Public Space CCTV in Scotland:
The Current Landscape and Future Opportunities

Summary Report

The Scottish Community Safety Network (SCSN) is the national forum for officers who are responsible for the strategic development of community safety at both local and national level, in the private, public and voluntary sector. The SCSN act as a strategic voice for community safety in Scotland and through working collaboratively with its members and partner agencies, it champions community safety and influences the shaping and development of national policy and local delivery.

The Scottish Community Safety Network (SCSN) commissioned this work to review Public Space Closed-Circuit Television (CCTV) in Scotland. The research project reviews the current landscape for Public Space CCTV across Scotland and identifies some future opportunities in terms of Community Safety outcomes. COSLA, Scottish Government, Police Scotland and Neighbourhood Watch Scotland are all parties of interest in this work and comprise the Project Advisory Board (PAB); involved from the Project Initiation Document to the brief that was used in the tendering process to reviewing drafts of the report.

Since 2014 a review into Public Space CCTV in Scotland has been mooted. Some small pieces of research and research proposals around this bigger issue were completed in 2015 and 2016 but no key research outputs published nor has the central question of what the future for public space CCTV in Scotland been answered. Discussions with SCSN and partners in 2019 agreed that this work needs to be resurrected and the start of this was the commissioning of a piece of work which explored the current landscape and future opportunities.

This review is offered as a starter for a conversation about what the future might be for CCTV in Scotland and highlights some key considerations on this topic. It does not make, nor did it ever seek to make judgement on current arrangements or recommendations on what should happen next. In bringing together a current picture of CCTV in Scotland we hope this review will help Local Authorities, Police Scotland and other partners in their collective local discussions and decisions. We trust this review will also be helpful to support any national discussions that take place.

In 2019, 28 authorities and other key stakeholders including Scottish Government, Police Scotland, COSLA and Neighbourhood Watch Scotland were engaged through mixed methods including an online survey, a full day workshop, webinars and one to one phone conversations. This evidence, in addition to some desk-based research gave rich insight into the current landscape and explored the future opportunities for CCTV in Scotland. This document summarises the key findings, and is accompanied by a commentary from SCSN. The full report is available on request by emailing info@scsn.org.uk.

1. Key Findings

Whilst the 2011 national strategy for public space CCTV provided some useful guidelines for those who have undergone programmes to rebuild their CCTV estates, research participants felt that an update was required due to advances in technology, regulations and support for a strategic direction and unified vision for CCTV in Scotland.

Some British Standards are being adopted, however there is not a great deal of standardisation between authorities while practices and technical solutions vary greatly from one local authority to the next. This is not necessarily a problem, but has risen in importance with the convergence of the separate forces to form Police Scotland.

They are often responsible for delivering multiple services from a single control room.

A theme through-out the study was constrained budgets. With austerity and increasing demand for public services on the rise, CCTV funding has to compete and demonstrate value against other services whilst being a non-statutory service. This results in many public sector operators in Scotland operating with increasingly aging technology. Camera estates are generally becoming increasingly difficult to maintain and network costs are putting a strain on budgets.

Upgrade programmes are increasingly focused on re-deployable cameras supported by wireless connectivity networks.

CCTV staff are well trained, very knowledgeable and passionate about their area of business.. There are a large number of good and promising practices being shown by local authorities across Scotland though mechanisms for sharing these practices and learning from other arrangements would be welcomed by research participants.

Although there is some appetite for cutting edge technologies such as facial recognition, machine learning and analytics, the reality is that most councils are not in a position to consider investing in them, yet, whilst others (most notably Glasgow) are. There are also ethical considerations within some of the more advanced technologies and implications and opportunities arising from the Scottish Biometric Commissioner Bill which was introduced and passed in the Scottish Parliament during the write-up of this report. As such the research has not considered the implications of the Bill but this should form part of any subsequent national and local conversations.

This report is seen as a mechanism to share more widely and is widely supported. The primary public safety benefits of CCTV are well understood, however participants would welcome more work to quantify the benefit of CCTV and use this to support business cases for investment. This work would also allow exploration of the other potential benefits of public space CCTV and take advantage of these.

2. Method Statement

In order to produce this report, a detailed research exercise has been conducted building on existing knowledge. Within tight timescales, a considerable number of research activities have been undertaken that have helped to build a picture of the current CCTV landscape, and opportunities, in Scotland.

The research methodology used for this project included:

- A thorough desk research exercise to identify relevant case studies supplementing existing Perform Green's knowledge of the Smart CCTV landscape.
- Designing, administering, managing and analysing an online survey.
- Creating and running an in-depth workshop using a focus group of key stakeholders from Local Authorities, Police Scotland, Neighbourhood Watch Scotland, COSLA and the SCSN.
- Creating and running a series of virtual webinars to support other stakeholders who were unable to attend the focus group.

- A series of one on one telephone interviews for further clarification and to test assumptions.
- A further data gathering exercise to widen participation following earlier tight deadlines.

The evidence use in this research is both quantitative and qualitative and provides a rich insight into the current landscape of CCTV and reflections on future opportunities from those that are currently working within the CCTV sector in Scotland. This represents a wealth of knowledge and experience from across the sector.

2.1. Responses

The following table shows the number of responses received through each of the communication channels.

Note: Some participants responded via multiple channels.

Survey Responses	Focus Group Attendees	Webinar Attendees	Interviewees
28	18	18	11

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3. Current Landscape

The current landscape of CCTV in Scotland is comprised of many interwoven elements. Technology is the often the first aspect that comes to mind when discussing this subject, however it the case that many of the people centric aspects such as training, resourcing and procedures are of equal or even greater importance. Throughout this report, these elements will be assessed alongside current standards, best practices, maintenance and upgrade plans, recognised benefits and views on the 2011 national strategy.

3.1.   The 2011 National Strategy for Public Space CCTV

The National Strategy for Public Space CCTV in Scotland (2011) is the most recent overarching review on the subject and as such represents the most logical starting point for understanding the current state of play. Across all of the research methods used, stakeholders were asked for their views on the 2011 strategy; had it delivered on its intentions, is it still relevant, was there any value in the strategy, what has changed since it was created and what has remained the same.

The survey data shows that there are mixed views on the success of the 2011 strategy, with over 60% of respondents stating that it was still **relevant to some extent**, but a significant minority of people surveyed felt it was not at all relevant in 2019 due to the length of time that has passed.

Two separate local authorities noted that they found some of the information in the strategy useful in helping them to plan for rebuild activities. The strategy provided information on the state of CCTV across the rest of the UK and as a result some authorities now have a bank of re-deployable cameras within their estate and have restructured where CCTV operations sit within their organisational structure.

A follow up question to determine if people believe that Scotland has a unified vision for CCTV strategy shows that people were less inclined to think that the existing strategy has produced a coherent view of how public space CCTV should be delivered nationally, with over half of respondents saying there was **no unified vision** at all. 41% felt that there was a unified vision "to some extent".

There appears to be an appetite for an updated strategy that does provide a unified vision for CCTV in Scotland: when asked if Scotland should have a unified vision for CCTV strategy, 70% responded that they either largely or completely agree with the idea.

What has changed since 2011 strategy?

CCTV technology has greatly advanced since 2011, however many respondents felt that Scotland has not kept pace with these developments; primarily due to constraints on funding and investment. Many local authority areas are now working with an aging estate of fixed-position analogue cameras, as well as dated control room software. Such is the investment now required to maintain and update systems, some areas are having to face some difficult decisions on future provision. There was a suggestion by a small number of participants that there has been a decrease in technical expertise in some areas. There are, of course, areas

of good practice, for example Glasgow, Perth & Kinross and South Ayrshire, and pockets of investment alongside these other discussions on the amount of investment required.

In addition, respondents reported that network connectivity costs have continued to increase and are becoming increasingly problematic for local authorities as costs for connections on existing models mount up on top of the maintenance costs.

One of the main changes since 2011 in terms of organisational structure is the creation of Police Scotland which merged eight geographical forces into a single unified force. Some respondents reflected that this has contributed to a lack of clarity around responsibilities, working partnerships, funding models and leadership structures; the absence of a single lead for CCTV in Police Scotland was mentioned by one respondent as influencing this.

The regulation frameworks have changed since 2011 particularly around the use of data where legislation such as GDPR (General Data Protection Regulation) have had a significant impact on that way CCTV data is captured, stored and analysed. Regulatory frameworks and legislation also has an important role to play as part of the conversations on the future.

While the technological landscape has changed, participants in the survey, focus groups and webinars reflected that many of the problems that existed in 2011 and acted as barriers for the development of more advanced CCTV are still present today. Funding and investment constraints and a variation in approaches to investment and planning/deployment of CCTV across local authority areas were cited as key issues that continue to present problems for CCTV operations in Scotland.
The absence of evidence that quantifies the effectiveness and impact of CCTV was felt to be an issue for the CCTV sector.

One of the main issues identified with the 2011 strategy was that it did not include any drivers to move forward and deliver the ideas that it presented. Consequently, everything the strategy proposed was viewed as optional rather than essential.

3.2.   Standards and Standardisation

There are a number of British Standards and codes of practice associated with the management of CCTV services. Certain regulations must be complied with, such as GDPR, and it may be beneficial to comply with other codes. These are offered as part of the 'current landscape' to assist partners in their local conversations on CCTV.

Examples of Standards that may apply include:
- BS 7858: Security Screening of individuals
- BS 7958:2015: CCTV Management and Operation – Code of Practice
- BS 50518: Monitoring and Alarm Receiving Centre

Compliance with the Code of Practice can help Councils avoid being exposed legally and politically should a complaint be made, and compliance would promote appropriate stewardship to citizens and visitors. Standards are not absolutely necessary, but can be

useful; regulatory compliance is essential, and alignment with the Code of Practice is highly recommended.

The research shows that there is some adoption of British Standards related to CCTV across local authorities in Scotland, but adoption is not widespread. From twenty eight responses to the survey, over half respondents advised that they adhered to at least one of the suggested British Standards with two adhering to all of them.

As part of the discussions on regulations, standards and compliance participants in the research also touched on procedures and protocols, training, technology and monitoring and explored standardisation across these.

Adopting standard practices and procedures can contribute towards a unified vision and coherent strategy for CCTV delivery. There is currently no standardised training programme in Scotland, although in the past SCSN created a CCTV operators eLearning course and manual.

As one would expect, there is no commonality of CCTV monitoring times across Local Authority areas. In some places, CCTV is monitored 24/7, however in other more rural areas this is not always the case (nor necessary).

There is no standardised technology across Local Authority areas. Though this is not unexpected nor necessarily a problem, respondents felt that technology is a further area where standardisation could play a part. There were some calls to look at a standardised national technology platform, with comments that having to deal with a myriad of different software platforms must be causing difficulties for the police now that they are a single unified force. However, it was also considered that **standardising protocols would likely have to take precedence over standardised technology**, given the current variation between technology across Scotland.

There are currently two accredited alarm receiving centres (ARCs) amongst survey participants, however, others advised that they have built control rooms to ARC standards with features including airlocks and reinforced walls, meaning that there is potential to gain accreditation in future should it prove useful.

3.3.   Technology

Technology is one area covered by the research where there appears to be real disparity between local authority areas. While some, mainly in the larger cities, have migrated to a fully digital estate, others are only just getting started on that journey and in some cases the authority continues to work with a fully analogue estate.

Of the 25 Local Authority areas that responded, seven now have a completely digital estate, seven still have a completely analogue estate and ten have a split, though it should be noted

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that most of those have a majority of analogue units[1]. Across the whole data set, 70% of the cameras are analogue and 30% are digital.

The research also asked respondents the age of their area's CCTV estate. Many local authority areas have aging camera estates with only one respondent saying that they had a full estate of cameras less than 2.5 years old.

up to 2.5 yrs old	2.6 to 5 yrs old	6 to 10 yrs old	11 to 20 yrs old	20+ yrs old
9%	5%	57%	24%	5%

Throughout the conversations on technology, camera placement was raised as well as the age of the estate and digital/analogue cameras. There was a general consensus that the placement of cameras has not been done according to a coherent strategy but has instead been more reactive, for example in response to members of the public or elected members. This has a particular impact where the cameras are not mobile and cannot be flexible to respond to changing need. This, combined with the aging technology, was a concern for research participants.

Some authorities are trying to tackle both issues of aging and placement of units by procuring more mobile / rapid deployment camera units, though this practice is not yet widespread as the vast majority of survey respondents advised that mobile/rapid deployment units made up less than 5% of their total camera estate.

An area of technology that was also considered to be beneficial but currently largely undeveloped was the ability to capture other sources of video evidence, for example public capture of incidents like fly tipping and dashcam footage that could become part of a larger data set along with footage taken from public space cameras.

Automatic Number Plate Recognition (ANPR) is another area of technology that is already being considered by some authorities in Scotland, with at least one advising that their waste management team were using ANPR solutions.

A further area of discussion was around data analytics, where there is currently a general inability within the majority of control room systems across Scotland to collect and analyse data. It was recognised that collection and analysis of data would allow the development of quantitative assessments of the value of public space CCTV as well as the positioning of cameras, however the technology to achieve this, either in terms of software or the cameras themselves is lacking. Even where the capability exists, the rest of the system is not always set up to make use of analytics.

Facial recognition and data analytics are a controversial aspect of CCTV technology. The research shows a mixed view of the importance of facial recognition. The survey data shows that over 20% of respondents completely agreed with the statement that Data Analytics &

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[1] One Local Authority area reports they now have no public space CCTV cameras.

Facial recognition are integral to the future of CCTV, while less than 10% thought it would not be integral. There are clear ethical considerations for these issues in future conversations.

Throughout the research it was made clear that most local authorities in Scotland feel they are not prepared for facial recognition technology, with several commenting that the current cameras would not have the technical capability to support it and others suggesting that facial recognition technology itself was not yet ready for large scale application in a public space environment.

3.4.   Training & Resourcing

Training of CCTV staff in Scotland appears to be good. Throughout the research it was clear that local authorities value their staff and the skills and experience that they hold.

The survey sample shows that a significant proportion of respondents provide comprehensive training for CCTV staff, including all seven of the training programmes suggested.

In addition to the wide-ranging training given to staff, the proportion of staff receiving the training is another positive factor. The data demonstrates that almost 80% of survey respondents provide training to all members of CCTV staff.

Respondents spoke about the challenges that exist in the resourcing of CCTV control rooms – examples given included staffing, monitoring hours and equipment. In part they felt that this is due to the variation of ownership and primary responsibility arrangements: in some authorities the police take primary responsibility for resourcing CCTV, in other the Council acts as primary and in many there is shared ownership.

It was noted that in some places there is a lack of dedicated leadership for CCTV and siloed approaches can impede collaboration between teams who have a vested interest in CCTV. A specific example mentioned was that public space and other teams such as parking have separate cameras estates. The survey data shows the wide variety of departments in which CCTV teams sit:

- Customer Services
- Police Scotland - Divisional Co-ordination Unit
- Assets & Infrastructure
- Community Safety Partnership
- Environmental and public protection
- Corporate and Community Services
- Homelessness and Community Safety
- Property Services
- Governance and Law
- Corporate and Housing Services

CCTV staff numbers vary across Scotland linked to value, with several control centres being operated by teams of five or less and others having more than twenty-five members of staff.

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Given the variance and mix of urban and rural areas across the nation, the different estate sizes and monitoring arrangements this is to be unexpected.

There was a general consensus that integrated operations and shared resources were beneficial and should be pursued, and indeed some are already doing this. However, for many LAs in Scotland, the team that operates CCTV is also managing other services. So, while consolidation is a good idea in principle, in practice it can only be considered alongside other services that that team carry out.

Some of the shared services that are currently being delivered from CCTV control centres in Scotland include:

- Telecare Monitoring and Council Out of Hours monitoring
- Community alarm calls and out of hours housing repairs calls
- Traffic Management and Environmental Services
- Concierge Services covering High Rise Blocks
- Street Lighting, Traffic Signals and EV chargers
- Lone worker response, out of hours road faults
- Event and crowd safety management run by the council and third-party event organisers

Over 30% of local authorities are already delivering shared services of some sort and the responses received suggest that several other authorities are in the process of adopting similar practices.

Often the largest operational cost for CCTV is in maintenance and system upgrades. It is therefore difficult to have a full discussion about CCTV without referring to funding and investment.
These costs vary depending on how frequently maintenance takes place. The survey data shows that 61% of respondents use third party suppliers to conduct maintenance and 39% have an in-house maintenance team.

Several participants advised that maintenance and repairs are becoming increasingly difficult to manage, not just because of reductions in funding but also because some of the cameras are now so old that it is not possible to find parts or people to repair them. Others stated that they are now managing maintenance on an ad-hoc basis and no longer have a dedicated maintenance programme in place.

Maintenance and upgrade programmes are often closely linked as there comes a point where a break/fix maintenance programme becomes unstainable and a strategic change replacement programme becomes more economical. At this point it often naturally follows that devices will be replaced with newer upgraded models.

One third of survey respondents advised that they do have an upgrade plan.

The survey data supports this showing that whilst less than half of respondents are still using solely fixed fibre connectivity solutions, almost 15% are now using fixed wireless networks with a further 38% using a combination on fibre and wireless.

One aspect of infrastructure where upgrades are currently being considered by a number of local authorities is the connectivity network supporting CCTV estates.

Multiple comments were made about the increasing cost of maintain and upgrading fixed fibre lines to transmit data from cameras back to control centres. As a result, several authorities are now investigating the options for wireless transmission using technologies such as 4G, 5G, point to point and mesh networks.

The issue of connectivity upgrades is particularly important in rural areas where CCTV cameras can often be positioned up to twenty miles from the central monitoring centre. It was noted that in these situations, wireless solutions may not be appropriate and fibre costs remain high, so alternative solutions will be needed.

3.5.   Good Practice

Defining 'good practice' or 'best practice' for CCTV operations can be a complex task. There are a multitude of areas to explore and, particularly in the context of public space CCTV, different stakeholders will have different needs and local circumstances and variation is important to remember. Throughout the research, views on what good or best practice CCTV approaches and arrangements looks like have been elicited alongside examples of good practice already being implemented by CCTV operators in Scotland. These have generally fallen into the following categories; Organisational practices, Procedural practices, Financial practices and Technological practices. Some of these are part of the current landscape in Scotland and some were offered by participants to be considered as part of future opportunities.

Specific areas mentioned during the research were Glasgow, Perth & Kinross and South Ayrshire but there are no doubt many more.

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ORGANISATIONAL	PROCEDURAL
• Forming wider partnerships with other organisations, integrated control rooms or colocation of operators delivering multiple services. This could include as the fire service, environmental protection agency as well as healthcare and adult social care providers. • Sharing information and intelligence with partner organisations and across local authorities via regional and/or national user groups and knowledge hubs. • Ensuring local ownership of CCTV and local knowledge in CCTV teams • Intelligence sharing processes where information on incidents is passed to police by operators for both criminal activity and for possible intelligence gathering. • Local government acting as data controllers and allowing the CCTV system to be used for the wider public protection agenda and not only prevention and detection of crime. • Using CCTV to support internal Council clients to deliver additional services such as property monitoring, depot vehicular access control, licensing and environmental services.	• Explore opportunities for ensuring data compliance and robust governance. There is a chance to learn from other approaches whilst considering the best model for Scotland. • Set up a system for reviewing Policies and Procedures, bringing together disparate CCTV from across the Council and creating a consistent Code of Practice for all. • Creating templates for procedures for each service which uses CCTV as they will have different ways of working. • Establishing 'tasking meetings' where cross functional CCTV teams work together to identifying opportunities for early interventions such as supporting vulnerable and homeless people. • Holding public consultations on CCTV operations to determine what end users see as the top priorities for public safety and using this information to shape and inform strategies.
FINANCIAL	TECHNOLOGICAL
• Developing standardised procurement processes and options for supplier rationalisation as well as sharing the cost of CCTV with all beneficiaries to obtain better value from suppliers. • Establishing larger control rooms as disaster recovery (DR) centres for smaller ones as well as other authorities and even private sector organisations who have a requirement for DR services. • Monitoring cameras owned by third party private companies for revenue generation, with some authorities working out deals to have cameras donated by third parties.	• Using data and intelligence to consider camera placement and make more efficient use of existing camera estates. • Increased use of mobile and rapid deployment cameras to quickly deploy units to them most relevant places. • Use of drone mounted cameras for more accurate and efficient delivery of services such as missing persons searches • Defining standardised frameworks and models for CCTV technology implementation • Running a cutting-edge 4G system with the option to view any public space images from any location. This has led to cost reduction from old fibre system, with the 4G model now costing about 1/3 of the previous cost. This saving has freed up additional budget for renewal of cameras. • Installation of motion sensor based digital cameras that reduce the need to monitor 24/7.

3.6. Benefits

Public safety is unquestionably the number one priority for the stakeholders taking part in the research. Participants noted the following uses and benefits of public space CCTV: provision of court evidence, early intervention and prevention of repeat offences, identification of anti-social behaviour, counter terrorism measures and tackling organised crime at the top of any list of benefits. A number also mentioned the role it plays in missing person investigations too.

However, there are other benefits of CCTV that may often be overlooked but having an awareness and understanding of them can be of significant value to CCTV operators.

The survey data indicates that about half of the respondents measure benefits of CCTV. Amongst those that do measure benefits there is some variety and little correlation in the results, with social benefits being the most commonly measured metric.

A further question asked how benefits are measured, some of the responses included:

- Data from Police Scotland, Emergency Response Team logs / records / Community Safety statistics.
- The number of evidential and intelligence packages passed to police. Number of Intelligence packages.
- Community impact surveys and incidents of note statistics are recorded in a database.
- Police provide data on the number of police warnings and arrests that resulted from CCTV incidents reported to Police by the Council control room.
- Output of CCTV Control Centre is included within annual Security Strategy reports.
- Court evidence packages as a quantified measurement
- Revenue generation as annual income from Housing Associations / Business Improvement Districts.

Throughout the research the main beneficiaries of public space CCTV have regularly been identified as members of the public and the police. However, it was noted by multiple participants that there are several other groups who do or could benefit from CCTV services:

- The wider justice system including the Crown Office and Procurator Fiscal Service (COPFS) is seen as a key beneficiary of CCTV evidence.
- Heath and social care providers and NHS Scotland benefit from CCTV services that support vulnerable people such as dementia patients.
- Environmental agencies benefit from services that support pollution monitoring, flooding and waste management such as overflowing bins.
- Private companies could also benefit from local authority run CCTV operations with things like third party monitoring and crowd behaviour analysis.

3.7. Funding

The majority of funding for public space CCTV in Scotland comes from local authority budgets, supplemented in many cases with money from Police Scotland (usually in the form of a grant) or in-kind payment by staffing control rooms and monitoring cameras. Nine local authorities receive no funding from Police Scotland for CCTV systems and are either fully local authority funded or a combination of private sector (Business Improvement District funding for example); Police Scotland provide funding or in-kind support to the remaining 23 local authorities. This is on a sliding scale. Some local authorities are also looking for funding opportunities through other grant applications.

Another example of alternative funding provided at the interview stage is the Smart Cities Scotland programme being delivered by the Scottish Cities Alliance. Through this programme, a number of local authorities are investing £60 million, including £25 millions of European Regional Development Fund (ERDF) support, to make Scotland's cities smarter, using new technologies, including CCTV, to accelerate and transform the delivery of city services[2].

It was discussed during the group sessions that there are several other beneficiaries of public space CCTV who for the most part do not currently contribute to funding. Some examples given were the Crown Office, the NHS and housing associations.

In some cases, funding only supports maintenance and resource costs, with little or no budget available for hardware, software and network upgrades. In some cases, even for funding for maintenance is overstretched.

Potential alternative funding models were being considered in the current landscape from using pilot studies and research projects to procure equipment to developing shared procurement models across multiple local authorities and partnerships as well as lobbying for national level capital contribution from central government. Some authorities are starting to look beyond cost saving models and are considering opportunities for income generation through their CCTV monitoring capabilities.

Multiple participants felt that the best way to improve funding would come from quantifying the value of the benefits of public space CCTV. Once the value of CCTV services can be proven it can be used to establish and strengthen business cases. It was noted that the team developing the strategy in 2011 did make requests for data but did not receive any response. If that work had taken place it was felt there would be a better understanding of what level of value CCTV has.

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[2] https://www.scottishcities.org.uk/workstreams/smart-cities

4. Future Opportunities

This section was informed by discussions at the focus group workshop, webinars and one to one telephone conversations as well as desk-based research about new ways in which CCTV is being used. These are not purely technological advances or dependent on investment in technology - for example consistency in frameworks and standards, training, opportunities for learning and practice sharing – but it is clear that many of the future opportunities lie in technological developments or are dependent on these.

Note that during the time between the research phase and publication of these reports the Scottish Biometrics Commissioner Bill was introduced into the Scottish Parliament and was passed on 10th March 2020. This creates a Biometrics Commissioner, who will oversee how policing bodies take, store, use and dispose of data such as finger-prints, DNA samples and facial images. Once in force, the Scottish Biometrics Commissioner Bill will ensure that the police's approach to biometric data, including the potential use of new technologies such as facial recognition software, is carried out in a lawful, effective, proportionate and ethical way. The research has not considered the implications or opportunities this Bill offers but it should be considered in any future national and local conversations on public space CCTV in Scotland.

As noted previously, the main use of public space CCTV in the context of this report is public safety, primarily criminal and antisocial behaviour (ASB). However, advances in smart technology have led to the introduction of Smart Closed-Circuit Television (SCCTV) systems that, in addition to the crime and ASB prevention use cases, can also provide important safety measures such as monitoring falls and accidents as well as understanding levels of pedestrian and vehicle densities.

Further to the additional safety measures that can be implemented through smart CCTV systems, there are a growing number of other services that could represent opportunities for local authorities to improve resident's quality of life, reduce operating costs and even generate revenue.

Good work is being done across the UK and worldwide to take advantage of these advancements in CCTV technology, and there are a vast number of case studies and examples to draw inspiration from. However, it is important to recognise that the research undertaken during this project has shown that there is a general consensus amongst CCTV operators that Scotland is not yet in a position to implement cutting edge CCTV technology or services.

If this is the case, then there is certainly a need to bridge the gap between the current state and the cutting edge. Therefore, this section will start by looking at opportunities to bring CCTV in Scotland up to speed before touching on the other future opportunities that are less dependent on bridging this gap.

4.1. Bridging the gap

4.1.1. Technology

In order to 'bridge the gap' between where CCTV in Scotland is now, and where it needs to be in order to start taking full advantage of the current technology, an assessment of the existing issues should be made.

Funding and investment was one of the main discussion points repeated throughout the research by participants. Local authorities across the UK continue to undergo austerity measures and budget reductions. Scotland is no exception, and as a result many public services have been affected, including CCTV where it becomes increasingly difficult to find funding for maintenance, upgrades or hardware, software and network infrastructure; particularly when considered alongside stretched budgets for even statutory services. Disagreements over funding for CCTV still occur and some of the key beneficiaries of public space CCTV often do not contribute to the funding. The NHS, Crown Office and Housing Associations could all be considered as beneficiaries but a full assessment would be required to support this assertion.

It is important to bear in mind the different requirements for rural areas compared to urban ones regarding public space CCTV. Participants noted considerations coverage and connectivity where large distances between cameras and control centres result in higher connection costs.

There are differing views on the approach to dealing with these aging estates of analogue cameras. Some favour a gradual replacement or break/fix approach, while others believe that starting from scratch with a strategic change programme would be most beneficial.

An area of technology that was also considered to be beneficial but currently largely undeveloped was the ability to capture other sources of video evidence, for example public capture of incidents like fly tipping and dashcam footage that could become part of a larger data set along with footage taken from public space cameras.

Automatic Number Plate Recognition (ANPR) is another area of technology that is already being considered by some authorities in Scotland, with at least one advising that their waste management team were using ANPR solutions.

While facial recognition may not be a near future opportunity for Scotland, there was a general consensus that both facial recognition and data analytics will form part of the future of public space CCTV at some point. The idea the public opinion and media controversy around the technology would be a blocker to the adoption of these technologies were largely refuted.

4.1.2. Articulate Value

The benefits of CCTV and the cost of its delivery are often not well understood and participants would value future work that sought to quantify the value of public space CCTV, and therefore support funding opportunities for the future.

Some authorities have employed analysts and partnered with universities to try and determine what the cost of e.g. gaining a murder conviction would be without CCTV evidence. However,

it has been found very difficult to quantify and therefore presenting evidence to support the value of public space CCTV has been problematic.

During the focus group it was noted that Police Scotland have a new research team and there may be opportunities for PHD students to undertake research into CCTV value as part of that team's work.

4.1.3. Revenue Generation

Reducing costs and implementing CCTV services that result in revenue generation can help local authorities find additional funding for critical maintenance and upgrades. However, this dual requirement of income generation and at the same time delivering public services can be difficult to balance ethically.

During the webinar sessions one participant noted that a number of CCTV control rooms in Scotland have previously tried to establish themselves as standalone organisations but have now been amalgamated back into local authority ownership.

However, there are examples of CCTV control centres not only reducing costs but operating at profit and delivering services that can generate income.

4.1.4. Standardise Procurement Framework and Other Shared Arrangements

The existing Security Services Framework[3] for Scotland expired at the end of March 2019. This framework allows for the purchasing of CCTV equipment and services from approved suppliers. However, it is not immediately clear how this framework will be replaced. The research has identified that stakeholders believe a standardised procurement framework is important for successful delivery of future CCTV services.

Collaborative procurement is another key opportunity that was raised at several points during the research phase. By combining their funding allocation local authorities can create larger contracts and therefore present opportunities for suppliers to offer better rates.

There was a general consensus that integrated operations and shared resources were beneficial and should be pursued, and indeed some are already doing this. However, for many LAs in Scotland, the team that operates CCTV is also managing other services. So, while consolidation is a good idea in principle, in practice it can only be considered alongside other services that that team carry out.

There were also discussions throughout the research around the idea of consolidating CCTV operations in Scotland by reducing the number of control rooms. Suggestions that these could be regionalised or even move to a model with e.g. the idea of three regional hubs were put

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[3] https://www2.gov.scot/Topics/Government/Procurement/directory/facilitiesmanagement/SecurityServices

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forward. It was recognised that while this would require significant initial investment it is likely to result in significant savings. Any model would require a level of local accountability.

4.1.5. Learning

Respondents felt that standardised training programmes for CCTV in Scotland would be beneficial, particularly given the fact that CCTV operational resources are supplied by different institutions depending on the local authority. In some places, CCTV is controlled solely by council staff, in others solely by police and in some cases, there was shared ownership.

Across the research activities, it was discussed that while there were previously a number of regional CCTV user groups in Scotland as well as a national one, these have now largely ceased to function. The user groups served as a forum for sharing information and best practice on CCTV operations. A number of reasons for the cessation of these groups were suggested, including:

- A lack of consistent procedures and variation in funding structures and arrangements means that while the various local authorities do have a number of similarities, they also have many differences. Therefore, within the user groups people would often split into different elements because there was no overarching view. Each authority's operational set up was so different that supporting each other would often not be possible.
- From a logistical stand point, some of the groups cover very large geographical areas, making travel and attendance more difficult.
- There was a lack of leadership and cohesion to hold the groups together and no central/national ownership to link ideas back to decision makers, so the issues being raised at the groups did not have a voice.

With these lessons learned about the regional groups, participants thought there is an opportunity to re-establish these groups as well as to set up a national one to share good practice and future developments. It was considered that video and teleconferencing sessions, like the ones conducted under this project, could help to alleviate the logistical and geographical issues. Future user groups should have both an operational and a strategic focus and would require a leadership structure that can take action on what comes out of the user groups. It should be recognised that the groups benefit from the diverse range of communities in Scotland, so user groups need to capture their uniqueness.

4.1.6. Develop A Coordinator Role

As well as the aforementioned user groups, many participants also raised the idea of establishing a national lead/coordinator role for CCTV in Scotland to act as a liaison between CCTV operators and decision makers. It was noted that local authorities want to take operational leadership for CCTV but there is a need for a framework, support channels and clarity to come from central government. There is a balance to be struck between national coordination and local autonomy within this model which would need to be explored in any future conversations. There is a chance to learn from other approaches whilst considering the best model for Scotland.

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4.2.   New Network Models

The research phase of this project has shown that connectivity network costs are a key issue for CCTV operators in Scotland. Cable and Fibre costs take up a significant proportion of budgets and have continued to increase in recent years.

The research has also shown that some authorities are now looking at alternative network models, making use of wireless network connectivity and finding significant cost savings as a result. Below are some of the alternative network models that may provide opportunities for authorities in Scotland to benefit from.

4.2.1. Fixed Wireless Network

A fixed wireless network offers the ability to significantly reduce the number of leased lines necessary to support the CCTV estate reducing operating costs given the right deployment and environment, while making Add/move/subtract simple and cost efficient. But it does not work in every implementation.

4.2.2. Open Access Network

The model for wide area networking that would create a single network, potentially generate additional income and certainly reduce overall costs is known as an 'Open Access Network' and can be delivered either by fibre optic cables or fixed wireless broadband in a point to point or point to multipoint configuration or any combination of the two. This overcomes the issue that was highlighted during the research of application/service specific networks that have resulted in multiple networks that overlap and/or underutilised. These networks often comprise a series of point to point fixed link dedicated circuits that have very limited flexibility in terms of bandwidth, device attach, and commercialisation and therefore would be inappropriate to deliver any of the value-added services described elsewhere in this document without upgrade to fibre.

4.2.3. Neutral Host Model

Once an Open Access Network model is established, the ability to overlay the network with a 5G Neutral Host would be possible. 5G is the next generation of networks, offering well in excess of 10x wireless speeds with lower lag times. This is a major cost saving potential for authorities as well as providing future revenue streams.

4.3.   New Technology and Services

This section presents examples of emerging CCTV technologies along with services that can be enabled through these technologies. They represent potential future opportunities for public space CCTV in Scotland.

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Smart CCTV systems can already be used for much more than the traditional security and surveillance use cases that CCTV is traditionally associated with. High specification IP network cameras, open smart city platforms and data formats, as well as image processing algorithms combined with other machine learning techniques all allow local authorities to take full advantage of their CCTV networks by providing a number of new smart city services.

Some of the areas where new services can be implemented include:
- Public safety
- Event management and crowd control
- Parking management
- Minor fine enforcement
- Concierge services
- Out of hours & lone worker support
- Disaster recovery sites
- Staff-less library security

4.4.   A shared vision for CCTV in Scotland

Throughout the study participants have been asked for their views on a shared vision for CCTV in Scotland. Responses were wide ranging and varied but a number of common themes shone through. The following vision statement takes these into consideration and frames them in the context of public space CCTV in Scotland.

Public Space CCTV in Scotland should be:

- **Consistent** – Standardised frameworks, governance training and protocols should form the basis of a national strategy. Standardised technology should be made available to all.
- **Efficient** – Not only financially efficient with cost savings and revenue models in place to address the austere climate but operationally efficient to manage Scottish cities and rural communities more effectively.
- **Collaborative** – Re-established regional user groups working together to solve problems collaboratively and sharing solutions to common problems. Knowledge sharing hubs should be established and sharing of best practices should be encouraged.
- **Supported** – CCTV teams should be supported with local accountability from elected members and national accountability from central government.
- **Led** - A centralised coordinator role should be established to act as a formal liaison between those with the in-depth knowledge of CCTV operations and those determining the overarching strategy.
- **Integrated** – CCTV operations should be integrated, removing silos, sharing services and co-locating operators wherever possible. The integrated operations centre in Glasgow services as the prime example

- **Consolidated** – In the same way that the legacy police divisions have been consolidated into a single force, there is an opportunity to examine the possibility of consolidating CCTV operations with shared platforms and fewer operations centres.

- **Evidenced** - Benefits should be developed to build an evidence base to prove the value and benefits of CCTV. Members of the public, elected officials and all potential beneficiaries of public space CCTV should be informed about the way in which it fits in the overall landscape of delivering public safety.

- **Safety Focused** – Above all, the primary aim should be to keep Scotland safe.