public works

Department:
Public Works
REPUBLIC OF SOUTH AFRICA

TECHNICAL SPECIFICATION PIJ

PARTICULAR SPECIFICATION SECURITY SYSTEMS

DEPARTMENT OF PUBLIC WORKS
SUNDUMBILI MAGISTRATES COURT

TECHNICAL SPECIFICATION PIJ

PIJ   PARTICULAR SPECIFICATION INTEGRATED SECURITY SYSTEM

CONTENTS

<u>**PIJ 01**</u>   <u>**SCOPE : GENERAL**</u>

PIJ 01.01

This specification specifies the principle of operation, the video equipment, the software, the Network Video recorders, the network, switches and servers.

PART 1 : **GENERAL**

PIJ 02 01 02 SUMMARY:

The contractor is required to supply and install a high-definition IP-Based Video Surveillance system with adaptive Video Analytics at the Gamalakhe SAPS. This system is to integrate seamlessly with any other electronic security systems for Gamalakhe supplied and installed under separate contracts.

All cameras mounted within and on the facility buildings will be linked to and powered by a star-topology distributed network of PoE switches with fibre uplinks to the Central Control Room. Perimeter cameras will be installed on a fibre ring using industrial grade switches with full ring protection. All other fibre links are to have dual-redundancy.

A Secondary Control Room with mirrored recording is fundamental in providing a completely fail-safe solution. Satellite Remote Viewing Stations will also be provided for the Management of localized cameras within the various sectors of the prison. Each Control Room is to incorporate a video wall with intelligent virtual matrix together with individual investigation stations. To facilitate communication and investigation between the Control Rooms, Satellite Stations and Management the solution must include collaborative investigation

functionality allowing video feeds to be shared and manipulated in real time.

The Network Video Management Software (NVMS), Network Video Recorder (NVR) Hardware, Network Surveillance Cameras and related components shall be installed and commissioned by authorized integrators trained and certified by the manufacturer. Certification and training for authorized integrators shall be available from the manufacturer or their local representative.

The tenderer is required to submit rates as per the Bill of Quantities. These rates are deemed to be inclusive of costs for all elements to make the system complete and fully functional.

The Security Video Surveillance System shall include but is not limited to the following:

1. Network Video Management Software (NVMS)
2. Network Video Recorders (NVR)
3. Network Video Remote Monitoring Workstations (RMWS)
4. Network Video Cameras

    1. Infrared Bullet Type

    2. Micro-Dome Type

    3. Pendant Dome Type

    4. Vandal Proof Dome Type

    5. Pan, Tilt and Zoom Dome Type

5. Network Infrastructure

PIJ 02 01 03 SUBMITTALS

Submittals described in this section shall be submitted by the Contractor with the original bid.

B. Product Data

1. Submit manufacturer technical specifications, typical installation drawings, system overview drawings and sample images of items included in this section.

C. Proposal Delta

1. It is the duty of the contractor to provide a working system. Any omissions or errors or differences between this document and the contractor's submitted proposal shall be clearly outlined in a separate document labeled "Proposal Deltas".

D. Qualification Statements

1. Manufacturer

   1. Submit confirmation and details of manufacturer's warranty, extended warranty, and replacement policies.

   2. Submit preceding 3 years financial statements for the equipment manufacturer.

   3. Submit list of available manufacturer provided, fee based professional services available to the contractor or the owner including but not limited to: training, installation, commissioning, remote diagnostics and integration with 3rd party software and hardware systems.

2. Contractor

1. Submit confirmation that contractor is licensed to install video surveillance and security equipment as required by the authority having jurisdiction.

2. Submit history of contractor certification(s) for items in this section.

3. Submit references with contact information where contractor has installed items in this section.

4. Submit confirmation that installer [who will install this equipment or who will supervise installation of this equipment] has received manufacturer training and is certified by the manufacturer on this equipment and that the training the installer received is current.

5. Submit preceding 3 years financial statements for the contractor.

PIJ 02 01 04 MAINTENANCE MATERIAL SUBMITTALS

E. Spare Parts

1. Deliver to the owner in its original packaging, spare parts as listed in the camera schedule.

2. Spares shall be housed in an environment and condition recommended by the manufacturer and shall be clearly labeled with "SPARE: DO NOT REMOVE", manufacturer part number, and date of delivery to the owner.

3. All packaging for spares must be kept in good condition and used as appropriate for any Returns to Manufacturer (RMA).

PIJ 02 01 05 QUALITY ASSURANCE

F. Qualifications

1. Manufacturer

    1. Manufacturer shall have been in business for more than 5 years.

2. Installers

    1. All camera installation, configuration, setup, program and related work shall be performed by authorized integrators/electronic technicians certified by the manufacturer.

    2. Certification for authorized integrators/electronic technicians shall include at a minimum the installation and service of the equipment provided.

PIJ 02 01 06 CERTIFICATIONS AND STANDARDS

PIJ 02 01 07 WARRANTY

G. The Contractor shall provide a single written document outlining the warranty of the manufacturer(s) product and the contractor's installation, on a single document. The document shall warrant complete installation of all services and equipment to be free from defects in materials and workmanship for a period of:

1. 12 months on all moving parts

2. 36 months for all other parts

H. During the warranty period, manufacturer shall provide direct support to the owner via web, phone and email, access to training and

education in the form of documents, videos and other materials via the web from a secure site

I. Contractor shall provide any software maintenance patches and version updates or upgrades at no-additional cost to Owner for a period of at least 2 years.

J. The Contractor will provide a cost budget for up to five (5) years for the maintenance and upgrades to the system. The budget must clearly define all contractor and manufacturer costs expected.

PART 2 : PRODUCTS

PIJ 02 02 01 NETWORK VIDEO RECORDER (NVR)

1. Network Video Recorders are to be supplied with and installed in 19" Server Racks in the Central and Secondary Control Rooms.

2. Each Network Video Recorder shall be preloaded by the manufacturer with Network Video Management Software (detailed in PART 2: PRODUCTS 2.4.) and configured for maximum performance and reliability. Each NVR is to record up to 32 MB/s of video image data from up to 128 camera channels running at 30 images per second (ips). It is to be of enterprise-class reliability with onboard storage configured in Raid-5. Hard Disk Drives and powers supplies are to be hot-swappable to facilitate running repairs. All NVR's are to be synchronized in a single cluster to operate as one unit providing a fully crash-proof solution in the event of complete NVR failure.

3. Each NVR is to be supplied complete with rack-mount kit, cable-management arm, rack bezel, USB keyboard, USB optical mouse and power chord.

4. Each NVR must meet the following minimum system, mechanical, electrical and environmental specifications:

1.	Recording Rate:	32MB/s
2.	Camera Channels:	128
3.	Recording Image Rate: total	30ips/channel – 3840ips
4.	Operating System: Embedded Standard 7	Microsoft ®Windows®
5.	Hard Disk Drive: 5	SAS, hot swappable, Raid-
6.	Onboard Recording Capacity:	21TB / NVR
7.	Expandable Recording Capacity: total	240TB / NVR – 261TB
8.	Processor:	Intel® Xeon® Processor E5-2407
9.	Memory:	6GB RAM (3 x 2GB)
10.	Network Interface: Ports (1000Base-T)	2 Gigabit Ethernet RJ-45
11.	Video Output:	1 VGA
12.	Optical Drive:	1 DVD-RW
13.	Form Factor: Rack-Mount kit)	2U Rack Mount Chassis (with
14.	Power Supply: Redundant	Single Hot-Swappable / Dual-

15.	Power Consumption:	495W
16.	Operating Temperature:	10°C to 35°C
17.	Humidity: (non-condensing)	20-80% Relative Humidity
18.	Operating Vibration:	0.26G at 5Hz to 350Hz for 2 minutes
19.	Operating Shock: up to 2.6ms	1 shock pulse of 31G for

PIJ 02 02 02 NETWORK VIDEO WALL WORKSTATION – 4 MONITOR (VWWS)

5. Network Video-Wall Workstations are to be supplied and installed as video wall drivers in the Central and Secondary Control Rooms.

6. Each Video Wall Workstation is to be supplied in a desktop form factor and must have the capacity to support up to four high-resolution (full HD) video monitors displaying 64 image panels per monitor and a total 256 video channels. The workstations are to be preloaded by the manufacturer with NVMS Client software.

7. Each VWWS is to be supplied complete with USB keyboard, USB optical mouse and a professional USB joystick incorporating a jog shuttle.

8. Each VWWS must meet the following minimum system, mechanical, electrical and environmental specifications:

    1. NVMS Edition: Enterprise

2.	Viewing Channels: workstation	64 / video monitor – 256 /
3.	Data Rate:	10MB/s
4.	Operating System: Professional (64-Bit)	Microsoft ®Windows® 7
5.	Processor: 2609	Dual Intel® Quad Core Xeon E5-
6.	Memory:	8GB RAM (4 x 2GB)
7.	Network Interface: Port (1000Base-T)	Gigabit Ethernet RJ-45
8.	Display Hardware: 600	Dual Nvidia Quaddro K-
9.	Video Ports:	4 Active (2 Display Port, 2 DVI)
10.	Optical Drive:	1 DVD-RW
11.	Form Factor:	Desktop
12.	Power Supply:	Single Non-Redundant
13.	Power Consumption:	635W
14.	Operating Temperature:	10°C to 35°C
15.	Humidity: (non-condensing)	20-80% Relative Humidity
16.	Operating Vibration:	0.0002G at 5Hz to 350Hz
17.	Operating Shock: up to 2ms	1 shock pulse of 40G for

PIJ 02 02 03 NETWORK VIDEO REMOTE MONITORING WORKSTATION – 2 MONITOR (RMWS)

9. Network Video Remote Monitoring Workstations are required to be supplied and installed as investigation stations in the Central and Secondary Control Rooms as well as observation and investigation stations in each of the Satellite Control Rooms.

10. Each Remote Monitoring Workstation (RMWS) is to be supplied in a desktop form factor and must have the capacity to support up to two high-resolution (full HD) video monitors displaying 64 image panels per monitor and a total 128 video channels. The RMWS's are to be preloaded by the manufacturer with NVMS Client software.

11. Each RMWS is to be supplied complete with USB keyboard, USB optical mouse and a professional USB joystick incorporating a jog shuttle.

12. Each RMWS must meet the following minimum system, mechanical, electrical and environmental specifications:

   1. NVMS Edition: Enterprise
   2. Viewing Channels: 64 / video monitor – 128 / workstation
   3. Data Rate: 10MB/s
   4. Operating System: Microsoft ®Windows® Embedded Standard 7 (64-Bit)
   5. Processor: Intel® Quad Core Xeon E3-1220V2
   6. Memory: 4GB RAM (2 x 2GB)

7.	Network Interface: Port (1000Base-T)	Gigabit Ethernet RJ-45
8.	Display Hardware:	Nvidia Quaddro K-600
9.	Video Ports:	2 Active (1 Display Port, 1 DVI)
10.	Optical Drive:	1 DVD-RW
11.	Form Factor:	Desktop
12.	Power Supply:	Single Non-Redundant
13.	Power Consumption:	320W
14.	Operating Temperature:	10°C to 35°C
15.	Humidity: (non-condensing)	20-80% Relative Humidity
16.	Operating Vibration:	0.0002G at 5Hz to 350Hz
17.	Operating Shock: up to 2ms	1 shock pulse of 40G for

PIJ 02 02 04 NETWORK VIDEO MANAGEMENT SOFTWARE (NVMS)

13. The Network Video Management Software (NVMS) must include all licenses required to provide a complete and fully functional solution.

14. The NVMS must be preloaded on the hardware as described in the preceding paragraphs.

15. The design and performance requirements for the NVMS software are as follows:

1. The NVMS shall be pre-loaded on turn-key Network Video Recorders running Microsoft Windows Embedded Standard 7, with configurable storage.

2. The NVMS shall be available in a licensed Enterprise, Standard and Core edition.

3. The NVMS shall be an enterprise level software solution that shall be scalable from one client, server, and camera to hundreds of clients, servers, and cameras.

4. The NVMS shall consist of server software applications and client software applications.

5. The NVMS shall include a gateway software application that connects mobile devices to the NVMS.

6. The NVMS shall support HDSM (High Definition Stream Management) for local and remote users and mobile devices.

7. The NVMS mobile client shall be supported by Android and Apple mobile devices.

8. The NVMS shall be available in English.

9. The NVMS shall include but not limited to the following applications:

   1) Server Software Applications

      a) Control Center Server

      b) Control Center Admin Tool

      c) Control Center Gateway

   2) Client Software Applications

      a) Control Center Client

      b) Control Center Web Client

      c) Control Center Player

      d) Control Center Camera Installation Tool

      e) Control Center Mobile

10. The NVMS shall permit server and client software applications to be installed and run on both the same computer or on separate computers.

11. The NVMS shall support storage and processing of video and audio.

      1) Audio and video must be recorded natively from the camera with no transcoding.

      2) Audio and video must be synchronized regardless of frame-rate, resolution or bitrate.

12. The NVMS shall support High Definition Stream Management (HDSM) architecture which includes:

      1) Support for industry standard JPEG2000, MJPEG, MPEG-4, and H.264 compression formats

      2) Support for reducing the required client bandwidth and processing power by only transmitting what is necessary to view the video stream at full quality (e.g. if a user is viewing a 29MP camera in a 1MP window then a 1MP representation of the 29MP image shall be transmitted).

      3) Support for "data-aging", enabling a low quality and high quality stream to be recorded under the same logical ID. After an administrator defined period of time, the higher stream would be deleted and the lower stream would remain until the end of the desired retention period.

13. The Network Video Management Software (NVMS) shall support recording and management of video and audio sources including but not limited to all the major brands of cameras and encoders fom 1 Megapixel to at least 5 Megapixels

14. The NVMS shall support receiving digital input triggers and triggering digital outputs through an I/O board.

15. The NVMS shall support recording and monitoring video and audio streams from sources with bandwidth up to 90 Mbit/sec, frame rate up to 60 fps, and video resolution up to 29 MP (6576 x 4384).

16. The NVMS shall support the decompression of H.264 video through the client graphics card/graphical processing unit instead of using the client processing power.

17. The NVMS shall require no proprietary recording hardware, no hardware multiplexer or time-division technology for video and audio recording or monitoring.

18. The NVMS shall not limit the storage capacity and shall allow for upgrades of recording capacity.

19. The NVMS shall digitally sign recorded video and audio using 256-bit encryption so video can be authenticated for evidentiary purposes.

20. The NVMS shall securely transmit all command and control data via TCP/IP using cryptographic keys based on SSL to prevent eavesdropping or tampering.

21. The NVMS will provide the mechanism by which individual alarm(s) from the Access system can be pre-selected and

configured to be monitored and, in turn, trigger event driven video operations

22. The NVMS shall support software level integration via an Application Programming Interface (API). The API integration should include but not limited to:

   1) Bi-directional alarm event processing for monitoring and acknowledgement

   2) Card access activity events

   3) Digital input events

   4) Intrusion zone events

23. Occurrences for "Alarm" and "Reset" conditions for each of the pre-selected Access system alarms will be processed and managed from the NVMS system's Live View workspace that is reserved for displaying alarm notifications in the alarm list message pane or from an alarm viewer. If the Alarm pane is hidden, the alarm can be acknowledged from the Camera display tile.

24. Once an Access system initiated alarm occurrence is acknowledged from the NVMS system, it should be automatically acknowledged and processed in the Access System alarm monitor queue without further operator intervention.

25. The NVMS shall support integration with the following systems:

   1) GE Security Facility Commander Wnx v7.x platform

   2) Lenel OnGuard.

   3) Gallagher FT Command Center.

4) RS2.

5) DSX.

6) Jacques VoIP Voice Communication System.

7) Stentofon AlphaCom XE.

8) DDS Amadeus.

9) Software House CCure 9000.

10) Hirŝch Velocity.

11) Picture Perfect 4.

12) S2 Netbox.

26. The NVMS shall be capable of being upgraded from one version to another without having to uninstall the previous version.

27. The NVMS shall be capable of being upgraded from one edition to another without having to uninstall the application.

28. The NVMS shall automatically detect if video or audio source firmware is out of date with respect to the current installed software and upgrade it.

29. The NVMS shall automatically detect if client application software is out of date with respect to the current installed server software and upgrade it.

30. The NVMS shall run as a service configured to automatically start when the server or workstation is powered on and automatically recover from failure or attempted tampering.

31. The NVMS shall allow system administration, and live and recorded video and audio monitoring all from a single client application that can be located anywhere on the network.

32. The NVMS shall automatically discover all Server instances running on computers connected to the same network as the Client.

33. The NVMS shall provide a search functionality to discover Server instances running on computers connected on a different network segment than the Client by using IP addresses or hostnames.

34. The NVMS shall automatically discover video and audio sources that are connected to the same network as the Server.

35. The NVMS shall provide a search functionality to discover video and audio sources that are connected on a different network segment than the Server.

36. The NVMS shall provide the ability to connect a video or audio source to multiple NVRs to achieve redundant recording.

37. The NVMS shall provide the ability to create a failover connection for a video or audio source. If the NVR that the video or audio source is connected to goes offline then the failover NVR will take over the connection.

38. The NVMS shall provide administration of all system connections from a single window.

39. The NVMS shall support receiving Simple Network Management Protocol (SNMP) messages from servers and alert the user.

40. The NVMS shall detect if the video or audio signal is lost and alert the system administrator.

41. The NVMS shall provide the capability to rename all video and audio sources and NVRs.

42. The NVMS shall record video and audio streams based on a recording schedule that can be defined individually for each video source. The schedule shall be created with the following parameters to include but not limited to:

   1) Recording Mode

   2) Continuous

   3) Motion

   4) Video Analytic Activity

   5) Digital Inputs

   6) Alarms

   7) POS Transactions

   8) License Plates

   9) Time and Date Settings

   10) Daily

   11) Weekly

43. The NVMS shall provide the ability to manually trigger recording.

44. The NVMS shall provide a pre-event and post-event recording option.

45. The NVMS shall provide a reference frame recording option in the absence of events.

46. The NVMS shall perform motion detection on each individual video source with adjustable sensitivity, threshold and detection zones.

47. The NVMS shall provide the ability to reduce the image rate of recorded JPEG and JPEG2000 video over time as a means of increasing record time. The image rate shall be able to be reduced to one half or one quarter of the original image rate. This setting can be configured separately for each JPEG and JPEG2000 video source.

48. The NVMS shall provide the ability to record and maintain a primary and secondary video stream for a set amount of time before the primary stream is discarded as a means of increasing record time. This setting can be configured separately for each H.264 video source.

49. The NVMS shall provide the ability to set a maximum recorded video retention time for each video source.

50. The NVMS shall perform dynamic bandwidth management to ensure that the total bandwidth does not overload the system.

51. The NVMS shall authenticate users before granting access to the system. Access rights for each user can be defined individually for each user, and shall include but not limited to:

   1) Viewing live images

     a) Using PTZ controls

     b) Locking PTZ controls

     c) Trigger manual recording

     d) Trigger digital outputs

     e) Listen to microphones

      f) Broadcast to speakers

2) Viewing recorded images

      a) Exporting images

      b) Backup recorded images

3) Manage user sessions

4) Connect and disconnect cameras

5) Setup cameras

      a) Setup general settings

      b) Setup network settings

      c) Setup image and display settings

      d) Setup compression and image rate

      e) Setup image dimension settings

      f) Setup motion detection settings

      g) Setup privacy zone settings

      h) Setup manual recording settings

      i) Setup digital input & output settings

      j) Setup microphone settings

      k) setup speaker settings

6) Setup servers

      a) Setup general settings

      b) Setup schedule settings

      c) Setup recording and bandwidth settings

      d) Setup user and group settings

e) Setup alarm management settings

f) Setup scheduled backup settings

g) Setup POS transaction settings

h) Setup email settings

i) Setup rule engine settings

j) View system log

k) Access to individual video and audio sources

52. The NVMS shall provide the ability to import members of Active Directory groups as users in the NVMS. Changes made to members in the Active Directory are automatically synced with the NVMS.

53. The NVMS shall optionally support using Windows credentials to authenticate users.

54. The NVMS shall provide the ability to create and schedule alarms.

55. The NVMS shall provide the ability to schedule backups of recorded video with associated events to a local folder or mapped network drive.

56. The NVMS shall provide the ability to email users and system administrators when an event or system health error occurs.

57. The NVMS shall provide the ability to schedule when email notifications are sent.

58. The NVMS shall provide the ability to include camera images in email notifications.

59. The NVMS shall maintain an event log for the following events to include but not limited to:

1) Server Events

   a) Server application starting up

   b) Server application shutting down

   c) Server application terminated unexpectedly

   d) Server application low on resources

   e) Server application installation error

   f) Licensed feature expires soon

   g) Licensed feature expired

   h) Database error

   i) Data initialization error

   j) Data volume failed

   k) Data volume recovered

   l) Data volume size reduced

   m) Data write error

   n) Data upgrade started

   o) Data upgrade completed

   p) Data upgrade failed

   q) Data recovery started

   r) Data recovery completed

   s) Data recovery failed

   t) Network connection found

   u) Network connection lost

   v) Network error

w) Network error resolved

x) Email send error

y) Server hardware error

z) Backup started

aa) Backup completed

bb) Backup failed

2) Device Events

a) Connection created

b) Connection removed

c) Connection created to standby server

d) Connection removed from standby server

e) Connection failure

f) Connection restored

g) Network packet loss unacceptable

h) Network packet loss acceptable

i) Motion detection started

j) Motion detection ended

k) Recording started

l) Recording ended

m) Recording interrupted

n) Recording resumed

o) Digital input activated

p) Digital input deactivated

q) Firmware upgrade started

r) Firmware upgrade completed

s) Firmware upgrade failed

3) User Events

a) User login

b) User logout

c) Server setting changed

d) Device setting changed

e) Device connected

f) Device disconnected

g) Digital output triggered

h) Bookmark added

i) Bookmark updated

j) Bookmark deleted

k) PTZ moved

l) PTZ idle

m) Export performed

n) Speaker activated

o) Speaker deactivated

4) Alarm Events

a) Alarm acknowledged

b) Alarm auto acknowledged

c) Alarm triggered

       d)   Alarm assigned

       e)   Alarm unassigned

       f)   Alarm purged

   5)   POS Transaction Events

       a)   POS transaction started

       b)   POS transaction ended

       c)   POS transaction exception

   6)   License Plate Recognition Events

       a)   License plate detection started

       b)   License plate detection ended

       c)   License plate watch-list match

60.   The NVMS shall have the capability to schedule and execute any of the following actions in response to any of the events listed above:

   1)   User Notification Actions

       a)   Display on-screen message

       b)   Send an email

       c)   Play a sound

   2)   Monitoring Actions

       a)   Start live streaming video

   3)   Device Actions

       a)   Reboot camera

       b)   Trigger digital output

   4)   PTZ Actions

a) Go to Preset

b) Run a Pattern

c) Set Auxiliary

d) Clear Auxiliary

5) Alarm actions

a) Trigger an alarm

b) Acknowledge an alarm

61. The NVMS shall provide the ability to create customized on-screen messages and email notifications.

62. The NVMS shall provide a maintenance log and audit trail of all system errors and events.

63. The NVMS shall provide the ability to receive transaction information from point-of-sale sources.

64. The NVMS shall support multiple encoding formats from point-of-sale sources.

65. The NVMS shall provide the ability to monitor live and recorded transactions from point-of-sale sources with linked video.

66. The NVMS shall provide the ability to generate events based on point-of-sale transaction exceptions.

67. The NVMS shall provide the ability to define a region of an image where license plate detection is performed. Detected license plates shall be stored along with the video data.

68. The NVMS shall provide the ability to create a watch-list that will be used to create events when any license plate on the watch-list is detected in the images being analyzed.

69. The NVMS shall provide the ability to enable and configure PTZ control on the RS-485 interface of a video source.

70. The NVMS shall support the following list of PTZ camera protocols it include but not limited to:

    1) American Dynamics Sensormatic

    2) AXSYS

    3) AXSYS DCU

    4) Ernitec ERNA

    5) Honeywell Diamond

    6) Kalatel ASCII

    7) Pelco D

    8) Pelco P

    9) TEB Ligne

    10) Vicon extended

    11) Vicon normal

    12) Videotec Legacy

    13) Videotec MACRO

71. The NVMS shall provide the ability to change the network settings for a video and audio source.

72. The NVMS shall provide the ability to change image quality and image rate parameters for a video source without affecting the settings on the other video sources.

73. The NVMS shall provide the ability to enable a secondary stream for live viewing.

74. The NVMS shall provide the ability to change the exposure, iris, IR filter, backlight compensation, gain, priority, sharpening, saturation, focus, and white balance settings for a video source.

75. The NVMS shall provide the ability to change the image dimensions for a video source.

76. The NVMS shall provide the ability to rotate the image 90°, 180° or 270° for a video source.

77. The NVMS shall provide the ability to add privacy zones to a video source to block unwanted areas in the image field of view.

78. The NVMS shall provide the ability to set a maximum recording duration for manually triggered recording for a video source.

79. The NVMS shall provide the ability to change the input, output, gain and volume for an audio source.

80. The NVMS shall provide for full-duplex two- way audio communication.

81. The NVMS shall provide the ability to link any audio source to any video source.

82. The NVMS shall provide the ability to set a limit on the maximum bandwidth transmitted to the Control Center Client application from the Control Center Server application.

83. The NVMS shall provide the ability to automatically log in to an NVR.

84. The NVMS shall provide the ability to override user access to an NVR if there are insufficient licenses.

85. The NVMS shall provide the ability to automatically log out of an NVR when the application is left idle.

86. The NVMS shall provide the ability to save and restore the window layout.

87. The NVMS shall provide the ability to control the system using a PC keyboard or joystick.

88. The NVMS shall provide the ability to import and export client settings such as maps, views, and web pages.

89. The NVMS shall support live or recorded video monitoring of 1 to 36 video streams simultaneously on a single monitor with the following standard layouts:

   1) Full Screen

   2) 2 x 2

   3) 3 x 3

   4) 4 x 4

   5) 5 x 5

   6) 6 x 6

   7) 8 x 8

   8) 1 + 5

   9) 1 + 7

   10) 1+ 12

   11) 2 + 8

90. The NVMS shall support live or recorded video monitoring in a customizable video display beyond the standard layouts.

91. The NVMS shall support the ability to bias the displayed video to a higher frame rate or to a lower image resolution if the client network bandwidth or client processing power is insufficient to display the full frame rate and image resolution.

92. The NVMS shall support the ability to display the following list of image overlays including but not limited to:

    1) Camera Name

    2) Camera Location

    3) Timestamp

    4) Record Indicator

    5) Motion Activity

    6) License Plate

    7) Video Analytic Activity (Bounding Boxes)

93. The NVMS shall support an unlimited number of monitors for monitoring video and audio streams.

94. The NVMS shall support monitoring live and recorded video and audio streams simultaneously on the same monitor.

95. The NVMS shall support viewing the same live or recorded video stream at different zoom levels and areas of interest.

96. The NVMS shall support the ability to switch from live to recorded video on demand for an instant replay of recently recorded video.

97. The NVMS shall support the creation of unlimited views with unique layouts of video streams.

98. The NVMS shall support the ability to full-screen a view.

99. The NVMS shall support the ability to save views.

100. The NVMS shall support the ability to cycle through views (guard tour) based on a specified interval.

101. The NVMS shall display all video sources connected to the system.

102. The NVMS shall support the ability to drag and drop a video source from a tree of video sources into a window for live or recorded video and audio monitoring.

103. The NVMS shall support the ability to drag and drop a view from a tree of views into a window for live or recorded video and audio monitoring.

104. The NVMS shall support the ability to configure how the tree of video sources and views is displayed.

105. The NVMS shall support the ability to designate one or more regions in a window for displaying video directly linked to triggered alarms and rules.

106. The NVMS shall support the ability to acknowledge alarms from the designated video display area.

107. The NVMS shall support the ability to manually trigger digital output.

108. The NVMS shall support the ability to create a map that represents the physical location of cameras and other devices throughout the surveillance system. Maps shall be created from images stored in JPEG, BMP, PNG, or GIF image formats. Maps shall have the ability to contain links so as to create a hierarchy of interlinked maps.

109. The NVMS shall support the ability to create an HTML-based map that has a link to a section of the entire image region.

110. The NVMS shall support the ability to drag and drop a video source from a map into a window for live or recorded video and audio monitoring.

111. The NVMS shall highlight a camera on a map when an alarm linked to the camera is triggered.

112. The NVMS shall highlight a linked map that contains a camera when an alarm linked to the camera is triggered.

113. The NVMS shall support the ability to save a link to a web page and view the web page in a window.

114. The NVMS shall support digital zooming and panning on live and recorded video streams.

115. The NVMS shall support controlling mechanical pan-tilt-zoom, iris, and focus as well as setting presets and patterns.

116. The NVMS shall provide the ability to name pan-tilt-zoom presets.

117. The NVMS shall support the ability to create guard tours by combining a set number of presets that are run in sequence or random.

118. The NVMS shall support the ability to center a PTZ camera's field of view by clicking anywhere on the video image.

119. The NVMS shall support the ability to click and drag to define an area for the PTZ camera to optically zoom and center on.

120. The NVMS shall support controlling mechanical pan-tilt-zoom camera on-screen display and auxiliary controls.

121. The NVMS shall support locking PTZ controls.

122. The NVMS shall support control of a mechanical pan-tilt-zoom camera with a USB joystick.

123. The NVMS shall support forward and reverse playback of recorded video and audio at variable speeds.

124. The NVMS shall synchronously playback recorded video and audio from selected video sources.

125. The NVMS shall support navigation of recorded video and audio via calendar, timeline, or events.

126. The NVMS shall support a timeline that displays all connected video sources and the corresponding motion and recording events.

127. The NVMS shall support a timeline that can display the entire time range down to one second of recorded video and audio.

128. The NVMS shall support creating bookmarks for recorded video and audio from multiple sources, displaying the bookmarks on the timeline, and searching for bookmarks.

129. The NVMS shall support protecting a bookmark so the video and audio data is never overwritten.

130. The NVMS shall support monitoring alarms.

131. The NVMS shall support the ability to assign alarms to users.

132. The NVMS shall support the ability to acknowledge alarms.

133. The NVMS shall support the ability to bookmark alarms.

134. The NVMS shall support searching through bookmarks based on various search criteria including bookmark name, notes, and linked camera names.

135. The NVMS shall support searching through recorded video and audio based on various search criteria including time, date, video source, and events.

136. The NVMS shall support searching through recorded video based on motion in user defined areas (pixel search).

137. The NVMS shall support searching through recorded video based on time, date, video source, and image region and have the results displayed as a series of thumbnail images.

138. The NVMS shall support searching through recorded video based on alarm events.

139. The NVMS shall support searching through recorded video based on point-of-sale transaction events.

140. The NVMS shall support searching through recorded video based on license plates detected in the images of the video source.

141. The NVMS shall support the ability to export recorded video in the following formats including but not limited to:

    1) Native

    2) JPEG

    3) PNG

    4) TIFF

    5) AVI

    6) WAV

    7) PDF

    8) Print

142. The NVMS shall support the ability to export recorded audio in WAV format.

143. The NVMS shall support the ability to take a snapshot of a live or recorded image and export it from the system.

144. The NVMS shall support the ability to export a live stream of images in the following formats including but not limited to:

    1) JPEG

    2) PNG

    3) TIFF

145. The NVMS shall support the ability to export video from multiple camera streams in Native format.

146. The NVMS shall support reviewing video and audio that was exported in the Native format.

147. The NVMS shall provide the camera properties and time zone for video exported in Native format.

148. The NVMS shall support authenticating video that was exported in the Native format to validate that it was not tampered with.

149. The NVMS shall support converting video that was exported in the Native format to an industry standard format.

150. The NVMS shall support reviewing video and audio stored in a backup.

151. The NVMS shall support exporting of video in lower frame-rates than originally recorded.

152. The NVMS shall support optionally exporting video representing a designated area of interest from within the camera's field of view.

PIJ 02 02 05 MULTI-MEGAPIXEL IP VIDEO SURVEILLANCE CAMERAS

Multi-megapixel IP Video Surveillance cameras are to be supplied and installed throughout the facility and around the perimeter of the premises in accordance with the system design provided in Annexure A. It is critical that the given scene configurations are adhered to to achieve the desired level of detail measured in pixels per metre.

B. *MICRO DOME-TYPE NETWORK VIDEO CAMERAS*

1. The camera shall:

   1. Be based upon standard components and proven technology using open and published protocols.

   2. Outdoor models shall be manufactured with an industrialized plastic body, IP66 rated, and suitable for outdoor installation.

   3. Be designed to provide video streams using H.264 or Motion JPEG image compression methods.

   4. Be a color, fixed focal length camera.

   5. Comply with the environmental and logical requirements and be of the technology family:

      1) Color Indoor IP Recessed Micro Dome Camera

      2) Color Outdoor IP Surface Mount Micro Dome Camera

   6. Utilize Power over Ethernet (PoE) allowing the camera and heater/fan functions to be powered over the network cable or

external power source to allow operation at lower temperature ranges.

7. Contain a built-in web server making video and configuration available to in a standard browser environment using HTTP, without the need for additional software.

    1) Web server shall support multiple users with different permission levels and unique usernames and password.

2. Performance

1. Video

    1) The camera shall be capable of simultaneously delivering at least two individually configurable video streams, for use when connecting to the Video Management Software for recording and live viewing.

    2) The camera(s) shall support the video resolution prescribed in the scope of work and be capable of generating the following image rates (in frames per second-fps) regardless of the complexity of the scene:

	1.0 Megapixel	2.0 Megapixel
768x432	30	30
1280x720 (HDTV 720p)	30	30
1920x1080 (HDTV 1080p)	-	30

2. Encoding

1) The camera shall:

a) Be able to provide independently configured simultaneous H.264 and Motion JPEG streams (multi-stream).

b) Support Motion JPEG encoding:

- Selectable range from 1 up to 30 NTSC/25 PAL frames per second.

- Supports compression and image quality settings from 1 to 64

- Provide user configuration of compression quality, bandwidth and image rate per camera.

c) Support H.264 encoding:

- Selectable range from 1 up to 30 NTSC/25 PAL frames per second.

- Supports Variable Bit Rate (VBR) in H.264 with a configurable maximum bit rate threshold.

- Provide user configuration of compression format, compression quality, maximum bit rate, key frame interval, and image rate per camera.

d) Support motion compensation and motion vector during motion estimation in H.264. Can maintain frame rate, regardless of scene complexity, when bandwidth is capped at:

- 1024kbps, for 1.0MP for 30NTSC/25PAL FPS

- 2048kbps, for 2.0MP, for 30NTSC/25PAL FPS

3. Transmission

1) The camera shall allow for video and audio to be transported over:

    a) HTTP (Unicast)

    b) HTTPS (Unicast)

    c) RTP (Unicast & Multicast)

    d) RTP over RTSP (Unicast)

    e) RTP over RTSP over HTTP (Unicast)

    f) RTP over RTSP over HTTPS (Unicast)

4. Image Control

    1) The camera shall support user configuration of:

        a) Automatic and Manual White Balance Control

        b) Automatic and manually defined exposure zones operating in the range

            • 1.0 MP Camera - 2 and 1/30000 second.

            • 2.0 MP Camera - 2 and 1/30000 second.

        c) Flicker Control (50 Hz , 60 Hz)

        d) Automatic and Manual Iris Control

        e) Color Saturation and Sharpening

        f) Motion Detection sensitivity and threshold

        g) Back Light Compensation

        h) Digital rotation of the image

        i) Wide Dynamic Range (WDR): the Dynamic Range shall be at a minimum:

            • 72.4db for 1.0Megapixel Cameras

- 72.4db for 2.0Megapixel Cameras

5. Network

1) The camera shall support both fixed (static) IP addresses and dynamically assigned IP addresses provided by a Dynamic Host Control Protocol (DHCP) server.

2) The camera shall support user configuration of network parameters including:

   a) Fixed (static) IP address

   b) Subnet mask

   c) Gateway

   d) Control Port

3) The camera shall allow for automatic detection of the camera when using a Video Management Application (VMA) or Network Video Recorder (NVR) supporting this feature.

4) The camera shall provide support for both IPv4 and IPV6 Networks.

6. Video Motion Detection Functionality

1) The camera shall support video motion detection functionality.

2) The camera motion detection shall be user configurable to detect motion based on:

   a) Motion detection mask; defines areas within the camera's field of view for the camera to detect for motion;

b) Sensitivity; how much each pixel with the masked areas must change before it is considered in motion;

c) Threshold; percentage of pixels that must detect change.

7. Event functionality

1) The camera shall be equipped with an integrated event functionality, which can be trigged by:

a) Video Motion Detection

b) Camera temperature outside operative range

c) Schedule

8. Protocol support

1) The camera shall incorporate support for at least IPv4, HTTP, HTTPS, SOAP, DNS, NTP, RTSP, RTCP, RTP, TCP, UDP, IGMP, ICMP, DHCP, Zeroconf, and ARP.

9. Video overlay

1) The Camera shall:

a) Provide four individually configurable privacy zones and 3D privacy masks to conceal defined areas in the image as non-viewable. These masks shall be dynamically adjusted based on current zoom-factor, and operator shall not be able to bypass.

b) Permanently obscure video masked by privacy zone prior to streaming video.

10. Security

1) The camera shall:

a) Support the use of password protection, and HTTPS encryption.

b) Restrict access to the built-in web server by usernames and passwords at three different user group levels.

c) Provide configurable 802.1x port based authentication

11. API support

1) The camera shall be fully supported by an open and published API (Application Programmers Interface), which shall provide necessary information for integration of functionality into third party applications.

2) The camera shall conform to the network video standard version 1.02, version 2.00 and Profile S as defined by the ONVIF organization (www.onvif.org).

12. Installation and Maintenance

1) The camera shall:

a) Allow updates of the software (firmware) over the network.

b) All customer-specific settings shall be stored in a non-volatile memory and shall not be lost during power cuts or soft reset.

2) Manufacturer shall provide:

a) A Microsoft Windows-based management software, which allows camera configuration, upgrade of firmware, and backup of individual camera configurations.

3. Materials

1. The camera shall be a factory assembly, designed for so-called continuous duty allowing for commercial/industrial 24/7/365 use.

2. The camera shall provide the following optical requirements:

   1) Use a progressive scan CMOS sensor.

      a) 1/3.6" for 1.0Megapixel Cameras

      b) 1/3.6" for 2.0Megapixel Cameras

   2) Be equipped with a factory installed and tuned lens depending on camera model:

      a) 2.8mm Fixed-focal F2.0 lens

         • Cameras shall provide 86 degree angle of view

   3) The cameras shall provide pictures down to the following Lux ratings:

      a) 1.0 MP Cameras - Color @ 0.6 lux at F2.0

      b) 2.0 MP Cameras - Color @ 0.6 lux at F2.0

3. The camera shall provide the following mechanical requirements:

   1) Be equipped with a firmware reset button to reset the camera to factory default settings.

4. The camera shall provide the following camera diagnostics:

   1) Be equipped with LEDs, indicating the camera's functional status.

   2) Allow user to disable Status LEDs.

3) Be monitored by a Watchdog functionality, which shall automatically re-initiate processes or restart the unit if a malfunction is detected.

5. The camera shall provide physical interfaces to external devices & systems:

1) Network interface

a) The camera shall be equipped with one 100BASE-TX Fast Ethernet-port, using a standard RJ-45 socket and shall support auto negotiation of network speed (100 Mbps and 10 Mbps) and transfer mode (full and half duplex).

6. The camera enclosure shall include the following:

1) Equipped as a surface mounted small form factor dome camera with industrial plastic body suitable for outdoor installations including:

a) IP66-rating

b) Clear transparent acrylic dome lens cover

c) Temperature and humidity sensors

d) Tamper resistant screws

2) Equipped as a recessed mounted small form factor dome camera with industrial plastic body suitable for indoor installations including:

a) Clear transparent acrylic dome bubble

b) Temperature and humidity sensors

c) Adjustable lock down brackets suitable for mounting in acoustic drop down ceilings

3) The camera enclosure shall not exceed these dimensions:

   a) Surface mount model: 37.15 mm x 51.15 mm (1.48" x 2.01")

   b) Recessed mount model: 91 mm x 107.54 mm (3.58" x 4.23")

4) The camera enclosure shall not exceed these weights:

   a) Surface mount model: 34 g (1.19 oz) + 36 g (1.27 oz) for cable

   b) Recessed mount model: 150 g (5.29 oz) + 36 g (1.27 oz) for cable

7. The camera shall be capable of being powered by the following power sources:

   1) PoE: IEEE 802.3af Class 1 PoE Compliant

8. The camera power consumption shall:

   1) Not exceed 4 W

9. The camera shall be connected to power through:

   1) Ethernet connection with IEEE 802.3af Class 1 PoE power

10. The camera shall operate in the following environment:

    a) Operate in a temperature range of -10° C to +50° C (14° F to +122° F)

    b) Operate in a humidity range of 20–80% RH (non-condensing)

    c) Be stored in a temperature range of -30° C to +70° C (-22° F to +158° F)

C. INDOOR DOME-TYPE NETWORK VIDEO CAMERAS

1. The camera shall:

   1. Be based upon standard components and proven technology using open and published protocols.

   2. Be designed to provide video streams using H.264 or Motion JPEG image compression methods.

   3. Be equipped with Day/Night functionality.

   4. Be available optionally equipped with Adaptive IR Illumination Technology.

      1) The IR spread must dynamically adjust in conjunction with the field of view and zoom configured.

      2) The IR intensity shall automatically adjust to compensate for excessive scene reflectivity and prevent image saturation.

      3) When using a 3 to 9mm lens, the camera shall provide uniform illumination in the dark under 0 lux, up to a maximum distance of 30m (100ft)

   5. Include a built-in web server.

   6. Utilize Power over Ethernet (PoE) allowing the camera and heater/fan functions to be powered over the network cable or external power source to allow operation at lower temperature ranges.

   7. Contain a built-in web server making video and configuration available to in a standard browser environment using HTTP, without the need for additional software.

1)   Web server shall support multiple users with different permission levels and unique usernames and password.

2. Performance

1. Video

1)   The camera shall be capable of simultaneously delivering at least two individually configurable high-resolution video streams and one lower resolution video stream over IP networks.

2)   The camera shall be one of four base models supporting the following video resolution and image rates (in frames per second-fps):

	1.0 Megapixel	2.0 Megapixel	3.0 Megapixel	5.0 Megapixel
480x270	30	30	30	30
1280x720 (HDTV 720p)	30	30	30	30
1920x1080 (HDTV 1080p)	-	30	30	30
2048x1536 (3MP)	-	-	20	20
2592x1944 (5MP)	-	-	-	13

2. Encoding

1) The camera shall:

    a) Support Motion JPEG encoding in a selectable range from 1 up to 30 NTSC/25 PAL frames per second.

    b) Support H.264 encoding in a selectable range from 1 up to 30 NTSC/25 PAL frames per second.

    c) Be able to provide independently configured simultaneous H.264 and Motion JPEG streams (multi-stream).

    d) Supports Variable Bit Rate (VBR) in H.264 with a configurable maximum bit rate threshold.

    e) Provide user configuration of compression format, compression quality, maximum bit rate, key frame interval, and image rate per camera.

    f) Support motion compensation and motion vector during motion estimation in H.264.

    g) Support G.711 PCM 8kHz audio compression.

3. Transmission

1) The camera shall allow for video and audio to be transported over:

    a) HTTP (Unicast)

    b) HTTPS (Unicast)

    c) RTP (Unicast & Multicast)

    d) RTP over RTSP (Unicast)

    e) RTP over RTSP over HTTP (Unicast)

    f) RTP over RTSP over HTTPS (Unicast)

4. Image Control

1) The camera shall support user configuration of:

a) Automatic and Manual White Balance Control

b) Automatic and manually defined exposure zones operating in the range 1/6 and 1/8000 second.

c) Flicker Control (50 Hz , 60 Hz)

d) Automatic and Manual Iris Control

e) Automatic and Manual Day/Night Control

f) Color Saturation and Sharpening

g) Motion Detection sensitivity and threshold

h) Back Light Compensation

i) Manual rotation of the image

j) Wide Dynamic Range (WDR)

	1.0 Megapixel	2.0 Megapixel	WDR 3.0 Megapixel	5.0 Megapixel
Dynamic Range	69db	69db	100db	69db

5. Network

1) The camera shall support both fixed (static) IP addresses and dynamically assigned IP addresses provided by a Dynamic Host Control Protocol (DHCP) server.

2) The camera shall support user configuration of network parameters including:

a) Fixed (static) IP address

     b)   Subnet mask

     c)   Gateway

     d)   Control Port

3)   The camera shall allow for automatic detection of the Camera when using a Video Management Application (VMA) or Network Video Recorder (NVR) supporting this feature.

4)   The camera shall provide support for both IPv4.

6.   Video Motion Detection Functionality

1)   The camera shall support video motion detection functionality.

2)   The camera motion detection shall be user configurable to detect motion based on:

     a)   Motion detection mask; defines areas within the camera's field of view for the camera to detect for motion;

     b)   Sensitivity; how much each pixel with the masked areas must change before it is considered in motion;

     c)   Threshold; percentage of pixels that must detect change.

7.   Event functionality

1)   The camera shall be equipped with an integrated event functionality, which can be trigged by:

     a)   Alarm Input Terminal

     b)   Video Motion Detection

     c)   Fan malfunction

d) Camera temperature outside operative range

e) PTZ position

f) Schedule

2) Event functions shall be configurable via the web interface.

8. Protocol support

1) The camera shall incorporate support for at least IPv4, HTTP, HTTPS, SOAP, DNS, NTP, RTSP, RTCP, RTP, TCP, UDP, IGMP, ICMP, DHCP, Zeroconf, and ARP.

9. Video overlay

1) The Camera shall:

a) Provide four individually configurable privacy zones and 3D privacy masks to conceal defined areas in the image as non-viewable. These masks shall be dynamically adjusted based on current zoom-factor, and operator shall not be able to bypass.

b) Permanently obscure video masked by privacy zone prior to streaming video.

10. Security

1) The camera shall:

a) Support the use of password protection, and HTTPS encryption.

b) Restrict access to the built-in web server by usernames and passwords at three different user group levels.

11. API support

1) The camera shall be fully supported by an open and published API (Application Programmers Interface), which shall provide necessary information for integration of functionality into third party applications.

2) The camera shall conform to the network video standard version 1.02, version 2.00 and Profile S as defined by the ONVIF organization (www.onvif.org).

12. Installation and Maintenance

1) The camera shall:

a) Allow updates of the software (firmware) over the network.

b) All customer-specific settings shall be stored in a non-volatile memory and shall not be lost during power cuts or soft reset.

2) Manufacturer shall provide:

a) A Microsoft Windows®-based management software, which allows camera configuration, upgrade of firmware, and backup of individual camera configurations.

3. Materials

1. The camera shall be a factory assembly, designed for so-called continuous duty allowing for commercial/industrial 24/7/365 use.

2. The camera shall provide the following Optical requirements:

1) Use a progressive scan CMOS sensor.

	1.0 Megapixel	2.0 Megapixel	3.0 Megapixel	5.0 Megapixel
Sensor Size	1/2.7"	1/2.7"	1/3"	1/3.2"

2)   Be equipped with a P-Iris lens supporting zoom and focus control by camera and user.

3)   Be equipped with lens options depending on camera model:

    a)   3-9mm varifocal lens

- 1.0 and 2.0 MP models providing 35 to 98 degree angle of view

- 5.0 and 3.0 MP models providing 28 to 84 degree angle of view

    b)   9-22mm varifocal lens

- 1.0 and 2.0 MP models providing 11 to 26 degree angle of view

- 3.0 MP models providing 11 to 28 degree angle of view

- 5.0 MP models providing 12 to 28 degree angle of view

4)   Be equipped with an automatically and manually removable IR-cut filter, providing so-called day/night functionality where the camera enters a monochrome mode when the available light drops below a set threshold.

a) While in day mode (color mode with IR-filter in use), provide pictures down:

- 1.0, 2.0, and 3.0 MP: 0.2 lux at F1.2 and 0.4 lux at F1.6.

- 5.0 MP: 0.3 lux at F1.2 and 0.6 lux at F1.6.

b) While in night mode (monochrome mode with IR-filter removed), provide pictures down to:

- 1.0, 2.0, and 3.0 MP: 0.02 lux at F1.2 and 0.04 lux at F1.6.

- 5.0 MP: 0.03 lux at F1.2 and 0.06 lux at F1.6.

3. The camera shall provide the following Mechanical requirements:

1) Be equipped with alarm input and output terminals.

2) Be equipped with line audio input (for external microphone) and audio output (for external speaker) connections.

3) Be equipped with an analog video output for external monitors.

4) Be equipped with a firmware reset button to reset the camera to factory default settings.

4. The camera shall provide the following Camera Diagnostics:

1) Be equipped with LEDs, indicating the camera's functional status.

2) Allow user to disable Status LEDs.

3) Be monitored by a Watchdog functionality, which shall automatically re-initiate processes or restart the unit if a malfunction is detected.

5. The camera shall provide physical interfaces to external devices & systems:

1) Network interface

a) The camera shall be equipped with one 100BASE-TX Fast Ethernet-port, using a standard RJ-45 socket and shall support auto negotiation of network speed (100 MBit/s and 10 MBit/s) and transfer mode (full and half duplex).

2) Audio / Input Terminals

a) The camera shall be equipped with one input terminal for receiving line level analog audio from an external microphone.

b) The camera shall be equipped with one output terminal providing line level analog audio for connection to an external speaker.

3) Analog Video Output

a) The camera shall be equipped with one NTSC/PAL, 3.5 mm A/V mini-jack for connection to external monitor.

4) External I/O Terminals

a) The camera shall be equipped with two alarm input terminals and two alarm output terminals.

b) Alarm inputs shall be individually configured for normally open/normally closed, duration of pre-recording and post-recording.

c) Alarm outputs shall be individually configured for normally open/normally closed and duration of state change when triggered.

6. The camera enclosure shall include the following:

1) Clear and smoked transparent acrylic dome bubble

2) Temperature and humidity sensors, fan and heater inside the enclosure.

3) Tamper resistant screws

4) The camera enclosure shall not exceed these dimensions:

a) Surface Mount Model - 138 mm x 104 mm (5.4" x 4.1")

b) Pendent Mount Model - 167 mm x 157 mm (6.6" x 6.2")

5) The camera enclosure shall not exceed these weights:

a) Surface Mount - 0.55 kg (1.2 lbs)

b) Pendent Mount Model - 2.1 kg (4.6 lbs)

6) Be equipped as a Surface Mount or Pendant mount

7. The camera shall be capable of being powered by the following power sources:

1) PoE: IEEE 802.3af Class 4 PoE Plus Compliant

2) 24 VAC

3) 24 VDC

8. The camera power consumption shall be:

   1) 5 W

9. The camera shall be connected to power through:

   1) Ethernet connection with IEEE 802.3af Class 3 PoE power

   2) 2-pin connector with external power

10. The camera shall operate in the following environment:

    1) Operate in a temperature range of -30 deg C to +50 deg C (-22 deg F to +122 deg F)

    2) Operate in a humidity range of 20–80% RH (non-condensing)

    3) Be stored in a temperature range of -10 deg C to +70 deg C (14 deg F to +158 deg F)

D. *VANDAL-PROOF DOME-TYPE NETWORK CAMERAS*

1. The camera shall:

   1) Be based upon standard components and proven technology using open and published protocols.

   2) Be manufactured with an all aluminium body IP66 rated and suitable for outdoor installation.

   3) Be designed to provide video streams using H.264 or Motion JPEG image compression methods.

   4) Be equipped with Day/Night functionality.

   5) Be equipped with Adaptive Video Analytic technology.

6) Be equipped with Adaptive IR Illumination technology.

    a) The IR spread must dynamically adjust in conjunction with the field of view and zoom configured.

    b) The IR intensity shall automatically adjust to compensate for excessive scene reflectivity and prevent image saturation.

7) Utilize Power over Ethernet (PoE) allowing the camera and heater/fan functions to be powered over the network cable or external power source to allow operation at lower temperature ranges.

8) Contain a built-in web server making video and configuration available to in a standard browser environment using HTTP, without the need for additional software.

    a) Web server shall support multiple users with different permission levels and unique usernames and password.

2. Performance

  1. Video

    1) The camera shall be capable of simultaneously delivering at least two individually configurable high-resolution video streams and one lower resolution video stream over IP networks.

    2) The camera shall be one of five base models supporting the following video resolution and image rates (in frames per second-fps):

	1.0 Megapixel	1.3 Megapixel	2.0 Megapixel	3.0 Megapixel	5.0 Megapixel
768x432	30	30	30	30	30
768x576	-	30	-	30	30
1280x720 (HDTV 720p)	30	30	30	30	30
1280x960	-	30	-	30	30
1280x1024	-	30	-	-	-
1920x1080 (HDTV 1080p)	-	-	30	30	30
2048x1536 (3MP)	-	-	-	20	20
2560x1440	-	-	-	-	13
2592x1944 (5MP)	-	-	-	-	13

2. Encoding

1) The camera shall:

a) Be able to provide independently configured simultaneous H.264 and Motion JPEG streams (multi-stream).

b) Support Motion JPEG encoding:

- Selectable range from 1 up to 30 NTSC/25 PAL frames per second.

- Supports compression and image quality settings from 1 to 64

- Provide user configuration of compression quality, bandwidth and image rate per camera.

c) Support H.264 encoding:

- Selectable range from 1 up to 30 NTSC/25 PAL frames per second.

- Supports variable bit rate (VBR) in H.264 with a configurable maximum bit rate threshold.

- Provide user configuration of compression format, compression quality, maximum bit rate, key frame interval and image rate per camera.

d) Support motion compensation and motion vector during motion estimation in H.264, able to maintain frame rate, regardless of scene complexity when bandwidth is capped at:

- 1024kbps, 1.0MP for 30 NTSC/25 PAL fps

- 1408kbps, 1.3MP for 30 NTSC/25 PAL fps

- 2048kbps, 2.0MP for 30 NTSC/25 PAL fps

- 2560kbps, 3.0MP for 30 NTSC/25 PAL fps

- 2560kbps, 5.0MP for 13 NTSC/12 PAL fps

e) Support G.711 PCM 8kHz audio compression.

3. Transmission

1) The camera shall allow for video and audio to be transported over:

a) HTTP (Unicast)

b) HTTPS (Unicast)

       c) RTP (Unicast & Multicast)

       d) RTP over RTSP (Unicast)

       e) RTP over RTSP over HTTP (Unicast)

       f) RTP over RTSP over HTTPS (Unicast)

4. Image Control

   1) The camera shall support user configuration of:

       a) Automatic and Manual White Balance Control

       b) Automatic and manually defined exposure zones operating in the range:

- 1.0MP camera – 1/6 and 1/8000 second

- 1.3MP camera – 1/6 and 1/2000 second

- 2.0MP camera – 1/6 and 1/8000 second

- 3.0MP camera – 1/6 and 1/8000 second

- 5.0MP camera – 1/6 and 1/8000 second

       c) Flicker Control (50 Hz, 60 Hz)

       d) Automatic and Manual Iris Control

       e) Automatic and Manual Day/Night Control

       f) Color Saturation and Sharpening

       g) Motion Detection sensitivity and threshold

       h) Back Light Compensation

       i) Digital rotation of the image

       j) Wide Dynamic Range (WDR) – the Dynamic Range shall be at a minimum:

	1.0 Megapixel	1.3 Megapixel	2.0 Megapixel	WDR 3.0 Megapixel	5.0 Megapixel
Dynamic Range	69db	71db	69db	100db	69db

2) Scene Adaptive IR illumination technology – available in ALL "-IR" Models

   a) The IR spread must dynamically adjust to the camera field of view and zoom level through the use of focused and tuned LED's generating the specific spread and intensity of illumination.

   b) The camera shall automatically adjust to compensate for excessive scene reflectivity and prevent image saturation by synchronizing the following camera settings to attain optimum video quality:

      • Wide dynamic range

      • Electronic Shutter Covering at minimum the range 1/6 to 1/8000

      • P-Iris

   c) The electronic shutter shall:

      • When using a 3 to 9mm lens, the camera shall provide uniform illumination in the dark under 0 lux, up to a maximum distance of 15m (50ft)

3) Adaptive Video Analytic Specifications

   a) The device shall support an unlimited number of configured behaviors per video source:

b) Automatic analytic setup and tuning of behavior identification:

- Upon selection of analytic and region of interest (ROI), the device will automatically configure behavior identification

- The device will constantly monitor changes in the scene and perform a tuning of the behavior identification parameters as the scene environment changes.

c) Behaviors detected shall include, but not be limited to:

- Object present in ROI

- Object enters ROI

- Object leaves ROI

- Object appeared

- Object disappeared

- Object crosses (line of interest or beam)

- Object movement direction

- Object loitering

- Multiple objects in ROI in specified dwell time

- Dwell time

- Number of objects exceeds limit in ROI

- Number of objects below limit in ROI

- Camera tampering

5. Network

1) The camera shall support both fixed (static) IP addresses and dynamically assigned IP addresses provided by a Dynamic Host Control Protocol (DHCP) server.

2) The camera shall support user configuration of network parameters including (but not limited to):

    a) Fixed (static) IP address

    b) Subnet mask

    c) Gateway

    d) Control Port

3) The camera shall allow for automatic detection of the Camera when using a Video Management Application (VMA) or Network Video Recorder (NVR) supporting this feature.

4) The camera shall provide support for both IPv4 and IPv6 networks.

6. Video Motion Detection Functionality

1) The camera shall support video motion detection functionality.

2) The camera motion detection shall be user configurable to detect motion based on:

    a) Motion detection mask; defines areas within the camera's field of view for the camera to detect for motion;

    b) Sensitivity; how much each pixel with the masked areas must change before it is considered in motion;

    c)   Threshold; percentage of pixels that must detect change.

7. Event functionality

   1)   The camera shall be equipped with an integrated event functionality, which can be trigged by:

      a)   Alarm Input Terminal

      b)   Video Motion Detection

      c)   Fan malfunction

      d)   Camera temperature outside operative range

      e)   PTZ position

      f)   Schedule

   2)   Event functions shall be configurable via the web interface.

8. Protocol support

      a)   The camera shall incorporate support for at least IPv4, HTTP, HTTPS, SOAP, DNS, NTP, RTSP, RTCP, RTP, TCP, UDP, IGMP, ICMP, DHCP, Zeroconf, and ARP.

9. Video overlay

   1)   The Camera shall:

      a)   Provide sixty four individually configurable privacy zones and 3D privacy masks to conceal defined areas in the image as non-viewable. These masks shall be dynamically adjusted based on current zoom-factor, and operator shall not be able to bypass.

b) Permanently obscure video masked by privacy zone prior to streaming video.

10. Security

1) The camera shall:

a) Support the use of password protection, and HTTPS encryption.

b) Restrict access to the built-in web server by usernames and passwords at three different user group levels.

c) Provide configurable 802.1xport based authentication

11. API support

1) The camera shall be fully supported by an open and published API (Application Programmers Interface), which shall provide necessary information for integration of functionality into third party applications.

2) The camera shall conform to the network video standard version 1.02, version 2.00 and Profile S as defined by the ONVIF organization (www.onvif.org).

3) The analytics model shall confirm to the analytics service specification version 2.4.2 as defined by the ONVIF organization (www.onvif.org). Bounding boxes and scene descriptions are not available with third party VMS.

12. Installation and Maintenance

1) The camera shall:

a) Allow updates of the software (firmware) over the network.

b) All customer-specific settings shall be stored in a non-volatile memory and shall not be lost during power cuts or soft reset.

2) Manufacturer shall provide:

a) A Microsoft Windows® -based management software, which allows camera configuration, upgrade of firmware, and backup of individual camera configurations.

3. Materials

1. The camera shall be a factory assembly, designed for so-called continuous duty allowing for commercial/industrial 24/7/365 use.

2. The camera shall provide the following Optical requirements:

1) Use a progressive scan CMOS sensor.

	1.0 Megapixel	1.3 Megapixel	2.0 Megapixel	3.0 Megapixel	5.0 Megapixel
Sensor Size	1/3"	1/3"	1/2.7"	1/3"	1/3.2"

2) Be equipped with a P-Iris lens supporting zoom and focus control by camera and user.

3) Be equipped with a factory integrated and tuned lens depending on camera model:

a) 3-9mm varifocal F1.2 providing;

- 1.0 and 2.0 MP: 26 to 79 degree angle of view

- 1.3 MP: 30 to 88 degree angle of view

- 5.0 and 3.0 MP: 28 to 84 degree angle of view

b) 9-22mm varifocal F1.6 providing;

- 1.0 and 2.0 MP: 11 to 26 degree angle of view

- 1.3 MP: 13 to 30 degree angle of view

- 3.0 MP: 11 to 28 degree angle of view

- 5.0MP: 12 to 28 degree angle of view

4) Be equipped with an automatically and manually removable IR-cut filter, providing so-called day/night functionality where the camera enters a monochrome mode when the available light drops below a set threshold.

5) Be equipped with support for onboard storage

a) The camera shall accept SD cards (full size) to record video onboard the camera

b) SD card access shall be secured via tamper resistant on dome camera models.

c) Video recorded on the SD card shall be retrievable via the camera web interface or directly from the SD card

d) The camera's web interface shall allow for the configuration of onboard storage options. These parameters shall include, but not limited to:

- Recording on motion

- Recording continuously

- Recording when the server connection is interrupted

6) Be equipped with a real time clock.

7) Be equipped with Integrated IR-LED illuminators, providing adaptive IR illumination, tuned to the field of view and zoom level configured in the field and dynamically adjusting intensity as scene reflectivity changes.

   a) While in day mode (color mode with IR-filter in use), provide pictures down to:

- 1.0, 2.0, and 3.0 MP: 0.2 lux at F1.2 and 0.4 lux at F1.6.

- 1.3 MP: 0.02 lux at F1.2 and 0.04 lux at F1.6.

- 5.0 MP: 0.3 lux at F1.2 and 0.6 lux at F1.6.

   b) While in night mode (monochrome mode with IR-filter removed), provide pictures down to:

- 1.0, 2.0, and 3.0 MP: 0.02 lux at F1.2 and 0.04 lux at F1.6.

- 1.3 MP: 0.002 lux at F1.2 and 0.004 lux at F1.6.

- 5.0 MP: 0.03 lux at F1.2 and 0.06 lux at F1.6.

   c) Maximum IR illumination Distance at 0 lux::

- 15 m (50 ft)

3. The camera shall provide the following Mechanical requirements:

   1) Illuminator Technology

      a) High-Power IR LED

      b) Wavelength 850nm

   2) Be equipped with alarm input and output terminals.

   3) Be equipped with line audio input (for external microphone) and audio output (for external speaker) connections.

   4) Be equipped with an analog video output for external monitors.

   5) Be equipped with a firmware reset button to reset the camera to factory default settings.

4. The camera shall provide the following Camera Diagnostics:

   1) Be equipped with LEDs, indicating the camera's functional status.

   2) Allow user to disable Status LEDs.

   3) Be monitored by a Watchdog functionality, which shall automatically re-initiate processes or restart the unit if a malfunction is detected.

5. The camera shall provide physical interfaces to external devices & systems:

   1) Network interface

      a) The camera shall be equipped with one 100BASE-TX Fast Ethernet-port, using a standard RJ-45 socket and shall support auto negotiation of network

speed (100 MBit/s and 10 MBit/s) and transfer mode (full and half duplex).

2) Audio / Input Terminals

    a) The camera shall be equipped with one input terminal for receiving line level analog audio from an external microphone.

    b) The camera shall be equipped with one output terminal providing line level analog audio for connection to an external speaker.

3) Analog Video Output

    a) The camera shall be equipped with one NTSC/PAL, 3.5 mm A/V mini-jack for connection to external monitor.

4) External I/O Terminals

    a) The camera shall be equipped with one alarm input terminal and one alarm output terminal.

    b) Alarm inputs shall be individually configured for normally open/normally closed, duration of pre-recording and post-recording.

    c) Alarm outputs shall be individually configured: for and.

- Normally open/normally closed

- Duration of state change when triggered.

6. The camera enclosure shall include the following:

1) Manufactured with an all-aluminum body

    a) IP66-rating

b) Clear or smoked transparent polycarbonate dome bubble that meets or exceeds and IK10 rating

c) Temperature and humidity sensors

d) Heater and fan inside the enclosure.

e) Tamper resistant screws

2) Be equipped as a Surface Mount or Pendant Mount

3) The camera enclosure shall not exceed these dimensions:

a) 152 mm x 109 mm (6.0" x 4.3") – Outdoor surface mount model

b) 167 mm x 157 mm (6.6" x 6.2") – Outdoor pendant mount model

4) The camera enclosure shall not exceed these weights:

a) 1.3 kg (2.8 lbs) - Outdoor surface mount model

b) 2.1 kg (4.6 lbs) – Outdoor pendant mount model

7. The camera shall be capable of being powered by the following power sources:

1) PoE: IEEE 802.3af Class 3 PoE Plus Compliant

2) PoE: IEEE 802.3at Class 4 PoE Plus Compliant

3) 24 VAC +/- 10%

4) 12 VDC +/- 10%

8. The camera power consumption shall be:

1) Not to exceed 10W for day/night outdoor IP camera

2) Not to exceed 7W for LightCatcher technology enabled day/night IP camera

    3) Not to exceed 10W for Scene Adaptive infrared illumination enabled day/night IP camera

9. The camera shall be connected to power through:

    1) Ethernet connection with IEEE 802.3af Class 3 PoE power

    2) Auxiliary power cables with external power

10. The camera shall operate in the following environment:

    a) Operate in a temperature range of -30 deg C to +50 deg C (-22 deg F to +122 deg F)

    b) Operate in a humidity range of 20–80% RH (non-condensing)

    c) Be stored in a temperature range of -10 deg C to +70 deg C (14 deg F to +158 deg F)

11. Certifications and Standards

    1) The camera shall carry the following Electromagnetic Emissions Certifications:

        a) EN 55022 Class B

        b) FCC Part 15 Subpart B Class B

        c) IC ICES-003 Class B

    2) The camera shall carry the following Electromagnetic Immunity Certifications:

        a) EN 55024 Class B

        b) EN 61000-4-2

        c) EN 61000-4-3

        d) EN 61000-4-4