S-VMX VIDEO MANAGEMENT SYSTEM

Architectural & Engineering document

S-VMX 4.8 PLUS FEATURE OVERVIEW

TELESTE

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2 Introduction

S-VMX 4.8 PLUS is an enhanced edition of the **S-VMX Video Management System**, providing a complete and operational platform for video monitoring, recording, alarm handling and situational awareness within a standalone system environment.

The **PLUS edition** includes video management, recording and export functions, alarm-driven workflows, **GIS-based operations**, operator communication capabilities and secure, role-based user access using **Web** and **Titanium Client** and Mobile Client access. Compared to the ONE edition, S-VMX 4.8 PLUS extends system capabilities by introducing load balancing, failover support for selected server roles, stream multiplication and Command and Capture functionality, enabling improved system resilience and operational flexibility within a single system environment.

This document describes only the scope of **S-VMX 4.8 PLUS**. Additional features and capabilities may require an upgrade to **S-VMX PRIME**.

S-VMX 4.8 PLUS is designed for standalone system deployments requiring enhanced resilience and operational flexibility. PRIME edition further extends the PLUS feature set with additional capabilities, including system federation, advanced integrations, extended mobility functionality and large scale multi system operational environments.

This document focuses on system-level functionality and operational behavior. Detailed device compatibility lists, low-level protocol specifics and implementation-level configuration options as well as more detailed information about functions and performance may be provided separately as appendices or project-specific documentation.

All equipment and materials shall be standard components that are regularly manufactured and utilized in the manufacturer's system.

All software and components shall be tested for the system operation.

All equipment and components shall be CE-marked, FCC-compliant where required, and certified for the operational environment.

The manufacturer's quality system shall comply with the **ISO 9001/EN 29001** standards.

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3 System Overview

Teleste **S-VMX 4.8 PLUS** is a modular **video management system** designed for surveillance applications requiring live video monitoring, recording, playback, video distribution and system control within a unified operational environment. The system supports standalone deployments within the defined S-VMX 4.8 PLUS scope.

S-VMX 4.8 PLUS enables operators to manage cameras, recorders, maps, alarms and associated system resources through a **unified user interface**. The system provides **browser-based**, **native and mobile client** access, supports efficient operation within one S-VMX system without reliance on federated systems. Authorized access is governed by role-based permissions to support controlled, accountable operations.

The solution is intended for environments where operational reliability and security are important. S-VMX 4.8 PLUS supports stable system operation, including **automatic restoration** of **video and data connections after restarts and failover support** for supported server roles. The platform also supports continuity features for recoverable interruptions to help preserve monitoring and evidence-handling workflows.

S-VMX 4.8 PLUS combines **real-time video operations**, recording and **playback**, **GIS-based situational awareness**, alarm handling and basic operator communication features into a single platform. This allows organizations to standardize surveillance operations while retaining the flexibility to adapt system usage to project-specific workflows and operational requirements within a single S-VMX system.

4 Core System Capabilities

4.1 Video Management

S-VMX 4.8 PLUS provides a unified operational environment for **live viewing**, **camera control**, **recording access**, **alarm handling** and **map interaction**. Operators can work with cameras, recorders, maps and other system objects through tree views, maps, **drag and drop** operations and customizable layouts. The same platform supports **browser access** and workstation use through **Titanium Client**.

The system supports real-time visualization of video on local displays, with the ability to connect individual cameras or groups of cameras through direct operator actions. **S-VMX Client** supports live video, playback, digital zoom, snapshots, layout management and rapid switching between operational views. The **S-VMX Titanium Client** extends this with local file handling, **GPU-assisted decoding**, enhanced display handling, **fisheye dewarping** and recording and export capabilities.

4.2 Modular System Architecture

S-VMX 4.8 PLUS is based on a client-server architecture designed for operation within a single system environment.
The system is modular, allowing organizations to add or remove **software components** and **system devices** as operational requirements evolve within the defined S-VMX 4.8 PLUS scope.

The architecture supports operation across multiple control rooms within a single S-VMX PLUS system through **user rights** and **arbitration mechanisms**. This allows simultaneous operations from multiple operator workstations while maintaining orderly control over shared resources such as **PTZ devices** and **playback services**.

4.3 Resilience and Operational Continuity

S-VMX 4.8 PLUS is designed to support operational continuity through redundancy for selected system components, **automatic restoration** of video and data connections after restarts and **controlled switching of clients** between available system resources when backup resources are configured.

The system supports **recovery** of interrupted operational video and recording paths after recoverable connection disturbances, helping maintain continuity of monitoring, display workflows and evidence capture with minimal operator intervention in enterprise and mission-critical environments.

4.4 Operator Efficiency and Situational Awareness

The system provides an operator environment that combines live video, playback, maps, alarms, **object search**, **PTZ control**, layouts, scenarios and system tools. **User interface customization**, **multi-monitor operation**, favorite cameras, object filtering, **GIS interaction**, **alarm widgets** and **quick launch** capabilities help operators access information quickly and adapt the workspace to their operational roles.

S-VMX 4.8 PLUS also supports operations based on **scenarios**, allowing predefined or ad hoc video switching sequences to be executed on **local displays**. In addition, **GIS functions**, alarm scenarios, recent alarms and **maintenance mode** indicators help operators maintain situational awareness within the S-VMX 4.8 PLUS system environment.

4.5 Security, Access Control and Auditability

S-VMX 4.8 PLUS supports multiple authentication approaches and **role-based access control** to system objects and functions, configurable **password policies**, camera access modes such as public and private, **session control** and **audit logging** of operator and system activities.

The system also supports secure communication and security functions, protected recordings and detailed logging of operations such as login, logout, snapshots, playback, downloads, object control, alarm handling and configuration changes. The system supports encryption and integrity protection for recordings and exported material, including encrypted downloads and checksum-based integrity verification. This helps organizations support operational accountability and basic evidence handling requirements.

S-VMX 4.8 PLUS provides centralized activity logging of system and operator actions. In PLUS deployments, the log service can be hosted on a dedicated **Log Server** to support scalable log handling, controlled access to log data and efficient search and export of activity records for audit and operational oversight purposes.

4.6 Performance Monitoring

S-VMX 4.8 PLUS supports **performance monitoring** and dashboards for operational visibility across key system components. Monitoring can include servers and client workstations with optional **notifications** when defined thresholds are exceeded.

5 Typical Deployment Scenarios

5.1 Single-System and Multi-Operator Control Rooms

S-VMX 4.8 PLUS is suited for deployments in which surveillance operations are managed within a single S-VMX system from a unified operational environment. The platform supports **multi-operator environments**, allowing several operators to work simultaneously with shared system resources while preserving control logic and access rights.

Operators can access live video, playback, **PTZ** functions, alarms and maps within the S-VMX 4.8 PLUS system using a single **user interface**. The system supports coordinated operation across multiple control rooms within a single S-VMX PLUS system environment.

Compared to the ONE edition, S-VMX 4.8 PLUS enables improved operational continuity through support for **failover mechanisms and load distribution**, helping ensure stable access to video and system resources in multi-operator environments. This deployment model works well for control rooms and operational centers where video resources are monitored and managed by multiple operators within one system.

5.2 GIS and Location Based Operations

S-VMX 4.8 PLUS supports deployments in which situational awareness depends on **GIS** maps, **georeferenced assets** and workflows based on location within a single S-VMX system. The system supports geographic and static image mapping, including **map layers**, object positioning, **camera cones** and **GIS search** capabilities. GIS functionality is focused on map-based visualization and navigation within the single system environment.

This makes the system suitable for environments where operators must quickly understand where an event occurred, locate relevant cameras and execute map-based monitoring and response workflows.

5.3 Operations Based on Alarms and Incident Response

S-VMX 4.8 PLUS is suited for environments in which operators must respond to alarms, incidents or operational events in real time. The system supports **alarm distribution**, **alarm scenarios**, **alarm search** and workflows that allow operators to access live or recorded video related to events. Alarm scenarios may automatically connect predefined camera views to operator displays as part of the response workflow.

It also supports maintenance mode (indicating devices are temporarily out of operation) and emergency mode (ensuring protection of recordings), activity logs, helping to manage incidents while maintaining operational traceability.

Enhanced system resilience features, such as **failover support**, help maintain alarm visibility and access to video streams during recoverable system or connection interruptions.

This operating model is appropriate for public space surveillance, facility monitoring and other control environments where alarms and operator actions must be correlated efficiently within a single system.

6 Core Features

6.1 Live Monitoring and Operator Control

S-VMX 4.8 PLUS provides operators with live video monitoring through a **browser-based client** and a workstation-based **Titanium Client**. Support for mobile client access is also available, providing access to basic system functionality.

Operators can connect video from selected cameras to local displays, switch between live and playback modes, manage multi-display layouts, use full-screen views and move video between displays. The **Titanium Client** supports display layouts up to 64 windows and high-resolution decoding, including support for **4K** and even higher resolution cameras.

The platform supports multiple methods of **PTZ control**, including **hardware joystick**, mouse-based **virtual joystick**, workstation keyboard, **on-screen controls**, **preset control** and activation of supported camera accessories such as washer, wiper and lighting functions.

Operators can personalize layouts, apply filters in camera and recorder trees, use favorites, search for system objects, manage widgets and adjust user settings such as aspect ratio behavior, unicast preferences, keyboard PTZ control and interface language. The **S-VMX** user interface can be presented in the following languages: English, Finnish, French, German, Polish, Swedish, Hungarian, Spanish, Slovenian, Bulgarian, and Romanian.

The user interface is intended to support both everyday monitoring and high-tempo operational situations.

6.2 Playback, Search and Evidence Handling

S-VMX 4.8 PLUS provides built-in tools for searching and playing back recordings using its browser-based interface. Users can filter recordings by a variety of criteria, including camera, recorder, time, metadata, description, alarms, comments, location and protection status.

Playback can be carried out at normal speed, **fast-forward** or **reverse**, viewed **frame-by-frame**, navigated directly by entering a specific time, previewed on a **timeline** or **synchronized** across multiple recordings within the **S-VMX Titanium Client**. Recordings are accessible locally and can be downloaded, exported to USB or **exported to NAS**.

The system supports mass extraction of selected recorded material directly from recorders to a target NAS, with operator visibility of extraction status and restart capability and storage organization aligned with ISO 22311 first-level hierarchy.

The system supports t**agging, protected recordings, emergency mode, snapshots, file export** and local download management. Operators can create protected recordings, add labels or comments and perform searches based on particular criteria.

6.3 Alarm and Incident Handling

S-VMX 4.8 PLUS provides centralized alarm handling for internal system components and connected devices, displaying severity, description, device, timestamps and state. Operators can search alarms by device, code, time or state and export results to **CSV** or **PDF**. **Alarm scenarios** trigger actions like map zoom, video connection, sound playback, highlighting and full-screen activation. Operators can acknowledge, group, change alarm states and request recordings based on alarm time for efficient response. The platform also features recent alarms views, maintenance indicators, filters and alarm filters to avoid event overload and ensure critical alarms remain actionable.

6.4 GIS and Location Awareness

GIS functionality is available in **S-VMX 4.8 PLUS**. Operators can use geographical maps or static maps, switch between **map layers**, navigate map hierarchies, locate devices on maps, manage camera objects and work with static location objects. Supported functions include map navigation, layer visibility control, **lasso selection**, **magnet link** tools, **object grouping**, **map search**, default map handling and presentation of camera direction and zoom information on maps.

GIS functionality is also used as part of alarm and response workflows, helping operators locate the source of an incident, quickly identify associated cameras and transition from a location view to live or recorded video.

6.5 Operator Collaboration and Workflow Support

S-VMX 4.8 PLUS includes functions that support operator coordination and daily operational workflows. Instant messaging enables operators to exchange text messages and request camera unlock actions. **Activity logs** provide searchable records of operator actions and system actions, helping supervisors and administrators maintain operational oversight.

The system also supports quick launch functions, user-specific layouts, scenario execution, maintenance mode, session control and status presentation for devices and system objects. Together, these features help teams work efficiently in shared control environments where speed, visibility and traceability are important.

7 Operational Environment Overview

Detailed compatibility information for supported operating systems, IP cameras, video IP encoders, video IP decoders and PTZ protocols are provided in *S-VMX Third Party and Internal Interfaces Support* Appendix.

7.1 Video Sources, Devices and Standards

S-VMX 4.8 PLUS supports a wide range of video sources and device types, including **ONVIF**-compliant cameras, generic **RTSP** devices, vendor-specific **IP** cameras, IP encoders and decoders, multisensor cameras. The platform operates as an ONVIF client and supports **ONVIF Profiles S, G, T, and M**, enabling access to device recordings, metadata handling, and limited configuration exchange for supported device classes.

For browser-based clients, **S-VMX 4.8 PLUS** provides access to live and recorded video streams using modern web technologies without the need for additional client-side software installation. Video delivery is adapted to the capabilities of the client environment and the deployment architecture, ensuring reliable access to video streams across supported browser environments. However, please note that S-VMX Web Client video performance may be limited compared to the S-VMX Titanium Client's performance.

S-VMX 4.8 PLUS supports **multistreaming**, **stream multiplication** and **stream reflection** capabilities that enable efficient reuse and distribution of live video streams to multiple operator workstations and operational workflows. These functions allow a single incoming video stream to be reflected or shared across multiple viewing and processing contexts without requiring multiple direct connections to the original source, supporting scalable monitoring operations and optimized use of network resources.

7.2 Metadata and Event Information

S-VMX 4.8 PLUS supports **video analytics** provided by compatible encoders or cameras that generate analytics events or **metadata**. It also includes analytics-related alarm handling and metadata ingestion within the S-VMX 4.8 PLUS system.

The platform supports 3rd-party **ANPR/LPR** and **face recognition** functionality integrations with **metadata ingestion, real-time metadata preview**, filtering, search, snapshot presentation and correlation with stored video. Operators can search metadata using fields such as date and time, device name, identifiers, snapshot preview and additional vendor-specific attributes when provided by the connected device.

7.3 Command and Capture

S-VMX 4.8 PLUS supports **Command & Capture** functionality, extending integration beyond video sources. This functionality enables users to observe, record and remotely manage external computer desktops within the **S-VMX** environment. Desktop displays are captured as video sources for purposes of display, recording, search and replay alongside other video streams. Where permitted, operators may interact with external systems via the S-VMX Client, thereby enhancing the efficiency of operational tasks that involve third-party applications.

8 Client Applications and User Access

8.1 Web Client

The web client provides access to core system functionality with certain limitations compared to the native client application without the need for local software installation. The S-VMX Web Client is designed for operational flexibility, allowing authorized users to connect from standard workstations within secured networks.

Through the **S-VMX Web Client**, operators can:

- Monitor live video streams
- Access recorded video
- Control cameras
- Work with **alarms** and **events**
- Use GIS maps and system object trees
- Apply drag-and-drop operations for video connections

The **S-VMX Web Client** supports **role-based access control** and **user-specific layouts**, ensuring that each operator sees only the functionality and system objects relevant to their **operational role**. This makes the **S-VMX Web Client** suitable for **daily monitoring** tasks, **supervision** roles and environments where **rapid workstation deployment** is required within a single S-VMX system.

8.2 Titanium Client

The S-VMX Titanium Client is an installable, high-performance workstation client designed for control rooms and operator stations requiring advanced video handling and local resource utilization. The S-VMX Titanium Client is based on the Chromium engine, supporting a secure and modern client environment for video management operations.

In addition to all Web Client capabilities, the Titanium Client provides:

- Support for flexible video layouts with multiple simultaneous video streams
- Hardware-accelerated video decoding using **GPU** resources
- Support for high-resolution and **multi-sensor cameras**
- **Local file management** for downloaded video and snapshots
- **Evidence handling** functions including local verification and export
- Advanced playback and synchronized multi-camera review
- Fisheye camera dewarping and virtual PTZ functionality

The S-VMX Titanium Client supports multi-monitor workstations and is optimized for continuous operation in control room and public safety environments. Centralized client update mechanisms allow administrators to manage workstation software versions consistently across the S-VMX 4.8 PLUS deployment.

8.3 Mobile Client Access and Mobility

S-VMX 4.8 PLUS supports access from **mobile devices** such as smartphones and tablets through a mobile-optimized **Web Client** interface. The mobile interface adapts automatically to the detected screen size and device type, allowing flexible access to system functionality within a single S-VMX system. Mobile client access is limited to basic monitoring and control functions and depends on the capabilities of the client environment.

Authorized users can:

- View live video streams
- Access recorded video
- Navigate **maps** and **locations**
- Receive alarms and notifications
- Control **PTZ** cameras (where permitted)

This functionality supports basic monitoring and situational awareness outside of operator workstations within a single S-VMX system.

8.4 User Authentication and Session Management

S-VMX 4.8 PLUS supports multiple authentication methods, including native S-VMX user management, **LDAP** integration and **single sign-on** using **SAML** or **OpenID**. For applicable environments, this may include integration with **Microsoft Active Directory** and **Microsoft Entra ID** in applicable deployment scenarios.

Only one **authentication method** is active at a time, simplifying operational management. Regardless of the authentication method used, **video access rights**, **object permissions** and **operational roles** are managed within the **S-VMX 4.8 PLUS system**.

The platform supports **secure session handling**, configurable **session timeouts** and **audit logging** of **login** and **logout** events. This ensures that access to the system remains controlled and traceable in shared operational environments within a single S-VMX system.

9 Recording, Playback and Export

9.1 Video Recording

S-VMX 4.8 PLUS supports video recording using dedicated network video recorders (**NVRs**) within a single S-VMX system. Recording can be continuous, event-based or triggered by alarms, depending on system configuration.

The system supports **loop recording** as well as **protected (permanent) recordings**, ensuring that critical **video evidence** is preserved and not overwritten. Recording operations are transparent to operators, allowing them to focus on monitoring and response rather than storage management.

9.2 Recording Search and Playback

Operators can **search** for **recorded video** using multiple criteria, including:

- Camera or recorder selection
- Time and date range
- Alarms and events
- Operator comments and tags
- Protected recording status
- Metadata types (operator comment/tag or alarm)
- Geographical area (map-based search)

Playback functionality includes normal playback, fast forward and reverse, frame-by-frame navigation and direct time navigation. When using the S-VMX Titanium Client, synchronized playback of multiple cameras is supported, enabling effective investigation of incidents captured from different viewpoints. Playback can be performed on local displays.

9.3 Recording Protection and Export

S-VMX 4.8 PLUS provides recording and export functions, including:

- Creation of **video tags** and operator comments
- **Protected recordings** that prevent overwriting
- **Emergency mode** to preserve recordings across selected system objects
- Snapshot creation and management
- Controlled download of recorded material to local workstations or NAS systems
- Recordings export

Exported video and snapshots can include basic audit information. Recordings and exported material support encryption and checksum-based integrity protection to prevent tampering and support controlled distribution. Access to export functions is controlled by user rights, ensuring that only authorized personnel can retrieve or distribute recorded material.

9.4 Audit Trail and Activity Logging

All critical system and operator actions are logged within **S-VMX 4.8 PLUS**. This includes:

- User authentication events
- Camera and device control actions
- Playback and download operations
- Alarm handling
- Configuration changes

Logs can be searched and exported for operational review and compliance purposes. This audit capability supports accountability and traceability in regulated or high-security environments.

10 Alarm Handling and Incident Response

10.1 Alarm Sources and Distribution

S-VMX 4.8 PLUS supports alarms generated by:

- Internal system components
- Cameras and encoders
- I/O devices

Alarms are **distributed** within the S-VMX system and presented to operators with information such as severity, source, description, timestamps and current state. **Alarm filtering mechanisms** can be applied to reduce noise and ensure that only stable and relevant alarms are presented to operators.

10.2 Alarm Visualization and Workflows

Incoming alarms can trigger predefined alarm scenarios that support predefined adjustments to the operator interface within the S-VMX 4.8 PLUS system. These scenarios may include:

- Automatic video connection
- Map zoom and object highlighting
- Display activation on local client (live or playback)
- Visual and audible notifications

Operators can acknowledge alarms, group related alarms and track alarm states such as active, observed and closed. Alarm lists support sorting, filtering and search functions to help operators manage high event volumes during peak operational periods.

10.3 Incident Investigation and Resolution

From an alarm or event, operators can **directly access** associated live or recorded video within the S-VMX 4.8 PLUS system. Drag-and-drop workflows allow transition from alarm lists to playback or live monitoring.

Alarm data and related recordings can be accessed, searched and **exported** by authorized users. This integrated approach supports incident response and investigation within a single S-VMX 4.8 PLUS system environment.

11 GIS, Maps and Situational Awareness

11.1 Map Operations

S-VMX 4.8 PLUS supports **GIS** functionality that allows operators to work with both geographical maps and static site plans. Maps can be organized **hierarchically** and presented with **multiple layers**, enabling clear visualization of cameras, alarms, devices and other system objects. The system supports both online and offline map operation depending on the deployment environment.

Operators can:

- Navigate maps and layers
- Locate devices and alarms
- Visualize camera orientation and coverage
- Use map-based selection tools to connect video
- Switch between different map providers and views
- Measure distances and use multi-selection tools (e.g. lasso/rectangle) for efficient camera selection and video connection workflows
- Visualize map objects (e.g. cameras) grouped by zoom level, ensuring clear and scalable map views

11.2 GIS Incident Response

Maps are used as part of alarm and incident workflows. When alarms occur, operators can visualize the affected location, identify nearby cameras and initiate live viewing or playback directly from the map interface. Alarm scenarios may automatically trigger map visualization and connect predefined camera views as part of operator workflows.

This supports situational awareness during incidents within a single system operational environment.

12 Secure Communication and System Security

The S-VMX 4.8 PLUS system is designed to protect system integrity, video data and operational resources by applying security mechanisms across communication, storage, access control and auditing domains.

12.1 Secure Communication

The S-VMX 4.8 PLUS system supports secure communication between all system components, including access from S-VMX Client applications. Secure communication mechanisms are used to protect the system and its resources from unauthorized access.

All supported communication channels are secured using industry-standard cryptographic protocols based on **TLS/SSL,** with support for **TLS 1.2** and **TLS 1.3**, depending on deployment configuration. The system also supports secure video streaming from video sources using **RTSP/RTP/TCP** over **HTTPS within the S-VMX 4.8 PLUS system.**

12.2 High Level System Architecture

S-VMX 4.8 PLUS is based on a client-server architecture designed for operation within a single system environment. Scalable and reliable operation is supported through system-level mechanisms, including a **load balancer and failover server** for selected system components to maintain service continuity during component failure or restart. Core system services manage device control, video distribution, recording, metadata, alarms and user access. Clients connect to these services to provide live monitoring, playback and control.

12.3 Video Data Protection

The S-VMX 4.8 PLUS system includes mechanisms to protect stored video data against tampering, unauthorized modification or fraudulent actions. Video recordings stored on Network Video Recorders (NVRs) are protected using AES-256 encryption, ensuring confidentiality of recorded data at rest. When video material is exported from NVRs, the system supports password-protected encryption of exported video files. The S-VMX 4.8 PLUS system ensures exported video integrity with XAdES digital signatures. When extracting video, a separate XAdES signature file is created for each recording, available after download and accessible via the same authenticated session.

12.4 Access Control, Password Management and Auditing

The S-VMX 4.8 PLUS system supports comprehensive **access control and auditability** to enable traceability of operational actions and to support audit and compliance requirements. The system provides configurable **password policy** rules and detailed **logging of system and user activities**. User-specific security reports can be provided, including information such as first login, last login and password age.

13 Legal Declarations

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Teleste S-VMX Architectural & Engineering specification May 2026