Architect & Engineer Specification

VideoEdge® Network Video Recorder

PART 1 – GENERAL

The intent of this document is to specify the minimum criteria for the design, supply, installation, and commissioning of the Network Video Recorder.

1.01 SUMMARY

A. The Network Video Recorder shall be turn-key, software-based open platform solution that functions as an appliance server and operates on hardened and embedded Linux® operating system. It shall be available as software-only or as a bundled server solution.

1.02 REFERENCES

A. Bureau of Standards, Metrology and Inspection (BSMI)
B. Canadian Standards Association (CSA)
C. China Compulsory Certificate (CCC)
D. Conformity for Europe (CE)
E. EMC and Radio Communications Compliance (C-Tick)
F. Federal Communications Commission (FCC)
G. HyperText Transfer Protocol (HTTP)
H. Interference-Causing Equipment Standards (ICES)
I. International Electrotechnical Commission (IEC)
J. Ministry of Information & Communications (MIC)
K. South African Bureau of Standards (SABS)
L. Transmission Control Protocol/Internet Protocol (TCP/IP)
M. Underwriters Laboratories Inc. (UL)
N. Voluntary Control Council for Interference (VCCI)

1.03 DEFINITIONS

A. No Substitutes: The exact make and model number identified in this specification shall be provided without exception.

B. Or Equal: Any item may be substituted for the specified item provided that in every technical sense, the substituted item provides the same or better capability and functionality.

C. Or Approved Equal: A substitute for the specified item may be offered for approval by the Owner. The proposed substitution must, in every technical sense, provide the same or better capability and functionality as the specified item. Such requests for approval shall be submitted in accordance with the provisions of

PART 1.05 – SUBMITTALS, and must be obtained within the time frames outlined.

1.04 SYSTEM DESCRIPTION

A. The Network Video Recorder shall be turn-key, software-based open platform solution that functions as an appliance server and operates on hardened and embedded Linux® operating system. It shall be available as software-only or as a bundled server solution. The unit shall combine multiplexing, sensor/motion detection, video, and audio. The unit must operate in server-client architecture as a network appliance and simultaneously support viewing, recording, and playback of video. The Network Video Recorder shall be TCP/IP and HTTP compliant, enabling administrators to provide better corporate deployment, and provide a standard format for server management.

1.05 SUBMITTALS

A. General: Submittals shall be made in accordance with the Conditions of the Contract and Submittal Procedures Section.

B. Shop Drawings and Schematics: Shall depict the Network Video Recorder in final proposed "as built" configuration. The following must be provided:

1. Connection diagrams for interfacing equipment.
2. List of connected equipment.
3. Locations for all major equipment components to be installed under this specification.

C. Product Data: The following shall be provided:

1. Technical data sheets.
2. A complete set of instruction manuals.

D. Quality Assurance Submittals: The following shall be submitted:

1. Checkout Report: The Contractor shall provide the Owner with a checkout report for each Network Video Recorder. The report shall include:

   a. A complete list of every device.
   b. The date it was tested, and by whom.
   c. If retested, the date it was retested, and by whom.
   d. The final test report shall indicate that every device was tested successfully.

2. Manufacturer's Instructions: The Contractor shall deliver **TBD** sets of System Operation and Maintenance Manuals (if available) to the Owner.

3. Notice of Completion: When the final acceptance has been satisfactorily completed, the Owner shall issue a notice of completion to the Contractor.

1.06 QUALITY ASSURANCE

A. Manufacturer's Qualifications: The Network Video Recorder shall be developed and manufactured by a reputable Fortune 100 company with more than 20 years of manufacturing experience in the security industry.

B. The Network Video Recorder manufacturer shall include on their public website a minimum of the following tools, directly related to the support of the Network Video Recorder system:

1. Application Solutions
2. Digital Demo Network
3. Software Downloads
4. Support Documents
5. Software Registration
6. Training Information and Registration

C. Contractor Qualifications: The Contractor shall be a factory authorized and certified installer of the security equipment supplied in this project and shall have been regularly engaged in the installation of the type of security equipment, hardware, and software specified herein for a period of not less than **TBD** years. The contractor shall be factory trained on the Network Video Recorder and products they propose and shall submit with their proposal a certificate from the manufacturer indicating their satisfactory completion of training for the Network Video Recorder proposed. Proposals submitted without this certificate shall be considered non-responsive and shall not be accepted.

1.07 DELIVERY, STORAGE, AND HANDLING

A. General: Delivery, storage, and handling of the Network Video Recorder shall be in accordance with the manufacturer's recommendations.

B. Ordering: The manufacturer's ordering instructions and lead-time requirements must be followed in order to avoid installation delays.

C. Delivery: The Network Video Recorder shall be delivered in the manufacturer's original, unopened, undamaged container with identification labels intact.

D. Storage and Protection: The Network Video Recorder shall be stored and protected from exposure to harmful weather conditions and at the environmental conditions recommended by the manufacturer.

1.08 PROJECT CONDITIONS

This section is determinate of owner's requirements. Left intentionally blank, but should be filled in, if applicable, by owner or consultant.

1.09 SEQUENCING

This section is determinate of owner's requirements. Left intentionally blank, but should be filled in, if applicable, by owner or consultant.

1.10 SCHEDULING

This section is determinate of owner's requirements. Left intentionally blank, but should be filled in, if applicable, by owner or consultant.

1.11 WARRANTY

A. Software products have standard 90 Days from American Dynamics
B. Hardware products have standard 3 Years from American Dynamics
C. Hard disk drives have standard 2 Years from American Dynamics
D. Annual SSA (Software Support Agreements or Maintenance Agreements) provide additional one year of support and updates for software products

1.12 MAINTENANCE

A. Preventative Maintenance Agreement during Warranty: As a separate price item, the Contractor shall provide preventative maintenance during the warranty period. Maintenance shall include, but no be limited to:

    1. Labor and materials, at no additional cost, to repair Network Video Recorder Digital Servers.

    2. Labor and materials, at no additional cost, to provide test and adjustments to the Network Video Recorder Servers.

    3. Regular inspections.

B. Preventative Maintenance Agreement: As a separate price item, the Contractor shall provide a complete Maintenance Agreement for a period of **TBD** months after the conclusion of the warranty period. The Maintenance Agreement shall include, but not be limited to:

    1. Labor and materials, at no additional cost, to repair Network Video Recorder Servers.

    2. Labor and materials, at no additional cost, to provide test and adjustments to the Network Video Recorder Servers.

    3. Regular inspections.

1.13 TRAINING

A. Operator training shall be conducted for a minimum of **TBD** sessions, with a session length of **TBD** hours at the customer's site.

B. Training shall include, but not be limited to Network Video Recorder operation and diagnostics.

PART 2 – PRODUCTS

2.01 MANUFACTURED UNITS

A. Model Number/Descriptions Table

VideoEdge Network Video Recorder Model Numbers:

ADNSNVR-CL1	VideoEdge NVR Server Software v2.05, One Camera Slot License (1-to-64 Total Camera Slots)
ADNSNVR-CL2	VideoEdge NVR Server Software v2.05, One Camera Slot License (65-to-249 Total Camera Slots)
ADNSNVR-CL3	VideoEdge NVR Server Software v2.05, One Camera Slot License (250+ Total Camera Slots)
ADNSNVR-UPG-CL1	One Camera Slot Upgrade License (1-to-64 Total Additional Camera Slots)
ADNSNVR-UPG-CL2	One Camera Slot Upgrade License (65-to-249 Total Additional Camera Slots)
ADNSNVR-UPG-CL3	One Camera Slot Upgrade License (250+ Total Additional Camera Slots)
ADN016S0150	**VideoEdge NVR Bundled Server, VideoEdge NVR v2.05 and** 16-Slot License **Quad-Core CPU, 4GB RAM, Dual Gigabit NICs,** 1.50 TB of Video Storage
ADN024S0300	VideoEdge NVR Bundled Server, VideoEdge NVR v2.05 and **24-Slot License** Quad-Core CPU, 4GB RAM, Dual Gigabit NICs, **3.00 TB of Video Storage**
ADN032S0375	VideoEdge NVR Bundled Server, VideoEdge NVR v2.05 and **32-Slot License** **Quad-Core CPU, 4GB RAM, Dual Gigabit NICs,** 3.75 TB of Video Storage

VideoEdge Management Suite Model Numbers:

ADNSCX-SM	American Dynamics Cx Site Manager Server Software v2.3
ADNSVXC-STN	American Dynamics Vx Client Software – Standard Mode v8.3
ADNSVXC-VWC	American Dynamics Vx Client Software – Video Wall Controller Mode v8.3
ADNSVMX-AGT	VideoEdge VMx Agent Software v2.3
ADNSCX-AMC	**American Dynamics Cx Alert Console Software v2.3**
ADNSCX-PDA	**American Dynamics Cx Mobile Alert Software v2.3**

2.02 SYSTEM PERFORMANCE

A. The Network Video Recorder running on VideoEdge NVR software v2.05 must meet the following minimum features, functions and specifications:

1. The Network Video Recorder and its components shall be thoroughly tested before shipping from the manufacturer's facility.

2. The Network Video Recorder shall be a turn-key software solution,

3. The Network Video Recorder software shall be provided as a bootable ISO image or bootable disc. It shall install from a single program that is launched from the bootable disc and automatically scan the server's hardware configuration. The complete Network Video Recorder software installation process onto an unpartitioned and unformatted hard drive shall be completed within minutes.

4. The Network Video Recorder software shall transform standard server hardware into an IP addressable enterprise appliance server designed for video surveillance. It shall operate as a read-only platform that prevents the installation of any third party software and restricts any file-level access to provide for a stronger level of virus protection and ensure a higher up-time operation in a commercial/industrial environment.

5. The Network Video Recorder software shall include and install a hardened and embedded Linux operating system (OS) that must be part of the automatic installation program. Third party operating system or patch management shall not be required.

6. The Network Video Recorder software shall include and install a web server that must be part of the automatic installation program. This shall provide a standard interface for administrators and clients to view, control, and/or manage the Network Video Recorder from a standard web browser. The latest list of supported browsers must be available on the manufacturer's web site.

7. The Network Video Recorder software shall include driver support for IP fixed cameras, IP pan-tilt-zoom cameras, IP MegaPixel cameras, and analog cameras using IP encoders that are from a variety of manufacturers. Supported cameras shall be easily interchangeable between different models without the need to register each individual MAC address. The latest list of supported devices must be available on the manufacturer's web site.

8. The Network Video Recorder software shall include driver support for a variety of standard network interface cards, host bus adapters, and large hard disk storage devices that are utilized by the server for network connectivity and storing video data. The latest list of supported devices must be available on the manufacturer's web site.

9. The Network Video Recorder software shall include driver support for a variety of standard network interface cards, host bus adapters, and large hard

disk storage devices that are utilized by the server for network connectivity and storing video data. The latest list of supported devices must be available on the manufacturer's web site.

10. The Network Video Recorder software shall include support for Motion JPEG (MJPEG), MPEG-4, and a patented proprietary compression scheme called Active Content Compression (ACC) that differentiates motion from video noises. The latest list of supported codec's must be available on the manufacturer's web site.

11. The Network Video Recorder software shall provide picture-in-picture (PiP) support to enable digital pan-tilt-zoom control for all fixed cameras. The client management software shall allow these digital preset positions to be saved onto the local client machine.

12. The Network Video Recorder shall incorporate open and innovative design architecture.

13. The Network Video Recorder's operating system and application must be installed on a dedicated hard drive, separate from the hard drives used for video recording, to dramatically reduce the risk of system failure.

14. The Network Video Recorder software shall utilize minimum number of open ports for discovery and communication to reduce the risk of attack from malicious programs and system hackers.

15. The Network Video Recorder software shall easily integrate with other business-critical systems and third party applications using its 100% Application Programmers Interface (API) driven interface. The manufacturer of the unit shall also offer a Software Developers Kit (SDK) to select third party manufacturers, in addition to sample modular programs with their source codes in C#, allowing programmers to develop their own software to control the unit's functions.

16. The Network Video Recorder software shall utilize standard server-client architecture for access and management of the server and its resources.

17. The Network Video Recorder software shall provide virtualization so that any number of Network Video Recorder servers and cameras from one or more sites can be managed as a single logical Network Video Recorder using the client management software.

18. The Network Video Recorder software shall support automatic and seamless bridging of multiple networks. This will enable the utilization of one physical/logical network segment for all users to access the Network Video Recorder while a separate physical/logical private network segment can be used for IP cameras and encoders. The software shall automatically bridge multiple networks to enable both IT and security managers to collectively integrate the server into existing networks without compromising security

protocols or causing bandwidth constraints. This provides for a more secure architecture, bandwidth control and higher performance.

19. The Network Video Recorder software shall be designed to support an open hardware architecture that uses commercial-off-the-shelf hardware (COTS), enabling virtually any standard hardware platform to be transformed into an Enterprise Network Video Recorder. The latest list of supported hardware must be available on the manufacturer's web site.

20. The Network Video Recorder software user interface must be easy to use, allowing the user with appropriate permissions to access operations using a standard browser (THIN CLIENT) on a Windows or Macintosh or UNIX machine, one-click hyperlinks and buttons, and drop-down menu selections. The system must also have the ability to host multiple remote users, archive data, and search for data, all while recording multiple video streams. The latest list of supported browsers must be available on the manufacturer's web site.

21. The Network Video Recorder system shall integrate into any standard TCP/IP network environment. The automatic bridging of multiple networks by the Network Video Recorder will enable both IT and security managers to collectively integrate the unit into existing networks without compromising the existing security protocols or causing bandwidth constraints.

22. The Network Video Recorder software shall support auto-discovery mechanism for supported devices to help reduce the time required to add these devices to the system. The client management software shall also provide auto-discovery of local Network Video Recorders.

23. The Network Video Recorder software shall support up to three network time protocol (NTP) servers for date and time synchronization. In addition, it shall include the option of being the NTP server for environments where connectivity to a public NTP server is restricted.

24. The Network Video Recorder software shall support receiving its IP address information from an existing dynamic host configuration protocol (DHCP) server for the user's network (LAN1). In addition, it shall include the option of being the DHCP server for smaller environments where a DHCP server may not available.

25. The Network Video Recorder software shall support a static IP address setting from the local IT administrator for both of the client and camera network interface cards (NICs).

26. The Network Video Recorder shall be designed to maximize performance.

27. The Network Video Recorder software shall support a hardened and embedded Linux operating system that utilizes the minimum required resources needed to efficiently operate. This appliance technology ensures

minimum system overhead in order to provide maximize available resource to efficiently manage hundreds of IP cameras.

28. The Network Video Recorder software shall provide enhanced performance as it is more powerful than any single video device, thus more users can simultaneously access the server. The video devices shall have the Network Video Recorder as its single client to achieve the highest possible performance.

29. The Network Video Recorder software shall absorb all of the IP video traffic as no video is sent across the client network when all devices are configured on the local and private camera network (LAN2). It shall only impact the corporate network bandwidth when authorized clients make request for live and recorded video.

30. The Network Video Recorder software shall be designed to support up to 128 standard IP cameras, or as many as 60 megapixel IP cameras on a standard dual-core server. It shall, at a minimum, combine multiplexing, alarm/event detection, video, and audio (currently for MPEG4 with AAC only) recording. Depending on the camera/encoder, hardware, and storage configurations, up to 128 cameras per server at 2CIF and 7.5 fps shall be supported by required hardware that is properly installed and set up according to manufacturer's instructions. The system must be scalable, with the ability to add additional camera licenses dynamically.

31. The Network Video Recorder software shall support parallel recording across multiple storage targets.

32. The Network Video Recorder shall be capable of recording video from up to 128 cameras onto standard internal or external direct-attached hard drive RAID storage. The duration of the recording is directly related to the following parameters which are all selectable on a per camera basis:

    a. Number of Cameras – (NVR Camera License Dependent: 1-to-128 Camera Slots)
    b. Resolution – (Device Dependent: QCIF, CIF, 2CIF, 4CIF, MegaPixel)
    c. Video Codec – (Device Dependent: ACC, MPEG4, MJPEG)
    d. Video Settings – (Device Dependent)
    e. Frame Rate – (Dependent on Device, Resolution, Compression, and Network)
    f. Hours of Recording – (Dependent on Customer Requirements)
    g. Modes of Recording – (Continuous, Motion/Alert-Based, Continuous with Motion)
    h. Level of Motion – (More Activity will Produce Larger File Sizes)

33. The Network Video Recorder shall allow for the following alarm recording settings:

    a. Image Resolution
    b. Maximum Video Fetch Rate (FPS)

c. Maximum Video Record Rate (FPS)
d. Pre-Alarm Duration – (Selectable from 30 to 120 seconds)
e. Post-Alarm Duration – (Selectable from 30 to 120 seconds)

Note: The video codec will determine the ability to setup different fetch and record frame rates, plus pre and post intervals.

34. The Network Video Recorder software shall support ability to quickly locate recorded video using standard search parameters to filter through hours and days of video to find only the essential events. Users shall search on recorded video using video or snapshot mode:

    a. Camera Name – (Corresponding camera slot number)
    b. Day – (Date of the recording)
    c. From - (Start time)
    d. To – (End time)

35. The Network Video Recorder software shall support a one, two, four or eight live camera views per monitor and with the ability to view full screen using the THIN CLIENT (browser) with appropriate drivers. The RICH CLIENT (Vx Client) provides multiple camera view templates for viewing cameras from multiple Network Video Recorders.

36. The Network Video Recorder software shall support server-based motion detection for the most recent supported devices and device-based motion detection for applicable legacy supported devices. The server-based motion detection shall provide a grid area that can select/deselect cells to designate the areas of interest to monitor for motion detection along with adjustable trigger parameters. The latest list of supported devices shall be available on the manufacturer's web site.

37. The Network Video Recorder software shall support specific IP based acoustic sensor devices. It shall trigger alert-based recording and support up to 10 actions. The latest list of supported devices shall be available on the manufacturer's web site.

38. The Network Video Recorder software shall support dry contacts for specific IP camera devices. It shall trigger alert-based recording and support up to 10 actions. The latest list of supported devices shall be available on the manufacturer's web site.

39. The Network Video Recorder software shall support audio recording for specific IP camera devices. MPEG4 with AAC shall be the initial codec that will support audio and video. The list of supported devices shall be available on the manufacturer's web site.

40. The Network Video Recorder software shall support a recording scheduler for all managed camera devices in sixty minute increments.

    a. Camera Selection

b. Day-of-Week Selection
c. Hour-of-Day Selection
d. Recording Mode Selection per Hour – (No Recording, Continuous Recording, Alert-Based Recording, Continuous with Alert-based Recording)

41. The Network Video Recorder software shall be designed to provide both redundancy and high availability as standard built-in features.

42. The Network Video Recorder software shall include configuration support for up to two levels of automatic storage fail-over. In the event that the designated primary storage encounters a problem, the system shall automatically switch to a designated level one storage device to provide continuous recording. In the event that a problem occurs with level one storage device, the system shall automatically switch to an alternative designated level two storage device. The optional storage fail-over drives must be setup on the Network Video Recorder.

43. The Network Video Recorder software shall include server-based fail-over support for 1-to-1, many-to-1 and many-to-many configurations. When a Network Video Recorder is setup to be a standby fail-over server, it shall be setup to monitor one or more active Network Video Recorders. When a failure is detected, the standby fail-over server shall automatically take control over all cameras and provide the same user and access rights as the failed server. The standby fail-over server shall have its own storage resources, be on the same network segments, and licensed to support the Network Video Recorder with the largest number of camera slots.

44. The Network Video Recorder shall be designed to provide a very secure environment.

45. The Network Video Recorder software shall operate as a secure enterprise IP appliance server designed to operate on a hardened and embedded Linux operating system, shall not accept any keyboard or mouse input at the physical server, and utilize true server-client architecture to provide a "lights-out" operation.

46. The Network Video Recorder software shall not be susceptible to daily patch management like other standard distribution operating systems. This shall reduce the administration overhead for each Network Video Recorder as well as limit the exposure to security risks.

47. The Network Video Recorder software shall function in a read-only mode to all users and administrators of the system. This shall provide stronger protection against virus and other malicious programs. This also eliminates the recurring cost for third party security software such as anti-virus, anti-spam, firewall, spyware, and intrusion prevention.

48. The Network Video Recorder software shall provide no file-level access to all users and administrators of the system. This shall protect against deletion

or modification of any files, whether it may be accidental or intentional, that could cause issues for the server, applications or video data.

49. The Network Video Recorder software shall support minimum number of open ports. These ports shall be used for discovery and communication between the clients-and-server as well as the cameras-and-server. This is an inverse approach when compared with standard distribution operating systems that have nearly all ports open and are completely vulnerable to system attacks.

50. The Network Video Recorder software shall support 7 different levels of permissions for each individual camera. Each group of users shall have their own unique combination of permission settings:

    a. No Access – (Users do not see or recognize these "covert" cameras)
    b. Viewer Only – (Users can only view these cameras in their present position)
    c. PTZ Viewer – (Users have same rights as Viewer Only, plus pan-tilt-zoom)
    d. Guard – (Users have same rights as PTZ Viewer, plus search/playback)
    e. Operator – (Users have same rights as Guard, plus modify camera settings)
    f. Lock-Out – (Users have same rights as Operator, plus locking out access to these cameras for all lower-level users)
       Note: When Lock-Out is enabled on any camera, all users with lower access permissions will immediately be denied access to live and recorded video until the camera's status is changed back to disabled.
    g. Administrator – (Users have full rights to camera and system settings)

51. The Network Video Recorder software shall support multiple networks. The client network (LAN1) shall enable users to log into and access to the assigned resources of the Network Video Recorder. The private camera network (LAN2) shall enable only the Network Video Recorder to log into each individual IP camera and encoder. This topology shall protect the individual camera devices from unauthorized access, achieves overall higher performance, and in the event of a denial-of-service attack (DoS), the web server of the Network Video Recorder shall shutdown and temporarily prevent any client access, but it shall continue to manage and record video until the administrator can secure the network and restart the server.

52. The Network Video Recorder software shall support both standard HTTP as well as HTTPS communication between the clients and server. The open SSL 128-bit encryption will provide a higher level of security.

53. The Network Video Recorder software shall support custom password groups for the IP cameras and encoders. Most camera devices have a default administrator or root username and password. For added security, the password for the highest level user account can be modified on the camera device. Therefore, a custom password group for each unique password shall

be easily be generated on the Network Video Recorder and utilized for the applicable devices.

54. The Network Video Recorder software shall support a read-only audit trail for the administrators of the server to track any changes to the settings and configurations:

    a. System Reboot
    b. Change to Storage Configuration
    c. Change to System Time
    d. Firmware Upgrade
    e. Modification to Users
    f. Modification to Groups

55. The activity log shall include, but not necessarily be limited to, the following information which the administrators shall have the ability to save as or print the entire audit file remotely from a web browser:

    a. Date/Time – (Date and Time the action was performed)
    b. Category – (Type of action that occurred (see above))
    c. Details – (Description of the action)
    d. User – (Login name of the user who performed the action)
    e. Client Machine – (The IP Address and MAC Address of the remote machine from which the action was performed)

56. The Network Video Recorder shall be designed to include built-in storage management.

57. The Network Video Recorder software shall support and manage multi-terabytes of large capacity storage devices without using any optional software:

    a. Internal Storage Devices – (Standard large capacity hard drives that are in the same chassis as the server)
    b. External Storage Devices – (Standard large capacity RAID storage devices that are in an external chassis and are directly attached to the server using SCSI or Fiber cable)

58. The latest list of supported devices shall be available on the manufacturer's web site.

59. The Network Video Recorder software shall support a larger number of logical unit numbers (LUNs) beyond the limit of 26 drive letters (A-to-Z) which is associated with a Windows operating system. The larger number of supported devices shall provide for longer video retention period. The flexibility of more supported storage devices enables administrators to configure the server to achieve better performance.

60. The Network Video Recorder software shall support up to 8 storage sections to group camera and storage for custom configurations and parallel recording across multiple storage targets.

61. The Network Video Recorder software shall support allocation of storage for recorded video for each storage section. This designated storage shall utilize first-in-first-out (FIFO) algorithm to maintain circular/continuous recording mode.

62. The Network Video Recorder software shall support allocation of storage for alarm archives for each storage section. Users shall have the option to copy the alert-based recorded video onto this designated storage which uses a linear recording mode.

63. The Network Video Recorder software shall support allocation of storage for ISO Images for each storage section. When executed by the user, the Network Video Recorder shall automatically generate an ISO Image of the corresponding video files and generate a unique MD5 checksum hash mark for a solid chain-of-custody. The image and checksum shall be saved onto this designated storage which uses a linear recording mode. The client shall download and record the ISO image directly to a blank CD or DVD using any third party software and drive. The player software shall provide standard DVR-like controls to playback the video off of the recorded disc or exported video stored on hard drive. Any third party software using the standard MD5 algorithm shall be used to validate the integrity of the original downloaded ISO image(s) to confirm that no tampering has occurred. This shall provide a solid end-to-end chain-of-custody for the video prior to recording the image directly to disc.

64. The Network Video Recorder software shall support ability to export video directly from the server to an unused and available large capacity hard drive. After the export has been completed, the hard drive storage shall then be properly disconnected from the Network Video Recorder and used on another server running in playback mode to retrieve the exported video.

65. The Network Video Recorder shall be designed to provide multiple levels of access and management.

66. The Network Video Recorder software shall support remote administration and configuration via a standard web browser (THIN CLIENT). Firmware updates (REFLASH) to the Network Video Recorder firmware shall be supported from any fast and reliable connection, whether it is executed over the LAN, WAN or internet.

    a. Internet Explorer – (Windows Clients)
    b. Firefox – (Windows and UNIX Clients)
    c. Safari – (Macintosh Clients)

    Note: With appropriate device drivers and login permissions, users can also view live or recorded video from the THIN CLIENT. The latest list of

supported browsers for specified video codecs shall be available on the manufacturer's web site.

67. The Network Video Recorder software shall support remote administration and configuration via client management software (RICH CLIENT). Firmware updates (REFLASH) to the Network Video Recorder firmware shall be supported from any fast and reliable connection, whether it is executed over the LAN, WAN or internet.

    a. American Dynamics Vx Client
    b. American Dynamics Vx Player
    c. VideoEdge VMx Agent
    d. American Dynamics Cx Alert Console
    e. American Dynamics Cx Mobile Alert
    f. American Dynamics Cx Site Manager

    Note: With appropriate device drivers and login permissions, users can also view live or recorded video from multiple Network Video Recorders using the applicable RICH CLIENT.

68. The Network Video Recorder software shall support direct access to both standard and advanced camera settings from within the THIN CLIENT or RICH CLIENT interface. The software must provide a standard interface that allows authorized users to easily change settings that are most common to all devices.

    a. Camera Name
    b. Unique ID
    c. Password Group
    d. Maximum Video Fetch Frames-Per Second
    e. Maximum Video Recording Frames-Per-Second
    f. Image Resolution

    Note: For device specific advanced settings, a separate pop-up window should display the available API supported options. The latest list of supported devices shall be available on the manufacturer's web site.

69. The Network Video Recorder software shall support the administrator’s ability to save a Configuration Backup from any local and remote server. This file must contain all of the current setting and configuration information for the server:

    a. Users, Groups
    b. Camera Access Configuration
    c. Server Settings
    d. DHCP Leases
    e. NTP Settings
    f. Camera Information

Note: The file can then be used to recover a system in the event that a change was made that needs to be undone, the bootable hard drive needs to be replaced, or multiple Network Video Recorders must be deployed with similar configurations.

70. The Network Video Recorder software shall include the ability to send an email via a SMTP server to any valid account, based upon an event. The events must include, but not necessarily limited to, the following:

    a. System Alerts
    b. DAS Alerts
    c. Storage Alerts
    d. Motion Detection Alerts
    e. Camera Malfunction
    f. Reboot Notification
    g. Rotated Logs
    h. Camera(s) Not Recording
    i. Switching to Backup Storage
    j. Backup Activation Failed
    k. No Storage Active on Unit
    l. Failed To Read Storage Configuration
    m. Camera Image is Too Large

71. The Network Video Recorder shall offer a suite of rich client management software designed to provide total end-to-end solution.

72. The Network Video Recorder manufacturer shall offer optional Network Video Recorder client management software (Vx Client – Standard) that is developed on the Microsoft .NET framework. This rich client shall provide ability to log into an unlimited number of Network Video Recorders (directly with local/remote servers or single-site login via optional Cx Site Manager) and create a single virtual NVR interface. Cameras from different Network Video Recorders shall be viewed in any combination. Map-based monitoring is supported by utilizing custom maps created by Cx Alert Console software

73. The Network Video Recorder manufacturer shall offer an advanced version of the optional Network Video Recorder client management software (Vx Client – Video Wall Controller) that provides additional remote management to control views, cameras, sequencing and salvo switching on many Virtual Matrix Video Wall PC's running the optional VMx Agent software.

74. The Network Video Recorder manufacturer shall offer a free player software (Vx Player) that is developed on the Microsoft .NET framework to provide standard DVR-like controls for playback of recorded ISO images or video that is exported from the Network Video Recording to a local drive.

75. The Network Video Recorder manufacturer shall offer optional Virtual Matrix Video Wall software (VMx Agent) that is developed on the Microsoft .NET framework. This application allows standard commercial off-the-shelf (COTS) Windows®-based systems with one or more monitors to operate as

an unstaffed network video workstation. This software shall enable Video Wall Controller licensed Vx Clients to remotely control and display any view and camera combination onto the monitors to easily expand the command-and-control center to anywhere on the LAN or WAN.

76. The Network Video Recorder manufacturer shall offer optional alert management and map creation software (Cx Alert Console) that is developed on the Microsoft .NET framework. This application allows monitoring real-time alerts from multiple Network Video Recorders. It shall support the creation of custom multi-layer and multi-tier maps that provide auto-display of live video when the mouse moves over any camera icon on the maps. The icons on the map shall flash red to indicate camera alerts.

77. The Network Video Recorder manufacturer shall offer optional PDA software (Cx Mobile Alert) that is developed on the Microsoft .NET framework. This application shall allow compatible wireless PDA devices to log into remote Network Video Recorders to view and control cameras and alerts. The latest list of supported devices shall be available on the manufacturer's web site.

78. The Network Video Recorder manufacturer shall offer optional three-tier hierarchy server software (Cx Site Manager) that is developed on the Microsoft .NET framework. This application allows the various client management software to utilize a single-site login. It shall also provide centralized database repository of alerts to enable advanced searches on metadata across cameras from multiple Network Video Recorders. This shall make it easier and more efficient for IT and physical security departments to administer and manage their systems with multi-site Network Video Recorder deployments.

79. Annual Software Support Agreements shall be available for all software products. The maintenance agreement shall provide customers with updates and technical support for their applicable software products.

80. The Network Video Recorder bundled server must utilize a chassis no larger than two rack units in height, and be suitable for rack mount installations. The unit must fit within a standard 19-inch IT server rack.

81. The Network Video Recorder bundled server shall be available with Intel Quad-Core CPU, 4 Gigabytes of RAM, dual Gigabit NICs, and 1.50 TB, 3.00 TB, and 3.75 TB of internal hard drive storage options that can also be reconfigured into RAID-5 configurations. Additional expansion storage shall be easily added using supported Adaptec LVD SCSI host bus adapter card (external SCSI RAID storage), and Qlogic Fiber Channel host bus adapter card (external Fiber RAID storage). The latest list of supported components shall be available on the manufacturer's web site.

82. The Network Video Recorder bundled server chassis shall incorporate six front accessible, swappable 3.5" drive bays plus one front accessible slim

optical drive. The bays must be behind a locking front cover that restricts access not only to the drives, but also to the power switch and reset switch.

83. The Network Video Recorder shall be the American Dynamics VideoEdge® Series or equivalent.

2.03 BUNDLED SERVER MECHANICAL SPECIFICATIONS

Unit Dimensions (HxWxD)	8.64 cm	(3.4")	High with Bezel
	44.43 cm	(17.5")	Wide
	74.40 cm	(29.31")	Deep
Rack Height	Two units (2U) chassis		Rack-mountable
Unit Weight	23 kg.	(50.71 lbs.)	Maximum configuration

2.04 BUNDLED SERVER ELECTRICAL POWER REQUIREMENTS

Input ..... Redundant 750W Hot-Plug Auto-Switching 100-220 VAC, 50/60 Hz

2.05 BUNDLED SERVER ENVIRONMENTAL CONDITIONS

Operating Temperature	10° to 35° C (50° to 95° F)
Storage Temperature	-40° to 65° C (-40° to 149° F)
Operating Relative Humidity	20% to 80% non-condensing (twmax=29C)
Storage Relative Humidity	5% to 95% non-condensing (twmax=38C)
Operating Vibration	0.26G at 5Hz to 350Hz for 2 minutes
Storage Vibration	1.54Grms Random Vibration at 10Hz to 250Hz for 15 minutes
Operating Shock	1 shock pulse of 41G for up to 2ms
Storage Shock	6 shock pulses of 71G for up to 2ms
Operating Altitude	-16m to 3,048m (-50ft to 10,000 ft)
Storage Altitude	-16m to 10,600m (-50ft to 35,000 ft)
Emissions	FCC (U.S. only) Class B
	ICES (Canada) Class B
	CE Mark (EN 55022 Class B, EN55024, EN61000-3-2, EN61000-3-3)
	VCCI (Japan) Class B
	BSMI (Taiwan) Class A
	C-Tick (Australia/New Zealand) Class B

	SABS (South Africa) Class B
	CCC (China) Class B
	MIC (Korea) Class B
Safety	UL 60950
	CAN/CSA C22.2 No. 60950
	EN 60950
	IEC 60950

PART 3 – EXECUTION

3.01 EXAMINATION

A. Submission of a proposal confirms that the contract documents and site conditions are accepted without qualifications unless exceptions are specifically noted.

B. The site shall be visited on a regular basis to appraise ongoing progress of other trades and contractors, make allowances for all ongoing work, and coordinate the requirements of this contract in a timely manner.

C. The Network Video Recorder must be inspected before installation, and shall be free of any cosmetic defects or damage.

3.02 PREPARATION

A. Prior to installation, the Network Video Recorder shall be configured and tested in accordance with the manufacturer's instructions.

3.03 INSTALLATION

A. The Network Video Recorder must be installed, programmed, and tested in accordance with the manufacturer's instructions.

1. In order to ensure a complete, functional Network Video Recorder, for bidding purposes, where information is not available from the Owner upon request, the worst-case condition shall be assumed.

2. Interfaces shall be coordinated with the Owner's representative, where appropriate.

3. All necessary backboxes, racks, connectors, supports, conduit, cable, and wire must be furnished and installed to provide a complete and reliable Network Video Recorder installation. Exact location of all boxes, conduit, and wiring runs shall be presented to the Owner for approval in advance of any installation.

4. All conduit, cable, and wire shall be installed parallel and square with building lines, including raised floor areas. Conduit fill shall not exceed forty percent (40%). All wires shall be gathered and tied up to create an orderly installation.

3.04 TESTING AND CERTIFICATION

A. The Contractor shall demonstrate the functionality of the Network Video Recorder upon completion of installation, documenting the result of all tests and providing these results to the Owner. The Network Video Recorder shall be tested in accordance with the following:

1. The Contractor shall conduct a complete inspection and test of all installed Network Video Recorder equipment. This includes testing and verifying operation with connected equipment.

2. The Contractor shall provide staff to test all devices and all operational features of the system for witness by the Owner's representative and the Authority Having jurisdiction. All testing must be witnessed by the Owner's representative, prior to acceptance.

3. The testing and certification shall take place as follows:

   a. The Network Video Recorder shall be tested in conjunction with the manufacturer's representative.
   b. All deficiencies noted in the above test shall be corrected.
   c. Test results shall be submitted to the consultant or Owner's representative.
   d. The test and correction of any deficiencies shall be witnessed by the owner's representative, and note.
   e. The Owner's representative shall accept the system.
   f. The system test shall be witnessed by the Authority Having Jurisdiction. Any deficiencies noted during the testing must be corrected.

4. A letter of certification shall be provided to indicate that the tests have been performed, and all devices are operational.