

# Standardization of the Central Console of Police Vehicles – An Outline of the Diagnosed Needs

Piotr ŁUKA<sup>1</sup>, Andrzej URBAN<sup>2</sup>

<sup>1</sup>PhD Piotr Łuka, head of the Social Security Faculty of the Security and Public Order at the Police Academy in Szczytno.

<sup>2</sup>Associate Professor, PhD Eng. Andrzej Urban, Associate Professor at the Social Security Faculty of the Security and Public Order at the Police Academy in Szczytno.

**Abstract**— *The authors bring closer the results of social studies conducted on a group of respondents - policemen using police cars during their everyday duty. The study seeks to answer the question: how to improve the daily duty and integrate the devices that are used for the everyday activities by the law enforcement services which contribute to safety or public order? It also seeks information and guidance concerning the actions to be taken in the future for the devices installed in police cars to be the most ergonomic and safest for their users.*

**Keywords**— *Safety, traffic, device integration, police car.*

## I. INTRODUCTION

The publication is the result of the social studies performed during the project implemented in the field of defense and security under tender No. 7/2015 funded by the National Centre for Research and Development entitled "Development of police vehicles classification depending on their purpose and standardization of the central console of vehicles in the scope of arrangement and installation of ICT systems and control devices of special purpose signals" No. DOB-BIO7/04/02/2015. The project is implemented by a scientific consortium composed of the Police Academy in Szczytno - project leader, the Automotive Industry Institute from Warsaw and the company Marvel Sp. z o. o. from Lodz. The beneficiary of the effects of research and development in this project are to be the services reporting to the Minister of the Interior and Administration. The assumptions established in the project fit in well with the current priorities of the Chief of Police [1] for the years 2016-2018. One of the seven priorities established by the Polish Police Headquarters include: improving the quality of the tasks performed by police officers and the employees of the Police by providing the optimal duty / work conditions. One of the specific tasks indicated for the implementation in this regard by the Polish Police Headquarters is equipping the Police with computer and communications hardware (including mobile devices and enabling the use of the functionality of information systems used by the Police) and transport equipment.

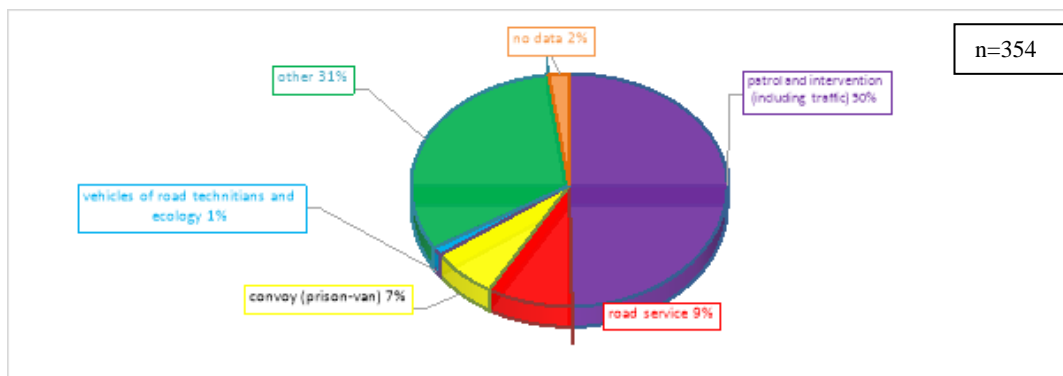
## II. MATERIALS & METHODS

The project implementation began in December 2015 and has been lasting for 36 months. The main objective of the project is to develop a directory of vehicles and to prepare documentation for the modification of the central console and the electrical system of the vehicles (depending on the classification) with respect to the standardization and enabling the installation of communications and ICT equipment at the locations adapted for this purpose along with the implementation of the document for use in proceedings when purchasing vehicles [3]. One of the results of the project was conducting surveys. The aim of this study was to collect reviews from the users of Police vehicles and draw conclusions for further exploration prospects.

Based on the available data, it was found that the Polish Police operates a total of 21 794 vehicles. This number includes 13 821 passenger vehicles (including 6 145 marked and 7676 unmarked units). Outside the indicated category, the Police also uses SUVs, pick-ups, utility vehicles, off-road RD-Video vehicles, van-type vehicles, trucks, buses and special purpose vehicles [2]. In order to obtain information about the preferences of the users of the Police vehicles with respect to the need for the modification of the central console of the field units of the Police, a study was conducted using the method of diagnostic survey. The study was carried out from April to June 2016. It was participated by a total of 354 police officers from the garrisons in Malopolska, Wielkopolska, Warmia-Mazury and the policemen during training and vocational training at the Police Academy in Szczytno. The policemen during training were the representatives of all the of the Polish Police garrisons. For the purpose of the study, a research tool was developed in the form of a questionnaire consisting of 22 questions.

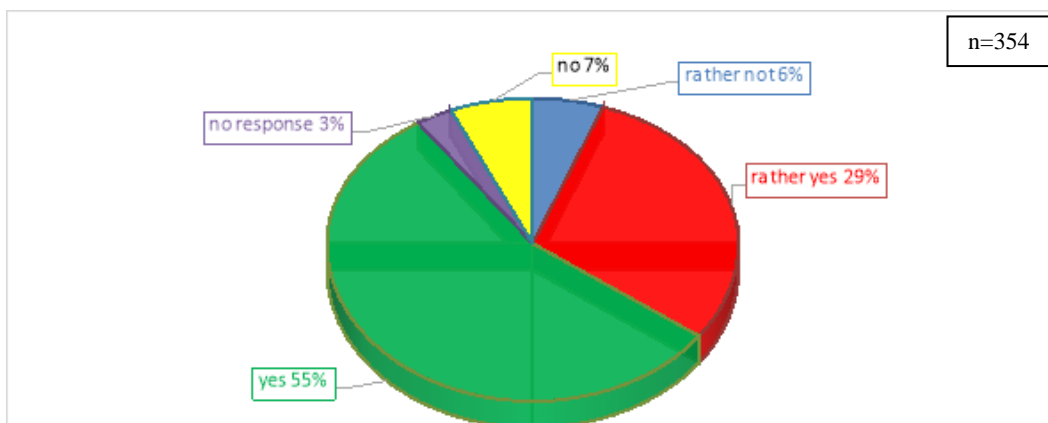
The study used a questionnaire prepared by the employees of the Police Academy in Szczytno and the Automotive Industry Institute in Warsaw. The study was preceded by obtaining the approval of the Chief of Police. The main purpose of the study was to find out user reviews concerning the Police vehicles with respect to the solutions functioning in them, as well as their assessment and preferences concerning the planned future solutions. Participants responded to a series of questions relating in particular to the vehicle's type and purpose which are the most commonly used in the Police and the type of additional devices in the vehicles. Further questions concerned the safety and efficiency of the operations related to the use of the devices installed in the vehicles. The policemen also commented on the location of the installation of the equipment, assessing the aptness of the location in the vehicle. The policemen were also asked what kind of other, not currently installed in the Police vehicles, devices should be there in the future. One of the important questions was also the one concerning the need for the integration of the devices in the vehicles and those used as part of their duties.

The study showed that the policemen (in prevention, crime units) mostly use passenger marked vehicles (44% respondents) and passenger unmarked vehicles (30% respondents).



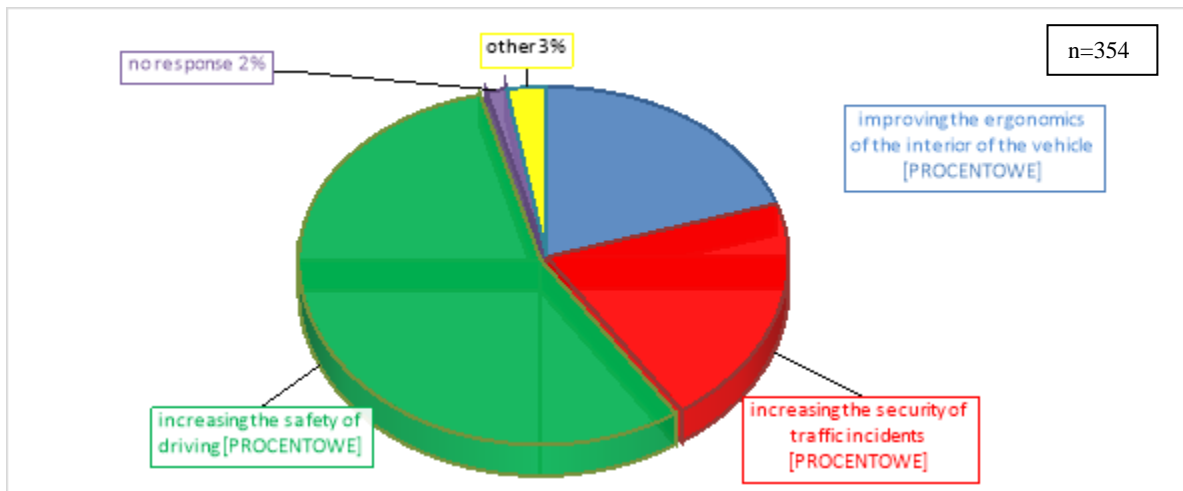
**DIAGRAM 1. INTENDED USE OF THE MOST COMMONLY USED VEHICLES.**  
 [Source: own research carried out under the project No. DOB-BIO7/04/02/2015]

Patrol and intervention vehicles are the most frequently used in everyday duty (Diagram 1) of the respondents - 50%. Another category of the vehicles that were used the most frequently were the traffic ones - 9% of the respondents and convoy vehicles - 7% of respondents. 1% of the respondents indicated the vehicles of road technicians and ecology. 31% of the respondents indicated "other" as the most commonly used vehicles.



**DIAGRAM NO. 2. IS THE INTEGRATION OF THE OPERATION OF THE DEVICES INSTALLED IN THE VEHICLE IN ONE CONTROL PANEL (TOUCH SCREEN) JUSTIFIED?**  
 [Source: own research carried out under the project No. DOB-BIO7/04/02/2015]

The question of whether the integration of the operation of the devices installed in the vehicles in one control panel was justified (Diagram 2) was answered "yes" by 55% of the respondents and "rather yes" by 29%. A total of as many as 84% of the responding policemen claimed that such a solution was justified. The results confirmed the validity of the undertaken development work aimed at integrating the devices used by officers during their daily duty. On the other hand, 13% disagreed. 7% percent claimed strongly that the integration was not needed, and 6% expressed the view that it was rather unnecessary.

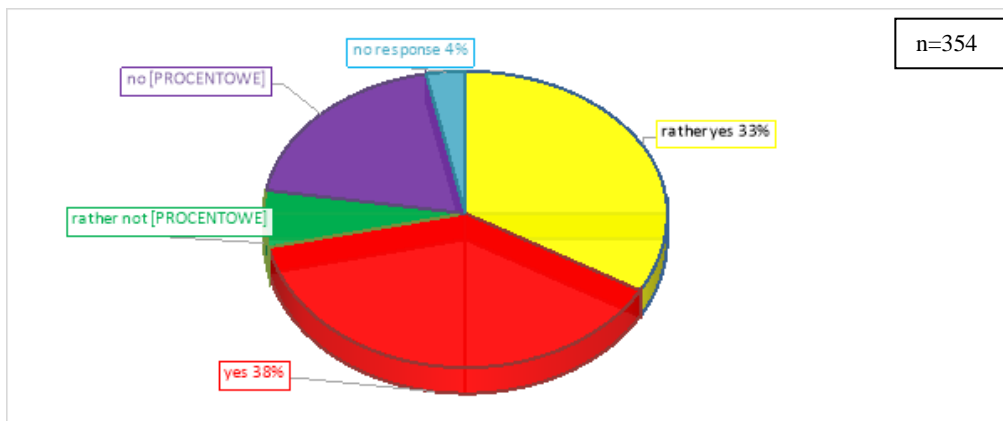


**DIAGRAM 3. WHAT IS THE RATIONALE BEHIND THE INTEGRATION OF THE OPERATION OF THE DEVICES INSTALLED IN THE VEHICLE IN A SINGLE CONTROL PANEL?**

[Source: own research carried out under the project No. DOB-BIO7/04/02/2015]

Justifying the need for integrating the operation of the devices in vehicles (Diagram 3), the respondents most often indicated, as the most important, the need for increasing their safety while driving (55% of respondents). It was followed by the need for the integration of operating the devices in the vehicle (20% of respondents), as justified by increasing the safety of the users of vehicles during traffic incidents or improving the ergonomics of the interior of the vehicle.

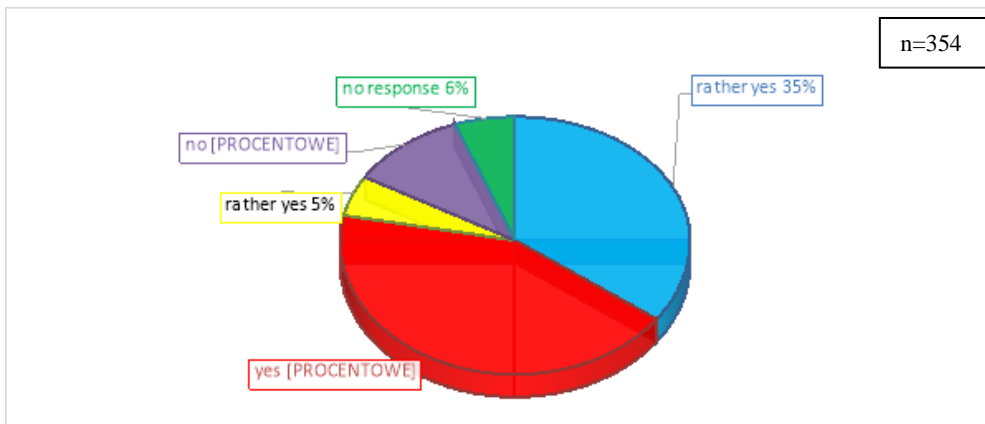
Typically, Police vehicles are equipped with radio stations and devices for operating light and sound signals. The respondents were asked questions concerning the safe use of the devices while performing duties (Diagrams 4 and 5).



**DIAGRAM 4. SAFE OPERATING DEVICES FOR OPERATING LIGHT AND SOUND SIGNALS DURING THE PERFORMANCE OF DUTIES**

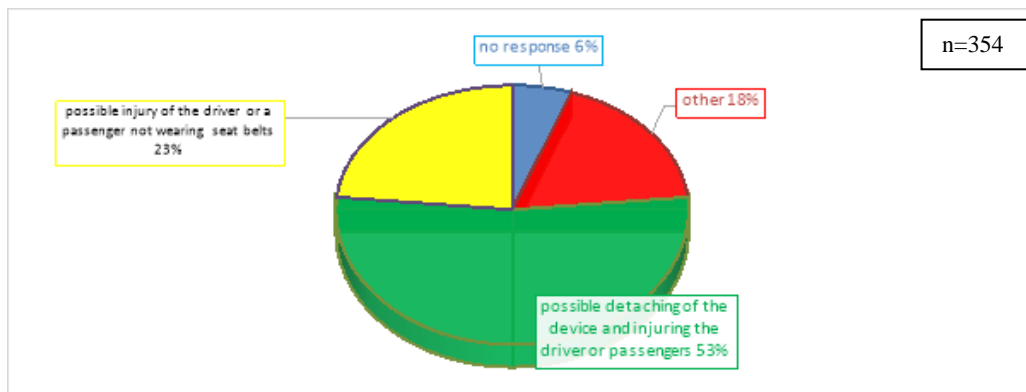
[Source: own research carried out under the project No. DOB-BIO7/04/02/2015]

The users of Police vehicles were also asked about the possibility (due to the location) of the safe and efficient operation of the light- and sound-signal control devices during driving the vehicle (Diagram 4). The responses show that 19% of the users said that the devices did not enable safe and efficient use while driving. Another 6% of the respondents also had doubts about the proper installation of the devices, checking the answer "rather not". In total, 24% of the respondents had reservations about the installation of the devices. 71% of the respondents felt that the location enabled safe and efficient operation. The analysis of this distribution of responses raises concerns. Almost every fourth vehicle user points to the lack of the safe and efficient use of the light- and sound-signal control devices. The results force conducting research to undertake further studies concerning the use of simulators and the Eye Tracker System.



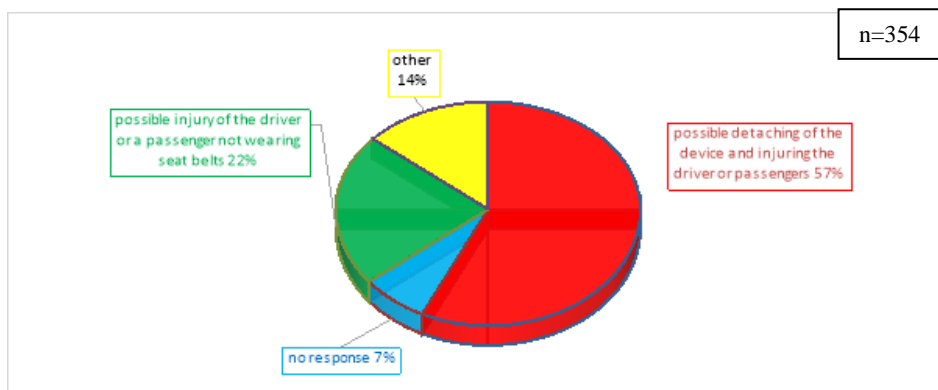
**DIAGRAM 5. SAFETY OF THE USE OF A RADIO STATION DURING THE PERFORMANCE OF DUTIES**  
 [Source: own research carried out under the project No. DOB-BIO7/04/02/2015]

The question concerning the possibility (due to the location) of the safe and efficient operation of a radio station during driving the vehicle (Diagram 5) was responded by a total of 16% of the respondents with the claim that the radio station did not enable simultaneous safe and efficient use of it while driving. On the other hand, a total of 78% of the respondents felt that the location of the radio station enabled safe and efficient use (43% of respondents replied "yes", and 35% "rather yes").



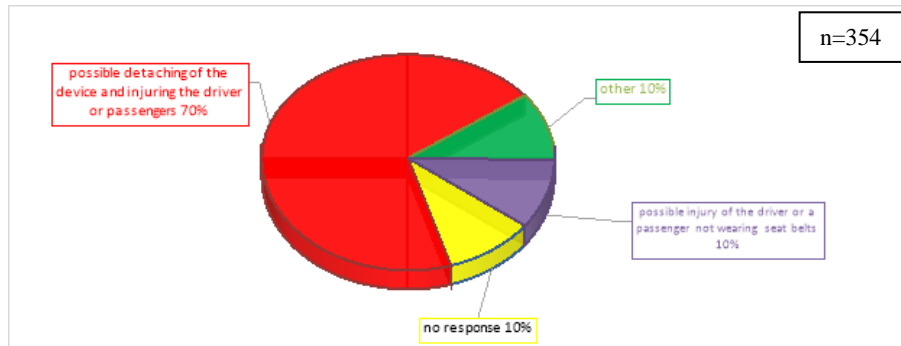
**DIAGRAM 6. RISK ASSOCIATED WITH THE CURRENT LOCATION OF LIGHT- AND SOUND-SIGNAL CONTROL DEVICES**  
 [Source: own research carried out under the project No. DOB-BIO7/04/02/2015]

The respondents were also asked about the risks of the current location of the light- and sound-signal control device in the vehicles they use (Diagram 6). It turned out that as many as 53% of the respondents fear the possible detaching of the device and injuring the driver or passengers. Another 23% of the respondents believe that the injury of the driver or a passenger not wearing seat belts is possible. The result indicates the need for the verification of the current rules and practices of the installation of such devices in Police vehicles.



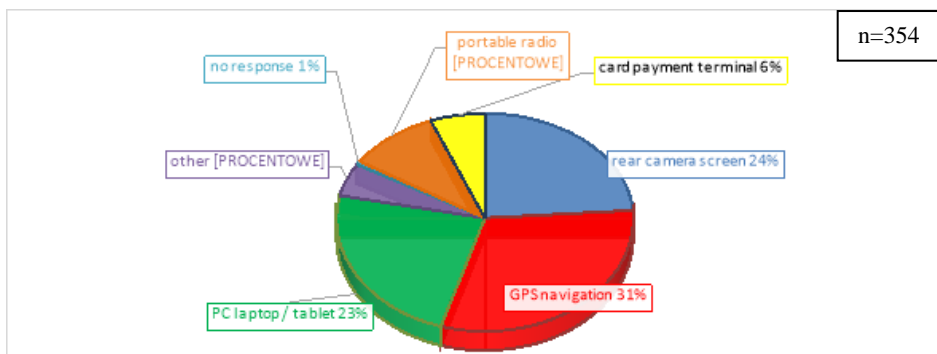
**DIAGRAM 7. RISK ASSOCIATED WITH THE CURRENT LOCATION OF A RADIO STATION**  
 [Source: own research carried out under the project No. DOB-BIO7/04/02/2015]

Similarly to the question described in Diagram 6, the respondents were asked about the risks associated with the current location of the radio station in their vehicles (Diagram 7). It turned out that as many as 57% of the respondents fear the possible detaching of the device and injuring the driver or passengers. On the other hand, 22% of the respondents believe that the injury of the driver or a passenger not wearing seat belts is possible. Conclusions from the analysis of the responses are the same as with respect to the question relating to the installation of the light- and sound-signal control device.



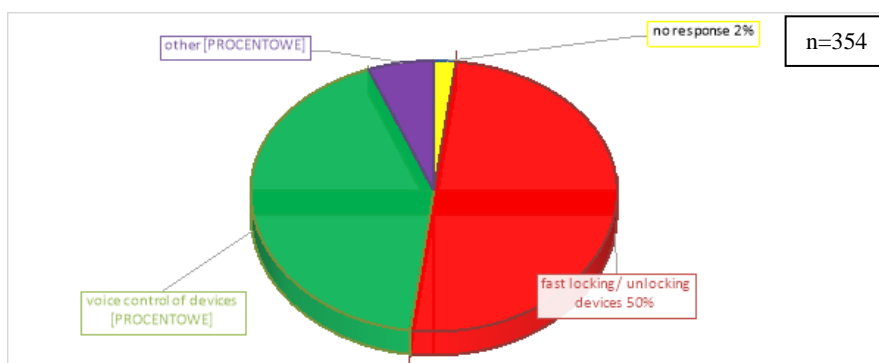
**DIAGRAM 8. RISK ASSOCIATED WITH THE CURRENT DVR LOCATION**  
 [Source: own research carried out under the project No. DOB-BIO7/04/02/2015]

The responses to the question concerning the risks associated with the current DVR location (Diagram 8) are even worse. In this case, 70% of the respondents indicated their concern about the possible detaching of the device and injuring the driver or passengers. 10% of the respondents also indicated the possible injury of the driver or a passenger not wearing seat belts.



**DIAGRAM 9: WHAT DEVICES, OTHER THAN THE CURRENTLY INSTALLED IN THE VEHICLES, SHOULD BE THERE IN THE VEHICLES / ON THE CONSOLE OF THE VEHICLES?**  
 [Source: own research carried out under the project No. DOB-BIO7/04/02/2015]

Responding to the question concerning other devices than the currently installed in the vehicles that should be there in the vehicles / on the console of the vehicles in the future (Diagram 9), the respondents most frequently pointed to the need for GPS navigation (31%), the rear camera screen (24%), a portable computer (23%), a portable radio (6%) and a card payment terminal (6%) in their vehicles.



**DIAGRAM 10. WHAT OTHER DESIRED FUNCTIONALITY SHOULD BE THERE ON THE CONSOLE OF POLICE CARS?**  
 [Source: own research carried out under the project No. DOB-BIO7/04/02/2015]

Responding to the question concerning other desired functionalities of the devices installed on the console of police cars (Diagram 10), the respondents most frequently pointed to fast locking / unlocking devices (50% of the respondents), and the voice control of devices (43% of the respondents).

### III. CONCLUSION AND EXPLORATORY PERSPECTIVE

On the basis of the research material collected, referring it to the previously established research assumptions, it can be concluded that it is justified to design the modifications of the central console and the electrical system of vehicles with respect to their standardization and enabling the installation of communications and ICT equipment in appropriate locations. It is indicated in the needs signaled in the field research conducted on the users of the Police vehicles. Particularly noteworthy are the ones that have been exposed in the paper, relating to the safety and, subsequently, the ergonomics and the possibility of efficient operating duty vehicles. The needs diagnosed on the basis of the users' reviews will be, in the later stages of the research, confronted with the technical capabilities in the field of the safe and ergonomic installation of devices in the vehicles. Account will be taken of the limitations of the current standards and regulations, and the requirements specified by vehicle manufacturers and the manufacturers of the equipment installed in the vehicles. Noteworthy and worthy of further research is the information collected from the users of the vehicles (Diagrams 4 and 5) reading that operating such additional devices as a radio or a light- and sound-signal control console, as assessed by some of the respondents, increases the risk of road accidents during the use of the devices while driving. In turn, diagrams 6, 7 and 8 show the concerns of policemen related to the possible detaching of the device and injuring the driver or passengers. The result suggests the need for the verification of the current rules and practices of the installation of such devices in duty vehicles.

### REFERENCES

- [1] Priorities and priority tasks of the Chief of Police for the years 2016-2018 approved by the Chief of Police (<http://bip.kgp.policja.gov.pl/kgp/priorityty-kgp>).
- [2] Agreement No. DOB-BIO7/04/02/2015 on the execution and financing of the project implemented in the field of defense and security under tender No. 7/2015 entitled "Development of police vehicles classification depending on their purpose and standardization of the central console of vehicles in the scope of arrangement and installation of ICT systems and control devices of special purpose signals".
- [3] Statistical data obtained from the Logistics Bureau of the Polish Police Headquarters, as at 31.12.2015.