

TECHNICAL SPECIFICATIONS FOR IP CCTV SURVEILLANCE SYSTEM.

INSPECTION OF SITE :

The bidder should inspect and examine the site and its surrounding and shall satisfy as to the quantities and nature of work, materials necessary for completion of the work and in general to obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect his offer. No extra claim consequent on any misunderstanding or otherwise shall be allowed.

REFERENCE DRAWINGS/DOCUMENTS:

(1) LAYOUT-BUILDINGS PLAN

DESIGN CONCEPT & SCOPE OF WORK :

1) IP CCTV SURVEILLANCE SYSTEM

(i) DESIGN CONCEPT:

- The entire IP surveillance system is designed to control and monitor the different blocks of the ICPAC Headquarters. All the corridors shall have IP Fixed dome camera to monitor the connecting corridors
- There are three types of cameras shall be installed to monitor the movement of the people as follows:
 - IP fixed dome camera indoor type
 - IP fixed box camera outdoor type
- IP fixed dome camera shall be installed at the entrances and connecting corridors of the main building like laboratories, server room , and guest house.
- IP fixed box camera shall be mounted on the pole at all boom-barrier and main gate to monitor the vehicles and pedestrians passing by there.
- All cameras shall be true IP camera.
- All outdoor cameras shall be in IP-66 housing.
- All outdoor items for cameras like JBs, power supply, media convertor etc. shall be in water proof and dust proof housing.
- Purchaser's LAN network being laid by third party would be utilized to extend the IP CCTV connectivity to central server
- All CCTV cameras shall have connectivity to non- PoE port of purchaser's networking switches on LAN.
- UPS Power supply for each camera.
- **Tentative locations of cameras are as was indicated during the site visit.**

(ii) SCOPE OF WORK:

- Supply, installation, testing and commissioning high quality fast-acting IP CCTV surveillance system along with power supply, power distribution and required accessories in the different blocks of ICPAC Headquarters •
The entire system shall be as per the and technical specifications enclosed with tender documents.
- The price quoted by the vendor should include all the expenses incurred in commissioning of all cameras with power supply, accessories and other devices complete with software.
- The CCTV surveillance system should consist of IP Fixed dome cameras (indoor type), fixed box cameras (outdoor type), software, server, power supply and cables.
- Video management software shall offer both video stream management and video stream storage management. Recording frame rate and resolution in respect of individual channel shall be programmable.
- The system is presently designed for **32** cameras where as not limited to the same and scalable upto unlimited cameras if required in the future.
- Provide an independent network that can be integrated to the purchasers network without degrading the perfosupervisory specialists and technicians at the job to assist in all phases of system installation, start up and commissioning.
- Cat 6cable/fiber cable connectivity with all required hardware upto purchaser's networking switches of LAN, locations of networking switches .
- 230 volts AC Power supply distribution from UPS to each location of cameras along with DBs ,JBs, cabling work etc. with required accessories.
- Power supply unit as required for cameras.
- Integrated testing and commissioning of CCTV system on LAN being provided by the third party in ICPAC Headquarters
- Training & handing over of all materials, equipment and appliances.
- **Any other items/accessories required for installation, testing and commissioning of CCTV system.**
- No extra cost shall be paid for miscellaneous items if required to complete the work as per the design concept.

(2) SUBMITTALS:

(i) Drawings:

The system supplier shall submit all shop drawings, and bill of materials .

- Installation drawing
- Bill of Materials
- Cable connectivity drawings and cable schedule.
- Power distribution scheme
- Specifications and data sheet for each item
- List of software and software licenses,
- Test certificates, Internal test reports etc.

(ii) System Documentation

- System configuration diagrams in simplified block format.
- Manufacturer's instructions and drawings for installation, maintenance, and operation of all purchased items.
- Overall system operation and maintenance instructions—including preventive maintenance and troubleshooting instructions.
- A list of all functions available and a sample of function block programming that shall be part of delivered system.
- Quality Assurance Plan
- Operation and maintenance manuals.

(3) QUALITY ASSURANCE:

- The entire system shall be installed and commissioned from a single vendor to assure reliability and continued service.
- The vendor shall be required to train and instruct client's personnel in the correct use, operation and supervision of the system, preferably prior to the handing over of the project.
- The supplier shall be responsible for inspection and Quality Assurance (QA) for all materials and workmanship

(4) TESTING:

- **Component Testing:** Maximum reliability shall be achieved through extensive use of high-quality, pre-tested components. Each and every component shall be individually tested by the manufacturer prior to shipment.
- **Tools, Testing and Calibration Equipment:** The supplier shall provide all tools, testing, and calibration equipment necessary to ensure reliability and accuracy of the system.

(5) POWER SUPPLY :

230 V + 10 % , 50 Hz + 5% shall be made available for UPS input. Bidder's scope shall include complete power distribution for IP CCTV including complete cabling work, DBs and required electrical accessories with suitable protection devices from UPS (in bidder's scope) and UPS output to IP CCTV cameras .

TECHNICAL SPECIFICATIONS:

(I) IP CCTV SURVEILLANCE SYSTEM :

(a) IP Video System Overview:

- Transmit and Receive H.264 and MPEG-4 Video and bi-directional Audio.
- Video and alarm management software under one single front end and should be on open platform with support to renowned IP camera brands.
- Support for multi user and multi user group environment in addition to user hierarchy
- System should allow to be used as a distributed or central architecture with support to any number of cameras and any number of clients that may be added in future.
- System Guarantees Bandwidth & Frame rate control.
- Provides Activity Controlled Frame rate, which in turn reduces the Bandwidth and the Storage requirements.
- Provides Broadcast quality Video across IP network including Internet.
- Provides multiple failover and network resilience.
- Provides real time recording at 25fps with no frame loss.
- Provides PTZ Camera Controls & Binary INPUT/OUTPUT controls.
- Supports Multiple IP Video Streams.
- Secured recording for evidence purposes and user authentication to protect data integrity.
- Video Stream bit rate selectable from 32 to 4096kbps.or better
- All the IP cameras shall have SD card slot for recording in SD card when network is down/fail

(b) IP Fixed Box Camera (Outdoor Type)

- Camera must provide atleast 704x576 (PAL) active pixels @ 25 fps
- Color Resolution 540 TV Lines/ 704x576 pixels or better for sharp pick up of live video.
- Minimum Sensitivity of Day: 0.5 Lux; Day/Night: 0.5 lux in color / 0.05 lux mono
- Gain Control Automatic
- White Balance Mode: Auto; Fluorescent; Indoor; Outdoor
- Shutter Speeds 1/60 to 1/100,00 (NTSC), 1/50 to 1/100,00 (PAL) or Auto*
- Operating voltage: Power over Ethernet (802.3AF); 12V/24V AC/DC
- The IP Camera should support a Receiver Driver Unit or a motorized zoom lens
- The hardware architecture must incorporate multiple processors to ensure best video quality and other functions even at maximum processor load.
- The IP Camera system must offer a choice of either MPEG-4 Advanced Simple Profile or H.264 video compression standards, by just upgrading the firmware over the network without dismantling the camera.
- The IP Camera must run Linux Operating system for reliability.
- The camera must have a built in firewall - SSL and other non-IP address specific security measures are deemed insufficient
- Should support and allow configuration of the following video resolutions or better.
 - 352 X 288 (SIF)
 - 704 X 576 (4 SIF)
 - 704 X 288 (2 SIF)

- When running on MPEG-4 / H.264 compression, the video codec should support atleast 2 simultaneous streams at resolutions between 4SIF and SIF.
- Each of these streams must be independently configurable to view and record at different frame rate and resolutions simultaneously.
- Each Video stream should in turn allow for TCP connections, UDP connections and an unlimited number of Multicast connections.
- Each stream must allow independent configuration of bit rate, frame rate, I frame interval, rate control mode and motion data.
- All streams must guarantee full frame (25fps) rate under high motion, PTZ operation and all conditions. **A certification from the manufacturer is required to prove this and will need to be shown during demonstration.**
- The IP Camera must support Capped Bit Rate (CBR) control, to enable users to keep bandwidth utilization under a certain value without compromise on image quality irrespective of the level of motion in the scene.
- The IP Camera must support **Activity Controlled Frame Rate** control to automatically adjust frame rate depending on motion in the scene. During periods of negligible motion, the frame rate must drop to 1fps and when motion occurs the frame rate will return to full frame rate (30fps/25fps) within 100ms. It must be configurable using a Region of Interest editor (ROI) that can select regions of the scene where motion will be ignored.
- Support network protocol 802.3 and IETF Standards 10/100 Base-T Ethernet, RTP/RTCP, TCP, UDP, ICMP, SNMP, HTTP, FTP, TELNET, MULTICAST, ARP and IGMP
- Each stream Bit-rate should be user configurable from 32 to 4096 Kbps or better
- The IP Camera will have a built in web server, making it accessible for configuration using a standard Internet browser.
- The IP Camera must be compatible to support advanced analytics software which should be able to perform the following:
 - Intelligent Motion Detection
 - Virtual trip wire
 - Left item detection
 - Theft detection
 - Object tracking
 - Counter flow detection
- Must have minimum 1 alarm inputs and 1 relay outputs
- The IP Camera must support redundant recording by streaming to multiple recorders at the same time.
- Should be able to detect motion based on localized area, object size & direction
- It must be possible to reset a unit back to Factory Default configuration without losing IP address information.
- Video Output PAL
 - Composite Video
- Serial Data Port supporting RS232/ RS422/ RS485

- Password protected Web interface for administration
- Should have onboard diagnostics facility for serial, Video & Network interface. System logging shall be possible to a remote IP address, the console port or the unit itself.
- The system MUST be able to use one particular frame rate and resolution at Day time and automatically switch to another frame rate/resolution profile when low light conditions occur
- The system MUST allow for Telnet/FTP access into the units and also this access MUST be configurable, wherein when active access is allowed and when deactivated access MUST not be allowed.

(c) IP Fixed Dome Camera (Indoor Type)

- Latest Sony Ex View 1/3 " or 1/4" interlaced imager or better
- Camera must provide atleast 752x582 (PAL) active pixels
- Color Resolution 540 TV Lines or better for sharp pick up of live video.
- Minimum Sensitivity of Day: 0.5 Lux; Day/Night: 0.5 lux color / 0.05 lux
- White Balance Mode: Auto; Fluorescent; Indoor; Outdoor
- Verifocal /Auto Iris DC drive lens options of 3.8 – 9.5mm or 9 – 22mm
- Shutter Speeds 1/60 to 1/10,000 (NTSC), 1/50 to 1/10,000 (PAL) or Auto*
- Operating voltage: Power over Ethernet (802.3AF); 12V/24V AC/DC.
- The hardware architecture must incorporate multiple processors to ensure best video quality and other functions even at maximum processor load
- The IP Camera must offer a choice of either MPEG-4 Advanced Simple Profile or H.264 video compression standards, by just upgrading the firmware over the network without dismantling the camera.
- The IP Camera must run Linux Operating system for reliability.
- The camera must have a built in firewall - SSL and other non-IP address specific security measures are deemed insufficient
- Should support and allow configuration of the following video resolutions
 - 352 X 288 (SIF)
 - 704 X 576 (4 SIF)
 - 704 X 288 (2 SIF)
- When running on MPEG-4 / H.264 compression, the video codec should support at least 2 simultaneous streams at resolutions between 4SIF and SIF.
- Each Video stream should in turn allow for TCP connections, UDP connections and an unlimited number of Multicast connections.
- Each stream must allow independent configuration of bit rate, frame rate, I frame interval, rate control mode and motion data.
- All streams must guarantee full frame (25fps) rate under high motion and all conditions. **A certification from the manufacturer is required**

- The IP Camera must support Capped Bit Rate (CBR) control, to enable users to keep bandwidth utilization under a certain value without compromise on image quality irrespective of the level of motion in the scene.
- The IP Camera must support Activity Controlled Frame Rate control to automatically adjust framerate depending on motion in the scene. During periods of negligible motion, the frame rate must drop to 1fps and when motion occurs the frame rate will return to full frame rate (30fps/25fps) within 100ms. It must be configurable using a Region of Interest editor (ROI) that can select regions of the scene where motion will be ignored.
- Support network protocol 802.3 and IETF Standards 10/100 Base-T Ethernet, RTP/RTCP, TCP, UDP, ICMP, SNMP, HTTP, FTP, TELNET, MULTICAST, ARP and IGMP
- Each stream Bit-rate should be user configurable from 32 to 4096 Kbps or better
- The IP Camera will have a built in web server, making it accessible for configuration using a standard Internet browser
- The IP Camera must be compatible to support advanced analytics software which should be able to perform the following:
 - Intelligent Motion Detection
 - Virtual trip wire
 - Left item detection
 - Theft detection
 - Object tracking
 - Counter flow detection
- Must have minimum 1 alarm inputs and 1 relay outputs
- The IP Camera must support redundant recording by streaming to multiple recorders at the same time.
- Camera should be able to detect motion based on localized area, object size & direction
- It must be possible to reset a unit back to Factory Default configuration without losing IP address information
- Video Output PAL
 - Composite Video
- Serial Data Port supporting RS232/ RS422/ RS485
- Password protected Web interface for administration
- Should have onboard diagnostics facility for serial, Video & Network interface. System logging shall be possible to a remote IP address, the console port or the unit itself.
- The system MUST be able to use one particular frame rate and resolution at Day time and automatically switch to another frame rate/resolution profile when low light conditions occur
- The system MUST allow for Telnet/FTP access into the units and also this access MUST be configurable, wherein when active access is allowed and when deactivated access MUST not be allowed.

(d) Video Operation Codec Management, Recording and Processing Software (VOCMRPS)

- VOCMRPS will be a highly scalable, enterprise level software solution. It must offer a complete Video Surveillance solution that will be scalable from one to hundreds of cameras that can be added as and when required. It should allow for seamless integration of third party security infrastructure where possible. The system MUST be capable of working on latest Windows OS and Windows Server platforms. Should support client- server architecture.
- The software must come as one unit and not multiple loadable units and should support free distribution of multiple clients to multiple machines.
- The software must not have operator seat based licensing. It must allow for any number of user seats/installations on the IP video network to be added for future scalability at no management software cost or licensing cost.
- The manufacturer supplied management software pack should be on open platform/ standard media player.
- The VOCMRPS should allow for video to be streamed on a video mosaic wall.
- All upgrades and releases should be made available free of cost during warranty period.
- The system shall allow operation with/without a PC keyboard or mouse with touch screen PC monitors. Once system configured, virtual matrix functions can be carried out using CCTV keyboards and should have capability to configure with HDTV.
- The VOCMRPS shall provide the following:
 - Automatic search of components of proposed system on the network. They can be Cameras, Monitors, Alarm panels, NVRs. It should also capture video from various source like webcam, USB cam etc.
 - The system should allow for live view, playback and system configuration of the IP video system.
 - The system should allow for creation of multiple users and user groups and assign tasks to each.
 - Drag & Drop functions for most functions on the system and also for set up of connection between cameras and monitors and also support to create custom layout by grouping of cameras from different server/ locations into groups for more efficient monitoring.
 - Several simultaneous live picture connections of camera in network. It should be capable of showing video pane layouts including 2x2, 3x3, 4x4, 5x5, 8X8 various Hot Spots (1+5, 1+7, 1+9, 1+12, 1+16) and custom layouts
 - It shall be possible to display video and audio bit rates; frame rate and resolutions on each video pane as overlays.
 - The live view must be capable of highlighting motion as green rectangle overlays and displaying real-time alarm information overlaid on the live video feed.
 - It shall be possible to listen to audio from individual codec (cameras) or Receivers.
 - Audio must be simultaneously transmitted from the Operator to allow a two-way conversation.
 - It must be possible to establish bi-directional audio connection on alarm. The user should also be able to disable listen when speaking to prevent feedback through the microphone.
 - System setup for pre-defined surveillance tasks to be invoked at pre-defined times in the day.
 - Programming of automatic recording events on NVR, maybe based on events such as alarms and video analysis
 - Remote maintenance of IP Video components
 - Off line construction of site 'tree' and addition of devices
 - It shall be possible to show text on screen display (OSD) when video is displayed on a Receiver/Decoder.

- The location of the OSD must be configurable on the screen
- The system should provide Video Lockout facility where a super-user can prevent all other users from viewing live video and divert recorded video to another Networked Video Recorder. The super-user shall also be able to release the video lockout and restore the system to its original state. It should also support software watchdog for advance detection of problem & recovery at server.
- The VOCMRPS shall allow the following:
 - Live display of cameras
 - Live display of camera sequences, salvos and guard tours
 - Playback of archived Video at speeds of x1/4 – x16
 - Retrieval of archived Video using normal playback, thumbnails (motion, event or time based)
 - Instant Replay of Live Video
 - Use of site maps and Google map
 - Configuration of system settings
 - For each camera set up bit rate, frame rate, and resolution shall be set independent of other cameras in the system. Altering the setting of one shall not affect the settings of other cameras.
 - Should allow up to 32 cameras to be replayed simultaneously from one NVR
 - Auto-protecting of video recording on post and pre ‘alarm’ images.
 - Exported recordings will be protected by an invisible watermark using hashing function with a 1024 bit key.
 - Should have facilities for play, forward, rewind, pause along with fast forward and rewind for reviewing the recorded videos.
 - The application should allow for time-synchronized playback of different cameras together in the same video pane. This will enable the operator to watch playback of an event in an area covered by multiple cameras from different angles as the event happens.
 - The system must support absolute redundancy with 1 to N, N to 1 and N to N redundancy configurations. All this should be provided without a licensing model.
 - The system must support video bookmarks, where the system allows the user to create textual bookmarks at various places in a recorded footage and allow access to these bookmarks through an intelligent bookmark management system.
 - The system must allow application of sorting and searching filters on bookmarks for faster retrieval and access to incidents in recorded footage.

(e) Network Video Recorder

- Should be installable on a Linux/Windows PC.
- The NVR/NAS should have no limitations on the kind of storage to be used (RAID, NAS, etc).
- The NVR/NAS must be capable of recording 50 cameras simultaneously.
- The NVR/NAS must be providing for a disk management system which will automatically reap old recordings to overwrite with new ones when max disk usage is reached.
- The storage on a minimum Disk of 8TB

(II) 5 KVA UPS (ONLINE) WITH BATTERY BACKUP FOR 30 MINUTES :

Input:

- Nominal AC Input Voltage: 1 Phase 230V AC + Neutral + Earth , 50 Hz
- Line low/ High transfer: + 15%
- Frequency range: + 5%

Output

- Voltage: 220VAC/ 230VAC/ 240VAC
- Voltage Regulation: + 1%
- Frequency: 50 Hz+/- 0.1%
- Output waveform: Pure sinewave
- Harmonic distortion: < 2% (linear load) / 5 % nonlinear load
- Power factor: 0.7 to unity
- Crest factor: 3:1
- Inverter overload capacity: 110% 15 min./ 125% 10 min./ 150% 1 min./ > 150% 1 sec.
- Efficiency (AC – DC): 90%
- Bypass: Static bypass

Display

- Standard: 2 line x 20 characters, Backlight LCD
- AC input voltage, AC input frequency, Battery voltage, AC output voltage , AC output frequency, AC output load %, Temperature
- UPS status(Mains fail, Individual phase fail, Battery low DC high, Overload with shut down time, Output low, Output high, Over temperature, UPS bypass)

(III) CAT – 6 Cable :

- 23 AWG Annealed bare solid copper, CAT-6 UTP Cable, Channel optimized to 350 Mhz
- Meets EIA/TIA 568-B.2-1 Category 6 specifications, Passed UL 444 test and meets CM and CMR ratings
- Worst Case Cable Skew : 45 nsec/100 meters
- Characteristic Impedence : 100(+/- 3) Ohms 500MHz , Tested till 700 Mhz
- Conductor Annealed copper wire Diameter 0.52 mm (nominal)
- Insulation High Density polyethylene, Diameter 0.94 mm (nominal)
- Support for Fast Ethernet and Gigabit Ethernet IEEE 802.3/5/12, Voice, ISDN, ATM 155 & 622 Mbps and Broadband