

SECTION 28 23 19 – VIDEO RECORDING SYSTEMS (VRSs)

1.01 SUMMARY:

- A. ^{A17}**Scope:** Scope of work shall be in accordance with Paragraph 1.01 D. of Section 01 81 26 (Communications, Control, Safety, and Security Systems), as required for continuous video recording of all closed circuit video system (CCVSs) cameras in parts of the Works.^{A17} This Section of the Employer's Requirements shall be read in conjunction with the Sections listed in Table 28 23 19-1.

B. **Related Sections:**

TABLE 28 23 19-1: ^{A8} Related Sections ^{A8}	
1.	Section 01 81 26 - Communications, Control, Safety, and Security Systems.
2.	Section 25 11 00 - Data Processing Equipment (DPE).
3.	Section 27 10 00 - Structured Cabling Systems for Communications Inside Plant.
4.	Section 27 17 00 - Communications Cabling for Outside Plant.
5.	Section 27 21 00 - Data Communications Equipment (DCE).
6.	Section 27 53 13 - Time Synchronization Systems.
7.	Section 28 23 00 - Closed Circuit Video Systems (CCVSs).

1.02 REFERENCE:

- A. **Applicable Publications:** Refer to Section 01 81 26 (*Communications, Control, Safety, and Security Systems*), Paragraph 1.02.

1.03 REQUIREMENTS:

A. **General Requirements:**

1. **General:**

- a. The Contractor shall meet all applicable requirements of Section 01 81 26 (*Communications, Control, Safety, and Security Systems*), Paragraph 1.03.
- b. VRSs shall be suitable for mission critical video surveillance, and shall not have tape drives. These are unacceptable.

2. ^{A5}**Coordination and Interoperability:** ^{A5}

a. **General:**

- 1) VRSs and storage area network (SAN) shall connect to Employer's intranet to allow remote access to authorized users.

- 2) VRSs shall include application program interfaces (APIs) for existing level security systems.

b. Storage Area Network (SAN) Equipment:

- 1) CCVS systems shall interoperate with Employer’s SAN available at the time of installation. Currently it is a Hitachi Data Systems model No. Thunder 9585V modular storage system equipped in a data center. As of 2007, it has 61 TeraBytes, and Brocade model Nos. 3250 and 3800 switches supporting up to 2 Gbps. More information may be found at http://www.hds.com/products_services/storage_systems/modular_storage and http://www.brocade.com/products/pdf/Fabric_Aware_Compatibility_Matrix-060206.pdf.
- 2) The Contractor shall expand the Employer’s SAN for recording additional Employer’s “División de Esclusas y Mantenimiento de Instalaciones” (OPE), División de Operaciones de Tránsito (OPT), and “División de Protección y Respuestas a Emergencias” (OPP) CCVS cameras in the new locks. All necessary additional encoders and software licenses shall be included.

c. Video Recording System (VRS):

- 1) OPE and OPP use a DVtel video (www.dvtel.com, Ridgefield Park, NJ, USA) ^{A9}Latitude NVMS v5.2 ^{A9} recording system with massive storage as described in SAN subparagraph above.
- 2) The Contractor shall either reuse and expand this VRS, or get a new one.
- 3) Redundancy shall be N+1 or better.
- 4) ^{A9}The DVtel VRS is a network-based video and audio management system comprised of servers, client workstations, connected media units (including encoders, decoders, cameras, and domes), and additional optional components, such as external storage modules and sensors.
- 5) The system provides a single, highly customizable client application, ControlCenter for viewing live and archived media, alarms and interactive maps. It supports all matrix-style features such as sequencing and guard tours.
- 6) A second client application, AdminCenter, allows for robust management of every aspect of the system, including camera and recording parameters, user privileges, and alarm behaviors. ^{A9}

B. Equipment and Materials:

1. **Ethernet Switches:** Shall be in accordance with Section 27 21 00 (*Data Communications Equipment*).
2. **Firewalls:** Shall be in accordance with Section 27 21 00 (*Data Communications Equipment*).
3. **Servers:** Shall be in accordance with Section 25 11 00 (*Data Processing Equipment*).
4. **Storage:**
 - a. The Contractor shall expand Employer's SAN capacity as required for recording of all cameras for security surveillance (OPP) local and locks operations (OPE) CCVS systems, 24 hours/day, continuously at four common intermediate format (CIF), 30 fps. For storage sizing, notice the required fps rates specified in Subparagraph 1.04 B.
 - b. Note that remote OPT and OPP CCVS systems already have DVtel video recording systems.
 - ^{A8}c. VRS storage shall be sized to maintain all new locks CCVS sources' recordings for no less than the latest 90 days.^{A8}
5. ^{A19}**Video Loggers:** Shall be as recommended by the system manufacturer as required to meet the requirements of this section.^{A19}

C. Software: Shall include the following:

1. Application program interfaces (APIs).
2. Network management, for system manager.
3. Object library.
4. Remote user access.
5. ^{A19}SAN multi-path, for connections between servers and SAN. This shall include Hitachi full fabric, high-command dynamic link manager (HDLM), and any other required licenses.^{A19}

D. Installation:

1. **Ethernet Switches:** Shall form dual, redundant Gigabit Ethernet or faster local area networks (LANs).
2. **Firewalls:** Shall be in accordance with Section 27 21 00 (*Data Communications Equipment*).

3. **Video Loggers:** Shall be installed in racks in communications equipment rooms in the main control buildings of the third set of locks.
4. **Servers:** Shall be rack mounted.
5. **Storage:** Shall be in SAN installed offsite in an Employer's data center and expanded as required. Current candidate sites are Balboa Building 625 and Corozal West Building 712 on the Pacific side.

1.04 DESIGN CRITERIA/SYSTEM PERFORMANCE:

A. General:

1. **Problem to be Solved:** VRSs shall solve the following business needs:
 - a. Provide means for simultaneous recording and playing back of video channels from CCVS cameras in the third set of locks areas.
2. **Restrictions to be Considered:**
 - a. Equipment shall be fully compatible with make and model of existing Employer SAN and VRSs in use at the time of installation.

B. Design Criteria:

1. **Interconnections to external devices such as SAN shall be made through network ports at Miraflores building 7D and Gatun building 24.**

C. System Performance:

1. General:

- a. Each VRS shall support 40 simultaneous remote users, expandable to 50, and no less than 32 video channels.
- b. ^{A17}Image rate shall not be less than 30 fps for fixed and PTZ cameras. ^{A17}

2. Functions: Video recording systems shall be capable of the following:

- a. Allowing the system manager to define whether to record always or when motion is detected, on a per camera basis. Continuous recording shall be the default for all channels, unless otherwise specified.
- b. Handling analog and internet protocol (IP) CCVS cameras.
- c. Compressing video in MPEG4 and MPEG7 formats in accordance with ISO 14496-12 and ^{A10}15938-8, ^{A10} respectively.

- d. Continuously recording all cameras in real time at specified rates between 2 and 30 fps. The system shall be capable of recording simultaneously in various sites with automatic file transfers as required.
- e. Providing video channel security through an effective encryption method.
- f. Data analysis.
- g. Storing in temporary buffer at fastest available rate, so that at least 5 seconds prior to movement or alarm can be stored permanently without loss of important visual information.
- h. Searching recordings based on date/time, events, and specific elements in a scene.
- i. Playing recordings back on multiple workstations, at the specified frame rates in real and non-real time.
- j. Video titling as required for identifying camera and site names.
- k. Apply analytics for the following:
 - 1) To track objects in each camera field while distinguishing between human and non-human activity. VRSs shall track directionally and provide alert notification for activities that require investigation or action, including tailgating.
 - 2) For asset detection, i.e., equipment and vehicles.
 - 3) To detect and notify alarms upon limit crossing such as fences.
 - 4) To identify patterns of operation, i.e.,
 - a) To detect objects that have previously moved and become static, after a predefined time limit.
 - b) To notify unusual events.
- l. To count or estimate the number of persons in a predefined area.
- m. To show procedures and appropriate responses in predetermined scenarios.
- n. To reconstruct events and scenarios.
- o. Storing recordings for no less than thirty days on a first-in first-out (FIFO) basis.

- p. Rendering high quality video, with resolution of 4CIF and signal to noise ratio (S/N) of 48 dB, or better.
- q. Exporting video recordings to computer files that can be attached to emails and played back with standard freeware such as Microsoft WMP and Nullsoft's Winamp audio players. Acceptable formats are AVI, MP4, and WMV.
- r. ^{A17}Synchronized audio and video recording and playback, should audio also be recorded. ^{A17}

3. **Screens:**

- a. VRS screens shall be friendly and intuitive.
- b. Based on the input of several cameras, screens shall be capable of defining automatic tours, camera groups, and panoramic views.
- c. Screens shall handle a combination of graphics, hyperlinks, maps, and watermarks, as defined by the system manager.

1.05 SUBMITTALS: The following shall be submitted for substantiation purposes:

- A. **Design:** The following shall be in accordance with Section 01 81 26 (*Communications, Control, Safety, and Security Systems*), ^{A8}Subparagraph 1.05 D. ^{A8}:
 - 1. Calculations, including –
 - a. Estimated size of massive storage for a given period of time.
 - b. System availability.
 - 2. Critical path method (CPM) diagram, with monthly updates.
 - 3. Descriptive literature.
 - 4. Drawings, including preliminary one-line diagram or sketch.
 - 5. Disaster recovery plan (DRP).
 - 6. Proposed governance and security policies.
 - 7. Protection methods for corrosion, electrostatic discharge (ESD), fungus/humidity, lightning/surge, power distortion and harmonics, radio frequency interference / electromagnetic interference (RFI/EMI), thermal, and vibration.
 - 8. Quality assurance and control plans.
 - 9. Specifications.
 - 10. Strengths, weaknesses, opportunities, and threats (SWOT) analysis.
- B. **Re-submittals Just Prior to Purchasing Materials:** All items under Subparagraph A., above, that have changed from original submittal shall be resubmitted in a design

conference in accordance with Section 01 81 26 (*Communications, Control, Safety, and Security Systems*), Paragraph 1.05.

C. Right after Factory Quality Control Tests (FQCT):

1. Test reports.

D. Upon Receipt of Shipped Items in Panama:

1. Instruction manuals for administration, installation, maintenance, and operation.
2. Packing lists.

E. Prior to Issuance of Taking-Over Certificate:

1. ^{A17}As-Built drawings, including IP addresses. ^{A17}
2. List of recommended spare parts.
3. Software licenses.
4. Test reports.
5. Training services.

1.06 QUALITY ASSURANCE: Shall include the following in accordance with Section 01 81 26 (*Communications, Control, Safety, and Security Systems*), Paragraph 1.06:

- A. Factory quality control tests (FQCT).
- B. Direct factory training services for no less than fifteen persons from the Employer's Personnel.
- C. Final field inspection tests (FFIT).
- D. Technical Support.
- E. Warranty.

END OF SECTION

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