Stanford's VMS Journey

Student Enrollment

7,841 undergraduate

Class of 2027 profile

9,688 graduate

As of Autumn Quarter, 2023

Faculty

2,323 faculty members

20 Nobel laureates are currently members of the Stanford community

Campus

8,180 contiguous acres

Over **600** buildings

Research

7,500+ externally sponsored projects

$1.98 billion total budget

Established 1885
Opened 1891

Leadership

President Richard Saller

Provost Jenny Martinez

Seven Schools

Business

Doerr School of Sustainability

Education

Engineering

Humanities and Sciences

Law

Medicine

Endowment

$36.5 billion *(as of August 31, 2023)*

Current Video Platform ~Camio~

- Cloud based viewing via browser
- Linux based local gateways
- 20 Production gateways
- 2 Development gateways
- 1300+ cameras
- Human & vehicle filter

The GSB Residence Building

About Our Cameras

1300 Cameras

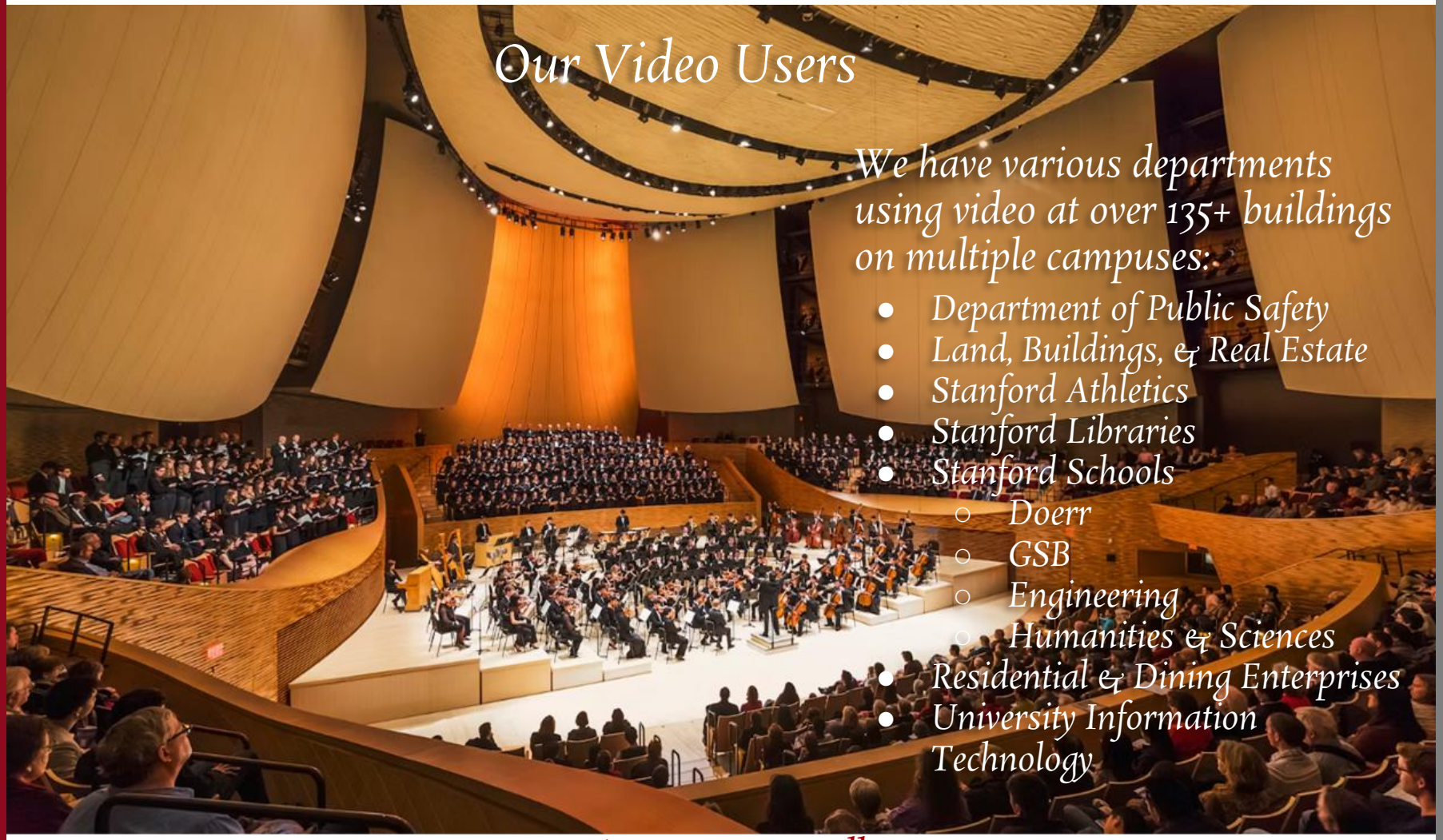
98% are Axis P Series streaming @ 15fps

Resolutions from 1080P up to 4K

- Fixed Cameras
- Multi Sensor Panoramic Cameras
- PTZ Cameras

Stanford Stadium

Our Video Users

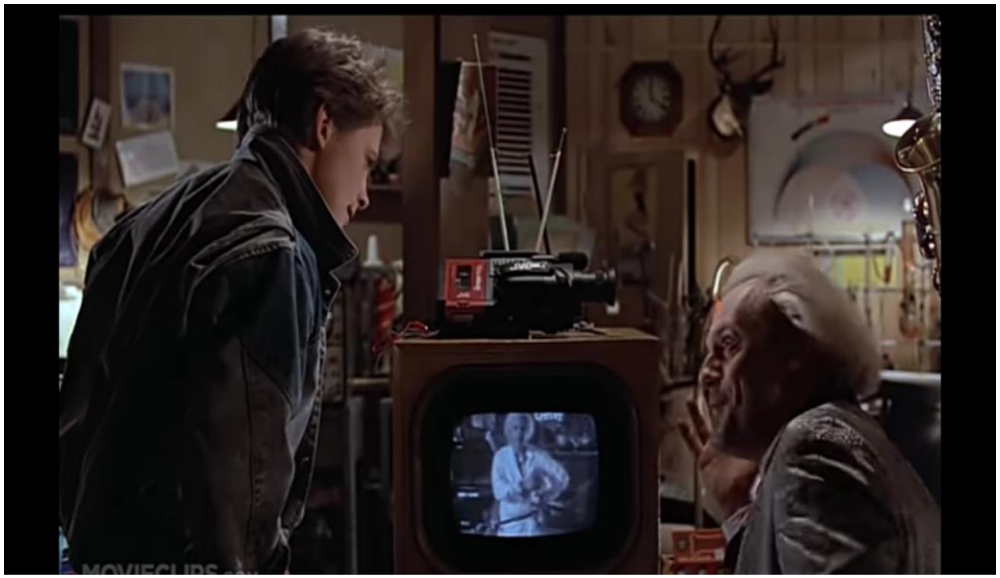


We have various departments using video at over 135+ buildings on multiple campuses:

- Department of Public Safety
- Land, Buildings, & Real Estate
- Stanford Athletics
- Stanford Libraries
- Stanford Schools
  - Doerr
  - GSB
  - Engineering
  - Humanities & Sciences
- Residential & Dining Enterprises
- University Information Technology

Bing Concert Hall

Current state of video at Stanford



[Stanford University Video Safety and Security Systems Standards]

How the adoption of video surveillance on campus has changed since COVID

- Need to integrate with access control
- Need for situational awareness

Pain points with current platform

- Live viewing
- Viewing multiple cameras simultaneously (Live/Recorded)
- Exporting/Sharing
- Inability to use camera side analytics (License Free)
- Server stream capacity - scalability
- Limited user permissions

Goals for our RFP

Select the Best In Class Enterprise Video Management System for both the current and future needs of the Stanford VSSS Program

- Increased integrations with other University business systems
- Provide better video quality
  - DORI (Detection, Observation, Recognition, Identification)
- Offer more services
- Be ready for the future
  - Situational awareness
    - "Know Before You Go!"
  - Increased Collaboration amongst Departments
    - Business Intelligence
    - Occupancy/Space Planning
- Enhanced Health Alerting and Reporting

Cloud, On-Prem or Hybrid?

What is Cloud?

- Cloud Hosted -VSaaS
- Direct to Cloud Cameras
- Cloud Storage

Advantages/Disadvantages

- Bandwidth
- Ingress/Egress charges
- Infrastructure Support
- Customization
- Remote Access

On-Prem with Hybrid Approach

- Best of both worlds
- Not Locked In
- More Control over your Data
- Leverage Long Term Storage

Solution Costs

How do you determine what is the best solution for you? It is more than just hardware and software. Due diligence in examining all of the associated costs is key to choosing the correct solution while keeping costs down.

What is better for your organization?

- Build your own - COTS Hardware
- Vendor provided Hardware
- Physical Servers or Virtual Machines
- What kind of Resilience do you require

Some things to consider

- Vetted Hardware Configurations
- Out of Band Patching
- Costs of Support Services
- VM's for Management Servers
- Physical Servers for Video Recording

Platforms

The initial 4 platforms considered for the POC:

- EagleEye
  - Only "Cloud" solution
  - 3rd Party Camera support
- Avigilon
  - Mercury hardware support
  - Made in North America
- Milestone
  - Lenel OnGuard integration capability
  - Attractive Lenel Licensing Costs
  - SHC current VMS platform
- Genetec
  - Lenel OnGuard integration capability
  - Mercury hardware support
  - Collaboration & Federation with other Agencies

milestone

VS

Genetec

The initial platforms were down selected to 2 platforms:

- ➢ **Milestone**
- ➢ **Genetec**

Must Have's / Would Like's

- Integrations
- Vendor supplied hardware
- Vendor software
- Camera features
- Support & Maintenance
- IT/Security features

Category	Business Requirement	To be Validated as Part of POC
Integration	POS Transaction Data - The VMS Platform shall have the ability to capture and record POS transactions.The transactional data shall be mapped and indexed to recorded video files for aiding the in searching of recorded video by transactional data. The following details provide additional requirements: (a) The ability to filter transaction types by designated criteria (b) Transaction query results shall display a unique thumbnail image from the transaction events w/o requiring the associated video files to be downloaded first (c) The ability to capture POS events w/o associated cameras (d) The ability to map multiple cameras to a multiple POS.	NICE-TO-HAVE
	PACS - The VMS Platform shall have an API that is capable of Integration will Lenel OnGuard v7.6 and higher to support the remote viewing of live and recorded video from associated cameras for PACS Alarms such as Door Forced/Held, Access Denied, Expired Credential etc. and support the auto camera call-up feature. Should have bi-directaional API data flow between VMS and Lenel.	REQUIRED
	Intrusion Alarm Integration - The VMS shall have an ability to integrate to major Intrusion Platforms such as DMP, Bosch, Honeywell etc. to create Alarm Events for any Alarm Event to include a hold-up alarm. The VMS Alarm Events should be filtered by Type for aiding the in searching of recorded video. Please list the Intrusion Integrations that are supported in the comments section.	NICE-TO-HAVE
	IP Intercoms - The VMS shall support IP Intercoms to allow for the remote viewing of live and recorded video from IP Intercoms. The IP Intercoms should be SIP/ONVIF complaint and support the auto camera call-up feature. The solution should have the ability to disable audio functionality.	NICE-TO-HAVE
	Video Walls - The VMS shall support 3rd Party Video Wall Controllers for Command Center type applications.	NICE-TO-HAVE
	Ability to integrate with MoogSoft	NICE-TO-HAVE
	Ability to integrate with Splunk	REQUIRED
	Ability to integrate with Slack	NICE-TO-HAVE
Vendor supplied Hardware	Software Patching and Updating - The VMS shall have a flexible, robust and reliable Enterprise Application Patch Deployment Utility 'WSUS' for both Application and OS if embedded and for broadcasting to all or selected devices software and /or firmware updates.	REQUIRED IF VENDOR HARDWARE IS SELECTED FOR POC
	Redundant Storage - The VMS Hardware shall support field swappable redundant storage options for stored data/video files to minimize the potential loss of data.	REQUIRED IF VENDOR HARDWARE IS SELECTED FOR POC
	Local Console - The VMS Hardware shall be capable of supporting a Local Console Connection (Keyboard, Mouse and Monitor) for both use as a VMS Client Workstation and Support and Maintenance.	REQUIRED IF VENDOR HARDWARE IS SELECTED FOR POC
	UPS Support - The VMS Hardware shall support the integration of UPS API's to allow for the proper shutdown/start up of systems in the event of a power loss to minimize the potential loss of data.	REQUIRED IF VENDOR HARDWARE IS SELECTED FOR POC
	Network Interface Cards - The VMS Hardware shall support the use of multiple Network Interface Cards (up to 4) to allow for segmented network as well as additional throughput in larger capacity deployments.	REQUIRED IF VENDOR HARDWARE IS SELECTED FOR POC
	Should have an additional NIC for secure out of band remote access (ex. iDRAC for Dell servers)	REQUIRED IF VENDOR HARDWARE IS SELECTED FOR POC

Executing the PoC - It's in the details

Be prepared to be creative, it's likely you will need to do some things to simulate a real-world environment to test things in.

Cameras

- Re-evaluate your current Recording & Viewing Settings
- Use multiple streams from Live Camera feeds to reduce number of devices
- Use Simulated Video to generate Motion Events
  - From Manufacturers
  - DVDs - Your favorite action movie

User Testing

- Create challenging scenarios for testing
- Provide the proper training materials
- Test all features that are relevant to the application
- Solicit user feedback - It's Important!

Application Reliability

- Try to break it
- Push known limitations
- Learn Thresholds

PoC - The Test Environment should be a Sandbox

Using a simple layered approach will help save time, resources and make it will be easier to identify issues as the arise one at a time rather than all at once out of the gate.

Have the correct permissions to perform tasks

- Create Unique User Permissions and Roles
- Disable/Suspend Security Policies
- Turn Off Firewall/Open Ports - LET IT FLOW

Start with the Basics

- Install Server OS/Application Software
- Install/Configure Database Instances
- Connect some cameras and make sure they communicate properly

Turn it up a notch

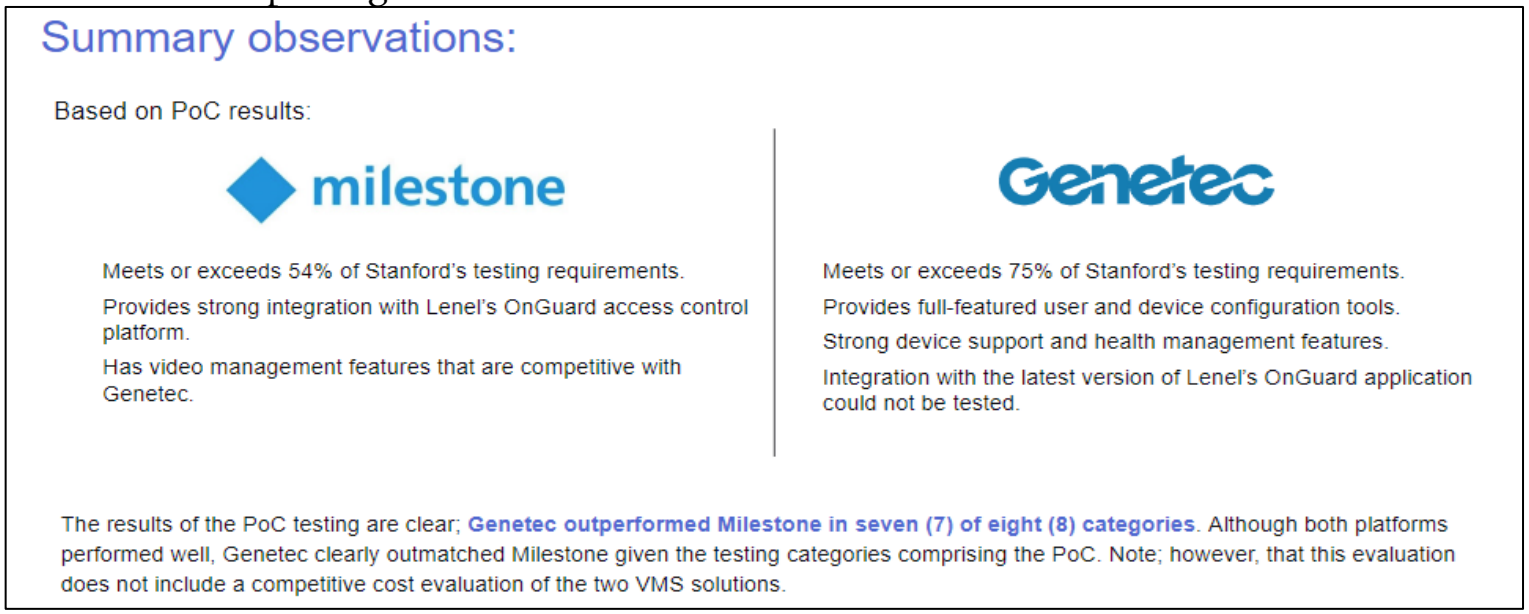
- Add in some User Permissions (AD/LDAP)
- Enable some Security Policies
- Turn on some Firewall Rules

Summary Evaluation

Utilized a consulting firm to consolidate evaluation results.

The evaluation was based on 8 categories:

- User Permissions
- Device and Camera Configuration
- Device Support
- Video Management
- Integrations
- System Administrative Features
- System Maintenance and Health
- Forensics and Reporting



The Final Decision

- Consultant scoring and summary
- Cost comparisons
  - Integrations
  - Additional products needed to deliver basic operational needs
- Feedback from Card Services team members
- Feedback from current platform users
- Working experience with the vendors, responsiveness and attention to detail

Genetec

Do Not Overlook the Important Stuff

Your Video Management System is as only as good as the data feeding it. Improperly configured devices just cause larger problems. Proper configuration and maintenance is the key to ACTIONABLE DATA!

- Increased Storage Costs
- Lost time searching for Events
- Erroneous Alerting Data
- Bad Metrics
- Poor Health Alerting Data

Using the correct CODEC settings

- Configuring Motion Inclusion Zones
- Proper Day/Night Settings
- Tuning the Analytics

Lessons Learned

Testing Environment

Unfortunately Stanford was not able to use a flexible Sandbox where we could test things before applying Security Policies and Rules. The end results were a little challenging, several of the issues could have been avoidable with a change to the current UIT PoC processes.

- Unanticipated project delays
- Poor use of resources
  - Troubleshooting
    - OS/DB problems
    - ISO/Security Policies
    - Network Access Rules
- Unforeseen application development

Resource Management

As with anything, it often takes more time and resources to accomplish tasks.

- Set Expectations accordingly
  - adjust as needed
- Allow proper allocation of resources for tasks
- Adjust project timelines as needed

THANK YOU !