SAND2010-5573P

Secure Video Surveillance System (SVSS)

Installation Presentation
ABACC

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Sandia National Laboratories

Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

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Objectives

- Describe the SVSS User Interface
- In-depth Software Architecture
- Discovered Issues

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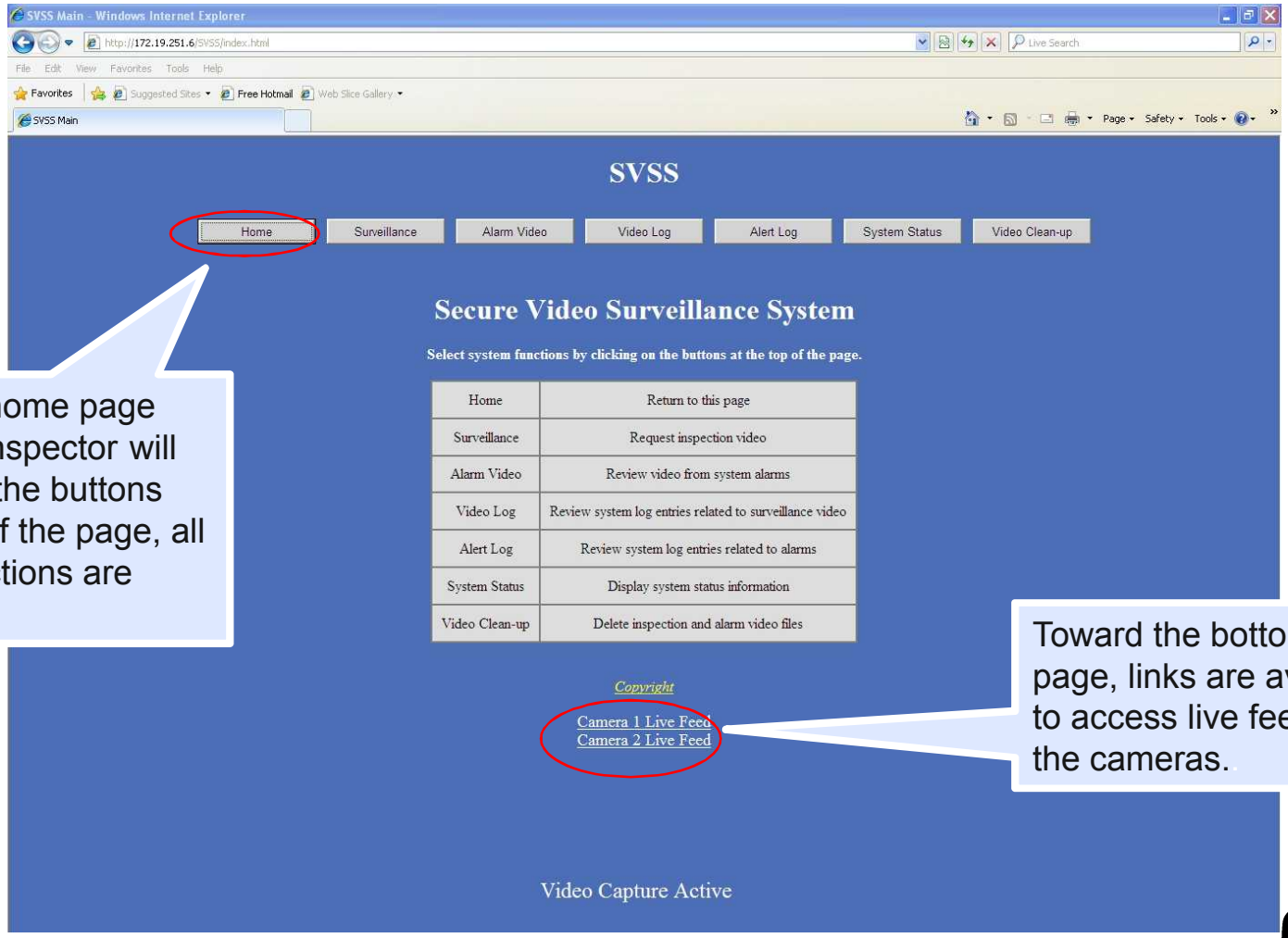
Secure Video Surveillance System (SVSS) User Interface – Home Screen



This is the home page where the Inspector will start. From the buttons on the top of the page, all system functions are accessible.

Toward the bottom of the page, links are available to access live feeds from the cameras.

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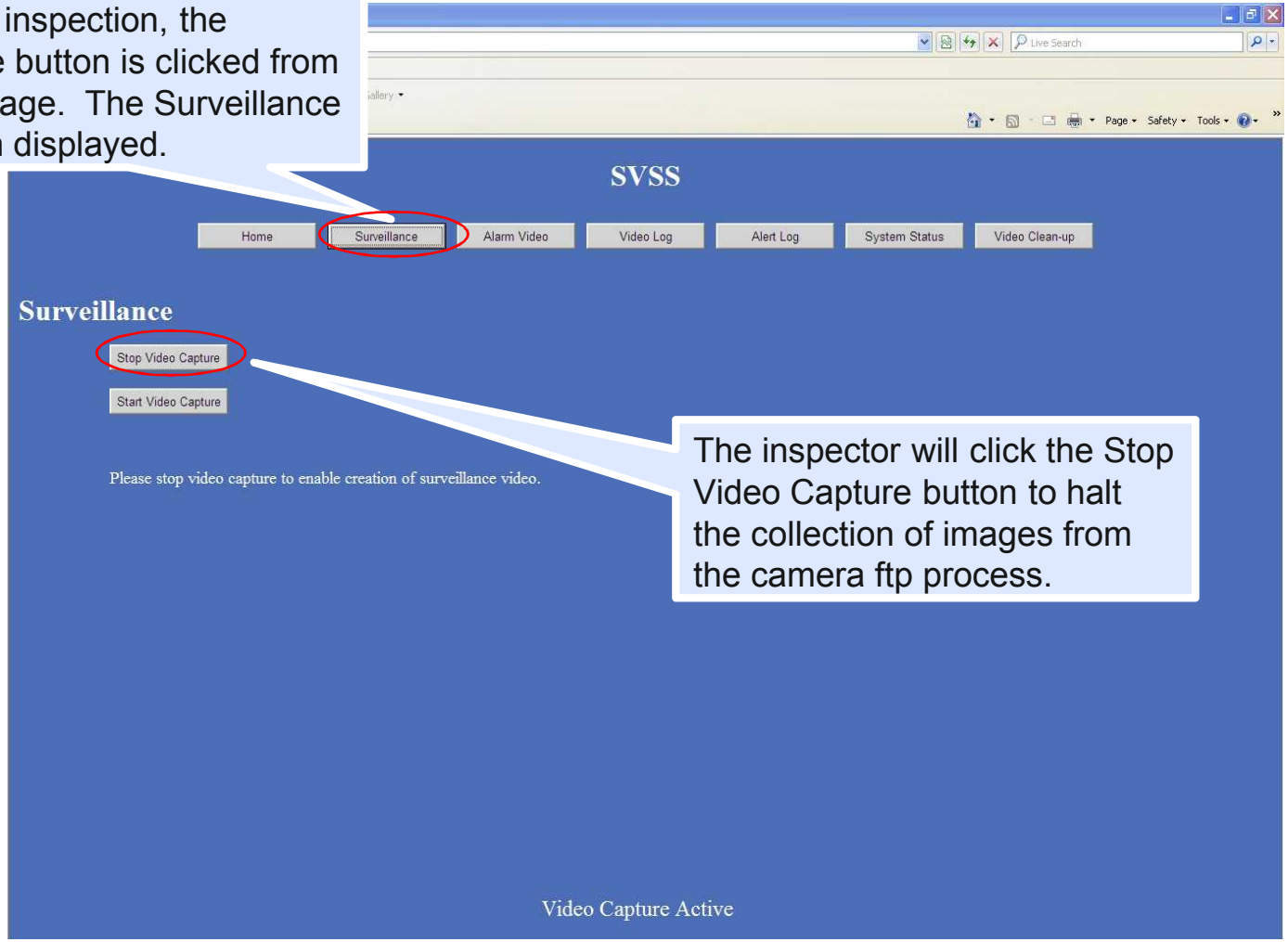
Secure Video Surveillance System (SVSS) User Interface

To begin an inspection, the Surveillance button is clicked from the Home Page. The Surveillance page is then displayed.



The inspector will click the Stop Video Capture button to halt the collection of images from the camera ftp process.

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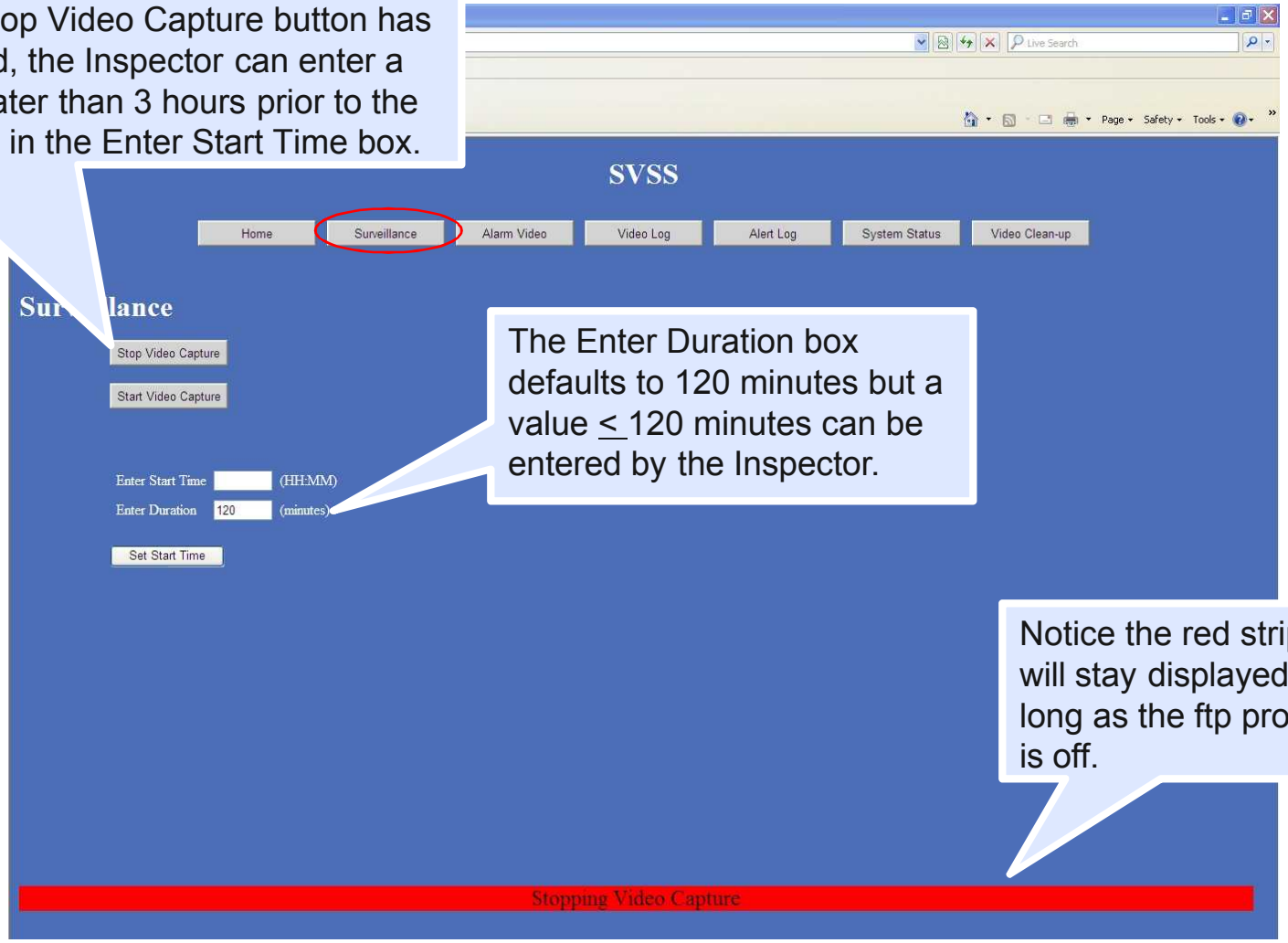
Secure Video Surveillance System (SVSS) User Interface – Begin inspection

Once the Stop Video Capture button has been clicked, the Inspector can enter a time no greater than 3 hours prior to the current time in the Enter Start Time box.



The Enter Duration box defaults to 120 minutes but a value $\leq$ 120 minutes can be entered by the Inspector.

Notice the red stripe, it will stay displayed as long as the ftp process is off.

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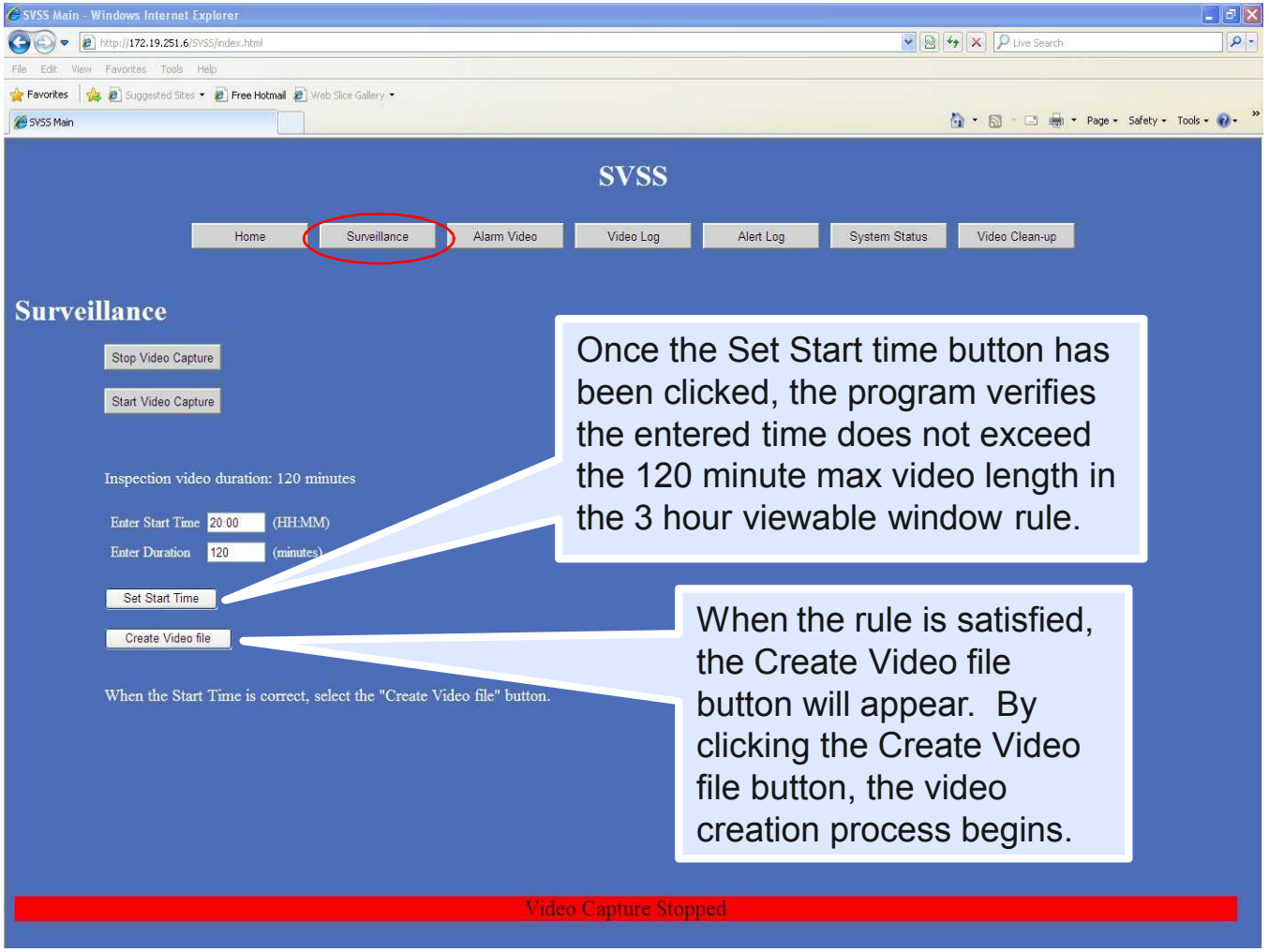
Secure Video Surveillance System (SVSS) User Interface – Inspection Time



Once the Set Start time button has been clicked, the program verifies the entered time does not exceed the 120 minute max video length in the 3 hour viewable window rule.

When the rule is satisfied, the Create Video file button will appear. By clicking the Create Video file button, the video creation process begins.

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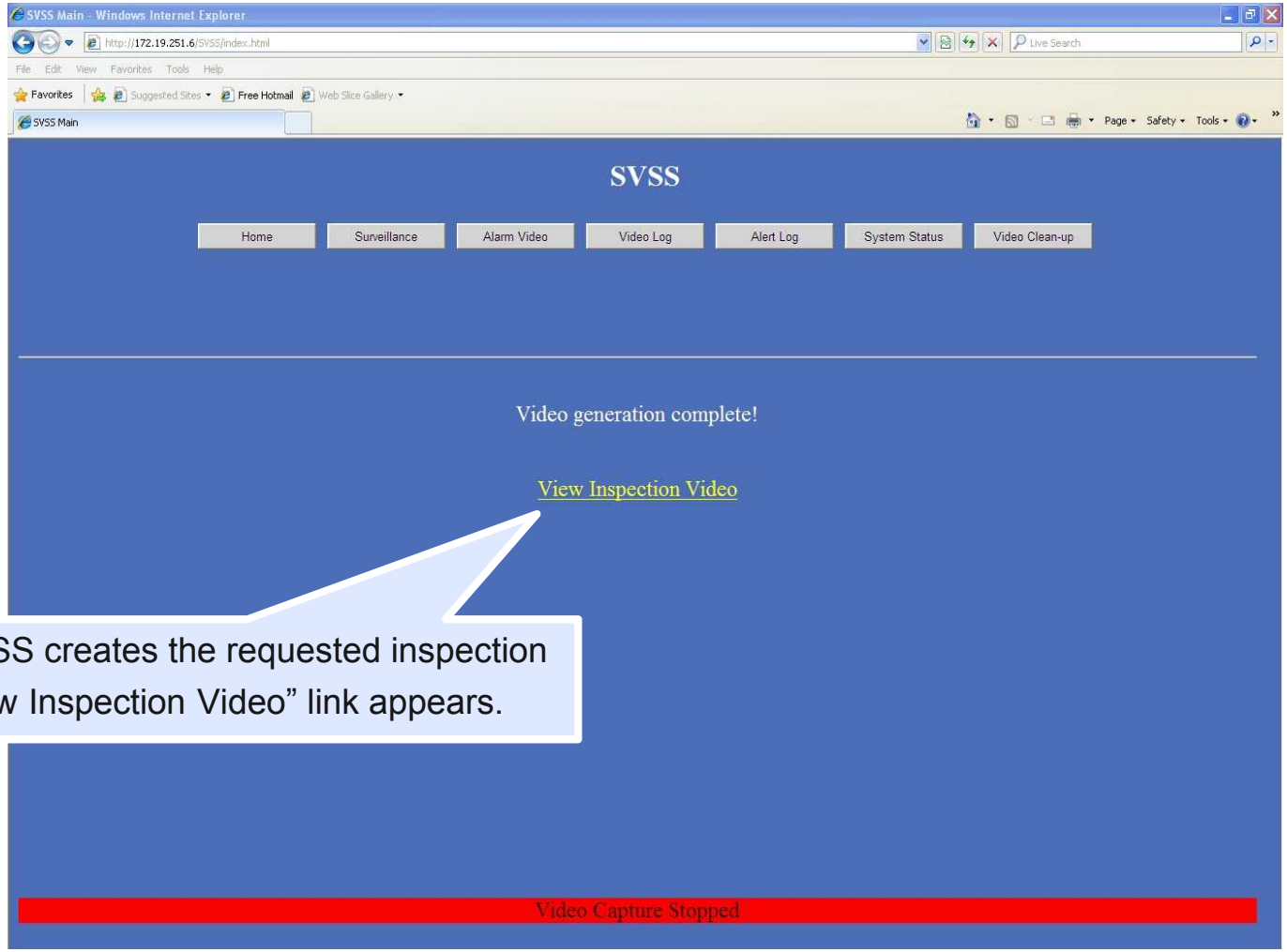
Secure Video Surveillance System (SVSS) User Interface – Video Creation



After the SVSS creates the requested inspection video, a “View Inspection Video” link appears.

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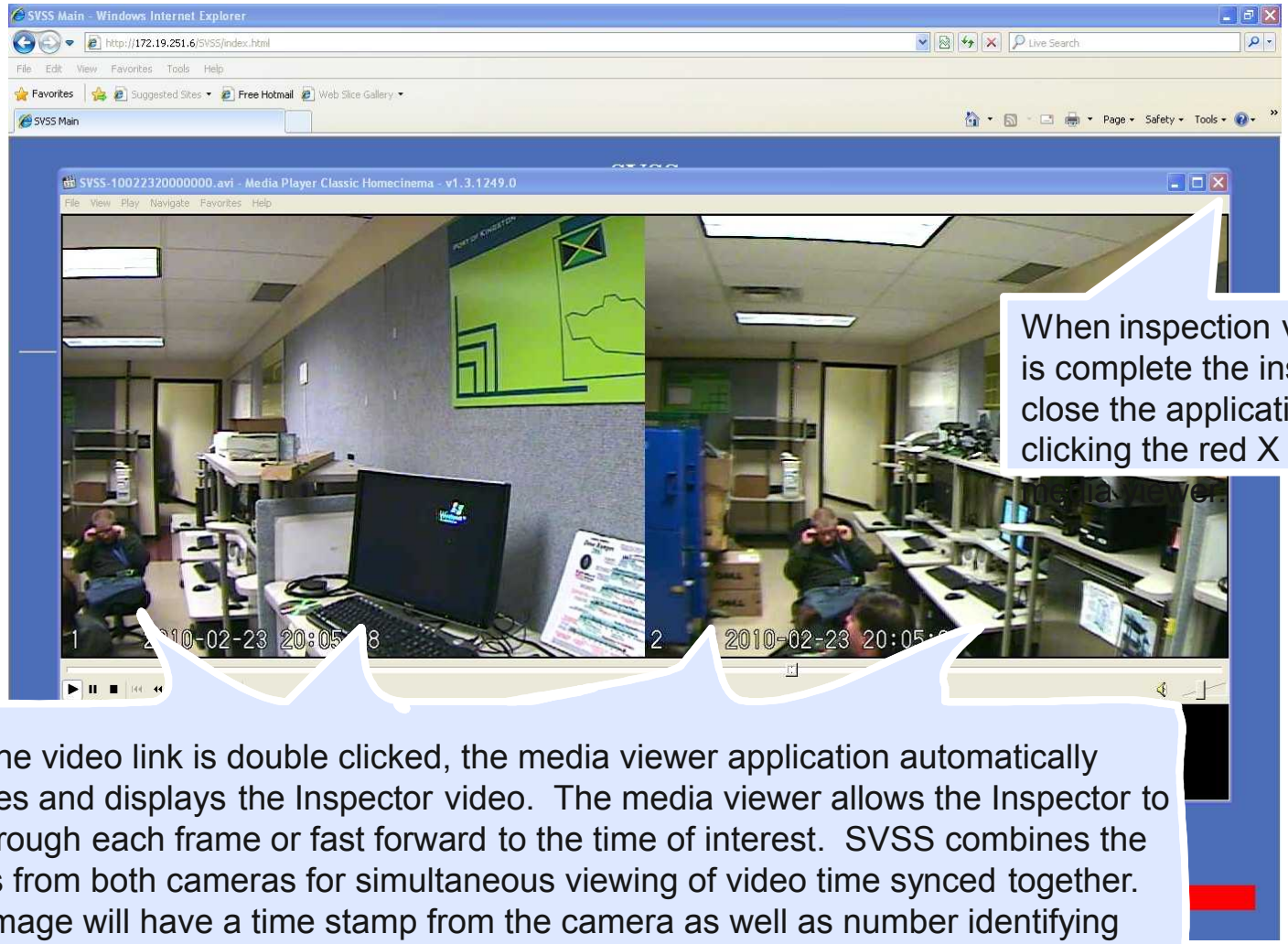
Secure Video Surveillance System (SVSS) User Interface – Video Display



When inspection video review is complete the inspector will close the application by clicking the red X on the

Once the video link is double clicked, the media viewer application automatically launches and displays the Inspector video. The media viewer allows the Inspector to step through each frame or fast forward to the time of interest. SVSS combines the images from both cameras for simultaneous viewing of video time synced together. Each image will have a time stamp from the camera as well as number identifying the camera.

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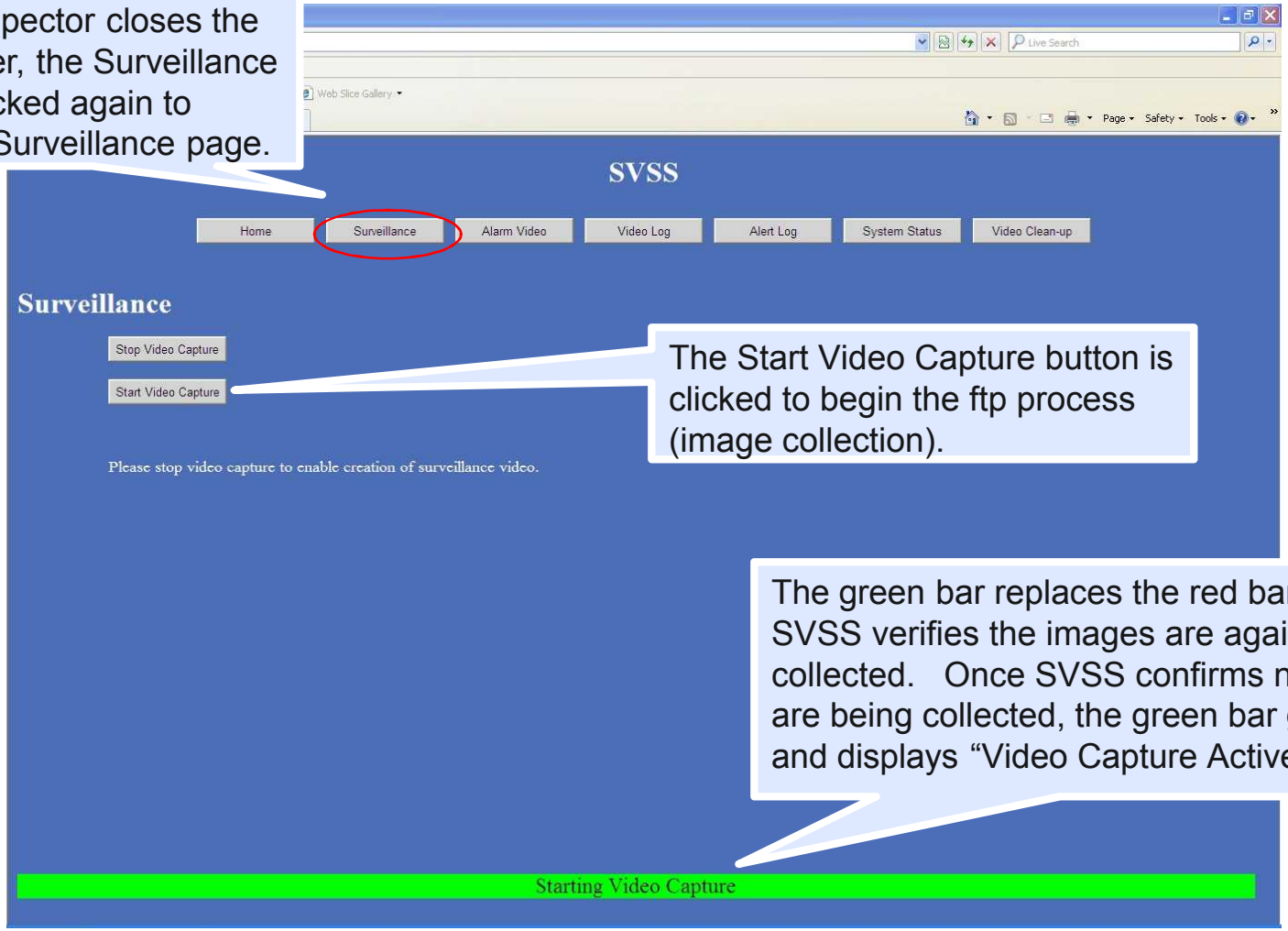
Secure Video Surveillance System (SVSS) User Interface – Inspection Completed

After the Inspector closes the media viewer, the Surveillance button is clicked again to display the Surveillance page.



The Start Video Capture button is clicked to begin the ftp process (image collection).

The green bar replaces the red bar until SVSS verifies the images are again being collected. Once SVSS confirms new images are being collected, the green bar goes away and displays “Video Capture Active”.

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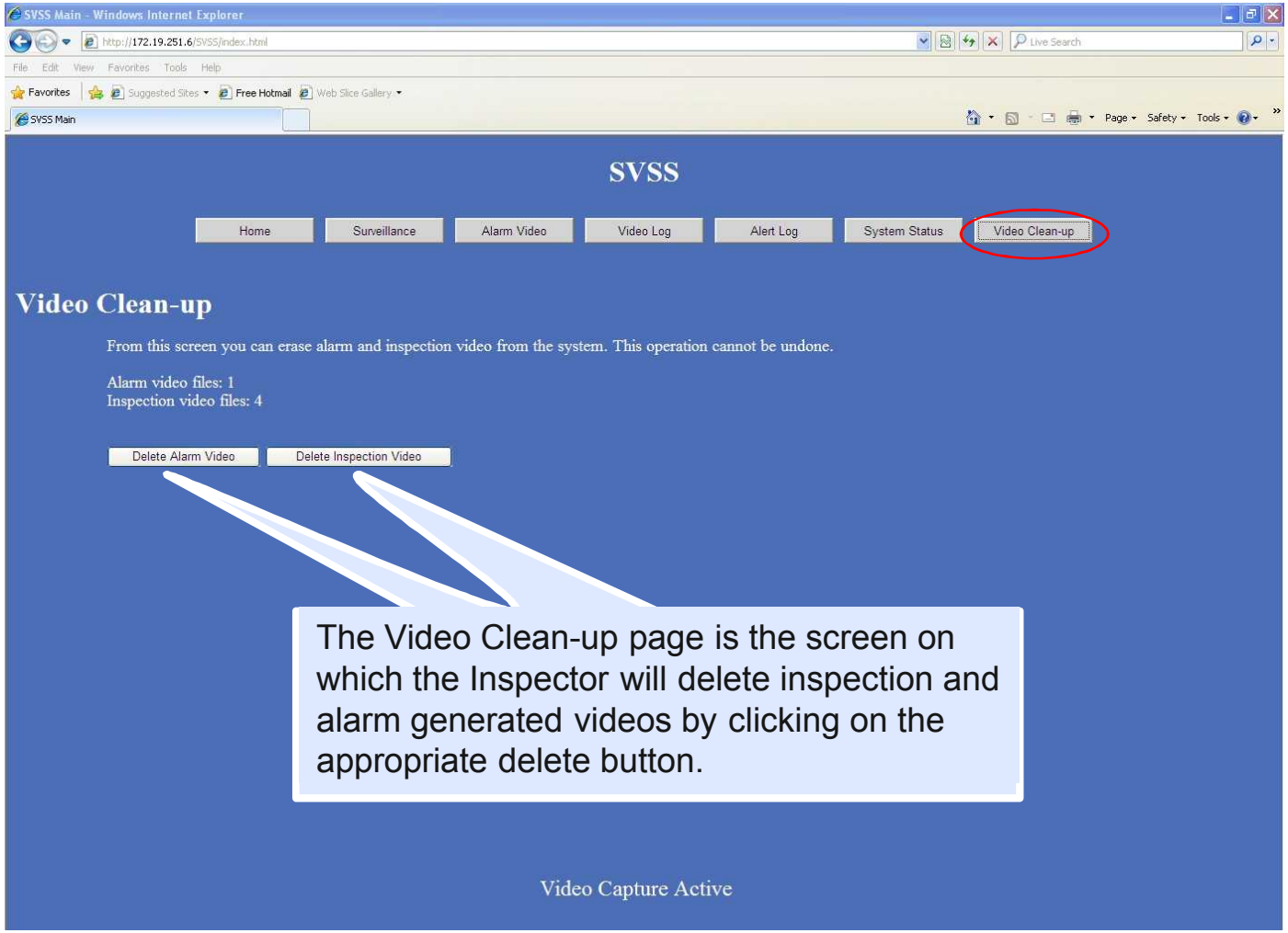
Secure Video Surveillance System (SVSS) User Interface – Video Deletion



The Video Clean-up page is the screen on which the Inspector will delete inspection and alarm generated videos by clicking on the appropriate delete button.

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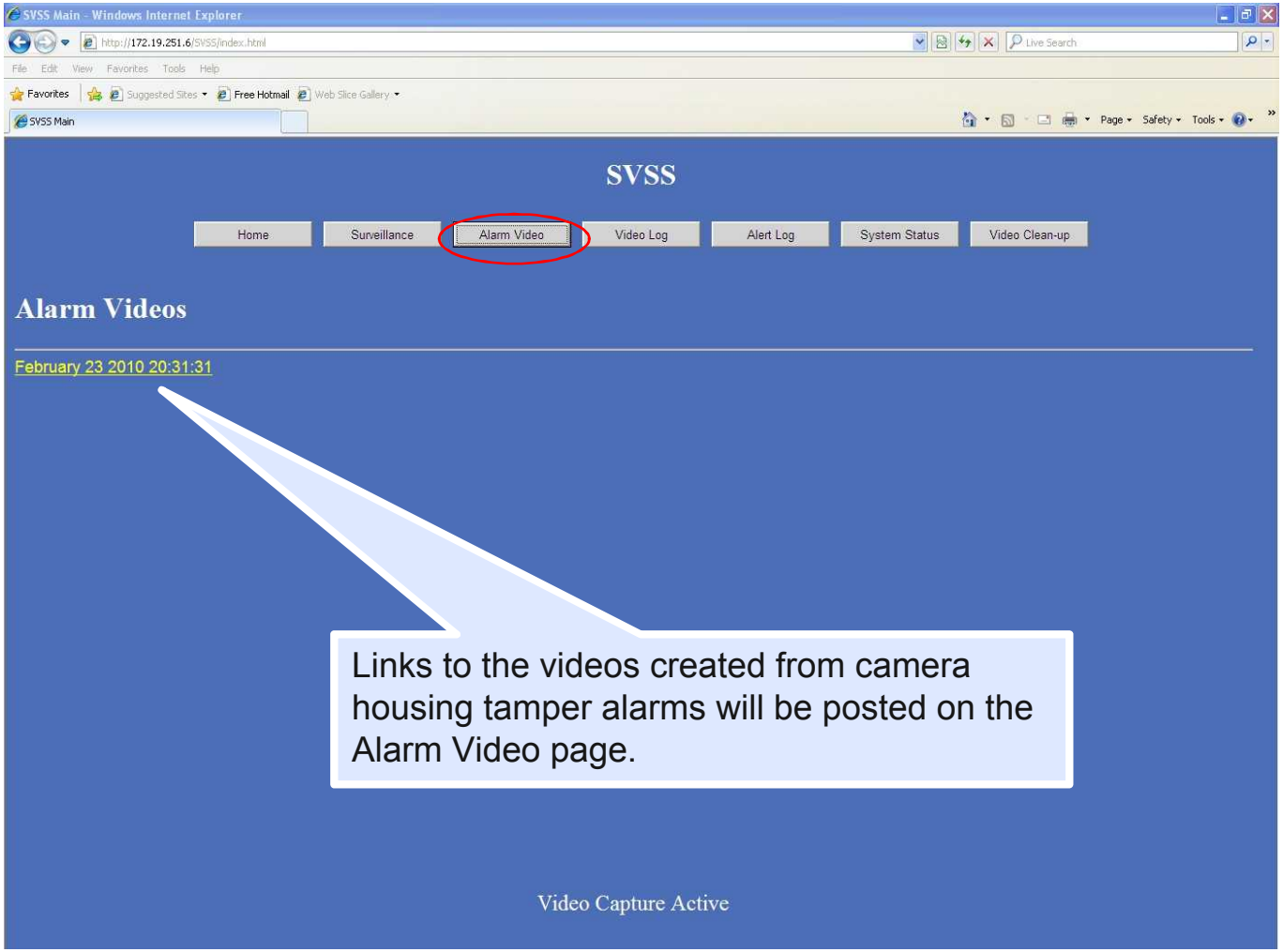
Secure Video Surveillance System (SVSS) User Interface – Alarm Review



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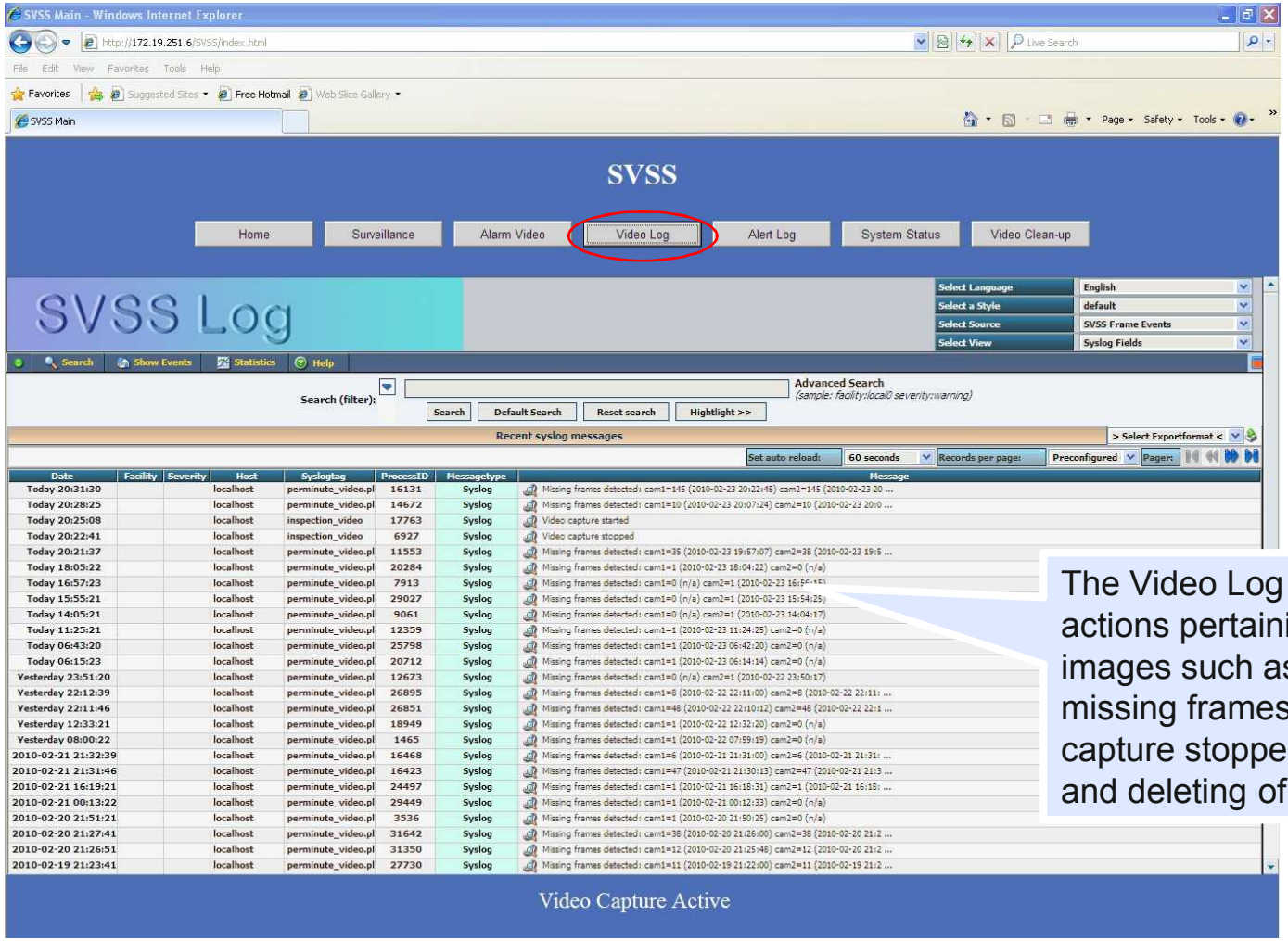
Secure Video Surveillance System (SVSS) User Interface – Video Log



The Video Log records all actions pertaining to the images such as: detected missing frames, video capture stopped/started and deleting of videos.

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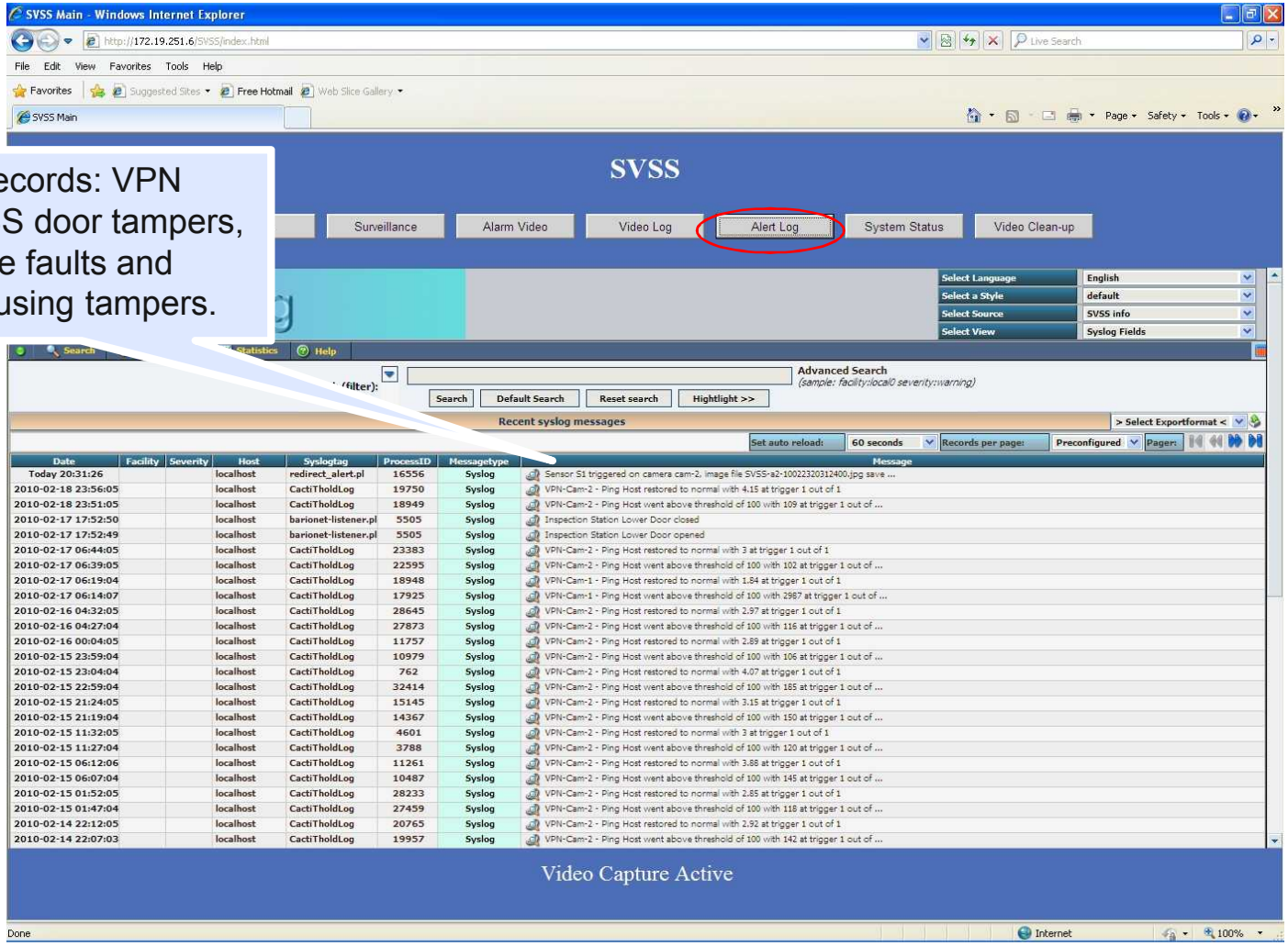
Secure Video Surveillance System (SVSS) User Interface – Alert Log

Alert Log records: VPN pings, SVSS door tampers, temperature faults and camera housing tampers.



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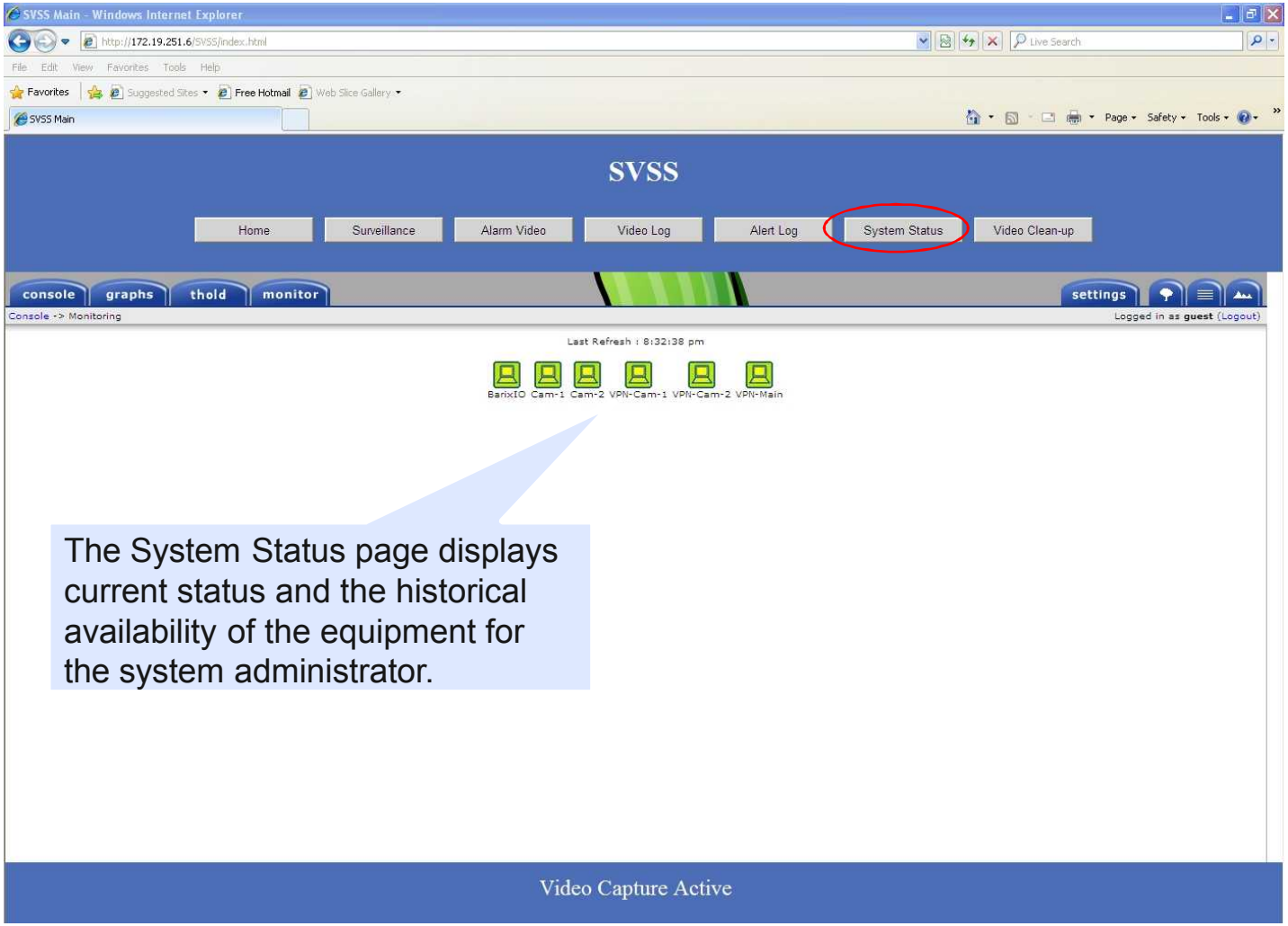
Secure Video Surveillance System (SVSS) User Interface – System Status



The System Status page displays current status and the historical availability of the equipment for the system administrator.

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Secure Video Surveillance System (SVSS)
User Interface – System Status

Questions / Discussion

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SVSS
Software Architecture

August 23, 2010

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Secure Video Surveillance System (SVSS) Software Architecture

Software Functionality

- Image Acquisition
- Tamper Event Handling
- State of Health
- Logging
- User Interface

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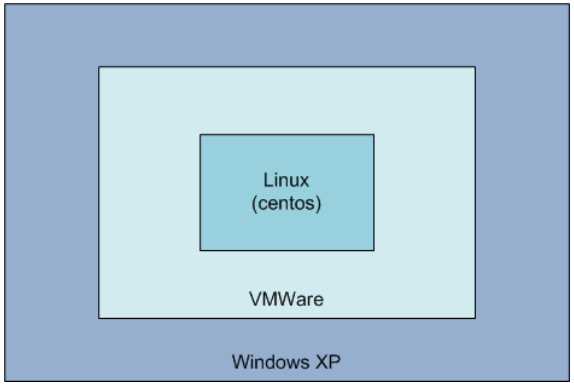
Secure Video Surveillance System (SVSS) Software Architecture

OS Components

- **Windows**
  - User Interface
- **Linux**
  - Camera interface
  - Tamper event handling
  - AVI construction
  - Apache / PHP
  - State of Health



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Secure Video Surveillance System (SVSS) Software Architecture

Image Acquisition

- **Periodic images**
  - Cameras send to linux ftp server
  - Daemon script monitors FTP directories
  - Once per minute, JPEG images are composed into one-minute AVI
    - camera images synchronized and displayed side-by-side
    - missing frames are logged
  - Cleanup process runs once a minute to delete JPEG and AVI files

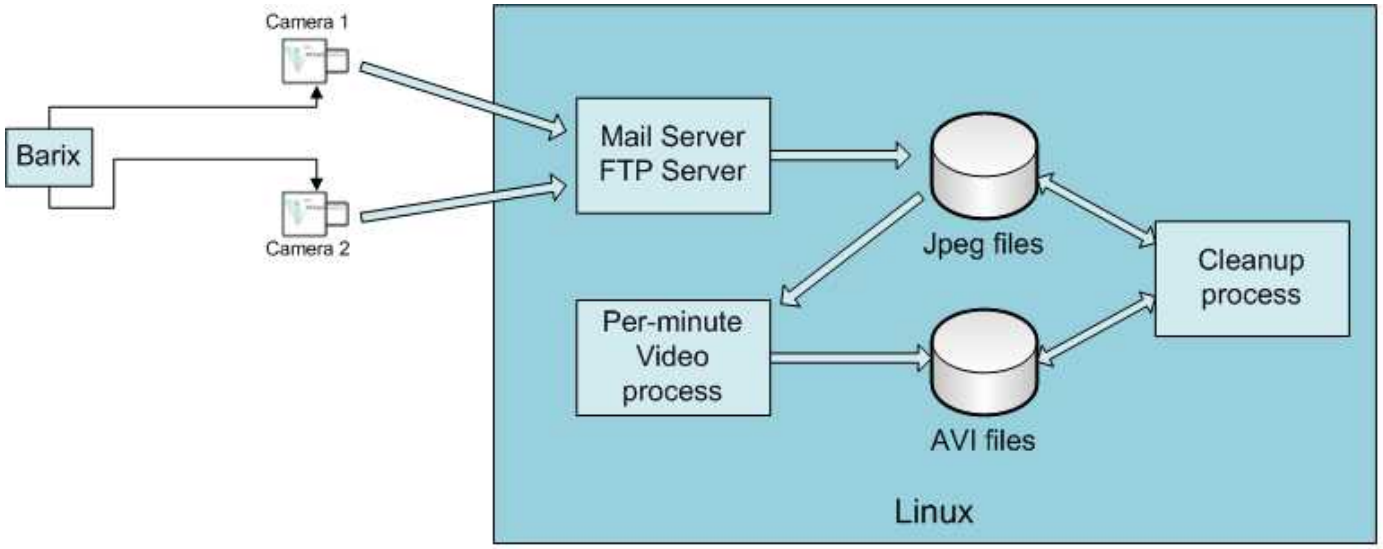
Secure Video Surveillance System (SVSS) Software Architecture

Tamper Event Handling

- **Tamper events**
  - Tamper wired into cameras – cameras send email to linux
  - sendmail mail alias invokes script that generates SNMP event
  - Daemon script traps SNMP event and builds AVI of event video

Secure Video Surveillance System (SVSS) Software Architecture

Camera and Tamper Interface



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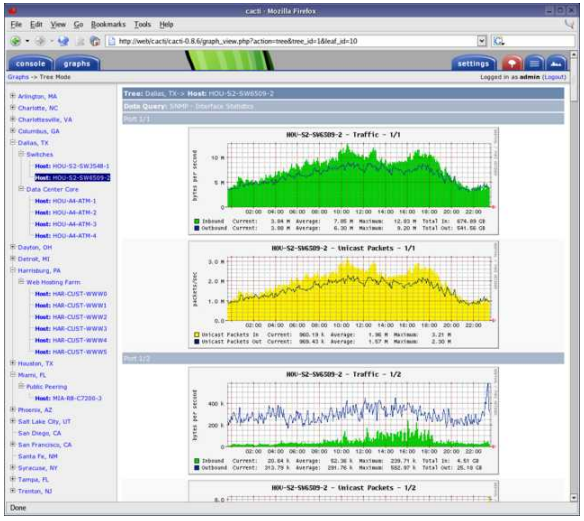
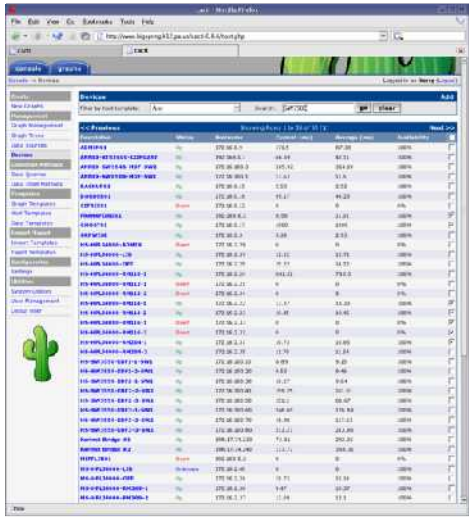
Secure Video Surveillance System (SVSS) Software Architecture

State of Health

- **Cacti (www.cacti.net)**
  - **Monitors component connectivity, system events**
  - **mysql for data storage**
  - **Apache web interface for user display**





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Secure Video Surveillance System (SVSS) Software Architecture

Logging

- **Linux syslog**
  - standard unix/linux logging mechanism
  - used by processing scripts and daemons
  - supports categories (i.e. script name) and priorities
- **phpLogCon (www.phplogcon.org)**
  - web interface to syslog and SNMP trap data
  - allows users to browse system events
  - SVSS user interface separates out video log from other log entries

Secure Video Surveillance System (SVSS) Software Architecture

User Interface

- Browser-based user interface – Internet Explorer
- PHP pages served by Apache in linux VM
- Inspection video
  - PHP code stops/starts linux ftp server
  - Inspection video is created on the fly
  - PHP code concatenates 1-minute AVI files to cover requested period
- Freeware video viewer displays AVI when complete
  - Media Player Classic Home Cinema (mpc-hc.sourceforge.net)

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Secure Video Surveillance System (SVSS) Software Architecture

Questions / Discussion

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Secure Video Surveillance System (SVSS)

Issues

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Secure Video Surveillance System (SVSS) Issues

- Occasional missing inspection images
  - Linux system timing glitch
- Cameras can drain UPS battery beyond recovery
  - Solution - Remove battery and charge with trickle charger

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Questions/ Discussion

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