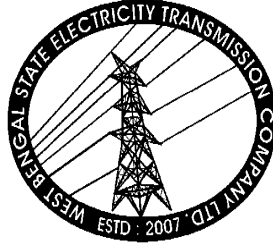


SUB STATION SURVEILLANCE SYSTEM



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Engineering Department

WEST BENGAL STATE ELECTRICITY TRANSMISSION COMPANY LIMITED

পশ্চিমবঙ্গ রাজ্য বিদ্যুৎ সংবহন কোম্পানি লিমিটেড
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Technical Specification for Sub Station Surveillance System

1.0 General

The specification covers design, supply, erection, testing and commissioning of the complete surveillance system including cameras, Network Digital video recorder, computer with peripherals, mounting arrangement for cameras, cables etc. for effective visual monitoring of total Sub-Station premises.

The number of cameras and their locations shall be decided to monitor at least:

- Total Sub Station Boundary wall
- Complete Switch yard portion.
- Entire GIS Hall & Relay Room (if applicable)
- Indoor switchgear room, ACDB room etc.
- Sub-Station main gate and Entrance doors of key areas like – Store, Colony, Control room building, fire-fighting pump house etc.

The cameras can be mounted on structures, buildings or any other suitable arrangement to be provided by the bidder. Preferred CCTV camera brands are – Sony, Pelco, Bosch with **service facility in India.**

2.0 Technical requirements

The system shall use video signals from various types of indoor/outdoor colour cameras installed at different locations, process them for viewing on workstations/monitors and simultaneously record all the cameras after compression using MPEG 4 or better standard and streamed over the IP network. Mouse-Keyboard controllers shall be used for Pan, Tilt, Zoom, and other functions of desired cameras. The System shall provide sufficient storage of all the camera recordings for a period of 30 days or more @ 25 FPS, at 4 CIF or better quality using necessary compression techniques. It shall be ensured that data once recorded shall not be altered by any means. The recording resolution and frame rate for each camera shall be user programmable. The provision for transfer of recorded data to separate external media shall be ensured.

The surveillance CCTV System shall operate on 230 V, 50 Hz single-phase power supply.

The camera and supplied software both shall be ONVIF (Open Network Video Interface Forum) compliant for easy integration with different make of cameras and hardware for future expansion.

3.0 System requirements:

- a) Camera with external encoder shall be used for image capture.
- b) Cameras for Switchyard portion shall be Day/Night PTZ Dome type. All other cameras shall be with fixed focal length lens suitable for Day-Night use as per site requirement.
- c) Housing of cameras meant for indoor use shall be of IP 42 rating whereas outdoor camera housing shall be of IP 66 or better rating.
- d) All camera recordings shall have Camera ID & location/area of recording as well as date/time stamp. Camera ID, Location/Area of recording & date/time shall be programmable by the system administrator with User ID & Password.
- e) System to have facility of additional camera installation beyond the originally planned capacity.
- f) System shall be triplex i.e. it should provide facility of simultaneous recording, playback & network operation.
- g) The offered system shall have facility to export the desired portion of clipping (from a desired date/time to another desired date/time) on CD or DVD. Viewing of this recording shall be possible on standard PC using standard software like windows media player etc.
- h) System shall have provision for remote monitoring.

The equipment should generally conform to Electromagnetic compatibility requirements for outdoor equipment in EHV switchyards. Type test reports to establish compliance with this requirement shall be submitted during detailed engineering.

The major EMC requirement for cameras and other equipment shall be-

1. Electrical Fast Transient -As per IEC 61000-4-4,
2. Damped Oscillatory (1MHz and 100 KHz) -As per IEC 61000-4-18,
3. AC voltage Dips & Interruption / Variation -As per IEC 61000-4-11,
4. Electrostatic Discharge -As per IEC 61000-4-2.
5. Power Frequency Discharge - As per IEC 61000-4-8,
6. Ripple on DC input power supply port immunity test -As per IEC 61000-4-17

4.0 VIDEO SURVEILLANCE APPLICATION SOFTWARE

- a) The required software used shall be of open protocol for ease of future expansion.
- b) Digital video surveillance control software should be capable to display and manage the entire surveillance system. It should be capable of supporting variety of devices such as cameras, video encoder, Servers, NAS boxes/Raid backup device etc.
- c) Surveillance control software should be compatible with MS Windows operating system.
- c) The software should have inbuilt facility to store configuration of encoders and cameras.
- d) The software should Support flexible 1/2/4/8 Windows Split screen display mode or scroll mode on the PC monitor.
- e) The software should be able to control all cameras i.e. PTZ control, Iris control, auto / manual focus, and color balance of camera, Selection of presets, Video tour selection etc.
- f) The software should have user access authority configurable on per device or per

device group basis. The user shall have the facility to request the access and control of any camera for a pre determined time period. Control of camera shall be released automatically after expiry of the pre determined time period.

- g) The system shall provide user activity log with user ID, time stamp, action performed, etc.
- h) The users should be on a hierarchical basis as assigned by the administrator. The higher priority person can take control of cameras, which are already being controlled by a lower priority user.
- i) It should have recording modes viz. continuous, manual, or programmed modes on date, time and camera-wise. All modes should be disabled and enabled using scheduled configuration. It should also be possible to search and replay the recorded images on date, time and camera-wise. It should provide onscreen controls for remote operation of PTZ cameras. It should have the facility for scheduled recording. Different recording speeds (fps) and resolution for each recording mode for each camera should be possible.
- j) The software for clients should also be working on a browser based system for remote users. This will allow any authorized user to display the video of any desired camera on the monitor with full PTZ and associated controls.
- k) Retrieval: The VMS application should allow retrieval of data instantaneously or any date / time interval chosen through search functionality of the application software. In case data is older than 30 days and available, the retrieval should be possible. The system should also allow for backup of specific data on any drives like DVD's or any other device in a format which can be replayed through a standard PC based software. Log of any such activity should be maintained by the system.

5.0 Network video recorder

The Personal Computer based network digital Video recorder is to be provided. The Personal computer shall include the PC (min intel core i5 processor, 4GB DDR3 RAM and storage space as required with RAID-5 considering future expansion) with latest configuration available in the market along with:

- Coloured TFT 22" monitor, External USB DVD writer.
- Windows Prof. operating system latest version with license

1.	Recording & Display Frame Rate	30 frames per second per camera
2.	Recording Resolution	(NTSC): 1280 x 720 / (PAL): 704(H) x 586(V) It should be possible to select lower resolutions
3.	Operating System	MS WINDOWS
4.	Compression Method	H.264 or latest
5.	Video Motion Detection Capable	Standard and built-in (selectable in menu)

6.	Video Motion Detection Options	Masking, sensitivity adjustment
7.	Monitoring Options	Split screen 1,2, 4 or 8 cameras (or as per system requirement to monitor the total system)
8.	Playback Options	Search, still image capture
9.	Network Operation Capable	To be provided by using WAN or LAN router
10.	Ethernet/Modem Built-in	Ethernet standard and built-in
11.	HDD Storage Consumption	80 ~ 350 MB per hour / channel variable based on frame speed and resolution settings, as well as compression
12.	HDD Speed	7200 R.P.M + 8 MB buffer
13.	Operation	Triplex operation (simultaneous recording, playback, network operation)
14.	Number of Video Inputs	Minimum Eight (8) video inputs for eight (8) cameras (total number will depend on system design)
15.	Audio Recording Capable	Minimum Eight (8) audio inputs for eight (8) microphones, however the number will depend on total camera quantity
16.	Number of Video Outputs	Two (2) HDMI outputs, one (1) VGA output
17.	Pan / Tilt / Zoom Protocol Drivers Built-in	Yes
18.	Input Voltage	230v AC

6.0 Camera for Visual Monitoring System (VMS)

The VMS camera shall be suitable for wall mounting, ceiling mounting and switchyard structure mounting. The VMS camera should be color high resolution, , Weatherproof, Dome / bullet type. The Camera shall have an internal amplifier that applies gain to the signal. The amplifier must operate when there is insufficient light in the scene to produce an acceptable video output level, and must only apply as much gain as is necessary. The camera shall incorporate one level of automatic gain Compensation (AGC), allowing the user to achieve the optimal balance of noise and low light performance in demanding environments.

Specification for Fixed Dome/Bullet Camera

The High Resolution DSP Color Camera (Digital Signal Processing using a DSP chip) shall include, as a minimum, the following features/ functions/ specifications:

- a) The High Resolution DSP Color Camera shall incorporate a 1/3-inch sensor.

- b) The Dome Camera shall support the use of Auto Iris/ Direct Drive lens connected to the camera via 4-pin molex socket located from the inside of the camera housing. The camera must provide power to the lens. In case of bullet camera, factory fitted lens and housing shall be offered.
- c) The Dome Camera shall use 3-9mm varifocal lens. Bullet camera with 3.3-12mm Varifocal lens is to be offered so that focal length can be adjusted as per site condition for larger area surveillance and better picture quality.
- d) The power consumption of the High Resolution DSP Color Mini Dome/Bullet Camera shall be minimum.

1.	Resolution	Full HD IP camera with 2MP (1920 X 1080) (Minimum)
2.	Low Light Sensitivity (lux)	0.1 lux or better
3.	Signal to noise Ratio	More than 45 dB (AGC off)
4.	White Balance Control (WBC)	Adjustable / Automatic (2,100° ~ 8,000°K)

Specification for PTZ camera –

1.	Electronic Shutter	1/60 ~ 1/100,000 sec. automatic
2.	Back Light Compensation	Adjustable / Automatic and built-in
3.	Automatic Gain Control (AGC)	Automatic ([0 ~ 30 dB] / 41) dB and built-in
4.	Lens	Minimum 20x HD IR-corrected aspherical power zoom lens
5.	Lens Aperture	F1.6 ~ 4.2
6.	Pan / Tilt / Zoom Protocol Languages Supported	Yes
7.	Panning Range	Complete 360 degrees (horizontal)
8.	Pan Speed	Adjustable
9.	Tilting Range	180 degrees (vertical)
10.	Tilt Speed	Adjustable

PTZ-Control –

The features of PTZ shall include:

- Fully functional dynamic keyboard controllers with joystick for smooth camera movements.
- Controls all pan, tilt, zoom, iris, preset functions.
- Many preset options for quick access to frequently monitored areas and advanced tour programming
- Compatible with all cameras and Control all units including future ones from a single keyboard.

Compliance List
(to be submitted by Bidder during Detailed Engineering)

Dome / Bullet camera			
Sl. No	Parameter	Tender Specification	Compliance (Yes/No)
1	Image Sensor	2-megapixel Progeassive,1/3" sensor, Minimum illumination 0.1 Lux	
2	Min Luminous	0.3 LUX(color) 0.1Lux(Black) with IR	
3	Lens	3.3- 12mm for outdoor 3-9 mm for indoor	
4	Camera Enclosure Type	IP66 Grade for bullet cameras	
5	Iris/Focus	Auto/Manual	
6	Video Compression	Dual Stream H.264 or better and MPEG 4 user selectable	
7	Support Dual-Stream	Primary/Secondary stream, H.264/MPEG 4	
8	Video Definition	Primary Stream: 1920x1080, 1280x960, 1280x720, Secondary stream: 800x600,400x288,192x144	
9	Video Parameters	Brightness, hue, contrast, saturation and image quality	
10	Video Frame Rate	PAL: 1-25frames/second NTSC:1-30 frames/second	
11	Video Compression BR	32 Kbit/S	
12	Video Output	One Channel Composite Streaming	
13	Supported Protocols	TCP, UDP, IP, HTTP, FTP, SMTP, DHCP, DNS, ARP, ICMP, POP3, NTP, IPsec, UPnP, RTP, RTCP	
14	Operating Temperature	-5~+50°C	
15	Operating Humidity	10~90%	

PTZ Camera			
Sl. No	Parameter	Tender Specification	Compliance (Yes/No)
1	Image Sensor	1/3 inch Sensor	
2	Security	Multiple user access with password protection	
3	Effective pixels	(PAL): Main stream:1920x1080	
4	Compression	Dual stream H.264 and MJPEG selectable	
5	Signal System	50Hz	
6	S/N (Signal to noise) Ratio	Better than 50dB	
7	Electronic shutter	1~1/8,000sec. automatic or better	
8	Scanning System	Progressive	
9	Low Light Sensitivity (lux)	Color: 0.3 Lux; B&W:0.1 Lux	
10	Lens	Minimum 240x (20X Optical Zoom and 12X Digital Zoom)	
11	Lens Size	Minimum 4.3-86mm	
12	Lens Aperture	F1.6(wide)-F4.2 (tele), Angle of view Horizontal: 55.4°(wide), 2.9° (tele)	
13	Panning range	Complete 360 degree (horizontal)	

14	Pan Speed	Adjustable , 0.1 degree / second ~420 degrees/ second	
15	Tilting Range	Minimum 180° Tilt Rotation	
16	Tilt Speed	Adjustable, 0.1 degrees/ second~200 degree / second	
17	In Built Storage	Camera should have inbuilt storage TF or SD format for recording and storing pictures	
18	IP class	IP66 standard	
19	Working Temperature	-0°C~+50°C	
20	Working Humidity	10~ 90%	

Serial No	Technical Requirement	Compliance (Yes/No)
1.	The Video Monitoring System Shall be an Integrated System with IP Network Centric functional and Management architecture aimed at providing high-Speed manual/automatic operation for best performance.	
2.	The system should facilitate viewing of live and recorded images and controlling of all cameras by the authorized users.	
3.	The system shall use video signals from various types of indoor/outdoor CCD/CMOS color cameras installed at different locations, process them for viewing on workstations /monitors in the control Room and simultaneously record all the cameras after compression using H264/MPEG 4 or better standard. Mouse/Joystick-keyboard controllers shall be used for pan, Tilt, Zoom, and other functions of desired cameras.	
4.	The system shall provide sufficient storage of all the camera recordings for a period of 30 days or more @25 FPS, at 1080P or better quality using necessary compression techniques for all cameras. It shall be ensured that data once recorded shall not be altered by any means. The recording resolution and frame rate for each camera shall be user programmable.	
5.	System Requirements:	
a)	System must provide build-in facility of watermarking of digital certificate to ensure tamperproof recording.	
b)	All cameras may be connected through a suitable LAN which shall be able to perform in High Voltage sub-station environment without fail. The equipment should generally conform to Electromagnetic compatibility requirements for outdoor equipment in EHV switchyards. Type test reports to establish compliance with the above requirement shall be submitted during detailed engineering.	
c)	All camera recordings shall have camera ID & location/area of recording as well as date/time stamp. Camera ID, location/area of recording & date/time shall be programmable by the system administrator with user ID & password.	
d)	Facility of camera recording in HD (1920x1080p), (1280x720p), DI, 4CIF, CIF, VGA as well as in any combination i.e any camera can be recorded in any quality.	
e)	System to have facility of 100% additional camera installation beyond the originally planned capacity.	
f)	In order to optimize the memory, while recording, video shall be compressed using H264 or better standard and streamed over the IP network.	
g)	System shall be triplex i.e. it should provide facility of viewing recording & Replay simultaneously.	
h)	The offered system shall have facility to export the desired portion of clipping (from a specific date/time to another specific date/time) on CD or DVD. Viewing of this recording shall be possible on standard pc using standard software like windows media player etc.	
i)	System shall have provision of WAN connectivity for remote monitoring.	

6.	Video Surveillance Application Software	
a)	Digital video surveillance control software should be capable to display and manage the entire surveillance system. It should be capable of supporting variety of devices such as cameras, Video encoder, servers, NAS boxes/Raid backup device etc.	
b)	The Software should support flexible 1/2/4/8/16/32 windows split screen display mode and scroll mode on the PC monitor	
c)	The Software should be able to control all cameras i.e. PTZ control , Iris control , auto/ manual focus, and color, audio/manual focus, and color balance of camera, Selection of presets, video tour selection etc.	
d)	The users should be on a hierarchical basis as assigned by the administrator. The higher priority person can take control of cameras, which are already being controlled by a lower priority user.	
e)	It should have recording modes viz. continuous, manual or programmed modes on date, time and camera-wise. All modes should be disabled and enabled using scheduled configuration. It should also be possible to search and replay the recorded images on date, time and camera-wise. It should be provide onscreen controls for remote, operation of PTZ cameras. It should have the facility for scheduled recording. Different recording speeds (fps) and resolution for each recording mode for each camera should be possible.	
f)	The software for clients should also be working, on a browser based system for remote users. This will allow any authorized user to display the video of any desired camera on the monitor with full PTZ and associated controls.	
g)	Retrieval: The VMS application should allow retrieval of data instantaneously or any date/time interval chosen through search functionality of the application software. In case data is older than 30 days and available, the retrieval should be possible. The system should allow for backup of specific data on any drives like DVD's or any other device in a format which can be replayed through a standard PC based software. Log of any such activity should be maintained by the system.	
h)	VMS shall provide the full functionality reporting tool which can provide reports for user login/logoff, Camera accessibility report, server health check reports etc.	
7.	The camera and supplied software both shall be ONVIF (Open Network Video Interface Forum) compliant	