PSiRA

Private Security Industry Regulatory Authority

Tracking the Valuable:

The Use of Tracking devices in the Private Security Sector

PSiRA
Private Security Industry Regulatory Authority

Tracking the Valuables:
The use of tracking devices in the Private Security Sector

Contact Details: Research and Development Unit

E-mail: Research.Development@psira.co.za

About the Report

Title: The Use of Tracking Devices in the Private Security Sector

Author: Tebogo Seanego

Publisher: Private Security Industry Regulatory Authority

Year: 2023

Special thanks: To all participants who took their precious time to contribute to enriching this study.

TABLE OF CONTENTS

ABBREVIATIONS AND ACRONYMS 4
EXECUTIVE SUMMARY 5
1. INTRODUCTION 7
2. BACKGROUND OF THE STUDY 9
3. RATIONALE 11
4. RESEARCH AIM AND OBJECTIVES 12
5. RESEARCH HYPOTHESIS AND QUESTIONS 13
5.1 Hypothesis 13
5.2 Main Research Question 13
5.3 Secondary Research Questions 13
6. METHODOLOGY 14
6.1 Limitations of the study 14
7. LITERATURE REVIEW 16
7.1 Introduction 16
7.2 History of Tracking Devices 17
7.3 Components of GPS/GSM Tracking Technology 18
7.4 Disadvantages of Tracking Technology 21
7.5 The Future of Satellite Tracking 23
8. RESEARCH FINDINGS 24
8.1 Structure and impact of the Tracking Sector 24
8.2 The level of regulation 30
8.3 Training of technicians and security officers doing recovery 31
8.4 The role of Security Service Providers in building the culture of compliance 32
8.5 Required intervention from PSiRA to ensure compliance . 33
8.6 Use Tracking Devices for non-security reasons 34
8.7 Other equipment used for rendering tracking services 35
8.8 Challenges in the Tracking Sector 36
8.9 Future of Tracking sector 38
9. RECOMMENDATIONS 41
9.1 Categorization of Tracking as a Sector 41
9.2 Regulation of Tracking Industry 41
9.3 Development of Training for Technicians 42
9.4 Installation Standards 42
9.5 Training of PSiRA Inspectors 42
10. CONCLUSION 43
REFERENCES 46

ABBREVIATIONS AND ACRONYMS

AVL	Advanced Vehicle Locator
FR	Radio Frequency
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
GSM	Global System for Mobile communication
ICASA	Independent Communications Authority of South Africa
iOS	iPhone Operating System
PSiR Act	Private Security Industry Regulation Act 56 of 2001
PSiRA	Private Security Industry Regulatory Authority
SAPS	South African Police Service
VESA	The Motor Vehicle Security Association of South Africa

EXECUTIVE SUMMARY

The tracking of vehicles and other mobile properties has become a very popular research topic in recent years for various reasons and in different approaches. The use of tracking is even more popular in South Africa as consumers continue to source the service of security service providers rendering tracking services for purposes of protecting human beings, animals, vehicles, and other valuables. The growth of this sector was exacerbated by insurance companies amongst things, by making it compulsory to have a tracking device installed on a vehicle before it can be insured. Ordinarily tracking devices are fitted-in on valuables that require that their whereabouts always be known by the owner. A satellite tracking unit is a security equipment and the manufacturing, installation, repairing and monitoring the signal thereof is a security service as per section 1 of the Private Security Industry Regulations Act 56 of 2001 as amended. Therefore, the rending of tracking services is a security service subject to PSiRA's regulation.

The Tracking sector as part of the Private Security Industry (PSI) has three (3) components which are linked. They are:

(1) technology division which deals with research and development and manufacturing of tracking units,
(2) the installation and monitoring division, and
(3) the tracking and recovery division.

Majority of tracking businesses are registered with PSiRA as required by the Act. Although tracking units are used to protect humans, animals, computers, yellow machinery and other valuables they are in the main used to protect vehicles. The use of tracking devices has found its application into other sectors of the economy for non-security reasons, these include e-hailing services and fleet management just to name a few.

Motor vehicles that are stolen in South Africa are recovered inside that country, in neighboring countries such as Lesotho, Zimbabwe, Mozambique and even as far as Angola and Nigeria. The recovery rate of stolen vehicles reported by tracking companies is estimated to be between 70% and 95% depending on a number of circumstances in different companies. There are several challenges noted which inhibit the tracking and recovery process which includes the prevalence of jamming devices and network related problems caused by load shedding and theft of batteries on network towers. There are no elements of non-compliance with the PSiR Act found although some technicians were not registered with PSiRA.

1. INTRODUCTION

The tracking of vehicles and other mobile properties has become a very popular research topic in recent years for various reasons and in different approaches. The studies were among others done to counter the crime rate which continues to increase worldwide.[1] There are several tracking techniques which have been applied such as Vehicle-Cart technique, Cellular Infrastructure technique, Dead-Reckoning technique, and Global Positioning System (GPS) technique or technology.[2] The use of tracking devices has become a common phenomenon in the motor industry as well as in the agricultural sector for security and other non-security related reasons, in particular the rapid technology development in the field of transportation and technology.[3] Over and above the use of tracking technological devices private security service providers track and recover stolen or lost vehicles and animals using this technology in the process of tracking and recovering.

Section 1 of the Private Security Industry Regulation Act 56 of 2001 (PSiR Act) defines security equipment as "an alarm system; a safe, a vault, or a secured container; a satellite tracking device, closed circuit television or other electronic monitoring devices or surveillance equipment; a device used for intrusion detection, access control, bomb detection, fire detection, metal detection, x-tray inspection or for securing telephone communication; a specialised device used to open, close or engage locking mechanisms; or a specialised device used to reproduce or duplicate keys or other objects which are used to unlock, close or engage locking mechanisms".[4] It is evident from the above that a tracking device is a security equipment. Furthermore, section 1 defines

1 Patra *et al*, GPS Tracking System, (2013) IIIT.

2 Oluwatobi *et al*, Real-time public vehicle mobile tracking system using Global Positioning System, (2016) IJCTT.

3 Hariyanto A, A Review of the GPS Tracker GT06N as the Vehicle Tracking Device, (2018) IJIRMF.

4 Section 1 of the Private Security Industry Regulation Act, 56 of 2001.

security service to mean protection or safeguarding persons or property in any manner; providing a reactive or response service in connection with the safeguarding of persons or property in any manner; installing, servicing or repairing security equipment and monitoring signals or transmissions from electronic security equipment".[5] The above mentioned activities defined as security service are conducted by tracking companies in their daily operations and qualifies them to be security service providers, rendering a security service and as subject to the regulation of PSiRA in terms of the PSiR Act.

PSiRA exists to provide regulation for the private security industry,[6] exercising effective control over the practice of the occupation of security service providers in the public and national interest, and the interest of the private security industry itself.[7] Among other objectives, the Authority will promote a private security industry which is characterized by professionalism, transparency, accountability, equity and accessibility.[8] The overarching object of regulating the industry include the regulation of the tracking devices (tracking technology) as well as the service rendered by the security service providers, which is installation and monitoring of tracking devices, and the tracking and recovery service itself.

It is against this backdrop that PSiRA conducted a study to unpack this sector by understanding the finer details of the development and usage of tracking technology in the private security sector with the aim of developing fit for purpose regulations for both the tracking technology and the security service providers using such technology. The literature review was conducted to deepen the understanding of the phenomenon being studied and to avoid duplication of research already conducted. Scholarly writings which include books and articles were utilized for this purpose.

5 As above.

6 Section 3 of the Private Security Industry Regulation Act, 56 of 2001.

7 As above.

8 As above.

2. BACKGROUND OF THE STUDY

For several decades, car keys have been used to physically secure vehicles.[9] Cowbells have also been used to track and locate animals. Initially, simple mechanical keys were introduced to open the doors, unlock the steering, and operate the ignition lock to start the engine.[10] Given access to a mechanical key, it is possible to create a duplicate with ease and mechanical tumbler locks and disc locks are known to be vulnerable to techniques such as lock-picking and bumping that allows operation of a lock without the respective key.[11] In addition to the above mentioned vulnerabilities it is worth noting that for most types of car locks, locksmith tools exist that allow the decoding of the lock and the creation of a matching key.[12] With regard to cowbells, they can be removed from animals thus making tracking and locating difficult, if not impossible.

Over the years engineers developed tracking technology to track vehicles and animals, and more recently, the technology has extended to the tracking of humans. The tracking technology was developed to counter the shortcomings of keys and cowbells as security equipment and tracking devices. Tracking is a process of monitoring or observing a person or objects on the move and supplying real-time data of the location.[13] This creates the idea that anything mobile can be tracked from anywhere at any time. Tracking currently reaches out to a wider range of users, and is accessible in various shapes, sizes and range of mobility.[14] Vehicle tracking, and monitoring systems are generally used by

9 Wirarespati *et al*, Automotive Security with Authorization and Tracking via GPS, (2019) Elsevier.

10 As above.

11 See (note 9) above.

12 See (note 9) above.

13 Agajo *et al*, Equipment, Security Personnel Tracking and Localisation using Geo-Location Techniques, (2016) JET.

14 Wirarespati (note 9 above).

administrators for management functions such as routing, dispatch, security, on-board information monitoring or even monitoring driving behavior.[15] In some cases, such systems are used as a theft prevention and retrieval device, for example; a security officer can simply follow the emitted signal by the tracking device to locate a vehicle.[16] The Authority's interest is the use of tracking technology for security reasons, hence the recommendation for this study to be conducted.

15 Lino Jr M.G.F and Festijo E.D, Vehicle Tracking and Monitoring: A Security System for Exclusive Subdivision, (2018) TIP.

16 As above.

3. RATIONALE

The use of tracking devices as a security equipment in the private security industry of South Africa has, and will continue to have, an impact on the regulatory regime of PSiRA. For the Authority to fully understand and appreciate such impact and then develop regulations that are fit for purpose, there is a need for PSiRA to undertake a study on this concept. It is impossible for any regulator to regulate that which it does not fully understand.

4. RESEARCH AIM AND OBJECTIVES

The aim of the study is:

To establish and evaluate the impact of the use of tracking devices in the private security industry of South Africa.

The objectives of the study are as follows:

a) To unpack the sector and evaluate the impact of the use of tracking devices in the Private Security Industry.
b) To explore the current level of regulation on the manufacturing and use of tracking devices in private security industry.
c) To determine the level of training required for security service providers dealing with tracking devices.
d) To establish the role of security service providers in the use of tracking devices and the level of regulation of human activities.
e) To determine the level of interventions required on the part of PSiRA as the regulator of the private security industry on training and the regulation of tracking device and security service providers rendering tracking services.
f) To determine if categories of services using tracking devices which are not a security service are subject to PSiRA's regulation.
g) To identify other equipment which are essential for the rendering of tracking services and the level of regulation of such equipment.

5. RESEARCH HYPOTHESIS AND QUESTIONS

5.1 Hypothesis

The hypothesis of this study is as follows: The proper use and regulation of tracking devices can enhance the credibility of the private security industry in the fight against car theft and poaching in South Africa.

5.2 Main Research Question

What is the impact of use of tracking devices in the private security industry of South Africa?

5.3 Secondary Research Questions

Research questions for this study are as follows:

a) What is the structure and impact of the use of tracking devices in the private security industry of South Africa?
b) What is the current level of regulation on the use of tracking devices in the private security industry?
c) What is the level of training required for security service providers dealing with tracking devices in the rendering of security services?
d) What is the role of security service providers on the use of tracking devices and the level of regulation of security service providers?
e) What is the required intervention from PSiRA to ensure that the use of tracking devices and the rendering of tracking services are adequately regulated?
f) What are the categories of services using tracking devices which are not subject to PSiRA regulation?
g) What other equipment is necessary for the rendering of tracking services and what is the level of regulation of such equipment?

6. METHODOLOGY

The study used qualitative research methodology in investigating the effects of the use of tracking devices as security equipment within the private security industry of South Africa and is exploratory in nature. Semi-structured interviews were conducted with security businesses and officers installing tracking devices and offering tracking and recovery services, with PSiRA staff members and members of other regulatory bodies regulating tracking devices. To achieve the objectives of this study and to answer the research questions, both desktop and field research were utilised as data collection methods. Face-to-face interviews were conducted with targeted participants across the republic of South Africa. Virtual interviews were used in situations where face-to-face interviews were impractical to achieve the objectives of the study. Virtual interview is a form of interview which takes place remotely by using online communication platforms. Purposive and snowbowling sampling methods were utilized to reach the above-mentioned sampling population. Purposive sampling is ideal for this exploratory research design as it is based on the judgement of the researcher as to who will provide the best information to achieve the objectives of the study if such information cannot be obtained from other sampling methods.[17]

6.1 Limitations of the study

The research was hampered by the unwillingness to participate by some in the targeted sampling population particularly service providers who track animals. The shortage of literature relating specifically to installation of tracking units, tracking and recovery in South African context also impeded the study to some extent.

17 Taherdoost H., Sampling Methods in Research Methodology; How to choose Sampling Technique for Research, (2016) IJARM.

7. LITERATURE REVIEW

This section presents a literature review on the use of tracking devices in the private security industry.

7.1 Introduction

There are various reasons why people require the whereabouts of their valuables to be known all the time such as the prevention of theft, the tracing of items stolen and the value of the property that requires that it be checked regularly. Tracking remains ever more important in today's world for the monitoring and tracking of the stolen vehicle, mobile and various other applications.[18] Shukla and Jain are of the view that the exponential growth of the market for online taxi booking increased the need for real-time location tracking of vehicles and made it an essential service. Furthermore, Rajeevan and Payagala points to thousands of vehicles being stolen on the roads and from unsecured parking areas as additional reasons for rapid growth of tracking technology on vehicles.

According to Agajo, Kolo, Lukman and Olusola tracking is the process of monitoring or observing a person or objects on the move and supplying real-time data of the location.[19] Satellites are in the main used for purposes of tracking. In essence tracking methods are generally based on a moving objects' distance, direction or both.[20] The Global Navigation Satellite System (GNSS) consist of three main satellite navigation systems, namely: Global Positioning System (GPS), GLONASS and Galileo.[21] GNSS has emerged as the standard navigation system that provides global positioning for devices that are used by human beings on daily basis such

18 Bhuvan S and Shah D, Study on Mobile and Vehicle Tracking System using GSM/GPS. NCRD's Technical Review (2018).

19 Agajo (note 13 above).

20 Bajaj *et al*, GPS: Location-Tracking Technology. AiC (2002).

21 Dhumal A *et al*, Vehicle Tracking System using GPS and Android OS. IJARCET (2015)

as smart phones and other location receivers. Although there are three identified GNS systems identified, the most used is the GPS due to accessibility and affordability amongst other reasons. Dhumal, Naikoji, Patwa, Shilimkar and Nighot are of the view that GLONASS and Galileo provide more accurate location than the GPS, yet they remain costly as they are under construction, hence they have lesser subscription than GPS. Shukla and Jain point to real-time location tracking for online booking services and prevention of vehicle theft as the two major aspects of applicability of vehicle tracking notwithstanding the fact these systems may be used for other reasons.

7.2 History of Tracking Devices

Throughout the time people have developed a variety of ways to figure out their position on earth and to navigate from one place to another. Early sailors relied on angular measurements and celestial bodies like the sun and stars to calculate their location.[22] "The 1920s witnessed the introduction of a more advanced technique-radionavigation-based at first on radios that allowed navigators to locate the direction of shore-based transmitter when in range. Later the development of artificial satellites made possible the transmission of more-precise, line-of-sight radionavigation signals and sparked a new era in navigation technology. Satellites were first used in position-finding in a simple but reliable two-dimensional Navy system called Transit."[23] This laid the foundation for the system that would later revolutionize navigation forever-the Global Positioning System (GPS). The satellite-based Global Positioning System as we know it today was initiated by the United States Department of Defense in 1978 for military purposes.[24] According to Bajaj, location tracking has been of great importance since World War II, when military planners recognised its usefulness for targeting, fleet management, positioning and navigation.[25]

22 Chan *et al*, From Objects to Landmarks: The Function of Visual location information in Spatial Navigation. Frontiers in Psychology (2012).

23 https://www.cs.cmu.edu/~sensing-sensors/readings/GPS_History-MR614.appb.pdf, Accessed on 24 June 2022.

24 Hariyanto (note 3 above).

25 Hariyanto (note 3 above).

As time evolved so did the tracking technology to an extent wherein today, "GPS has wide range of other applications including tracking package delivery, mobile commerce, emergency response, exploration, recreation, wildlife tracking, search and rescue, roadside assistance, stolen vehicle recovery, satellite data processing and rescue management."[26]

7.3 Components of GPS/GSM Tracking Technology

Although there are several components on a tracking system, the monitoring unit, tracking unit and server are the main pillars of GPS/GSM based vehicle tracking system.[27] There are variances regarding other components depending on the design of the tracking system. Dhumal, Naikoji, Patwa, Shilimkar and Nighot indicates that GPS based vehicle tracking system uses the GPS technology, GSM service and Android Mobile.

7.3.1 Tracking Device

There are variety of tracking devices designed and manufactured by different manufactures. Some refer to it as GPS module, others refer to it as Advanced Vehicle Locator (AVL) and other scholars refer to it as the vehicle unit. Vehicle tracking system is an electronic device, installed in a vehicle to enable the owner or a third party to track the vehicle's place.[28] The GPS device installed in the vehicle continuously moves with the vehicle and will calculate the co-ordinates with other related information at each position and then transmit the information via GSM to the tracking server, thus storing it in the database; which can be viewed on electronic map.[29] In addition to the above Kasture, Gandhi, Gundewar and Kulkarni adds that an AVL device which is placed in a vehicle accepts data from GPS satellites and stores it temporarily in the device.

26 Hariyanto (note 3 above).

27 Agajo (note 13 above).

28 Usman A, Yusuf Gambo and Sajiyus O, A Model for Smart Vehicle Tracking: A Review. JSRR (2019).

29 Kasture *et al*, Multi-Tracking System for Vehicle using GPS and GSM. IJRET (2014).

7.3.2 GPS

Shukla and Jain are of the view that GPS is an essential component that makes tracking possible for the service provider and, consequently, the end-user. According to Sandika and Suryana the GPS is a system for determining position and navigation globally by using satellites and triangulation methods.[30] The system was developed by the United States of America's Department of Defense and was originally intended for its Satellite Timing and Ranging Global Positioning System. In addition to the above Kasture, Gandhi, Gundewar and Kulkarni indicates that it is a US-owned utility that provides users with positioning, navigation, and timing services. Initially it was called Satellite Timing and Ranging Global Positioning System before it was renamed to GPS and had three segments, namely: satellite (Space Segment), controller (Control Segment) and receiver/user (user Segment).[31]

The GPS satellites orbiting the earth totaling 24 pieces, of which 21 pieces remain active and 3 remain on standby. According to Cooksey as cited in Agajo GPS satellites complete revolution in approximately 12 hours, which implies that they pass over any point of the earth about twice a day and they rise (and set) approximately four minutes earlier each day.[32] Over and above showing the exact location of the vehicle, tracking systems can also track the speed and direction of the vehicle using a number of satellites.[33]

7.3.3 GSM (Global Systems for Mobile Communications)

In Europe, GSM is the essential wireless telephone service and boasts one billion users on a global scale.[34] In addition to Europe, GSM operates and is readily available as a digital network in

30 Sandika G and Suryana T, Vehicle Tracking Applications Position Using GPS and GSM based on Android. Indonesia Computer University (2014).

31 As above.

32 Oluwatobi (note 2 above).

33 Shukla A and Jain A, GPS-Based Tracking System for Vehicles Using Google Maps. IUP (2018).

34 Agajo (note 13 above).

over 190 countries although initially GSM was set up to act as a common, more unified European Mobile Technology System.[35] Kasture, Gandhi, Gundawar and Kulkarni are of the view that the integration between GPS and GSM makes them major components of the multi-tracking system in world of vehicle tracking due to the fact that they can generate different alerts.

7.3.4 Handphone/Smart Phones

Smart phones have become essential part of everyday human life for various reasons.[36] In the tracking technology, smart phones are used to receive notifications through SMS or viewing of the location of the tracked property on Google Maps. Over and above this they have internal tracking devices which makes them traceable through tracking technology. Cellphone or mobile phone is a telecommunications device electronics which have basic capabilities like conventional phone line fixed (landline), and can be taken anywhere as it does not require cable connection to the telephone network to function.[37]

According to Elrhman, Ahmed, Mekki and Taha, smart phones use different features to get the location of the phone, and the GPS is one of them. Tete *et al* indicates that they are integrated with multiple and different features that allow us to communicate with the world, organize our lives and document events and furthermore, assist with location-based services.[38] In this chapter the word Handphone or Smart phones is used in a broader sense to include all hand-held gadgets such at tablets or any hand-held device which serves similar purpose as Smart Phones.

7.3.5 Android

Android is an operating system for mobile devices that covers Linux-based operating system, middleware and applications.[39]

35 Agajo (note 13 above).

36 Tete *et al*, Android App: Vehicle Tracking System. IRJET (2018).

37 Sandika (note 30 above).

38 Tete (note 36 above).

39 Patra (note 1 above).

Android provides an open platform for developers to create their applications.[40] It is the most commonly used operating system for smartphones worldwide despite the presence of iPhone Operating System (iOS) and Microsoft windows.

7.3.6 WEB Application

The server programme is a computer programme where the system owner interacts with a graphical interface on his computer to track a moving object attached with a tracker on Google Maps.[41] The server receives multiple vehicles' location through a modem and displays these locations on a map viewed on the screen.[42] The server performs similar functions in the tracking of valuables which are not vehicles including but not limited to animals and electronic gadget fitted with tracking devices.

7.4 Disadvantages of Tracking Technology

7.4.1 Enforcement Related Challenges

One of the disadvantages of law-enforcement relating to mobile-tracking technology is the sheer number of enquiries.[43] At times, clients send enquires to the services provider for the sake of testing the tracking system whichimpedes response to real complaints of theft or hijacking of vehicles and livestock. Also, an overwhelming number of complaints at a particular point will make it impossible for the service provider to render an effective service to all clients due to resource constraints.

7.4.2 Cost related challenges

Several number of tracking systems have been developed with a wide range of tracking facilities, but the operational costs of

40 Patra (note 1 above).

41 Elrhman *et al*, Android Based Vehicle Tracking System. University of Khartoum (2014).

42 As above.

43 Bhuvan S and Shah D, Study on Mobile and Vehicle Tracking System using GSM/ GPS. NCRD's Technical Review (2018).

most of them is higher and as such hinder the widespread use of them.[44] Tete, Sahare, Likhar and Badalu are of the view that although most people know that GPS can provide more security for a vehicle and any other valuable property, costs related to its use remains the main deterrent factor to many people.[45] Furthermore, it was indicated that an advanced vehicle security system is expensive which is compounded amongst other things by the fact that consumers have to buy a tracking device and pay for a service on monthly basis to a service provider.[46] Dhumal, Naikoji, Patwa, Shilimkar and Nighot have contrary opinion with regard to the costs of GPS usage as according to them, GPS is the best technology considering its availability and receiver cost.[47] The issue of affordability will be determined by a variety of things, which includes the development status of the country, the financial standing of the user, service providers rendering tracking services, etc.

7.4.3 Signal related Challenges

Satellite signals require a direct line of sight on the GPS receivers and cannot penetrate obstacles such as water, soil, and walls. "For example, heavy forest canopy causes interference, making it difficult, if not impossible, to compute positions".[48] In canyons (and "urban canyons" in cities) GPS signals are jammed by mountain ranges or buildings and if a GPS receiver antenna is blocked, it will be disabled from computing positions.[49]

44 Hasan *et al*, Cost Effective GPS-GPRS Based Object Tracking System. IMECS (2009).

45 Tete (note 38 above).

46 Tete (note 38 above).

47 PSIR Act (note 4 above).

48 Agajo (note 13 above).

49 Agajo (note 13 above).

7.5 The Future of Satellite Tracking

Bajaj, Ranaweera, and Agrawal are of the view that as more devices become GPS enabled, accuracy will increase, and the system's scale and global reach will benefit everyone.[50] Furthermore, they added that wireless technology promises to be a key element in any long-term solution[51] in many aspects of life including in security. According to Shukla and Jain, one of the most important features of a GPS tracking system is customizable alerts[52] which can be altered according to the needs of the customer and prevailing circumstances of the model of business for which the service provider is using the system.

50 Bajaj (note 20 above).

51 Bajaj (note 20 above).

52 Shukla (note 33 above).

8. RESEARCH FINDINGS

This portion of the report present research finding which are in the main informed by the views of research participants.

8.1 Structure and impact of the Tracking Sector

The study established that the tracking sector is divided into three divisions, which are (1) the technology division, (2) the installation and monitoring division and (3) tracking and recovery division. Although sounding a bit technical, one the research participants indicated that tracking is not a complicated phenomenon and should never be made complicated in any way.[53] The technology division includes the research, manufacturing, assembling of the tracking units and its activities are largely determined by the market as informed by the challenges experienced by service providers on daily basis.

The fitting division includes activities such as fitting tracking units into vehicles, monitoring of tracking units from the control room and guiding the manufacturers regarding what is required in the industry. Finally, the tracking and recovery division is made up of service providers who are responsible for tracking and recovery of vehicles, or any other property or person stolen or abducted following updates from the devices which is fitted in the stolen property or in possession of abducted person.

The study further established that tracking units connected either with the GPS/GSM technology or with the Radio Frequency technology (RF technology). The GPS/GSM technology work in similar manner as outlined in literature review. The RF technology although is an old technology, it was regarded by one participant as very accurate even more than GPS/GSM because the grid accuracy of GPS/GSM technology is 13 Meter radius whereas the RF technology is pinpoint.[54] Contrary to the above views, RF

53 Interview with anonymous participants, 03 November 2022.

54 Interview with Ben Jordaan, 21 September 2022.

regarded as an old technology, which is limited and inaccurate although it is still used.[55] RF technology in the main is used on animal tracking due to its ability to save battery as compared to GPS/GSM technology. Furthermore, there are special tracking units which are having both the GPS/GSM and FR technology. This hybrid tracking technology is important when technology fails because of issues such as basement parking, in such cases the GSP/GSM technology will lead the recovery team to the entrance and the RF will lead to the exact location of the vehicle in the basement.

Although tracking business operating in South Africa are in the main tracking vehicles, it was established that there are businesses tracking other valuables including trailers, yellow machinery, human beings, industrial generators, containers, animals, and other valuables of which the owner needs to regularly know their whereabouts. This is because most participants indicated that tracking means looking after an asset or person by attaching a tracking unit which can send regular information to the server about the activities of such an asset or person.

What is being tracked is not the property or the person but a tracking unit which is attached to a property or a person.[56] One of the participants indicated that tracking is done on the assumption that the tracking unit is still attached to the property or person.[57] Simply put, the device is associated with something or somebody and transmits from that property or person until detached. Furthermore, it was highlighted that regarding the tracking of vehicles, the technology allows the service provider to know if the tracking unit has been tampered with, removed from the vehicle or is being illegally towed.[58]

Vehicles are the most common assets tracked through tracking units for various reasons which includes high crime rate in South Africa, in particular car theft and hijacking. Moreover, some

55 Interview with Bheki Madide, 27 October 2022.

56 Interview with Anton Senekal, 23 October 2022.

57 Interview with Mike Du Preez, 21 October 2022.

58 As above.

insurance companies make it a prerequisite for one to have a tracking device on the vehicle for it to be insured with them. Some insurance companies are very specific with regard to which tracking company a potential client should use which raises the question of limitation of the freedom of choice of the client and the monopolizing of the industry.

Although animals and human beings are tracked for various reasons, this was not found to be a popular practice in South Africa, despite the rise in human trafficking. Animals, which includes domesticated animals and wildlife, are tracked through both GPS/GSM technology and RF technology. Regarding the difference between tracking animals, human beings, containers and vehicles it was indicated that tracking is the same with the only difference being the source of energy of property or person which is non-motorized and which uses a battery as a source of energy.[59] The aim is to create visibility on any property or person being tracked through tracking unit associated or attached to such property or person. The only challenge with regard the use of battery is its lifespan which often is short and must be replaced from time to time.

Although most service providers that took part in this study focused on the installation of tracking devices, there were some who specifically dealt with tracking and recovery of stolen property in particular vehicles. This is a specialised field that requires specific skills. The majority of service providers involved in the installation of tracking units offer a monitoring service but outsource the tracking and recovery service to service providers that specialising in recovery. Risky as it may seem it is essential in the recovery of stolen vehicles and requires a close working relationship with the South African Police Service (SAPS).

The recovery process requires highly trained security officers and high caliber firearms to match the unknown suspects they face every day. The process of recovery amongst other includes the risk of facing suspects head-on without knowing how heavily armed they are. The standard practice is that, should there be

59 Du Preez (note 57 above).

any suspicion of a vehicle leaving the demarcated area, signal of harsh impact on the vehicle, tampering with the vehicle in any manner including its power supply or illegal towing detected, the tracking service provider will call the client to check the status of the vehicle. If the client fails to respond to calls or there is a confirmation that the vehicle is stolen, the tracking service provider will activate the recovery unit and they will be guided by communications transmitted by the tracking unit fitted into the vehicle about the whereabouts of the vehicle and its movement. The recovery unit will try to recover the vehicle before the tracking unit is removed from the vehicle and will notify the police of the area where the stolen vehicle has been located.

Once a stolen vehicle has been recovered, the place where it has been recovered becomes a scene of crime. The scene of crime will be handed over to the police for further processing, which includes lifting of fingerprints, taking photographs where necessary and arranging a towing truck. It was established that in previous years some clients, when their vehicles were recovered, preferred they be handed back to them without involving the police. Some of the reasons for not involving the police were: delays in the the release of vehicles from the SAPS 13 vehicle storage, theft of parts, and theft of recovered vehicles from the storage area. The situation has since changed due to the instruction issued by the Minister of Police that all tracking security service providers recovering vehicles must report to the police and it will the police who decides what to do with a recovered vehicle.[60]

Vehicles that are stolen in South Africa are sometimes recovered inside the country, towards the borders of neighboring countries and beyond the borders of South Africa. South African companies that provide recovery services have subsidiaries and agents in many African countries and some vehicles have been recovered in Lesotho, Zimbabwe, Eswatini, Mozambique, Angola and even Nigeria. The study established that, although recovering a vehicle inside South Africa, processing it and returning it to the owner might be easy, processing a recovered vehicle beyond the borders of the country was found to be a challenge. Angola, for example,

60 Interview with Reinier Van der Bergh, 03 November 2022.

does not allow foreign security company to trade within their borders. Angolan magistrates often impose impractical conditions such as instructing the recovery company to find and present the person who illegally brought the car into the country before granting a repatriation order.[61]

The first challenge is that service providers are trying to return to the country - in legal way - a vehicle which has been taken illegally. It was indicated that in some cases stolen vehicles were found in neighboring countries with fraudulent registration documents already created for them, which makes it even more difficult to return the vehicle. The challenge is that the original owner must prove that the documents generated in another country are fraudulent and that theirs are legit. The registration documents are generated from two different systems in two different countries.

A service provider who recovered a vehicle in Lesotho indicated that the process of bringing the car back into the country was not very difficult,[62] contrary to the view of other participants. The dispute about authenticity of registration documents when they are generated in another country, and lack of proof of the vehicle entering the country, makes it difficult if not impossible to return the stolen vehicle from another country.[63] The challenges with regard to returning a stolen vehicle led to one participant suggesting that stealing it back into the country might even be a better option than the legal way of returning it. [64]

The use of tracking devices continues to play a significant role in the private security industry of South Africa as it is one of the ways in which people protect their valuables. They do this by tracking and tracing the tracking device(s) attached to their valuables with a belief that it is still attached or inside the property. According to the findings of the survey conducted by Insurvey which was commissioned by PSiRA, most users of tracking services are satisfied with services they receive from service providers and

61 Interview with Reinier Van der Bergh, 03 November 2022.

62 Interview with Kunjulwa Magona, 21 October 2022.

63 Du Preez (note 57 above).

64 Interview with Anonymous participant, 20 October 2022.

feel that their valuables are secure. This is a clear indication that tracking devices have a positive impact within the industry and on the users.

The use of tracking devices and the tracking sector itself impact on the private security industry of South Africa by providing peace of mind to consumers knowing that their valuables are likely to be recovered when stolen due to the tracking device fitted in them. This is further confirmed by the findings of a survey commissioned by PSiRA which indicated that 90% of customers feel safe because of it.[65]

Although the number of cars that are fitted with tracking units for security reasons has not been established, it can be argued that the majority of vehicles, particularly in urban areas, are fitted with tracking devises and often have two devices fitted in one vehicle. The recovery rate of security service providers using tracking devices is estimated at 70% to 95% which aligns with survey findings indicating that the recovery rate of SSPs using tracking devices is over 76%.[66]

Tracking devices play a significant role in securing people and their valuables, however the presence of jamming devices compromise their effectiveness. The study established that although tracking devices that are fitted on vehicles are fit for purpose when it comes to tracking and recovery, this at times is impossible due to the prevalence of jamming devices. A jamming device blocks transmission or reception of signals, usually by creating some form of interference at the same frequency that other communication channels use.[67] When a stolen vehicle cannot communicate with the server of the service provider, the first suspicion is that it has been disabled through a jamming device. Although it is illegal to possess a jamming device in South Africa, the study established that these are readily available on the market and there is no effort made to curb their sale.

65 PSiRA-survey: The use of tracking devices, 2022.

66 As above.

67 https://www.ijert.org/research/mobile-jammer-IJERTCONV3IS28040. Accessed on 01 November 2022.

Tracking service providers have indicated that the battle against jammers is real, because they must use legal ways to fight an illegal problem. They always strive - through research and other means - to develop and improve their system to defeat jammers.

8.2 The level of regulation

Section 1 of the PSIR Act defines security equipment to include a satellite tracking device. Moreover, a security service is defined to include the installation, service or repair of security equipment.[68] It goes without saying that the installation of tracking devices for security purposes on any property or person is a security service subject to PSiRA's regulation. The technicians installing tracking devices on any property or person for security purposes, are security officers subject to PSiRA regulation. The study established that although most technicians are registered with PSiRA there were some who were not registered as security officers.

The majority of participants who install tracking devices use the services of other security companies for recovery. It was established that the risk involved in the recovery of vehicles requires specific skill and resources. The resources required for recovery purposes included but is not limited to the following: firearms, helicopters, and high-power vehicles, although it is not always necessary to have high-power vehicles. The nature of the service rendered by tracking and recovery service providers is purely a security service subject to PSiRA regulation and the purchase of firearms, including application for firearm licenses, is the responsibility of the Central Firearms Registrar of the South African Police Service (SAPS).

The study established that the Independent Communications Authority of South Africa (ICASA) and The Motor Vehicle Security Association of South Africa (VESA) play an active role in the regulation of tracking sector. The GPS/GSM and Radio Frequency technologies transmit messages thereby rendering them communication devices subject to ICASA approval.

68 Section 1 of the Private Security Industry Regulation Act 56 of 2001.

Tracking units which are not activated cannot serve any purpose. The process of activating a tracking unit requires both a sim card from a network service provider and computer software. [69] In as much as software is an essential component of the tracking sector, most participants agreed that PSiRA should never try to regulate software as it is a tool that enables the equipment to function and cannot be classified as equipment in and of itself.[70] Moreover, the constant and rapid improvements to security software renders the regulation of it impractical. [71]

The installation and use of tracking devices for non-security related reasons, although a popular practice in South Africa, is not subject to PSiRA's regulation in any manner as the purpose is not security related. Overall, there is a high degree of compliance by security service providers rendering tracking services although there remains room for improvement on the registration of technicians installing tracking devices. The Authority must educate security service providers about the obligation to register their technicians and enforce the law against those who knowingly choose not to comply.

8.3 Training of technicians and security officers doing recovery

The Private Security Industry Training Regulation, 1992 continue to regulate the training of security officers and prospective security officers. The technicians who are responsible for fitting the tracking units on vehicles are compelled to do Grades training (as determined by these regulations) and to be registered with PSiRA. Some service providers lamented that grades do not serve a person who will be installing the units on vehicles as grades are in no way related to this task. Almost all the tracking companies that participated in this study said they do their own training which is linked to their internal standards. Information relating to the training curriculum and company standards was not readily available as it forms part of the trade secrets of the business.

69 Magona (note 62 above).

70 Interview with Renolan Govender, 21 September 2022.

71 As above.

Overall, the recruitment requirements of the service providers focus on technical astuteness, prior exposure to the motor industry, auto-electric training, or experience in tracking device fitting.

Some of the research participants were of the view that there is a need for PSiRA to develop a course which will specifically relate to the job done by tracking technicians, notwithstanding the fact that the development and public access to such course material might compromise the security of vehicles, in that it will be accessed by people with wrong intentions.

8.4 The role of Security Service Providers in building the culture of compliance

The Authority introduced a self-assessment tool in the financial year 2021/2022 to give effect to the role of SSPs compliance in terms of the Code of Conduct Regulations for Security Service Providers, 2003 (Code of Conduct, 2003). According to Code of Conduct, 2003, a SSP must, with his or her ability, render all reasonable assistance to and co-operate with the Authority to enable the Authority to perform any function which it may lawfully perform, and must take all reasonable steps to ensure that any information provided to the Authority by such SSP is true and accurate.[72] By introducing this model of regulation the Authority has increased the responsibility of SSPs in ensuring greater compliance with the PSiR Act and the Regulations drafted in terms thereof. This provision is also applicable to service providers in the vehicle tracking sector of which some of whom were found to be non-compliant with provisions of the Act. There is a need for PSiRA, as the regulator, to augment the self-assessment tool to the industry to educate service providers about their responsibility to conduct self-assessment honestly and transparently, and to impose the repercussions of providing untruthful information. Overall, the study established that majority of tracking service providers are taking strides to ensure compliance with the PSiR Act.

72 Regulation 6 of the Code of Conduct Regulations for Security Service Providers, 2003.

8.5 Required intervention from PSiRA to ensure compliance

The majority of participants in this study had never been inspected by PSiRA, in particular those who offer installation and monitoring, which is a major cause for concern. According to some participants, the Authority has not been visible on the ground. The regulations drafted for the private security industry can only be as good as its enforcement. The annual targets of PSiRA inspectors must be amended to include service providers that render tracking services with the aim of increasing compliance in the tracking sector. The importance of tracking units and tracking services cannot be overemphasized as their correct use, and the regulation of such, will enhance the reputation of the private security industry in the fight against abduction, car theft and poaching in South Africa. Consumers have already indicated their trust in tracking devices by subscribing to the services of tracking services providers in their numbers for the protection of their children, animals, vehicles, and other valuables. It should be communicated to the industry and consumers that service providers installing, monitoring, tracking, and recovering any valuable using a satellite tracking device should be registered with PSiRA.

For PSiRA to take charge in determining which tracking devices can be used or how installations or fitment of tracking devices should be done, more technical and practical knowledge is required. The Authority must invest resources in research aimed at understanding the specifications and components of various makes of satellite tracking devices. This calls for further research on the technological component of tracking sector for the regulator to clearly understand what makes a good or a bad tracking device for purposes of protecting the consumers before developing regulations.

8.6 Use Tracking Devices for non-security reasons

Although a satellite tracking device is a security equipment it is worth noting that, in some cases, it is not subject to PSiRA regulation due the purpose for which it is used. The study found that although the tracking technology was originally made for military application, it has been developed to protect vehicles and lately its application has found its way into other sectors of business. Fleet management is one example of such non-security use of tracking technology. Transportation companies use tracking devices in their vehicles to monitor driver behaviour, to estimate time for delivery of goods, fuel management, general vehicle maintenance and other business efficiency needs.

The other sector of society wherein in the tracking technology has found a space is e-hailing services such Uber, Bolt and other online transportation services. The GPS/GSM tracking technology is used to locate the client for purposes of pick-up, drop-off, or delivery of goods. Although the GPS/GSM technology on the mobile application of the service provider has a security feature, security is not the core function and their application in this sector of the economy cannot be interpreted to be a security service subject to PSiRA regulation.

In South Africa animal tracking is done for both security and non-security related reasons. Non-security related uses include the monitoring of animal behaviour such as migration patterns, environmental adaptations and reproduction monitoring. Whales, for example, are tracked through direct GPS tracking technology (which does not use GSM) to monitor their movements and breeding patterns throughout the year. These non-security related applications tracking and monitoring falls outside the scope of security and[73] cannot be regarded as a security service.

73 Magona (note 62 above).

8.7 Other equipment used for rendering tracking services

The satellite tracking unit or tracking devices, as a major component of the tracking sector, does not work in isolation but with several components which enables it to serve the purpose for which it is created. These components include radio frequency towers and cellphone network service provider towers. The above two mentioned components are subject to ICASA regulation and PSiRA has no business in regulation them. The other components are Firearms and computer software, with the former already regulated by SAPS and PSiRA it is only the former which participants highlighted as a crucial role in the tracking sector. It was indicated that a tracking unit with no sim-card and that has not been configured through software to enable transmission, cannot serve a purpose. It is only after the tracking device has been activated by capturing it into the tracking platform (using software) that it goes live. [74] It was cautioned that although software plays a significant role in bringing tracking units to life, PSiRA should not attempt to regulate such. Furthermore, software was regarded as a tool enabling the equipment to function and not an equipment.[75] It was further indicated that security software changes rapidly which makes it impractical to regulate.[76] The impractical nature of regulating software, and the fact that it was never the intention of the legislature to have PSiRA regulating software, leaves software out of scope of regulation of PSiRA.

74 As above.

75 Interview with Renolan Govender, 21 September 2022.

76 As above.

8.8 Challenges in the Tracking Sector

The study established several challenges that are faced by service providers in the tracking space which includes returning vehicles when recovered beyond the borders of South Africa. Electricity load shedding by ESKOM remains one of the biggest threats to the tracking sector due to the fact GSM/GSM tracking depends on cellphone Network service providers to transmit. Load shedding compromises the quality of networks as some of the service providers' towers are often unable to switch from electricity to battery due to the prevalence of the theft of batteries in towers. Load shedding effects on the networks of tracking units leads to delayed transmission of messages or no transmission at all.[77] Network related challenges found are in line with literature review which highlighted the same problem although not emanating from load shedding but from other reasons.

Over and above load shedding, there are other hindrances which affect the ability of a tracking unit to transmit such as bad weather which includes heavy over-cast, rural areas where the network is generally low, and concrete slabs and steel-top buildings in urban areas. The study further established that time is very important in the process of recovery. The time between vehicle theft or hijacking and reporting (which activates the recovery) allows a service provider to determine whether the vehicle will be recovered. The nature of a GPS/GSM tracking device dictates that its installation be shallow and not deep[78] thus when criminals are afforded some time, they will locate and remove the shallow device even if it means damaging the vehicle.[79]

It was pointed out that if an hour lapses between the vehicle being stolen and reporting to the recovery company, the vehicle might be 110Km away from the scene of crime in any direction.[80] Such waste of time may also provide criminals with an opportunity locate the tracking unit and remove it from the vehicle. Therefore, the

77 Interview with Dennis Motshwane, 21 September 2022.

78 Interview with Reinier Van der Bergh, 03 November 2022.

79 Interview with Mike Du Preez, 21 October 2022.

80 Van der Bergh (note 78 above).

tracking companies doing the monitoring of client's vehicles, or any property, must put in place measures to ensure that any other threat to the security of property is reported to recovery agents as soon as possible to increase the chances of recovering the property.

The other challenge is lack of national standards regarding quality and installation of tracking devices. Tracking companies (which includes those doing installations and those that engage in recovery) have their own standards with regard to the quality and specification of the tracking unit, installation standards and the manner in which recovery is carried out. This has the potential to compromise the clients as some service providers can do dubious work or install a tracking unit of inferior quality, thus disadvantaging the clients. This is in line with allegation made by a participant who alleged that "start-up companies are buying and selling sub-standard units."[81]

One of the participants indicated the battle is against organised crime to prevent vehicle theft.[82] The manner in which vehicles are stolen, the choice of which vehicles to steal, the way the vehicles are processed after being stolen are a clear indications of the involvement of organized crime. The processing of vehicle includes the stripping of security features such as tracking devices, moving from one place to another, tampering with the identity of the vehicle and obtaining fraudulent registration certificates for stolen vehicles. The nature of the enemy the tracking industry faces dictates the level of security to be fitted on the vehicle and the direction which the tacking sector is taking particularly regarding further development of the tracking device.

According to a few of the participants some vehicles are more at risk of being stolen than others due to amongst others, the following: Appetite of the stolen vehicles market for such cars and their ability to quickly cross the river when taken to a neighboring country. Regarding categories, bakkies were found to more prone to theft than any other category of vehicle.

81 Motshwane (note 77 above).

82 Du Preez (note 57 above).

8.9 Future of Tracking sector

Ever since tracking technology was introduced in South Africa it has grown exponentially. The growth was primarily driven by insurance companies who made it compulsory for one to have a tracking unit before they consider insuring a vehicle.[83] In addition, some insurers went as far as prescribing the tracking companies the client must use. Ever since tracking technology was introduced in other sectors of the economy such as fleet management and the online taxi industry, it continues to grow and is now an entrenched solution to many sectors of the economy.

The tracking industry in South Africa for security purposes has different categories of tracking business ranging from big, medium to small businesses. This means some businesses are thriving, some are doing well, while others are barely surviving. This leads to several tracking businesses focusing on tracking assets other than vehicles; One business participant indicated that although they continue to track vehicles, their primary focus shifted to trailer tracking as the vehicle tracking sector is over supplied and South Africans are loyal to the brands they know.[84] These aspects create a high barrier to entry into the vehicle tracking space making it difficult if not impossible for new entrants into the industry to find clients in the vehicle tracking space.

83 Interview with Roelof Du Preez, David Renton, and Reinier van der Bergh, 03 November 2022.

84 Interview with Ben Jordaan, 21 September 2022.

Almost all participants agreed that there are no new emerging businesses in this sector, and they stated various reasons. One participant made an assumption that this might be because the industry is dominated by a certain group of people.[85] Another participant echoed similar sentiments indicating that, by design, it was made to be difficult for the new entrants to emerge, specifically referring to the prerequisites that a tracking service provider must belong to VESA before insurance companies can approve their clients to use such service provider.[86] Tenders, in particular large tenders, were also cited as a reason for preventing small companies to grow as clients attach onerous clauses with regard to security before a service provider can be awarded a tender.[87]

South Africa recorded 46 921 and 35 023 motor vehicle theft cases in the financial years 2019/2020 and 2020/2021 respectively. This high crime rate suggests that there will always be a need for South African car owners to protect their cars in one way or another including installing tracking units. In addition to the above crime statistics, it was indicated that the tracking industry will continue to grow because vehicles are always going to be stolen for one reason or another.[88]

In a broader context it was indicated that, in terms of opportunities, there is not much as the high cost of living is affecting everyone and new entrants will find it hard to emerge, whereas the established businesses will continue to grow.[89]

85 Interview with anonymous participant, 21 October 2022.

86 Interview with Bheki Madide, 27 October 2022.

87 Du Preez (note 57 above).

88 Interview with Gaibe, 05 October 2022.

89 Interview with Eddie Mabasa, 28 September 2022.

Participants cautioned that developers of tracking units must invest more into research in order to counter jamming devices as the criminals are getting more advanced.[90] Private security has become a large part our lives as South Africans and there will always be a need for people to know the whereabouts of their valuables and varying needs will continue to create opportunities for the tracking industry,[91] despite assertion by some that factory fitted devices signals the end of tracking industry as we know it.

Although the industry might be changing for various reasons including the advent of the 4th industrial Revolution, such changes cannot be interpreted to mean a bleak future for the industry. It was established that some vehicles are released to the market with factory-fitted tracking units, which was interpreted as a threat to the industry. There will however always be older vehicles, vehicles that do not have factory-fitted tracking units, and those requiring after-market tracking units. For as long as there are vehicles in South Africa and for as long as vehicle theft forms part of crime statistics, there will always be a need for tracking devices. In addition, other categories of valuables will require tracking and, as a result, the future of tracking industry looks promising.

90 Interview with Ricardo De Lange, 21 September 2022.

91 Motshwane (note 77 above).

9. RECOMMENDATIONS

This section of the study presents recommendations which are informed by the research findings and are aimed at improving the regulatory regime of PSiRA, specifically regarding the use tracking devices for security reasons.

9.1 Categorization of Tracking as a Sector

Although the PSIR Act recognises a Satellite Tracking device as a security equipment and its installation, repair, and maintenance as a security service, the entire tracking sector is not categorized as a specialized sector. The rendering of tracking services is a large stand-alone sector within the Private security industry and as such requires individual recognition as it cannot be termed Asset-in-Transit or Armed Response. It is therefore recommended that PSiRA adds Tracking as a separate sector and, when registering technicians, in this field they must be registered according to what they do. Recovery security officers should be recognised as such over and above the graded training they possess.

9.2 Regulation of Tracking Industry

The study established that some security service providers providing tracking services are not registering their technicians with PSiRA although it is clear they are rendering a security service. To ensure compliance with the PSiR Act, Private Security Industry Regulations, 2002 and the Code of Conduct for the security service providers, the Law Enforcement Department must set targets for inspecting tracking service providers and educate them on the importance of compliance with the law. In cases where non-compliance persists, remedial action must be taken which may include criminal cases and code of conduct dockets.

9.3 Development of Training for Technicians

Security service providers installing tracking devices recruit technicians from the motor industry, electrical engineering sector and from other businesses that have already trained their staff. There is no training centre in South Africa which is dedicated to training tracking technicians and producing a pool of qualified technicians for the industry. It is therefore recommended that PSiRA - in consultation with the VESA and the industry - develop a training course for installers of tracking units. The candidates must be taught the history and evolution of tracking devices, how a tracking device functions and how to install a device on different properties.

9.4 Installation Standards

The lack of national standards regarding installation of Tracking devices is a major cause for concern as some of the service providers do shallow installations which poses a risk for both the tracking device and the owner of the property. The Authority, in consultation with Tracking Sector experts, VESA and the South African Veterinary Council (SAVC), must develop national standards for the fitment or installation of tracking devices on vehicles, animals and on other forms of properties, with the goal of improving the quality of installation for better protection of both tracking units and the consumers of tracking services.

9.5 Training of PSiRA Inspectors

The evolution of tracking devices requires constant training on the part of those who are rendering services and regulating the services rendered. Tracking devices change regularly in terms of shape, capacity, and application therefore, it is recommended that PSiRA inspectors should be trained to identify different types of tracking devices and learn their installation and functional capacity. This will ensure that the tracking sector is properly regulated because one cannot regulate that which one cannot measure. The Training of inspectors will go a long way towards ensuring that tracking devices are properly installed and are functioning to the required standards, to benefit of consumers of such services.

10. CONCLUSION

The study established that the use of tracking devices is divided into three divisions which are:

(1) the Technology division,
(2) the Installation and Monitoring division, and
(3) the Tracking and Recovery division.

Furthermore, tracking is conducted for many reasons some of which are non-security related which includes but is not limited to research, environmental, behaviour monitoring, fleet management, fuel consumption, route planning and online taxi services. When used for security purposes, tracking devices are used primarily to track vehicles which is the largest market segment. They are furthermore used to track human beings and other valuables such as computers, truck loads, animals, industrial generators, mobile toilets, trailers, motor bikes, ships, yellow machinery, and any property which can be moved from one place to another.

Security services providers that install tracking devices are obliged to register with PSiRA in terms of the PSiR Act, but some of them are not registered with the Authority. About businesses doing tracking and recovery, it was found that all participants were registered with PSiRA, and they are all using licensed firearms in their operation, ranging from handguns to high caliber firearms. The recovery agents were primarily recruited from SAPS followed by Cash-in-Transit and Armed response officers. The study also established that although the tracking technology has over time migrated from Radio Frequency to GPS/GSM technology, there is still a role to be played by RF technology in the world of tracking.

The vehicles stolen in South Africa are tracked and recovered in South Africa and in other countries such as Lesotho, Zimbabwe, Mozambique, Eswatini, Angola, and Nigeria. The study established that although majority of tracking and recovery companies do not have formal Memoranda of Understanding with SAPS, there is a good collaboration between them when it comes to the tracking and recovery of stolen vehicles. The growth of the tracking sector over the years led most participants to predict that the industry will continue to grow, and, moreover, that theft of motor vehicle statistics at SAPS continue to be high. South Africans will continue to seek ways to protect their valuables, in particular vehicles, in many ways including installing a tracking device(s). Wherefore the proper use and regulation of tracking devices will continue to enhance the credibility of the private security industry in the fight against car theft, poaching, kidnapping and other criminal activities.

REFERENCES

Legislation

Private Security Industry Regulations Act 56 of 2001.

Thesis and research papers

Angsuman, P., Kailash C.H., and Shashank S., (2013). GPS Tracking System: (Bachelor of Technology in Computer Sciences, International Institute if Information technology).

Articles

Agajo, J., Kolo, J.G., Lukman, A. and Olusola K.Y. (2016) Equipment, Security Personnel Tracking and Localisation Using Geo-Location Technique: Journal of Engineering Technology.

Agrawal, D. (2002) GPS: Location Tracking Technology: Researchgate.

Bhuvan, S. and Shah, D. (2018) Study of Mobile and Vehicle Tracking System Using GSM/GPS: NCRD's Technical Review.

Dhumal, A., Naikoji, A., Ptwa, Y., Shilimka, M. and Nighot, M.K. (2015) Vehicle Tracking System Using GPS and Android OS: International Journal of Advanced Research in Computer Engineering and Technology.

Elrhman, O.A.A.A., Ahmed, A.M., Mekki, T.H. and Taha G.M. (2014) Android Based Vehicle Tracking System: University Khartoum, Sudan.

Hariyanto, and Siahaan, A.P.U (2018). A Review of the GPS Tracker GT06N as the Vehicle Tracking Device: International Journal for Innovative Research in Multidisciplinary Field.

Hasan, S.H., Rahman, M., Haque, A.L., Rahman, M.A., Rahman, T. and Rasheed, M.M. (2009) Cost Effective GPS-GPRS Based Object Tracking System: IMECS.

Jethwa, A.H. (2015) Vehicle Tracking System using GPS and GSM Modem- A Review: International Journal of Recent Scientific Research.

Kadiri, K.O. and Adegoke, O.A. (2019) Design of a GPS/GPM Based Anti-Theft Car Tracker System: Current Journal of Applied Science and Technology.

Khraisat, Y.S.H., Al-Kheteeb M.A.Z., Abu-Alreesh, Y.K., Ayyash, A.A. and Lahlouh, O.S. (2011) GPS Navigation and Tracking Device: iJIM.

Lino Jr, M.G.F. and Festijo E.D. (2017) Vehicle Tracking and Monitoring: A Security System for Exclusive Subdivision: Technological Institute of the Phillipines.

Mehta, H., Kanani, P. and Lande, P. (2019) Google Maps: International Journal for Computer Applications.

Rajeevan, A. and Payagala, N.K. (2016) Vehicle Monitoring Controlling and Tracking System by Using Android Application: International Journal of Technical Research and Applications.

Sandika, G. and Kom, T.S.M. (2016) Vehicle Tracking Applications Position Using GPS and GSM Based on Android: Indonesian Computer University.

Singh, P., Sethi, T., Biswal, B.B. and Pattanayak, S.K. (2015) A Smart Anti-Theft System for Vehicle Security: International Journal of Materials, Mechanics and Manufacturing.

Tete, S., Sahare, S., Likhar, D. and Badalu, R. (2018) Android APP: Vehicle Tracking System: International Journal of Technical Research and Applications.

Usman, F.K., Yusuf, G. and Sajiyus, O. (2019) A model for Smart Vehicle Tracking: A Review: Journal for Scientific Research and Reports.

Wirarespati, A. and Rasjit, Z.E. (2019) Automotive Security with Authorization and Tracking via GPS: Elsevier.

Agajo et al, (2016). Equipment, Security Personnel Tracking and Localization using Geo-Location 2Technique: Journal of Engineering Technology.

Arko Wirarespati and Zulfany Erlisa Rasjid, (2019). Automotive Security with Authorization and Tracking via GPS: Elsevier.

Michael George F. Lino Jr and Enrique D. Festijo, (2018). Vehicle Tracking and Monitoring: A System for Exclusive Subdivision: Technological Institute of Philippines.

Taherdoost H., (2016). Sampling Methods in Research Methodology; How to choose Sampling Technique for Research: IJARM.

PSIRA
Private Security Industry Regulatory Authority

420 Witch-Hazel Avenue
Eco Glades 2 Office Park
Highveld Ext 70
Centurion
0158

Tel: 086 10 **PSIRA** (77472)
Email : info@psira.co.za
Website: www.psira.co.za

082 803 4329
Private Security Industry Regulatory Authority
Psiralive