CC:IPS

THE POWER OF VIDEO IN EMERGENCY RESPONSE

SUMMARY:

Incident-Related Imagery (IRI) is defined as any form of visual information associated with an incident scene that is delivered via any medium to public safety personnel. With the evolution of Next Generation emergency number calling (NGX-X-X), the capability for IRI delivery to Public Safety Answering Points/Control Rooms (Emergency Communications Centre/ECC) increases as will the expectation of the public to interact with public safety services in this way.
Video is the IRI medium we will be addressing in this document.

THINGS TO CONSIDER

Public expectation – Imagine you are an emergency number services professional. You receive a call from someone who is in distress. They are trying to describe their situation but they're too panicked to speak clearly. You can hear them crying and screaming in the background. You need to act fast but don't have enough information. What do you do? This is where video comes in. With video, you can see what's happening and respond more effectively. This also benefits Responders in the field, knowing the environment they're walking into. Remember: the public has access to these tools; they expect their public safety services to utilize them. Modern television programs have highlighted the abilities of some of our consumer devices, however fictionalized that might be, has come to greatly influence public expectation.

CCTV – Closed Circuit Television has been utilized in ECCs across the globe for more than a decade, even longer in some places.

Live Response Unit / Drone Feed – With the evolution of Broadband wireless technology in both public and public safety networks, the ability to stream near real-time video or live into the ECC or to other responding units can aid in resource deployment or incident tracking (such as with use of law enforcement rotary, fixed wing aircraft or drones for Fire Incident Command).

HOW VIDEO IS BEING DEPLOYED

There are various solution providers and agency-developed digital portals currently in the public safety space which are injecting video capabilities into PSAPs through call handling solutions, over-the-top applications in which the call taker sends a link to the citizen calling for help, and fixed closed-circuit systems that have direct feeds into emergency services.

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ARGENTINA (SALTA) USE CASE

Along with the call taking and dispatch of emergencies, CCTV has been a key component of the Salta ECC ecosystem since 2011.

The CCTV project started with 500 cameras distributed across Salta City and the 9-1-1 center coverage area. That represents 3 main dispatch centers and 5 remote centers distributed along Salta province.

The aim of the project was to support prevention strategies by detecting potential crimes, hazardous situations, and reckless behavior. Uniting with the CAD solution enabled CCTV operators to dispatch their own incidents while providing the details to first responders.

In the second stage, CCTV started delivering visual support to incidents reported through 9-1-1 calls. This visual support was also possible due to the integrated SAE CAD solution, which allowed every agency of the ECC to have access to the same information.

Currently, 2026 cameras are being monitored throughout the province with a new CAD solution. After evaluating the results of the first two stages of implementation, modernizing video solution became a priority.

We are migrating to a new CAD, which provides the following capabilities:

- Access to online video of pre-established public places in CAD GIS, available for the call taker and dispatcher
- Recording and storage of videos for first responders and legal requirements
- Attaching screen shots and videos to calls (from caller or first responder)
- Motor vehicle video available in 9-1-1 units
- Addition of body cameras for first responders
- Direct access to video from a caller through a link sent to a smart phone.

The roll-out plan includes improvements to operational procedures, to establish use of these new video capabilities.

AUSTRALIA AND NEW ZEALAND USE CASES

Video usage in Australian and New Zealand ECCs is generally limited to CCTV and, for police in particular, streaming from aircraft (e.g., police helicopter) and in some cases from drones. Some ambulance services also have access to hospital CCTV to view emergency vehicle parking bays.

CCTV is not necessarily a live stream, but video can be accessed by ECC for situational awareness when initiating a response to an emergency assistance request. Inputs vary from traffic cameras to transport to the local council.

One jurisdiction in Australia has a dedicated police CCTV unit within the ECC that monitors more than 1,000 cameras on a 24/7 basis to increase situational and potential risk awareness.

There is the ability in some police agencies to upload imagery provided through their non-emergency services.

While there is no access for citizens to send video or contact ECCs via video, options to use applications that can establish a video channel with a person's phone (with their approval) are being explored.

DOMINICAN REPUBLIC USE CASE

CCTV video surveillance in the Dominican Republic provides real-time monitoring and subsequent review of emergency incidents from images captured by cameras deployed throughout the national territory. This system's main objective is to protect and guarantee the physical integrity, freedom, and security of citizens, and their property.

The public video surveillance system has three main objectives: alternative creation of emergency alerts, police surveillance, and forensic use. Below are the use cases associated with these objectives.

Alternative creation of emergency alerts:

Operators are continuously monitoring cameras in real-time to identify emergency events, facilitating the rapid dispatch of units without the need for users to report an emergency. The information captured by cameras provides better location and situational awareness of the environment for dynamic decision-making, resulting in a quick and effective emergency response.

In addition, the video is broadcast in the emergency dispatch room, allowing institutions to acquire real-time updates of the situation in the field and to coordinate resources more effectively.

Police Surveillance:

It serves as a tool for preventive policing by surveillance in areas with a high concentration of people and incidents, detecting situations that require immediate police presence. The cameras are also monitored to identify suspicious profiles or activities that may lead to vandalism or criminal activities. In these instances, preventive police units are dispatched.

Forensic Use:

Images and videos captured by video surveillance cameras and drones are used as visual evidence to support investigations that are or will be subjected to legal proceedings. The law and regulations establish the mechanism by which these images can be used upon request of the public prosecutor and/or a competent judge, ensuring the privacy of citizens.

Similarly, captured images and videos are used as supporting tools for police investigations of crimes and offenses.

Drone Support:

The 9-1-1 System has a drone unit that supports response institutions in search and rescue events in wooded areas and in maritime accidents. Drones also provide visual support in citizen security events and accidents with multiple fatalities. These images can be directly shared with the rescue team in the field for more effective interventions.

ECUADOR USE CASE

Ecuador's governing document regarding the use of video surveillance is their SIS ECU911.This document allows for the operation of nationwide video surveillance cameras. The following are specific incidents in which video played a key role in providing the appropriate response to the situation.

Floods:

A call came in at 6:10 a.m. on Wednesday, July 12, 2023, reporting homes affected by rainwater buildup and a river overflowing its banks in the Convento parish, in the Chone Canton, Manabí province.
From the ECU 911 Operations Center in Portoviejo, deployment of National Police, Risk Management Secretariat, and Chone Fire Department personnel and specialized units was coordinated to provide the affected individuals with the necessary assistance.
The evolving emergency was actively monitored from the Video Surveillance Center for situational awareness and incident progress as the early imaged showed progressively flooding streets.
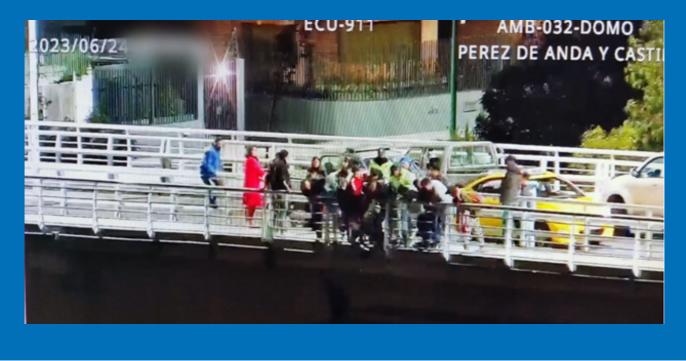

Building Fire:

A call came in at 7:19 a.m. on Thursday, July 6, 2023 with the 9-1-1 caller reporting "a fire at a composite construction house" in Esmeralda's Canton, in the vicinity of Pedro Vicente Maldonado street, between Perdomo and Margarita Cortez streets.
Mobilization of Esmeraldas Fire Department (CBE), National Police, and Esmeraldas Canton Public Transit, Ground Transportation, and Road Safety Corporation (ESVIAL) personnel and units was coordinated from the ECU 911 Operations Center in Esmeraldas to respond to this emergency report.
A multi-agency response (Fire/Rescue, Ambulance, Police and others) arrived on the scene and the cameras were used to monitor and update agencies as to the progress on the incident.

Attempted Suicide:

An emergency call came in to 9-1-1 at 2:38 a.m. on Saturday, June 24, reporting that an individual was attempting to jump off a city bridge. Based on the details given by the caller, the Ambato ECU 911 operations center coordinated the dispatch of rescue personnel from the Ambato Fire Department (CB-A), emergency medical services from the Ministry of Public Health (MSP), and National Police.
While the rescuers were on their way, the video surveillance room provided visual backup for the people helping the individual, who was dangling from the side of the bridge at risk of falling into the precipice. Ongoing updates were relayed to responding agencies.

SWITZERLAND USE CASE

Since 2015, Switzerland's government recommended the use of apps to assist in providing care to the community. Applications include live video streaming and pictures, specifically as it relates to cardiac events. The goal was to increase the survival rate of victims up to 35%. They determined with live video feed they had better assessment, in situations such as pediatric emergencies and would help to guide the first aid being performed on scene by a citizen.
In 2019, the inaugural program kicked off. During Covid Pandemic, call volume increased 5x normal call volume. They were able to determine that medical triage decisions for suspected Covid-19 patients are strongly influenced by the use of live video. As the use of live video streaming continued, they determined it was easier to adapt to images than to verbal information.
They also realized a double digit increase in patient survivability with the use of streaming video with the patient pre-arrival. As of spring 2023, video is used in 15% of their medical calls with a goal in the near future to use it in 80% of emergency calls.

UNITED KINGDOM USE CASE

Police, Fire & Rescue, and Ambulance services in the UK have all, to some extent, been using video in ECCs for quite some time. It is more generally used to inform ongoing incident management rather than as part of call taking and initial mobilization.
Call taking & mobilization: A limited number of Fire & Rescue Services (e.g., West Midlands FRS) have used the 999EYE application[i] to help visualize an incident that is being reported. This allows the call taker/dispatcher to request access to the device camera of the emergency caller – and helps determine the scale of the fire or road traffic collision and therefore the mobilization response.   For both Police and Ambulance scenarios (e.g., London Ambulance & West Yorkshire Police), the use of the Good Sam application[ii] works in a very similar way with the call taker/dispatcher requesting access to the device camera of the emergency call maker.This process provides a live video feed, accurate location information, and helps with dynamic decision making.

Incident Management: Historically, police ECCs have had video feeds from several sources, including major roads (although road feeds have subsequently moved across to the Highways Agency). In London, the Metropolitan Police Service had one of the largest video matrices in the world with feeds from their own cameras; Transport for London cameras (including on buses and at tube stations); and local council feeds. All this information is available on a dispatch console which includes mapping highlighting where cameras are located, the direction in which they could view, and, for some, the ability to pan, zoom & tilt. Most police force ECCs have access to cameras fitted to helicopters or fixed wing surveillance aircraft where incident commanders can make dynamic decisions, and the incoming video feeds can be appropriately stored. Finally, the use of drones by the police and fire & rescue services is gaining traction as a means to get real-time incident information from above. Video feeds from drones can also be relayed into communication ECCs.
The UK still has some way to go to being NG999/112 ready in terms of video to the call taker by the emergency caller, and any such situation would need to have the video requested (or the feed accepted) by the call taker before any images were viewed.

UNITED STATES USE CASE

Video usage in the United States is just now beginning to be utilized within the ECC.This is coming into effect through a variety of solutions: through call handling equipment, via a link sent to the caller that opens the caller's device camera, and CCTV.

In the solutions via call NG9-1-1 call handling equipment, many of the centers that are live have an established policy and practice that gives the 9-1-1 professional the latitude to determine if and how to utilize the video feed. It will be another 2-3 years before this solution becomes more widely used. Centers that have utilized the call handling solution are beginning to share information to help establish best practice where video is concerned.

For those centers who have deployed over-the-top solutions that require the caller to open a link on their device, the initial examples indicate this video is being utilized in medical emergencies.
While CCTV has been in place for many years in the U.S., most ECCs do not have access.CCTV solutions are most prevalent in major metropolitan areas in the form of traffic monitoring cameras. With the advent of real time crime centers, some of that feed is now being routed to those designated centers.

BENEFITS OF USING VIDEO

Accurate, as-it-happens situational awareness is the best benefit derived from video into public safety services.

- Benefit to fire services – Early identification of large impact events, specialty rescue and hazardous materials response saving critical dispatch time prior to arrival of first units.
- Benefit to law enforcement – Suspect and vehicle descriptions, weapons information, situational awareness and real-time coordination of resources
- Benefit to EMS response - Enhanced triage and pre-arrival lifesaving skills compliance. Potential seen for increased use with low acuity calls to better guide patient to alternative care and/or transport rather than an EMS response.
- General - There are some perceived benefits across all services where civil or citizen provided video (similar to officer's body worn camera footage) can enhance real-time situational awareness and support evidentiary investigations.
- There is some evidence that community confidence is increased knowing that access to video (currently via CCTV) is available, particularly in areas where crime is more prevalent.

REQUIREMENTS FOR A VIDEO SOLUTION

Implementing a video solution requires careful consideration of certain requirements.Modernizing the call handling solution may be the route the agency chooses to take, or an agency can implement something as simple as an over-the-top application.

- Key requirements to consider:
- Bandwidth: Min 25mbps for an average 12 position ECC,
- Storage: ensuring that video is stored securely and in compliance with relevant regulations. Transcription of audio should be included.
- Record of who's viewed: keeping a record of who has accessed the video and when, to maintain accountability and prevent unauthorized access.
- Ability to black out/blur or scrape video while still being recorded: providing the ability to mask certain parts of the video to protect privacy and Call Taker mental health while still allowing for the capture of valuable information.
- Sharing: Ability to forward live and recorded video to First Responders and Investigators with transaction record
- Outlining of weapons: enabling the ability to highlight or outline any weapons or dangerous objects in the video to help guide the appropriate response.
- Capture of metadata from the video: capturing additional information about the video, such as the location and time of the incident, to provide context and aid in investigations.
- Strongly consider the agency's cybersecurity infrastructure surrounding this capability. Video and pictures are a common path that bad actors take in corrupting systems.

MENTAL HEALTH CONSIDERATIONS AND CONCERNS

Management should acknowledge that some ECC personnel may be concerned about witnessing graphic or disturbing images; yet those personnel can receive specialized training to help them handle these situations. Always advise personnel and ensure that robust support services are available to help them cope with the emotional toll of their work.

Research is being conducted by Dr. Michelle Lily, Northern Illinois University (Lilly Counseling and Consultation). In her recently published white paper, "How NG911 Technology May Positively Impact Mental Health in 9-1-1: Evidence from Research and Theory on PTSD[i]" she states, "The research literature leads
mental health considerations and concerns to a reasonable conclusion to while some, if not a minority, of calls might enhance risk for adverse psychological impact, there are compelling arguments that access to video may have net beneficial psychological impacts within 9-1-1."

This stems from several areas however, it appears that exposure to actual video or still imagery will lower stress reactivity as compared to that of audio exposure only as telecommunicators may imagine scenarios that are worse than reality and may be able to process "closure" of the incident once responders arrive on scene.

Salta, Argentina Use Case:
Mental health has been a priority since the beginning of our emergency center. That´s why since 2005, the call taker's shifts are planned according to the following considerations:
- 6 hours shifts
- 45 minutes daily break
- Only 4 days' work in a row
- Night shift: two groups 5 days' work, 5 days off

This schedule was developed according to the national call takers law and considering the type of expertise required for this position. This schedule was also formalized in a Special Regime for 911 call takers.

The daily responsibilities of this role demand call takers have good rest and emotional stability, as they are the first in hearing citizen's cry for help, and simultaneously they must focus on recording in their CAD as much information as possible to contribute to the emergency resolution.

For that reason, long hour shifts are detrimental to your staff's ability to perform at the top of their capacity.

In addition, 911 Salta ECC was the first in Argentina that created Psychological Area which gives support to suicidal callers and is available for call takers to relay on them when needed.

The daily break was later adopted by other agencies, Police CCVT operators and dispatchers, as it was proved that eye and hearing breaks were necessary.

OTHER CONSIDERATIONS AND CONCERNS

There should be some consideration of the operational impact of staff dealing with video in addition to the voice call. It has been noted that in some instances the provision of video (such as a fire event) can prove to be a distraction to focusing on the caller.

The access to and use of video or imagery should be considered carefully in the context of the roles within the ECC and the timing of presentation. For example, call-taker's role is to ascertain information of the event quickly and submit this to a dispatcher. In addition to the mental health considerations noted above, would access to video or imagery enhance the call taker's ability to gather information quickly? For a dispatcher whose role is to initiate and coordinate the response, there may be some operational value whereby video might raise an additional response consideration (e.g., ladder for a high-rise fire). This could improve the operational response.

Finally, some questions arise that require further discussion;

- Would access to video and imagery enhance the responder's situational awareness. If video of a high-rise fire was provided to the responders enroute, would they have greater awareness of the situation they were heading toward and allow them to adjust their operational response?
- Should video received by one agency be available to other agencies during a multi-service response?
- Like the consideration of the additional time required to handle text contacts, is there a handling time impact of video calls?

Noting that video calls would also allow people who communicate through sign language to contact emergency services directly, there would be considerations in terms of recruitment and skills sets both to deal with the sign language requirement and also the potential exposure to graphic imagery.

With the introduction of video, and even within the context of current usage (e.g., CCTV) what opportunities could Artificial Intelligence provide in assisting emergency services in identifying critical situations such as suicide attempts?

REFERENCES
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BEST PRACTICES

While no two implementations are going to be identical, the following items are being adopted and should be considered in most situations.

Analytics position

With data- incident related imagery being injected into ECCs, bad actors will certainly take advantage of this. Active work is being done on real time analytics and analytical assessment positions within the centers to validate data and imagery and reduce spoofing and cybersecurity risks. Some law enforcement agencies have incorporated these positions into real-time crime centers.

CCTV/IRI Integration

Resource management is a foremost concern within most agencies; integration during initial incident response and for ongoing situational awareness is essential. Agencies need to be able to ingest the Data/IRI and push it to incident commanders, responders and tactical dispatchers for active and ongoing monitoring.
Imagery should also be available for post-incident analysis / after action reports with a focus on education and improvement in systems and operations. This will require appropriate digital storage infrastructure.

Regulatory

This area will be dependent on the regulatory framework in your region for ecosystem integration. For NGXXX implementation, integration will depend on Emergency Services IP Network (ESINet), Non-ESINet carried data/imagery and potential integration for Over-the-Top applications or local portals.
For example, in Canada the regulator has decided this imagery and data will not be carried over the ESINet due to cybersecurity risks and to avoid bandwidth congestion. Therefore, Canadian ECCs must rely on local or regional data portals or data aggregators in order to receive imagery. Regardless, data portals and aggregators must have the same integration and push capability as noted above.

CONCLUSION

This paper sites only a few examples after a global analysis of several use cases. With the addition of Next Generation services on the horizon, there are clear advantages for the incorporation of imagery into the Emergency Communications Centre.

With a more mobile and connected public, expectations will be high that an ECC can ingest and utilize imagery from the emergency caller impacting immediate response related decisions, providing information directly to enroute responders and maintaining strong situational awareness.

Look at these opportunities to see how to improve current systems or how new NG technology can be included to enhance your operations in the near future.