Specification for Upgrading of Finance Data Centre

LOT 1: Diesel Generator, Electricity, Uninterrupted Power Supply (UPS) and Cooling system

1.1 Diesel Generator 250 kVA

Three phase four wires, 50HZ at 1500 RPM, silent type. Guarantee Period: One year or 1000 hours whichever comes first. General features:

- Preferred engine brand: Perkins, Cummins, Caterpillar or equivalent
- Alternator Type: European Type or equivalent
- Oil and fuel filter fitted, water separator
- Lube-oil drain valve fitted
- Electric starter motor 24 V. D.C
- Output range: Prime-250KVA / Standby-275KVA
- Induction system: Turbocharged
- 8-hour operation base tank
- Key start / auto start
- Mechanical /Electrical governor
- 4 pole MCCB, set mounted starting battery
- Soundproof and weatherproof canopy
- Operation and Maintenance manual
- Special Integrated Steel Base tank and sprayed overall in gloss enamel paint

Genset Specification:

Voltage Regulation

Voltage regulation maintained within ±0.5%

- Between 0.8 and 1.0 lagging and unity
- From no load to full load
- At speed droop variation up to 4.5%

Frequency Adjustable Ratio

Change load from 0-100%, within 1.0% (electric speed regulator), within 4.5% (mechanical speed regulator)

Frequency Undulation

- Load from 0-100%, Frequency undulation within 0.25%
- No load wire volts max undulation ratio within 1.8%
- Three phrase balanced load in the order of 5%

Engine Specification:

In-line direct injection 6-cylinder diesel engine.

Type

Water cooled, four cycle, Turbocharged.

Construction

Two valves per cylinder, forged steel crankshaft and connecting rods, cast iron block. Starter 24 volt negative earth. battery charging alternator 35 amp on engine. Cranking current 640 amps at 0oc.

Fuel System

24 volt fail safe actuator. Spin-on paper element fuel filters with Bosch fuel pump injection system with integral

Electronic governor. Dual flexible fuel lines and connectors. Standard fuel water separator.

Filters

Air cleaner with dry element and restriction indicator. Spin full flow lube oil filter.
Oil cooler. Drain Tap

Alternator Technical Data:

- European Type or equivalent
- Brushless, self-exciting
- Class (H) insulation
- Standard degree of protection is IP23
- Self regulating
- With fan cooling
- Resist humid grease
- AC excitation, rotating rectification tube
- Stator grease insulation covered
- Rotator and excitation high polymer, Resist the corruption of oil and acid.
- Rotator balance is in accordance with BS5625 standard 12.5
- High-quality lubrication sealed long-time bearing
- Rotator silicon steel close tight

1.2 Electricity

Earthing:

Separate earthing should be installed to earth all IT equipment, server racks, UPS etc by making dedicated earth pits. Data Centre earthing should be separate from building earth system mainly used for other Non-IT equipments, lighting etc. The understructure system in the raised floor of the Data Centre also shall be properly connected to the building earth. All earth pits shall be as per IS 3043 with latest amendments. Earthing stations should contain relevant grade of charcoal and salt packed around the earth plate / earth pipe. Earthing shall be done at indicted location. The minimum distance between the two earth station shall be 3 meters. An earth ring with relevant earth test terminal boxes shall be provided at regular intervals. Adequate number of earth strips with proper sized holes shall be provided for extending earthing / looping earth connections at various floors shall be provided and executed as per the requirement.

The Contractor has to provide heavy duty Cover of size 450 x 450 x 8 mm thick to the Earthing Chamber. The cover is to be sand blasted and then Powder coated using Matt Jet Black Colour. The Cover is to be fabricated using 8 mm thick Chequered Plate. Other specifications are

- Earthing pits with 600 x 600 x 6mm Copper Plate earth upto 10 feet deep with all accessories (Dedi. for UPS)
- 6 sqmm braided copper tape for gride earthing
- 8 swg bare cu wire
- 25 x 3 copper Strip for Earthing of panel
- 1c x 50 sqmm cu flexible (Green Colour)
- Dedicated Earthing Box with 50mm x 10mm x 200mmLength.
- Tinned copper strip with 6mm holes
- 150x150x3mm Danger Notice Board & 415 Enameled Danger Board
- Shock Treatment chart with Frame In Local & English Language
- First Aid Medical Box
- 1000mm wide 20mm thick Rubber Matting suitable for 1100 Grade

Transient Voltage Surge Suppressor (TVSS)

For 80kVA UPS system incoming feeder. For PAC system incoming feeder.

TVSS is proposed for the critical and expensive electronic equipment protection from the transient over-voltages and shall be as per following specifications.

- Surge Current Capacity : 100 kA
- All Modes Protection : L-L, L-N, L-G, N-G
- Connection Type : Parallel
- Protection Level : < 1 kV
- MCOV : Min. 320 Volts
- Response Time : < 0.5 nanoseconds
- EMI/RFI Attenuation : 40 dB typical
- Status Indication : LED, Dry contacts
- Monitoring : Monitoring of All Modes, including N-E
- Fusing : Individual Fusing of MOV's including N-G
- Certification : UL 1449-3
- Enclosure : NEMA Tested
- Mounting : Wall Mounting
- Warranty : 3 Years

TVSS Detailed Specifications -

The main incoming switchboard (MSB) and distribution boards (DB) shall be equipped with TVSS as defined in the IEEE standard 1100(1999).

1. The TVSS shall be constructed of Metal Oxide Varistor (MOV) technology and Internal surge capacitors.
2. The surge protective devices shall be sized per IEEE Std C62.41-1991 and IEEE Std C62.45- 1992.
3. The TVSS shall have a UL listing and labeled 1449-3 suppressed voltage rating of 1000V peak.
4. The unit shall have a maximum continuous operating voltage (MCOV) rating of minimum 320VRMS.
5. The Response time of TVSS shall be ≤ 0.5 nanoseconds.
6. The TVSS shall provide up to 40dB for RFI & EMI noise attenuation.
7. TVSS monitoring shall consist of indicator lamps and form C dry contacts. Monitoring of all
modes, including N-E is required.
8. The TVSS warranty shall be 3 years minimum and cover all parts of the TVSS.

Input Electrical Feeder Power Source: Lesotho Electricity Company will provide an independent RAW power feeders backed up by Diesel Generator supply terminated on a suitable LT panels for 80 KVA UPS, three PAC Systems (50 KVA) at Electrical / UPS room at ITG Ground Floor and LT panels at first floor for Lighting, comfort AC loads as described below.

At ground floor UPS Room:

1. 80 KVA (160 Amps) Raw power Feeder for UPS-1
2. 80 KVA (160 Amps) Raw power Feeder for UPS-2.
3. 50 KVA (160 Amps) Raw power Feeder for PAC Cooling

At first floor entrance area:

1. Panel for Lighting loads
2. Panel for Power load like comfort AC, etc.

From the NIO supplied LT feeder panels onwards all electrical input and output cables (Fire-retardant quality) and wiring for all UPS and PAC systems should be provided by the vendor as per the specifications mentioned in electrical. All UPS systems and its backup battery banks will be installed at identified Ground Floor area.

Structured Cabling in other areas:

As per TIA -942 guidelines all power and data cables for other areas should be carried under the raised flooring in separate raceways. The power cables will be carried through raceway beneath cold aisle and the data cable will be extended in raceways under the Hot Aisle

Main Power Cables:

1. The interconnection cable for UPS input and output shall be single core copper to make easy termination.
2. Cables for PAC, Comfort AC shall be fire retardant type copper flexible conductor. The PAC interconnecting cables between indoor and outdoor units must be armoured cables.
3. All electrical load points in the first floor area, server and network racks load points shall be individually wired through Fire Retardant copper conductor cable as per the specifications mentioned in the respective area.
4. Separate trays should be provided for both Data and Electrical cables. Common trays are not allowed either above ceiling or below flooring. As per TIA -942 guidelines all cables (Power & Data) will be carried under the raised flooring in separate raceways. The power cables will be carried through raceway beneath cold aisle and the data cable will be extended in raceways under the Hot Aisle.

Main Power cable:

Main Cables	**From**	**To**
1C x 50 Sq.mm Cu flexible FRLS	LEC Raw Power Panel	UPS-1, 80 kVA
	LEC Raw Power Panel	UPS-2, 80 kVA
	LEC Raw Power Panel	PAC Main Panel
	UPS-1, 80 kVA	UPS-1 PDU
	UPS-2, 60 kVA	UPS-2 PDU
5C x 10 Sq mm Cu. flexible FRLS	LEC Raw Power Panel	UPS-3, 10 kVA
	UPS-3, 10 kVA	BMS/ Emergency DB
	PAC Main Panel	PAC
3C x 6 Sq mm Cu. flexible FRLS	UPS-1 PDU	Each Racks
	UPS-2 PDU	Each Racks
5C x 10 Sq mm Cu. flexible FRLS	UPS-1 PDU	Storage Rack
	UPS-2 PDU	Storage Rack
3Cx6 Sq.mmCu flexible FRLS	LEC Raw Power Panel	Comfort AC locations
	LEC Raw Lighting Panel	ON/OFF Lighting Panel

1.3 Cooling Technical Specification

The following specifications is applicable under normal conditions including total pressure losses through the water circuit inside the unit.

		Open Loop	Closed Loop
Total Cooling Capacity	kW	19.3	36.0
Power Supply	V/ph/Hz	230/1/50	230/1/50
Air Flow	m3/h	3600	4000
FAN			
AC Fan version			
Number of Fans		5	5
Fan Motor Max. (each)	W	160	160
	A	0.7	0.7
EC Fan version			
Number of Fans		5	5
Fan Motor Max. (each)	W	178	178
	A	1.4	1.4
Air-to-Water Heat Exchanger			
Face Area	m2	0.4	0.4
Air Face Velocity	m/s	2.8	2.8
Water Circuit			
Water Flow	l/h	3300	6200
Water Pressure Drop (total)	kPa	75	142
Water Valve		3 way modulating valve	
Water Connection Sizes			
Supply Line Diameter	in	1`` Female	1`` Female
Return Line Diameter	in	1`` Female	1`` Female

Closed loop: return air temperature 45C/RH 15%
Open loop: return air temperature 30C/RH 30%
Water temperature in = 7C
Water dT = 5C (12C return temperature)
Gross cooling capacity (including power dissipated by fans)
Refrigerant: Water without additives

Complete cooling management application should be supplied also to:

- Monitor and administer their cooling systems from any location with Internet access
- Automatically notify key personnel of alarms or alerts
- Analyze and graph trends, to predict and prevent problems before they happen
- Integrate with existing network and management systems via open standards and platforms

1.4 Uninterruptible Power Supply Technical Specification

Electrical - Surge Levels & EMI/RFI

On the AC Mains to Rectifier/Charger	Surge & EMI/RFI Levels can be high
On the UPS Static Bypass Input	Surge & EMI/RFI Levels can be high
On the DC Input - Battery	Power Gen. UPS often connected to Station Battery High DC Transients
Input Isolation Transformer	Usually Specified in Industrial setting

Physical Environment - UPS Area

Ambient Temperature	15 – 55 Degrees Celsius
Air Humidity	10 – 95 % RH
Air Contaminants	Often very dusty, sometimes corrosive air contaminants also

UPS Static Switch Design

Full Electronic vs. Hybrid Configuration	Full Electronic – SCR devices in both Inverter & Bypass poles
Sustained Load Fault Clearing on Bypass	SCR devices are sized for worst- case bypass fault current.

UPS Failure Contingency

Static Switch Power Supply Failure	Static Switch Fails to Bypass Source
Control Microprocessor Failure	Static Switch Fails to Bypass Source
Spare parts & Obsolescence	15 –25 yr. support required

Manual Bypass Scheme

Drum Switch vs Circuit Breaker	Drum Switch – zero break
Independence from Static Switch	Independent of Static switch

UPS Battery

Design Life	VRLA & Flooded – 20 years
Support time Range	60 – 480 minutes
Depth of Discharge / End Voltage	60 -80%, minimum 1.75 volts per cell
Battery Re-charge Time to 90% of original Capacity	Battery Chargers are sized to achieve 8 hour recharge
100% Performance Testing MA	Certified Test Data per NEMA PE-1, NE-PE-5, IEE-944, IEC-146

Equipment Design Life	10 - 15 Years in Petrochemical 15 – 30 Years in Power Gen.
Inverter Technologies	Split between Ferroresonant and PWM Inverters

Logical and complete power management application should be supplied also to:

- Monitor and administer their UPSs from any location with Internet access
- Automatically notify key personnel of alarms or alerts
- Perform orderly, unattended shutdowns of connected equipment, or better, work with virtualization software to move virtual machines so as to maximize availability of key applications and hardware
- Selectively shut down non-critical systems to conserve runtime
- Analyze and graph trends, to predict and prevent problems before they happen
- Integrate with existing network and management systems via open standards and platforms

LOT 2. Integrated Fire Suppression System Specification

PERFORMANCE REQUIREMENTS

A. Design clean-agent extinguishing system and obtain approval from authorities having jurisdiction. Design system for Class A, B, or C fires as appropriate for areas being protected and include safety factor. Use clean agent indicated and in concentration suitable for normally occupied areas.

B. The system shall be complete in all ways necessary for a functional, UL listed and/or FM approved, clean agent suppression system. It shall include: All mechanical and electrical installation, all detection and control equipment, agent storage containers, clean agent, nozzles, pipe and fittings, manual release and abort stations, audible and visual alarm devices, auxiliary devices and controls, shutdowns, alarm interface, caution/advisory signs, functional checkout testing, and training.

C. Performance Requirements (Agent): Per manufacturer’s data.

D. Performance Requirements (Detection): Per manufacturer’s data.

E. System Operating Sequence: As described by manufacturer.

PIPING MATERALS

Steel Pipe: ASTM A53, Type S, Grade B or ASTM A106, Grade B; Schedule 40, seamless steel pipe.

1. Threaded Fittings:
    a. Malleable-Iron Fittings: ASME B16.3, Class 300.
    b. Flanges and Flanged Fittings: ASME B16.5, Class 300, unless Class 600 is indicated.
2. Grooved-End Fittings: FMG approved and NRTL listed, ASTM A47 malleable iron or ASTM A536 ductile iron, with dimensions matching steel pipe and ends factory grooved according to AWWA C606.

2.4 VALVES

A. General: Brass; suitable for intended operation.

B. Container Valves: With rupture disc or solenoid and manual-release lever, capable of immediate and total agent discharge and suitable for intended flow capacity.

2.5 EXTINGUISHING-AGENT CONTAINERS

A. Description: Steel tanks complying with ASME Boiler and Pressure Vessel Code: Section VIII, for unfired pressure vessels. Include minimum working-pressure rating that matches system charging pressure, valve, pressure switch, and pressure gage.

1. Finish: Red and white enamel or epoxy paint.
2. Storage-Tank Brackets: Factory- or field-fabricated retaining brackets consisting of steel straps and channels; suitable for container support, maintenance, and tank refilling or replacement.
3. Each cylinder shall have a low-pressure switch to provide visual and electrical supervision of the container pressure. The low-pressure switch shall be wired to the control panel to provide an audible and visual “Trouble” alarm in the even the container pressure drops below 272 psi.
4. Each cylinder shall be fitted with a liquid level device to determine the clean agent quantity without removing the cylinder from its mounting bracket, disconnecting the distribution piping, or removing the clean agent system from service. (35 lb. and 60 lb. cylinders are excluded).

2.6 FIRE-EXTINGUISHING CLEAN AGENT

A. Manufacturers:

1. Fike Corporation.
2. Ansul.
3. Viking.

B. Clean Agent: HFC-227ea, heptafluoropropane.

2.7 DISCHARGE NOZZLES

A. Equipment manufacturer’s standard one-piece brass or aluminum alloy of type, discharge pattern, and capacity required for application.

1. Deflector plates shall be used with the nozzles when sensitive ceiling tiles must be protected.
2. A maximum nozzle flow rate of 17 lbs./sec shall be designed for all areas with false ceilings or delicate operations. Higher flow rates may dislodge objects, which could damage or affect equipment and/or process.

2.8 FIRE SUPPRESSION RELEASING CONTROL PANEL

A. Control panel and its components shall be listed and approved type.

B. The addressable control panel shall be UL listed and Factory Mutual Global (FMG) approved for use as a local fire alarm system, and/or releasing clean agent, deluge and preaction sprinkler fire suppression systems.

C. Control panels shall be capable of networking with similar panels to allow for internal and external NOC communications.

D. Power Requirements: 120-Vac; with electrical contacts as described in manufacturers data.

E. The control-panel shall include the following features:

1. Electrical contacts for shutting down fans, activating dampers, and operating system electrical devices.
2. Automatic switchover to standby power at loss of primary power.
3. Storage container, low-pressure indicator.
4. Service disconnect to interrupt system operation for maintenance with visual status indication on the control panel.

F. Standby Power: Lead-acid or nickel-cadmium batteries with capacity to operate system for 24 hours and alarm for minimum of 5 minutes. Include automatic battery charger, with varying charging rate between trickle and high depending on battery voltage that is capable of maintaining batteries fully charged.

2.9 DETECTION DEVICES

A. These shall include ionization detectors and remote air-sampling detector system. Including air-sampling pipe network, a laser-based photoelectric detector, a sample transport fan, and a control unit.

2.10 MANUAL STATIONS WITH DIGITAL COUNTDOWN TIMER

A. General Description: A manual release shall also consist of a digital countdown timer and abort switch combined as one unit.

B. Manual Release: “AGENT RELEASE” caption, and red finish. Unit shall have a metal housing with a dual action release configuration to prevent accidental system discharge.

C. Abort Switch: “ABORT” caption, momentary contact, with yellow button.

D. Countdown Timer: The countdown timer provides a digital readout, indicating the number of seconds remaining until the clean agent discharges. There shall be a label stating “Seconds Remaining to Discharge” at the digital readout.

E. Each manual release and abort station shall include a contact monitor module to provide for a custom message and device location at the control panel.

2.11 SWITCHES

A. Listed and approved type, 120-Vac or low voltage compatible with controls. Include contacts for connection to control panel.

1. Low-Agent Pressure Switches: Pneumatic operation.
2. Door Closers: Magnetic retaining and release device or electrical interlock to cause the door operator to drive the door closed.

2.12 ALARM DEVICES

A. Low voltage and surface mounting, unless otherwise indicated.

B. Bell: Minimum 6-inch diameter.

C. Horns: 90 to 94 dBA.

D. Strobe Lights: Translucent lens, with “AGENT” or similar caption.

2.13 AUXILIARY PANELS

A. Maintenance By-Pass Switch/Panel: Shall be located adjacent to the clean agent releasing control panel. The maintenance by-pass switch/panel shall have a key-switch which, when operated, will place the clean agent control panel in a “TEST” mode without affecting the detection system.

LOT 3. CCTV Technical Specifications

3.1 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

(c*) IP Fixed Dome Camera (Indoor Type)*

- Latest Sony Ex View 1/3 “ or 1/4" interlaced imager or better
- Camera must provide at least 752x582 (PAL) active pixels
- Colour 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 colour / 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 utilisation 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. • Camera should be able to detect motion based on localised 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 overlayed 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-synchronised 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 sine wave
- 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, Over-load 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 opti-mised 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 Impendence : 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

3.2 Access Control Technical Specification

- Size: 4.4” L x 5.3” W x 1.5” D
- User Capacity: 8000
- Verification mode: 1:N
- Card type: EM4100 125 Khz
- Reading distance: >5cm
- Interface: Wiegand 26
- FAR: <=0.001%
- FRR: <= 1%
- Verification speed: <=1 second
- Operating Temp: 32°F – 105°F
- Voltage: 12VDC

- Idle draw: 80mA
- Operating draw: 500mA
- Relay: SPDT, 12VDC, 3A
- Optional Wiegand input