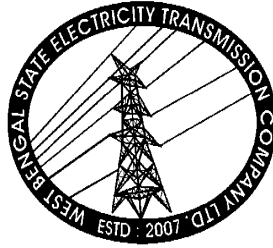


SUB STATION SURVEILLANCE SYSTEM



February 2016

Engineering Department

WEST BENGAL STATE ELECTRICITY TRANSMISSION COMPANY LIMITED

পশ্চিমবঙ্গ রাজ্য বিদ্যুৎ সংবহন কোম্পানি লিমিটেড
(পশ্চিমবঙ্গ সরকারের একটি উদ্যোগ)

Regd. Office: VidyutBhawan, Block – DJ, Sector-II, Bidhannagar, Kolkata – 700091.

CIN: U40101WB2007SGC113474; Website: www.wbsetcl.in

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:

- All the Transformer and Reactors
- The operation of each and every isolator of the complete yard.
- All other Major Equipments (such as CB, CT, CVT, SA etc.)
- Key areas of control room cum administrative building, Indoor switchgear room, entire GIS Hall, Relay room etc.
- All the Entrance doors of Control Room Building, Fire-fighting Pump House, GIS Hall, Sub-Station main gate, gates of switchyard, colony entrance gate etc.

The cameras can be mounted on structures, buildings or any other suitable arrangement to be provided by the contractor.

2.0 Technical requirements

The system shall use video signals from various types of indoor/outdoor CCD colour 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 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.

3.0 System requirements:

- a) Camera with external encoder shall be used for image capture.
- b) Indoor cameras shall be either with fixed focal length lens or with Pan/Tilt & Zoom lens as per site requirement. All outdoor Cameras shall be Day/Night PTZ Dome type cameras.

- 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 Electro magnetic compatibility requirements for outdoor equipment in EHV switchyards. Type test reports to establish compliance with this requirement shall be submitted during detailed engineering.

4.0 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) 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) There must be a single encoder for each camera.
- g) 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.
- h) The system shall provide user activity log with user ID, time stamp, action performed, etc.
- i) 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.
- j) 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.
- k) 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.
- l) 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 Digital 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, 500 GB hard disk) with latest configuration available in the market along with:

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

1.	Recording & Display Frame Rate	Real time 240 frames per second total, 30 frames per second per camera
2.	Recording Resolution	(NTSC): 704(H) x 480(V) / (PAL): 704(H) x 586(V) It should be possible to select lower resolutions
3.	Operating System	MPEG4 Hardware RTOS (Real time operating system)
4.	Compression Method	MPEG-4
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
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	Eight (8) video inputs for eight (8) cameras
15.	Audio Recording Capable	Eight (8) audio inputs for eight (8) microphones
16.	Number of Video Outputs	Two (2) A/V 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, superHAD (Hole-accumulation Diode), Weatherproof, Dome 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.

1.	Resolution(TV lines)	480 horizontal TV lines (Minimum)
2.	Effective Pixels (minimum)	(PAL): 752(H) x 582(V) pixels (NTSC):768 (H) x 494 (V)
3.	Low Light Sensitivity (lux)	0.1 lux
4.	Signal to noise Ratio	More than 45 dB (AGC off)
5.	White Balance Control (WBC)	Adjustable / Automatic (2,100° ~ 8,000°K)
6.	Gamma Correction	$d = 0.45$

Specification for Fixed Dome Camera

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

- a) The High Resolution DSP Color Dome Camera shall incorporate a 1/3-inch Charge-coupled device (CCD).
- b) The Dome Camera shall support the use of Auto Iris/ Direct Drive lens connected to the camera via 4-pin moxex socket located from the inside of the camera housing. The camera must provide power to the lens.
- c) The Camera shall support the use of Fixed lens, focal length is 3.6mm, each.
- d) The power consumption of the High Resolution DSP Color Mini Dome Camera shall be no more than 1 watt.

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	270x (27x optical /10x digital) IR-corrected aspherical power zoom lens
5.	Lens Aperture	F1.6 ~ 3.7
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 and zoom functions
- Many preset options for quick access to frequently monitored areas and advanced tour programming