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Consultant Services

for

Road Safety Technical Assistance

Technical specifications for inclusion in the bidding documents for procurement of additional enforcement equipment (if/as required)

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EXECUTIVE SUMMARY

With the dynamic evolution of technology, Police leaders are confronted with a constant stream of new and emerging innovations to address within traffic management and traffic law enforcement. These issues range from officer and community safety, operational efficiencies, and cost containment. Any new equipment requires evaluation to assess its potential and value to increase effectiveness and efficiency of police operations and activities. Additionally, technological equipment must be asset managed with cyclic maintenance and a redundancy plan.

It is important that when discussing enforcement technologies that all key stakeholders have a shared understanding of the types of technology available, how these systems operate and what are the most suitable and appropriate technologies so that an informed decision can be made for procurement of the identified technologies.

This document constitutes the outcomes of Activity 2.6.4 of Component 2 of the Road Safety Technical Assistance (TA) under the Results-Based Road Maintenance and Safety Project (RRSMP): Technical specifications for inclusion in the bidding documents for procurement of additional enforcement equipment (if/as required).

The document further identifies the standard types of enforcement technologies used by traffic police internationally and also provides outline specifications for the most common technology in use worldwide.

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LIST OF ABBREVIATIONS AND ACRONYMS

AADT	Average Annual Daily Traffic
ADF	Albanian Development Fund
AE	Automated Enforcement
ANPR	Automatic Number Plate Recognition
ARA	Albanian Road Authority
ARC	Albanian Road Code
ASP	Albanian State Police
ATC	Automatic Traffic Counts
ATP	Albanian Traffic Police
CBMIE	Controlling Body in Ministry of Infrastructures and Energy
CSG	Central Steering Group
DRST	Directorate of Road Safety and Traffic
DRST	Directorate of Road Safety and Traffic
EC	European Commission
EG	Expert Group at the local level
ERA	Emergency Response Albania
EU	European Union
GDRTS	General Directorate of Road Transport Services
GoA	Government of Albania
GRD	General Roads Directorate
IMRSC	Inter-ministerial Road Safety Committee
INSTAT	Institute of Statistics
IoT	Institute of Transports
ITS	Intelligent Traffic System
JV	Joint Venture
M&E	Monitoring and Evaluation
MI	Ministry of Interior
MIE	Ministry of Infrastructure and Energy
NGO	Non-Governmental Organization
NSM	Network Safety Management
PAMECA	Police Assistance Mission of the European Community to Albania
PIARC	World Road Association
QKUM	National Emergency Medical Center
RSM	Road Safety Management
WB	World Bank
WHO	World Health Organization

1. Introduction

With the dynamic evolution of technology, Police leaders are confronted with a constant stream of new and emerging innovations to address within traffic management and traffic law enforcement. These issues range from officer and community safety, operational efficiencies, and cost containment. Any new equipment requires evaluation to assess its potential and value to increase effectiveness and efficiency of police operations and activities. Additionally, technological equipment must be asset managed with cyclic maintenance and a redundancy plan.

It is also important that when discussing enforcement technologies that all key stakeholders have a shared understanding of the types of technology available, how these systems operate and what are the most suitable and appropriate technologies so that an informed decision can be made for procurement of the identified technologies.

This document constitutes the outcomes of Activity 2.6.4 of Component 2 of the Road Safety Technical Assistance (TA) under the Results-Based Road Maintenance and Safety Project (RRSMP): Technical specifications for inclusion in the bidding documents for procurement of additional enforcement equipment (if/as required).

In particular, this document describes the various types of traffic law enforcement equipment that should be considered for procurement to enhance the efforts of the Albanian Traffic Police in contributing to the overall project outcomes.

2. Report Limitations

The development of this report has been limited by the inability of the expert to travel to Albania and the lack of feedback and input from the Albanian Traffic Police. Without this input, there is no knowledge of current plans, if any, for procurement of enforcement technology.

3. Enforcement technology

3.1 Overview

One of the most effective, evidence-based, low-cost opportunities to reduce speeds and save lives and injuries is the introduction of speed cameras combined with the promotion of enforcement activity. For example, evaluation of the first 28 speed cameras introduced in the state of New South Wales, Australia, revealed a 71% reduction in speeding which delivered an 89% reduction in deaths at the treated locations. Other studies show consistent though somewhat smaller reductions in trauma. Reduced speeds also deliver large reductions in fatalities and injuries for pedestrian[1].

There are various types of speed measurement and enforcement technologies available, however, these should only support road policing and not replace it. Some of the available technology includes:

- Vehicle mounted – moving mode radar (MMR)

[1] Job, S., Cliff, D, Fleiter, J.J., Flieger, M., & Harman, B. (2020). Guide for Determining Readiness for Speed Cameras and Other Automated Enforcement. Global Road Safety Facility and the Global Road Safety Partnership, Geneva, Switzerland.

- Tripod or vehicle-based cameras
- Police 'in car' systems – digital video and automated number plate recognition
- Speed cameras – laser-radar
- Speed/red light cameras (combined)
- Point to point – distance over time cameras

One of the most effective forms of speed enforcement (AE) is point-to-point or average speed camera enforcement, which measures the average speed of vehicles over longer distances, ranging from 1km to over 100km lengths. This technology is most suited to stretches of roadway, such as motorways or highways, that do not have opportunities for drivers to exit or enter the roadway between speed check points. This form of AE has been shown to be effective at reducing speeds as well as in reducing vehicle emissions and noise[2].

The second most effective form of AE which provides a general deterrence in preference to fixed site operations is Moving Mode Radar (covered in detail below).

To be effective, automated speed enforcement requires some core background capacities and successful detection levels. These are required to ensure the essential steps in the automated enforcement sequence are possible. There are other issues which apply more broadly, such as extent of corruption in a system, and the extent to which penalties actually deter drivers, but the specific focus here is on automated enforcement.

3.2 Technology Limitations

Technologies usually enable officers to work smarter and faster, however, they do not replace the basic principles of policing. Technology enables policing to streamline processes for higher level efficiencies. Road safety is a '*whole of community*' responsibility and a major rationale for using technology is to ensure safer community outcomes and safety on the roads.

Technology is an aid to traffic and road policing and not the solution. It does not replace the basic principles of policing in working with the community to ensure road safety on all roads for all road users.

3.3 Legislation

It is vital to ensure that appropriate legislation is in place before an AE system is launched to avoid expensive and damaging consequences. International experience identifies the following examples which must be considered and can be managed with good legislation:

1. Loss of public trust and confidence in the accuracy of devices and fairness of the system - this issue highlights the importance of exhaustively testing the accuracy of the system before it is purchased - the AE system must demonstrate accuracy at all times, in complex traffic scenarios and conditions. Ongoing calibration and system checking must be built into the maintenance of the programme
2. Highly publicised avoidance of penalties – these experiences of avoiding punishment undermine the integrity of the system and its ability to deter offending
3. Inability to identify the vehicle and driver – there is need for robust enforcement of, and deterrent penalties when vehicle registration plates are not displayed or are obscured or falsified excessive proportion of money from speeding infringements going to private camera operating companies.

[2] Soole, D.W., Watso,n B.C., & Fleiter, J.J. (2013). Effects of average speed enforcement on speed compliance and crashes: A review of the literature. Accident Analysis & Prevention, 54, 46–56.

3.4 Types of Automated Speed Enforcement

3.4.1 Overview

Over the last twenty years there have been significant developments in the technology that can be used to support road policing operations. These technologies range from breath testing devices to automated speed enforcement. This section will provide a basic overview of some of the key technologies that are used in detection and prevention of high user behaviours. It does not address all available technology for law enforcement.

No matter how effective the technology is, it is a support to road policing only and cannot replace active and visible traffic policing in achieving road safety outcomes. Also, use of any technology must be supported by legislation, regulations and organisational policy including operational deployment and operating policy guidelines.

3.4.2 Fixed Site

On road are basically cameras combined with the handheld speed measuring devices. Software in the processing unit of the on road system interprets the information from the trigger and interprets it into date for use in any infringement that may be recorded.

Any such systems should be based on state of the art digital camera technology with advanced communications and security features and proven ability to operate in extreme environmental conditions.

The systems should comprise versatile traffic data and infringement capture modules. With advanced processing platforms, the systems should provide world class world class technology with a range of enhanced features including (but not limited to):

- Compact and robust digital infringement capture
- Enhanced vehicle identification using dual lens technology
- Advanced security and data encryption
- A variety of intelligent infringement triggers
    - Radar
    - Laser
- Infrared or invisible flash for night operations
- WAN capability using common transmission solutions such as:
    - ADSL
    - WIFI
    - GPRS/3G
    - Satellite (not preferred due to cost)
- Manual collection of data where communications not in place
- Full feature traffic data collection and management
- Built in GPS
- Coverage of multiple lanes from roadside and bridge gantry mounting
- Use of suitable local language enabled Automatic Number Plate Recognition (ANPR) systems are being investigated along with identification of car number plate colours to distinguish between private and commercial vehicles
- Investigation of a suitable lane movement detection system, possible via in road sensors, will be undertaken for enforcement of lane exclusion regulations
- Multi lane applications
- Small, compact and elegant design

3.4.3 In Car Mobile Systems

The mobile digital cameras system is usually a 'slant'-Radar based digital capture system for the purpose of detecting and storing speed infringements. The system utilises a high-resolution digital camera that enables the system to capture readable images of vehicles travelling in more than four lanes of traffic.

The camera and speed measurement device are mounted inside a marked or unmarked police car, which is often parked on the side of the road. Sometimes, the camera is mounted on a tripod. An operator sits in the vehicle while the camera is operating, to ensure operations go smoothly.

The fitting of the camera units to vehicles minimizes the chance of operator error in camera and site set up and makes it far easier to re locate the camera from site to site in one shift so as to maximize its road safety affect.

Each time the camera is positioned on the roadside, the control unit is programmed with specific information. This includes the time, date, session number, speed zone, recording media type, the direction of the traffic to be covered, as well as the threshold speed.

The camera is an automatically operated digital system. Instead of the operator pushing the button to capture an image, the radar control unit checks the speed of the passing vehicle, and tells the camera when to capture the image.

3.4.4 Portable Systems

Portable speed cameras operate in a similar way to mobile systems but are generally located on the roadside and mounted on a tripod. Portable systems use mainly radar and laser and can be set as automatic or manually operated by an operator.

3.4.5 Point to Point Systems

Also known as Section Control or Distance over Time, this system involves two or more fixed site camera systems combined with appropriate detection devices. As a vehicle passes the first camera, the detection device activates the camera which records the vehicle and especially the registration plate. At the next or subsequent camera, the vehicle is recorded and its number plate is read and matched to the system that has recorded the first point. The distance travelled is then compared to the time taken for the vehicle to travel the distance and an average speed is calculated. If that average speed is above the speeding threshold, an image is taken and goes to the processing centre for issue of infringement or warning.

This type of system is dependent upon an effective Automatic Number Plate Recognition system.

3.4.6 Moving Mode Radar (MMR)

Not all types of cameras are applicable to be used in all locations. The decision on which type of camera to be used relates to road infrastructure and alignment, roadside access, the type of technology selected to detect speed (e.g., radar, laser, induction loops), and the desired mix of mobile/fixed speed enforcement.

MMR provides a more versatile, mobile and safer option for speed detection based enforcement actions. The system consists of a radar device fitted to the police vehicle connected to an in car processing unit with a visual display and recording capability.

MMR is very similar to stationary radar, but it's looking for two different speeds. The radar looks for the largest object in its field, and it assumes that this is the passing background. Then it looks for the second most significant object that it assumes is the target. The radar actually measures the closing speed or separation speed between the target and the patrol vehicle. The radar's processing unit will then use the following formulas.

Target Speed (TS) = Closing Speed (CS) - Patrol Speed (PS)

or

Target Speed (TS) = Separation Speed (SS) - Patrol Speed (PS)

The radar unit will then display two speeds. It will show the target speed and the patrol speed. The officer must compare the patrol speed displayed on the radar with that displayed on the car's speedometer. This is an essential element of the radar case. The radar speed will be more accurate, but there are certain errors that this will detect. The speeds must be consistent.

3.4.7 Automatic Number Plate Recognition

Automatic Number Plate Recognition (ANPR) is a system whereby a digital camera captures the image of the vehicle license plate and through the use of optical character recognition (OCR) processes, reads the content of the plate and recognizes the characters, digits and optical features on that plate.

The ANPR system can then compares the recognized license plate to a data base of registrations for either general road policing of crime suppression activities including in point to point speed measurement systems.

ANPR cameras can be dedicated cameras on the side of the road, mounted on roadside fixtures, on gantries and bridges or mounted in cars. ANPR can also be combined with most digital road policing activities.

Image Data

Each image should contain an embedded text block containing, but not limited to, the following information:

- Date of infringement
- Time of infringement
- Measured speed of Vehicle
- Speed limit in zone
- Distance to vehicle at capture point
- Direction: Away or Toward
- Infringement number (per session)
- Site Location
- Operator ID if present

This data is also included in binary machine-readable form in an encrypted infringement file.

3.4.8 Type Approval, Calibration and Cyclical Maintenance

There are three key issues that need to be considered when identifying appropriate technology to support road policing. These are:

3.4.8.1 Type Approval

In many jurisdictions, all enforcement technology has to undergo a type approval process. Basically, this process involves examination of the technology by a nationally accredited scientific facility to ensure it complies with all technology, electrical, emissions and operator protection standards. These standards are often based on international standards. In some jurisdictions, any software used also needs to be type approved to ensure it meets with the relevant legislation and prosecuting guidelines.

Normally, evidential recording or evidence gathering equipment must be approved and authorised under government legislation or regulations. This applies to surveillance equipment such as cameras and tape recordings to equipment where a penalty is collected on behalf of the state. Usual equipment includes video and static speed cameras, radar and laser speed measuring devices, seat-belt enforcement cameras, weigh & measure equipment, and weigh-in-motion. Basically, standards must apply to the laws of each country or region.

Examples of technical standards in different countries:

- USA Department of Justice, National Institute of Justice (NIJ) example is the In-car video camera systems performance specifications provides law enforcement agencies and systems manufacturers with a set of minimum performance and system specifications to ensure quality digital recordings and promote officer safety. www.justnet.org
- The South African Bureau of Standards (SABS), www.sabs.co.za, – develops and issues SANS (South African National Standards) relative to law enforcement technology. The South African Standards are approved by the Department of Transport's Technical Committee for Standards and Procedures (TCSP) for traffic law enforcement equipment. These standards are prescriptive and include:
    - Scope of use
    - Metrological requirements
    - Operational requirements
    - Design and construction requirements
    - Electrical requirements
    - Hardware, firmware and software requirements
    - Inspection and methods of test
    - Cyclical maintenance and calibration
- United Kingdom (UK) – Traditionally controlled by the Home office as – Home Office Type Approval (HOTA) requiring all new technology to be presented for testing, review, and certification before being purchased or used by any police organisation in the UK. Following scientific laboratory and road-test scrutiny, the equipment may then be used by police for enforcement and evidential purposes. Applications include equipment for speed monitoring, alcohol and drug testing, and all types of camera and measurement technology. Contrary to some other countries, all equipment is tested "**under load**" i.e. in real operational situations rather than by a salesperson demonstrating new technology to senior police command or government personnel who may then approve equipment which is un-tried in the real world. UK now has all 'type approval testing' undertaken by an internationally approved Scientific Test Laboratory (ISO 17025 accredited) with a 3km test track. United Kingdom Accreditation Services (UKAS) now tests equipment for all British services as well as other countries. www.ukas.com

3.4.8.2 Calibration

As with type approvals, many jurisdictions require that technology be calibrated on a cyclical basis such as every six months. All these devices are scientific instruments that measure an action or outcome. The accuracy of the measuring component of the technology must therefore be guaranteed to be accurate.

3.4.8.3 Cyclical Maintenance and Replacement

As with all equipment, cyclical maintenance is required to ensure that the devices are usable and in good condition. Having a cyclical maintenance and replacement plan will significantly extend the operational life of the equipment.

3.4.8.4 Budget Considerations

When planning to procure enforcement technology, an appropriate budget must be established for future supply of consumables that will be required. These may include: printer paper rolls, printer refills, tubes for breath testing devices, etc.

3.4.9 Potential Suppliers

A review of the available technology has been undertaken mainly focusing on the major suppliers and concentrated as much as possible on European based organizations. Several of the suppliers offered laser-based products but this type of system has limited capability as compared to radar.

An indicative list of suppliers follows:

1. Sintel Italia - http://www.sintelitalia.it/eng/prodotti/mobile-devices-for-speed-detection/
2. MPH Industries - https://www.mphindustries.com/
3. Stalker/BallingerTech - http://www.ballingertech.com.au/vehicle-speed-detection-law-enforcement.html
4. Cordon - http://simicon.com/products/
5. Ramet - http://www.ramet.as/speed-cameras
6. Truvelo - http://www.truvelo.co.za/traffic/index.html
7. Redflex - https://redflex.com/int/solutions/photo-enforcement/
8. Sensys Gatso - https://www.sensysgatso.com/products
9. Jenoptik - https://www.jenoptik.com/products/traffic-safety-systems/speed-enforcement-monitoring
10. TeleTraffic - https://www.teletrafficuk.com/
11. Vitronics - https://www.vitronic.com/traffic-technology/applications/traffic-enforcement.html
12. OLVIA - https://www.roadtraffic-technology.com/contractors/photo_enforcement/olvia/
13. Kustom Signals - https://kustomsignals.com/products
14. Simicon - http://simicon.com/products/#in-vehicle-traffic-enforcement
15. LTI - https://www.lasertech.com/Speed-Enforcement-Measurement.aspx
16. Tattile - https://www.tattile.com/vision-systems/traffic-division/cameras-applications/speed-enforcement/
17. Houston Radar - https://houston-radar.com/?gclid=EAIaIQobChMIv5etpcqp4gIViOd3Ch3B7g9BEAMYAiAAEgJj3vD_BwE
18. ARH - https://www.arh.hu/index.php/en/products/speed-cameras/speedcam.html
19. Italtraff - https://company.intertraffic.com/?a=OSluR74bTvo7DmuuyW7fBcBXVbPQJblGtri%2BWNN9uS0%3D
20. TMT Services and Supplies - http://www.tmtservices.co.za/

3.4.10 Outline Specifications

After reviewing the available and most appropriate technologies, an outline set of base specifications will be developed based on an assessment. These will not be a comprehensive set of technical specifications, but the base for the development of the detailed specifications for procurement purposes. The final output specifications must be a fit with the user requirements of the Traffic Police and other key stakeholders and also comply with any relevant legislation and regulations.

It must be noted that these specifications do not reflect any specific supplier or equipment but are a combination of the applicable attributes that were identified during the technology review.

1. Radar
- 1.1. Low frequency Doppler Radar
- 1.2. Planar or Parabolic Radar head
- 1.3. Direction sensing technology – approaching or receding traffic
- 1.4. Speed measurement: 20 to 270KPH
- 1.5. Accuracy: +/- 1%
- 1.6. Built in self testing protocol
- 1.7. Range: minimum 70 meters

2. Camera
- 2.1. Dual image – environmental (wide angle) and target vehicle
- 2.2. High resolution color (preferred) or monochrome
- 2.3. Automatic focus and exposure setting

3. On board system
- 3.1. High resolution compact screen
- 3.2. Touch screen user interface
- 3.3. Live streaming of video from camera
- 3.4. Automatic Number Plate Recognition capability
- 3.5. GPS
- 3.6. Protection of embedded software and output data from unauthorized change.
- 3.7. Logging of all system events and user actions.

4. Infra-Red Illumination
- 4.1. LED
- 4.2. Certified eye safe
- 4.3. Index of housing protection: minimum IP65
- 4.4. Operating temperature: minimum -10C up to 50C

5. Image data block (minimum)
- 5.1. Equipment unit number
- 5.2. Unique infringement identification number
- 5.3. Date and time of offence
- 5.4. Location
- 5.5. Detection mode – stationary or moving
- 5.6. Approaching or receding traffic
- 5.7. Applicable speed limit
- 5.8. Speed of detected vehicle
- 5.9. Operator (police) identification name or number
- 5.10. Registration plate of offending vehicle

6. Printer
- 6.1. Compact in car printer if required

7. Storage and retrieval of data
    7.1. Minimum storage capacity of 10,000 infringement files
    7.2. Ability to transfer the recorded violation data to back office via wire or wireless communication channels

8. Power Supply
    8.1. Fixed site - Solar powered with battery backup
    8.2. MMR or in car – battery additional to general car power supply

9. Certification
    9.1. Supplier is European based – type approval or certification in base country or other acceptable European country
    9.2. If not European based - type approval or certification in European country
    9.3. Can meet certification to the required Ethiopian standards

10. Calibration
    10.1. Calibration/tuning devices to be supplied

11. Training and manuals
    11.1. Provision of training program for operation of the units and low-level maintenance
    11.2. Manuals for both users and low-level maintenance including process of calibration/tuning

12. Cyclical maintenance and consumables
    12.1. Detailed cyclical maintenance plan including ongoing supply of any required consumables such as printer paper rolls, etc.

Development of final specifications will be through consultation with local experts to ensure a logical and operational fit for pilot corridors and any future rollout of further systems.

3.5 Alcohol Detection Devices

3.5.1 Overview

Blood alcohol concentration is central to establishing a link between alcohol and road traffic crashes. Investigations into the role of alcohol in road crashes require that those where alcohol played a causal role be differentiated from those where it didn't.

Although it is often difficult to attribute a crash to a particular cause or causes, decisions as to whether or not a crash was alcohol-related are often based on how much, if any, alcohol was present in the bloodstream of the road users involved. The amount of alcohol that is contained within the bloodstream can be measured by testing a small sample of blood or urine, or through analysis of exhaled breath.

The amount of alcohol within the bloodstream is described in terms of Blood Alcohol Content (BAC). BAC is usually measured as:

- grams of alcohol per 100 millilitres of blood (g/100 ml)
- milligrams of alcohol per 100 millilitres of blood (mg/100 ml)
- grams of alcohol per decilitre (g/dl)
- milligrams of alcohol per decilitre (mg/dl) or other appropriate measure.

Legal BAC levels for driving vary from country to country, or state to state, throughout the world – ranging from 0.02 g/100 ml to 0.10 g/100 ml.

3.5.2 Detection Devices

It is critical that the use of alcohol detection devices is supported by appropriate legislation, operator training and written operator instructions on use of the devices.

There are three distinct types of breath based alcohol detection devices:

- *Screening devices:* Hand-held field testing devices are generally based on electrochemical platinum fuel cell analysis and, depending upon jurisdiction, may be used by officers in the field as a form of "field sobriety test" commonly called "preliminary breath test" or "preliminary alcohol screening" or as evidential devices in point of arrest testing.
- *Evidential devices:* Desktop analyzers generally use infrared spectrophotometer technology, electrochemical fuel cell technology, or a combination of the two. These devices are larger, less cost effective and require detailed training in their use. A number of jurisdictions required these devices to prove accurately the level of BAC for evidential purposes.
- *Combined screening and evidential devices* (preferred option): Handheld passive alcohol breathalysers receive a breath sample when a subject speaks to or blows onto the instrument from a short distance. Importantly, there must be no direct contact between the mouth of the subject and the instrument (for hygiene reasons). In "Passive mode" the instrument does not give a blood alcohol concentration (BAC) reading, only a confirmation that alcohol is or is not present (positive/negative only). A device operating in "Active mode" requires the subject to deliver a breath sample through an approved, hygienic mouthpiece. The result from a device in "Active mode" is an accurate BAC reading resulting from the analysis of the subject's "deep lung air." Operationally, if in "Passive mode", alcohol is detected, the device is then switched to "Active" and second breath test is administered to provide the actual BAC.

3.5.3 Outline Specifications

The consultant has reviewed available technology and determined that the minimum key features of any recommended combined screening and evidential device should include:

1. Multi-function capability (active with breath tube and passive modes)*
2. Highly sensitive electrochemical detectors for accuracy
3. Analysis time: <3-5 seconds
4. Recovery time: Instant for 0.000 BAC
5. Display: Colour LED
6. Battery: Rechargeable Li-Lon
7. Calibration: 6 months**
8. Number of tests: unlimited
9. Data download capability (10,000 logs)
10. Unlimited tests
11. Multi-language capability
12. Bluetooth printing capability
13. Compact printer for in car or onsite operations*
14. Supporting software
15. AC/DC charger
16. Bluetooth, Wifi or USB data download
17. Protective silicon cover

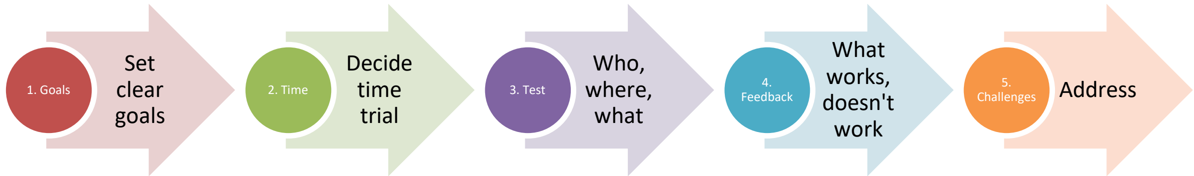
18. Protective carry bag or carry case
19. User manuals and onsite training

*It is vital that any procurement of these devices includes an ongoing budget for consumables such as breath tubes, printer paper rolls, printer ink cartridges, etc.

**Several suppliers offer a self-contained calibration unit that can be changed on site by the operators with minimal training and with only the calibration units requiring updating. This functionality ensures the continued availability of the devices with no down time from operational use.

4. Piloting New Equipment - Guidelines

With any new technology, you must make sure it is beneficial before implementation. Running a pilot lets you test it on a small scale and prevents huge costs and mistakes with something that looks 'good and shiny' but doesn't work or solve the problem. You need to now what features of the new product will make it more effective or more efficient than your current system and especially how it can be integrated into your current operations. Steps in the process.



1. **Goals:** Set clear goals. What the new technology is expected to achieve.
2. **Time:** How long is needed to test the new equipment. Test all the issues. Know the set-up and take-down time. Test in all weather and circumstances. Allow for full evaluation and feedback from operational users.
3. **Testing - evaluation:** Who is to test it? Where and what are is actually being tested. Ensure that it is tested by those who use it – not just a demonstration by a salesperson who is using it all the time. Is it easy to operate/understand? Are the instructions in your native language? Is the information on the equipment in your native language? What training is required and is that provided by the supplier? Or do you have to provide the training? What is the situation with warranties, repairs maintenance and calibration? What resources are required to use the technology? New unit? New division? If the technology is tested thoroughly, the take up and use will be more beneficial.
4. **Feedback**: What works? What doesn't work? – Ensure feedback is received from the operational users. Devise a questionnaire or undertake structured interviews of the users or conduct workshops to really understand the practical application.
5. **Challenges?** What are the challenges required before implementation? Training or whole of life costs? How soon will benefits be achieved?

NB: With any new technology, it is important that you do the testing in the operational environment. Most responsible suppliers will offer or encourage a genuine trial to ensure that the technology works to your satisfaction before commitment to purchase. This thorough analysis provides the suppliers with a "user reference" and boosts their credentials.

5. Asset Control- Managing the Lifecycle of Technology

All new technology becomes an asset for the police organisation and as such should be recorded in an official "Assets Register". This ensures accountability for its use and so it can be treated as a "whole of life" product for cyclic maintenance; loss, damage and repair; recalibration and certification (if required); product depreciation of initial cost; and, importantly planned redundancy or planned upgrade.

Planned Obsolescence: Most companies plan obsolescence into their products. This is demonstrated in the common mobile phone where batteries degrade over time, services becomes unavailable, software updates fail to support older models and replacement parts are not available. The lifecycle of all products becomes shorter as technology improves.

Cautions: Some critical issues to consider:

a) Software upgrades are now frequent with many products and companies require monthly payments to ensure software is always up-to-date
b) Some items if they fail are not worth repairing and may be an instant write-off to be discarded
c) Technology is difficult to scope for 'whole of life' because of the rapid pace of technology. At best a pattern of upgrades can be established from previous models and assess the trend if the change is rapid
d) Model upgrades and software upgrades may not always be necessary or essential- Need to ascertain what is new or different in the upgrade and go through the same evaluation as if it is a new product/technology
e) Have an alternate to fall-back upon if your technology fails – a redundancy plan.

6. General Enforcement Equipment – Overview

Communications: A vast array of social networking systems exist in the hands of all citizens with the mobile phone, constantly being upgraded with photography, video, voice recognition and voice command systems, internet access and as an international personal communicator. The impact can be positive in assisting police communicate general messages and negative in community networking about police checkpoints and enforcement patterns. Additionally, any police interaction, good or bad, is likely to be filmed and uploaded to social media for local and international attention.

Police communication: Police voice communication in the digital age provides instant access to a command centre and mobile data access to an array of databases. These include Automated Number Plate Recognition (ANPR), Licence identification, Commercial Vehicles, Firearms Registration, Stolen vehicles, missing persons, and wanted persons as well as other agency data bases such as Fisheries and Wildlife etc. Many of these systems have end to end encryption and security monitoring.

Body-worn cameras: These are now standard equipment for most modern police officers, especially those on traffic patrol. These are often directly linked to in-car video systems. Daily information can be downloaded and stored for a pre-determined period.

Police cars as a mobile office: Patrol information, traffic report information, crash and crime reports can all be completed using standard templates in the field, with a normal size keyboard. Many police cars are now equipped with in-car camera systems to record every passing event. Connected to the ANPR, evidential quality infringements can be generated for mobile offences video-recorded without an actual interception. Police vehicles can be directly monitored from the central base, not only for GPS locations, but also to directly monitor speed, cornering "g" forces and braking in the event of a police pursuit or poor driving behaviours by officers.

Information and knowledge: Traditionally, police were required to know the finite aspects of law, policy, and procedures as a foundation of training. Now, all legislation and policy can be downloaded and available on an officer's cell-phone (personal communicator), Ipad or laptop. The internet can be searched in the field for key information, good practice, or assistance as required. Problems and solutions can be addressed on the run with the availability of expert advice.

CCTV Systems: These systems are widespread in the community as a security and monitoring service for commercial, industrial, manufacturing, factory and for private dwellings. These are also widely used for traffic management and traffic monitoring to assist in changing the traffic light sequence and clearing congestion. They are embedded everywhere on light poles, gantries, building fronts and yards as well as in street furniture – some visible, others hidden.

Traffic Survey Collection and Network Analysis: The traffic network system is flooded with an array of monitoring, recording and analysis systems providing bio-directional traffic flow information. Police can now better understand traffic flow to identify high volume areas, traffic mix and importantly for enforcement, identify high-risk and high-speed sites. They also monitor vehicle types from bicycles through to multi-wheel large transport. Data can be visually reviewed across multiple sites for comparison and assessment far more easily than general knowledge from driving on the network. Travel time displays are common internationally. Connecting monitors in electronic studs identify abnormal traffic conditions such as ice, snow, fog, dust creating reduced vision and trigger warning to motorists.

GPS Location: Vehicle and individual location are automatically identifiable with trackable features available in vehicles and mobile phones. GPS trackers are operating in all newer model cars providing highly accurate speed monitoring from satellites. Other devices such as digital cameras, drones, 3D lasers, Speed Radars and Lasers also have inbuilt GPS identification. Within the community, a large variety of small, high tech, low-cost GPS devices and cameras are being used in commercial, industrial, fleet, manufacturing, and private services (community electronic surveillance).

Mapping systems: These are developing rapidly in such systems as "Google Maps", "Google Street View", "Satellite mapping systems" and "Geo-spatial" systems, and, are all available for general use within the community.

Crash Investigation: Systems have now been greatly improved to streamline investigations, through high quality photography, scanning, measurement and scene reconstruction through computer generated animation programs.

a) The **3D laser scanner** is a very efficient data capture tool with the capability to assist the crash investigator in recording, measuring and preserving critical elements of the crash and the environment as evidence to enable professional analysis of the circumstances surrounding the crash.

b) **The unmanned aircraft (drone**) is a remote-controlled aircraft-borne camera. Its capability is to record and preserve critical elements of the crash and environment to enable professional analysis.
c) **The Electronic Data Recorder** enables crash investigation officers to plug into the engine management system, 'the black box', following a crash to retrieve critical pre-crash information such as speed and braking
d) **Computer software** programs such as 'PC Crash', 'PC Rect' and 'Virtual Crash' enable the investigator to reconstruct the crash using sophisticated software packages to provide evidence-based presentations.
e) **GPS.** All crashes are now able to have the exact coordinates recorded in GPS format which can then be mapped to identify high-crash zones, black-spots and black lengths. Linked to mapping systems, these provide immediate visual displays to assist road safety reform.
f) **Forensic analysis:** To match evidence left at the crash scene in hit run situations – paint, car parts, fluids, tyre marks, clothing (pedestrian)
g) **DNA analysis**: for blood and body fluids match – especially in hit run situations.

7. Evaluation to Show Road Safety Improvements

A well-managed automated enforcement program will deliver positive road safety outcomes, including significant cost-benefit outcomes through reduced death, injury and risk exposure. Being able to demonstrate such benefits of an automated enforcement system is important for a number of reasons:

1. Convincing decision makers of the value of the automated enforcement program
2. Communicating safety improvements to the public
3. Expanding and refining the system.

Evaluations need to be planned from the beginning of a camera programme to ensure that baseline infringement and crash data can be collected, and that funding is made available for the evaluation research[3].

Requirements for the evaluation process should be included in bidding documents to ensure that the providers/suppliers contribute, both financially and with technical expertise, to the process.

8. Progression

It is recommended that, once approved, this report be provided to the Albanian Traffic Police for feedback and input.

[3] Job, S., Cliff, D, Fleiter, J.J., Flieger, M., & Harman, B. (2020). Guide for Determining Readiness for Speed Cameras and Other Automated Enforcement. Global Road Safety Facility and the Global Road Safety Partnership, Geneva, Switzerland.