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**Video Surveillance Systems (VSS) for use in security applications –
Part 2-11: Video transmission protocols – Interop profiles for VMS and cloud
VSaaS systems for safe cities and law enforcement**

**Systèmes de vidéosurveillance destinés à être utilisés dans les applications de
sécurité –
Partie 2-11: Protocoles de transmission vidéo – Profils d'interopérabilité pour les
systèmes VMS et VSaaS en nuage pour la sécurité urbaine et le maintien de
l'ordre**



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IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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**VIDEO SURVEILLANCE SYSTEMS FOR
USE IN SECURITY APPLICATIONS –**
**Part 2-11: Video transmission protocols – Interop profiles for VMS and
cloud VSaaS systems for safe cities and law enforcement**

FOREWORD

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The text of this International Standard is based on the following documents:

Draft	Report on voting
79/697/CDV	79/702/RVC

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 62676 series, published under the general title *Video surveillance systems for use in security applications*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

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INTRODUCTION

IEC Technical Committee 79 in charge of alarm and electronic security systems together with many governmental organizations, test houses and equipment manufacturers has defined a common framework for video surveillance exchange in order to achieve interoperability between products and parties.

The IEC 62676 series of standards on video surveillance systems (VSS) is divided into six independent parts:

Part 1: System requirements;

Part 2: Video transmission protocols;

Part 3: Analog and digital video interfaces;

Part 4: Application guidelines;

Part 5: Data specifications and image quality performance for camera devices;

Part 6: Performance testing and grading of real-time intelligent video.

Each part offers its own clauses for the scope, normative references, definitions, and requirements.

Today there is a lack in directive standards giving precise requirements for VSS in certain situations involving third parties (and especially the authorities), compared to intrusion or fire detection alarm systems, while video applications are becoming more important for public security.

In most cases, such situations apply to one or more independent regular operational systems (or systems of systems) and correspond to exceptional events or security incidents where authorities, first responders, etc. need immediate access to the data (video and associated information) through a single third-party Video Management System (VMS) for a timely response.

Since the surveillance systems are a crucial asset in crime prevention, crisis management, or forensic applications to assist the law-enforcement agencies and smart cities, the goal of this document is to provide a fully interoperable interface for VMS and Cloud Video Surveillance-as-a-Service (VSaaS) Systems with third-party:

- security operations centres,
- professional remote video monitoring,
- remote access by law-enforcement and authorities,

for sharing their digital video-surveillance contents and associated metadata.

This document builds upon the IEC 62676 family of standards and complements it. It does not specify any detailed requirements on application guidance and video observation objectives, on system availability, cyber security, privacy, national and legal constraints, operational procedures, environmental conditions, or technical protocols.

VIDEO SURVEILLANCE SYSTEMS FOR USE IN SECURITY APPLICATIONS –

Part 2-11: Video transmission protocols – Interop profiles for VMS and cloud VSaaS systems for safe cities and law enforcement

1 Scope

Based on the IP video features offered by the IEC 62676-2 protocol series, this document defines minimum requirement profiles for Video Management Systems (VMS) and cloud Video-Surveillance-as-a-Service (VSaaS) Systems to optimize interfacing with third parties.

It defines minimum required VMS interoperability levels from video export to exclusive video control, for the sake of remote support, for example in crisis situations, regulating governmental organizations, national law enforcement, private security service companies, public transport operators and other authorities.

This document is intended to set the common technical basis for national regulations requiring inter-organizational remote, local or on-site access, for example so that authorities can be granted temporary access to the VSS in the case of emergency situations.

This standard is accordingly expected to supersede ISO 22311 (Societal Security – Video-surveillance – Export interoperability).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60839-11-31:2016, *Alarm and electronic security systems – Part 11-31: Electronic access control systems – Core interoperability protocol based on Web services*

IEC 60839-11-32, *Alarm and electronic security systems – Part 11-32: Electronic access control systems – Access control monitoring based on Web services*

IEC 62676 (all parts), *Video surveillance system for use in security applications*

IEC 62676-2-31:2019, *Video surveillance system for use in security applications – Part 2-31: Live streaming and control based on web services*

IEC 62676-2-32:2019, *Video surveillance system for use in security applications – Part 2-32: Recording control and replay based on web services*

IEC 62676-2-33:2022, *Video surveillance system for use in security applications – Part 2-33: Cloud uplink and remote management system access*

ISO 23601, *Safety identification – Escape and evacuation plan signs*

ISO/IEC 14496-3, *Information technology – Coding of audio-visual objects – Part 3: Audio*

ISO/IEC 14496-10, *Information technology – Coding of audio-visual objects – Part 10: Advanced video coding*

ISO/IEC 14496-12:2022, *Information technology – Coding of audio-visual objects – Part 12: ISO base media file format*

ISO/IEC 23000-10, *Information technology – Multimedia application format (MPEG-A) – Part 10: Surveillance application format*

ISO/IEC 23008-2, *Information technology – High efficiency coding and media delivery in heterogeneous environments – Part 2: High efficiency video coding*

ITU-T/Rec G.711, *Pulse code modulation (PCM) of voice frequencies*

ITU-T/Rec G.722, *7 kHz audio-coding within 64 kbit/s*

RFC 5246, *The Transport Layer Security (TLS) Protocol Version 1.2*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in the IEC 62676 series apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.2 Abbreviated terms

FOV	field of view for a camera
GPS	Global Positioning System, the widespread GNSS (global navigation satellite system) for universal geolocation
LEA	law-enforcement agency
PTZ	pan, tilt and zoom of a camera
RTSP	Real Time Streaming Protocol
SVG	Scalable Vector Graphics
TLS	Transport Layer Security
VMS, lower	video management system, installed in single locations
VMS, upper	video management system, connecting as client to the lower VMS
VSaaS	cloud Video Surveillance-as-a-service Systems

4 Overview

4.1 General

The IEC 62676 series of video-surveillance standards has been established to ensure interoperability and performance within systems, whatever their size is, up to systems of systems. The objective of this document, within this family, is to define minimum additional requirements to ensure that all the compliant video-surveillance systems not only perform as expected by their owners, but also can play their societal role by supporting at the same time the relevant authorities. Such authorities can be as diverse as the various first responders, such as police investigators, or as diverse as the services of smart cities, all with varied use cases.

In this context, with the authorities mastering their own assets, this document concentrates on the requirements put on the "low-level" systems producing the videos and associated data, allowing flexibility in the implementation by the "authorities" of their receiving or processing (client) system.

Such requirements rely, for each parameter and feature, on the provisions of the IEC 62676-2 series. For the implementer's convenience, these requirements are associated to functional levels and sub-levels as described in Table 1.

Contrary to the other parts of the IEC 62676-2 series, the above provisions shall accommodate the fact that most of the context relative to the site monitored by the producing system is generally stored locally at the system level and that it is accordingly the responsibility of the producing system to ensure that, whatever video and associated data are transferred to the third party, they are provided with the minimum information to allow understanding by the third-party end-users of the videos in their environment (this is especially true when GPS localization is not enough to show FOV obstacles or masking, such as indoors and in 3D infrastructures).

The other specificity is that, as entities involved are different and information is often sensitive, local or national provisions can apply in relation to information security and privacy; typically, an authentication by a state-of-the-art signature of the information shared is generally expected, as well as the encryption of the transmitted data.

Nevertheless, as subject information is often critical in emergency situations, dispositions shall be taken by the low-level VMS owners to ensure that first responders (and more generally authorities) can have a timely, without pre-notice, access to it in all circumstances.

These specificities are further detailed in 4.2.

4.2 Location information

4.2.1 Preliminary

The location information box ('loci' box) as defined in (3GPP TS 26.244 version 16.1.0, Release 16, Table 8.10) and referred to by IEC 62676-2-32:2019, Clause 9 provides basic information about the location of the capture.

The GPS position as indicated in 3GPP TS 26.244 version 16.1.0 is however often not enough to allow interpretation of the videos by the third party when the monitored environment is 3D, underground structures or on-board vehicles unless special arrangements (as described in 4.2.2) are in place to maintain up-to-date detailed site descriptions in the third-party system.

This is especially true when the third party is connected simultaneously to several adjacent, but different, low-level systems.

4.2.2 Detailed location information in 3D and complex spaces

This gap has already been identified by first-responders for emergency escape situations and is covered by posting mandatory 2D maps derived from ISO 23601. To complement the GPS coordinates, the positions and FOV of the relevant cameras, as well as GPS reference points (to allow correlations and bridges between maps), could easily be added to the map. For universal readability, such maps shall be encoded as PDF files, SVG images or JPEG images.

The difficulty is that, at this stage, the above referenced 'loci' box is not designed to carry such images or drawings. This might change as technology evolves. In the meantime, one of the three following options shall be used:

- Use one of the cameras of the low-level system to carry (full-time or not) a picture of the above-described drawing.
- If providing such image or drawing can be achieved without accessibility risk and without delay, it shall be proposed to give access to the same information through an URL or any other electronics means
- The systematic sharing in advance of the mapping information between the low-level systems and the third parties shall be encouraged, as described in 4.2.3.

Optionally, an extension will allow application of the above to cameras onboard vehicles. For instance, localization onboard the vehicle combined with the position of the vehicle allows to define in front of which point of a platform the door of a train is, where an incident has been detected.

4.2.3 Special case of infrastructures routinely connected to third parties/authorities

When a VMS is scheduled to be routinely used by a third party, the above complexity (see 4.2.2) shall be avoided by transferring the geolocation with each video shared and by sharing once and for all the relevant mapping information.

Annex A describes a possible way to achieve such a transfer of information .

4.3 Digital signature

Several methods, including digital signing, hashing, and encrypting, can be used to secure the contents of an exported file.

The signature identifies the individual responsible for performing the file export as well as any subsequent operations on the exported file and provides some assurance. As called for in IEC 62676-2-32, a signature is generally required when video-surveillance data are exchanged between entities.

All data a user wishes to carry away separately are put into a metaphorical bag. The bag is then sealed to enable tamper detection. Anyone wanting to use the data from the bag first examines the seal. The data in the bag are identical with the original data as long as the seal is intact; see Figure 1.

Here, the metaphorical bag is represented by a file and the seal is represented by a signature over all data in the file.

The "bag of evidence" approach builds on procedures for media data and related metadata to be securely extracted from a trusted storage in a separate file. This approach defines which metadata have to be preserved in order to provide accurate replay. Data are provided "as is" without any further assertions, whatsoever, to perpetuate evidence.