations. After this year, the water cannon vehicle remained in use by the riot police, but with a strong reduction in their numbers. A lack of these vehicles was later manifested in mass demonstrations on the occasion of the meeting of the Monetary Fund and the World Bank in Prague in 2000 when other vehicles of the Czech Army and Fire Brigade had to be called. The vehicles have now been upgraded, but their numbers and technical condition are currently very low and several vehicles are immobile. Public Order Police Headquarters exploits available possibilities to communicate with other EU countries, where they also deal with legal issues of using a water cannon type vehicle as a coercive means. All neighboring states have included these vehicles in their equipment itinerary, but their use varies according to the legal framework. In this respect, the possibility of using a vehicle as a coercion mean under the Police CR Act is at the same and often a higher level than abroad. On the other hand, we must state that massive demonstrations are taking place in all neighboring countries with significant disturbances to public order, while in our country, eventual demonstrations are less numerous and calmer. However, it is not possible to predict future developments in the Czech Republic based on this situation, especially concerning the immigration crisis and open borders within the Schengen area. It is, therefore, necessary to have such a coercion means available to protect the life and

health of intervening police officers, while at the same time allowing termination or at least disrupting such unlawful conduct. Water cannon type vehicles included in the riot police service are a single-purpose vehicle, which its construction is based on the basic fire brigade special vehicle and their parameters and characteristics have not complied with the requirements of the Czech Police for several years. Their deployment is also problematic with regards to their size, maneuverability, and possible documentation of unlawful conduct. As a result of the combination of these elements and characteristics, the vehicles are mainly used for demonstrations and exercises but remain largely unused during safety or security measures. The usability of future vehicles was a key prerequisite in the development of the multifunction vehicle concept. The ŘSPP are fully aware of the duties of proper management and that is why it proposes to change the systemization of these service vehicles when these special vehicles of water cannon type will be replaced by a special multifunction vehicles with a water cannon fitted. The aforementioned amendment shall not affect the wording and interpretation of Act No. 273/2008 Coll., within the Police of the Czech Republic, § 52 let. k) a water cannon, as this is an extension of the name of the official operation transport means. The new concept drafted vehicle envisages that the scope of this act will extend the possibilities of use also for coercive means mentioned under b) tear-forming, electric or other temporarily disabling means, letter f) stopping belt, blocking the road forcibly, stopping the vehicle or preventing the vehicle from escaping and avoiding capture and letter g) forcing out using a vehicle.

In addition to the repressive characteristics of the vehicle, it is also necessary to emphasize its tactical capabilities. The technology that the ŘSPP plans to apply will allow on-line transmission of video (or sound) to the headquarters of a particular situation, documentation of unlawful conduct, making calls or communicating information, and a two-way communication with the headquarters of the situation which is being met or with the control center and intervention units. In addition to this, the vehicle will be able to transmit images from areas affected by a natural disaster, industrial accident, a polluted or otherwise contaminated area or from areas otherwise inaccessible. The ŘSPP dealt with the question of usability concerning the individual units of the Police ČR. Upon the analysis of typical and extraordinary activities performed by the Police ČR, the vehicle is required to have defined characteristics and its technical equipment was then designed. Considering that technological and technical developments are moving forward very quickly, there is a possibility for further expansion within the requirements of the live deployment of the vehicle.

The following table compares existing water cannons and planned multifunction vehicles regarding their deployment possibilities for various activities and usage (**Table 1**).

From the table above, it is clear that the vehicle could be used for numerous operational activities. The reason why the work team and the ŘSPP prefer a multifunction vehicle is based on two factors. The possibility of universal and frequent deployment and saving money, compared to the purchase of more single-purpose vehicles. The actual deployment (in the case of a security measure) is another decisive element that would require at least three separate vehicles with their crew, which then deprive the maneuvering space of intervention units and three crews are therefore necessary, who could have been deployed elsewhere and otherwise. It should be noted that the idea of a universal vehicle, which has been developed by the ŘSPP since 2015, instigated by discussions held by a team of professionals, is going in the right direction. Today we can already see one fire-fighting special vehicle produced by Hlučín Fire Brigade; however, it lacks the basic and essential characteristics of this police multifunction vehicle.

Technical specification (serving just as a base for proposal and numerous negotiations of the team).

Activity type		Water cannon	Multifunction vehicle
Safety measures	City	Yes, on main roads	Yes, even in restricted areas
	Terrain	With limitations	Yes, almost without limits
Emergency	Industrial accident	As with fire brigade support only	Action headquarters support, fire brigade support, possible evacuation
	Floods	No	Wading up to 120 cm, action headquarters support, fire brigade support, possible evacuation
	Large fire	As with fire brigade support only	Protection from radiant heat and flames, all-terrain performance capability, action headquarters support, fire brigade support, possible evacuation
	Mass disaster	As with fire brigade support only	All-terrain performance capability, action headquarters support, fire brigade support, possible evacuation
Coercive means	Water cannon	Yes	Yes
	Tear agent	No	Yes
	Acoustic or luminous temporarily disabling mean	No	Yes
	Blocking the road using the vehicle	Yes	Yes
	Forcing out using the vehicle	Yes, with limitations	Yes
Other activities	Green border surveillance	No	Yes, thermovision, night vision, image transmission
	Soft targets	Partially	Thermovision, night vision, camera recording, calls, mobile roadblock, image transmission to headquarters
	Large sport or other events	No, only for road spraying at hot days	Action headquarters support, image record and transmission, calls, drinking water in hot days, road spraying in hot days
	AMOK	No	Partially, image and sound transmission to headquarters, calls, logistics background for action squads
	Search actions	No	Logistics background for units, drinking water, lighting, electric circuits, camera surveillance or thermovision

Table 1.
Table of possibilities and a quick comparison of water cannon and multifunction vehicles.

2.2 Vehicle basic characteristics and equipment

(1) Dimensions

- a. Max. height 3.000 mm
 - Maximum transport height (without displaced accessories) is set for underpasses and overhead lines in cities, passages to prisons and other enclosed spaces

b. Max. width 2.550 mm

- Maximum width is set for passage through streets and to meet road traffic rules, when vehicles with a wider width are considered as exceptional and their operation requires special regime and permission.

c. Length - maximum length is not defined

- The length shall coincide with vehicle chassis; however, the vehicles maneuverability being dependant also on the vehicles length will also be a determining factor. Therefore, the shorter the better.

(2) Driveability

a. Turning diameter – near to 14 m and less

- This is a key factor because the vehicle must be able to pass to the same locations as the VW Crafter (turning diameter 13.6 m) – riot squad vehicles.

b. Terrain passage – the vehicle must be able to pass through heavy terrain including water obstacles and vertical steps

- Driving on roads and paved roads in normal traffic
- Driving on field and forest roads in any weather
- Driving on unpaved terrain on all types of surface
- Wading ability up to 1,200 mm without preparation
- Ability to overcome vertical steps up to 500 mm
- Ability to overcome trenches up to 500 mm wide

c. Engine power – min. 18kW/t

- Engine cannot be specified by type, but power values must be set depending on the total weight (maximum instantaneous vehicle weight)

d. Tyres – 14,00 R20 or 16,00 R20

- “Run Flat” construction rough-terrain tires
- Pressure change possible from the driver’s cabin
- Automatic inflation system in case of a small puncture
- Particular type will depend on the chassis used

e. Chassis and drive – 4 × 4, both axles steerable

- This special requirement is based on the comparison with other available similar vehicles with this type of chassis and is then a key requirement

f. Other characteristics

- The possibility to change smoothly the height clearance from the driver’s cab
- The range without refueling (road, at constant speed 90 km/h) to be at least 500 km
- Max. speed 115 km/h (speed limiter)

- ABS
- Differential lock (axle and inter-axle)
- Automatic transmission allowing speed of 5 km/h or less
- There will be a reinforced displacement frame allowing road blockage in front of the driver's cabin, for pushing off an immobile vehicle, clearing the path from fallen trees...

(3) Crew cabin

- a. Extended, two rows of seats with technical space
 - The basic crew will consist of a driver, an operator of the water cannon or the functional mast, and a vehicle commander (who has the possibility of taking over an operator's activities)
 - One full-value observer seat (commander of the action, units...)
 - One emergency seat in case of evacuation
 - The seats will be equipped with four-point self-winding belts, with head-rests and increased lateral guidance (the emergency seat may be folding and fitted with a basic lumbar belt)
 - The seats must provide comfortable seating for several hours (without the possibility to leave the vehicle)
- b. Resistant construction with treatment against thrown objects, stones, etc.
 - The cab design shall meet the requirements for protection against thrown objects, it shall not restrict the view of the crew, and it shall be easy to maintain and repair
 - The possibility of integrating basic ballistic protection, especially against splinters
 - An emergency exit for the crew shall be located in the roof
- c. Cabin technical equipment
 - Air conditioning and independent heating
 - Filtered ventilation
 - Control of all vehicle technologies
 - Camera display units
 - Driver's camera display units
 - 2 pcs RDST
 - A computer with a connection to MBP and tactical software
 - A computer with a connection to helicopter image and operating center information
 - Data storage for camera recordings with a capacity to store data for a min. 24h
 - Video and audio on-line transmission technology

- A powerful LED reflector will be placed on the upper exterior of the cab to create a light curtain, to be used as a coercive means through glare and for space lighting

(4) Technical superstructure

- a. Structurally, it must be smoothly connected to crew cabin, and there shall not be any clearance between the cab and the technical superstructure into which fallen or thrown objects might enter
- b. The surface must withstand thrown objects, and easy and cheap repair is essential
- c. Location of all technology and equipment must be easily accessible but must also be secured against misuse or theft
- d. Water tank with min. capacity 4000 L, the material and construction used must allow easy cleaning, and transport of drinking water protected from any contamination
- e. The rear part of the superstructure will accommodate technologies allowing the connection of a drinking water hose
- f. Hose inputs/outputs will be located in rear part (tank filling - flow line with hose)
- g. Power generator distribution panel ($3 \times 230 \text{ V } 10\text{A}$, $2 \times 230 \text{ V } 16\text{A}$) will be placed at the lateral part
- h. A power generator with connection to the vehicle tank – remote-controlled from the cab, with automatic operation, controlled from the distribution panel
- i. A tear gas tank
- j. A coloring agent tank
- k. Telescopic and retractable fence closures of 0–150 cm width on each side at vehicles front part
- l. In the upper part of the front, there will be placed a monitor mount (channel line) – at its resting position, it will be inserted into the superstructure of the roof, and in its use, it will be extended and will cover the space of min. 270° around vehicles front-to-back axle
- m. In the vehicles upper front part, there will be a telescopic mast equipped with a rotator carrying a UHD camera with night-time (low-lux) capability (IR illumination), thermal imaging camera, and an LRAD-type device (min. level 450LX)
- n. A telescopic mast will be placed in the upper rear part to enable illumination of the circular space within a radius of 50 m

(5) Other technical elements

- a. On the top of the vehicle, there will be strobe lights (blue/red) covering the 360° space around the vehicle

- b. Entire vehicle will be covered by a fire protection system
- c. The vehicle will have increased protection against radiant heat and flames
- d. There will be high-pressure nozzles above the windscreen for washing of adhering substances on the windscreen
- e. The vehicle will be fitted with visual cameras that will allow driving without the driver's window view (including the camera on the roof of the body to check the clearance and displaced accessories) (**Figure 1**)

2.3 Comments to vehicle equipment

The team has designed the vehicle so that the crew can perform the tasks asked of the headquarters while responding with security measures and mainly to support the intervening units. Its construction is designed to be robust because heavy equipment is currently missing within the equipment of the Czech Police and it is necessary to cooperate with Fire Brigade units, which is not always convenient or possible taking into account time requirements. The possibility of using LRAD devices as a safety measure should be highlighted. This equipment is already in use by the police and its deployment greatly facilitates and at the same time improves the performance regarding challenges and the transmission of information. It should also be mentioned that the device can be used as a coercive means with a temporary disabling effect. A camera system allowing documentation of unlawful conduct, which allows the transmission of up-to-date information of the staff during these measures direct from the place of the intervention and thus providing surveillance of the situation to commanders of the intervening units is another element. The vehicle itself can safely move directly on the site of the intervention without any risk of its significant damage (unlike current camera cars). At the same time, the commander shall be a part of the vehicle, who may analyze on-the-spot the evolution of measures concerning unlawful conduct and provide the headquarters or the intervening units with this information. Lastly, but not least,

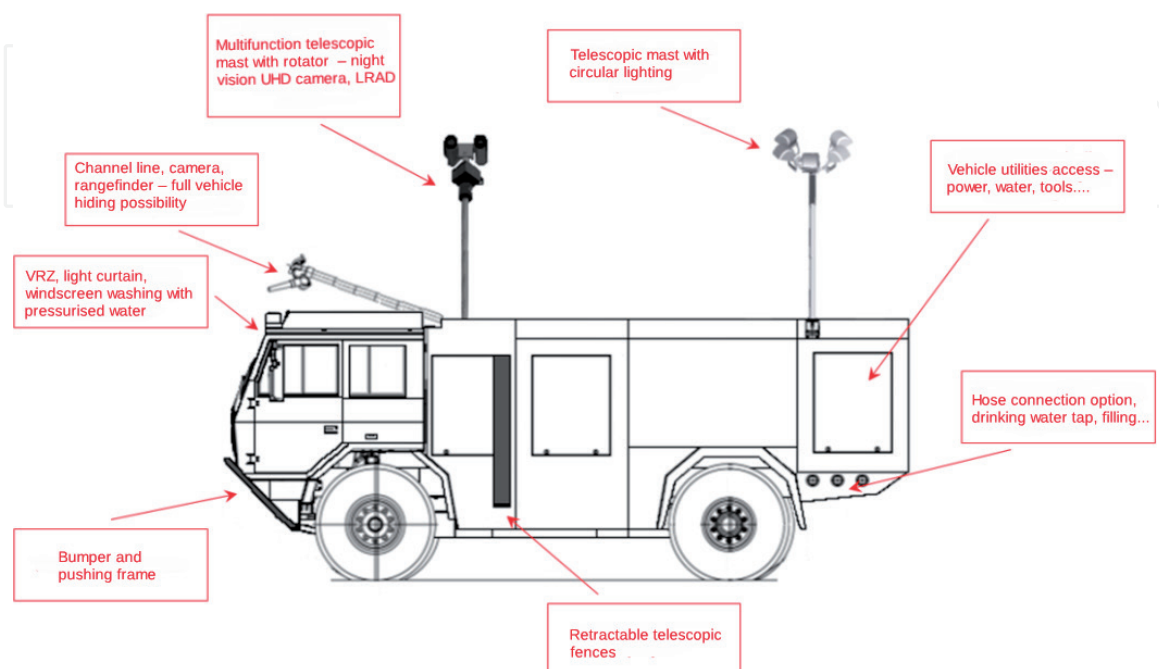


Figure 1.
Layout of proposed technical elements.

is the use of a water cannon (monitor) with continuously variable pressure and shape of the water jet. The monitor itself will be equipped with a rangefinder and camera, so the operator will be able to control the monitor using controls from the cab, but at the same time, he will precisely see where the water stream exactly hits. Another advantage is that the use of the water jet against a specific perpetrator can be automatically documented. The whole device will allow the tear-forming agent to be mixed into the water stream and sprayed over a large area within a second or a short impulse to cover a small space. Marker paint admixture is less aggressive, it serves as a clear identifier for intervening police officers that an individual is likely to have committed an offence and can be apprehended to explain themselves after the cessation of such a measure and compare camera images within a particular proceeding. Especially in conditions of reduced visibility, a so-called light curtain can be used, which may serve as a coercive means (painful stimulus when looking into the light), but at the same time allows for good illumination of the targeted site and its main purpose is to hide the activities of units behind the vehicle.

The general advantage of this vehicle is that it is not necessary to have the monitor in a standby position during normal measures, but that the vehicle acts only as a camera car. If the vehicle is used outside this measure, it will allow the units to create a background with utilities (light, electricity, water, transport of other materials, transport, and a heavy trailer) even to places where other police vehicles can get into problems or not be able to reach at all. The possibility to remove obstacles from the road by either pushing or by use a winch is another important feature. If necessary, the vehicle can travel through water with a depth of approx. 120 cm, even with an unpaved watercourse bottom.

Enumerating all deployment possibilities is very difficult because it will depend on the ability of commanders to utilize the maximum potential of this vehicle. It is clear that this vehicle meets the requirements of modern trends and concepts of security forces within the EU and the world.

3. Conclusion

This paper presents the function and development of requirements for modern and high-quality equipment and for equipment of special units of Police ČR with a practical example, which comes in the form of a draft requirement for a means of transport – a multifunctional special vehicle, intended to intervene against demonstrators, extremists, and football hooligans. No such vehicle exists now in the Czech Republic, of which its development and proposal for future possibilities of its use which has been created by a team of police officers who perform daily service in the streets within security measures, so it would be quite unique in its purchase and production, but the authors do not have the ambition to describe in this paper the details of the future steps of the vehicles development or its purchase. The authors describe the means and idea of creating working teams, consisting of ordinary police officers, who thanks to the work of such a team, can from their own experience suggest its optimal means, which, in their opinion, is missing in practice and would be useful. At the same time, this paper briefly describes the system of collecting information on modern means used by other security forces and on the market, which is then (if suitable and also upon experience from abroad) can be proposed for development and use under the conditions of the Czech Police practice.

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