Project Manual For

Replacement Facility for Wrangell Medical Center

Volume 4 – Vendor Package
Architect's Project No. 10528.00

Wrangell, Alaska

March 21, 2012

Bid Package for Vendors to Provide
Nurse Call System, Real-time Locator Tracking System (RTLS), Video Management
System, Electronic Door Access System, VOIP Phone System, Public Address System,
Wireless Access Points, and Ethernet Infrastructure for Wrangell Medical Center
March 22, 2012

The selected vendor will furnish, install, and commission all Low Voltage and Telecommunication and Security Systems which shall include the following major components: Nurse Call System, Real-time Locator Tracking System (RTLS)**,** Video Management System, Electronic Door Access System, VOIP Phone System, Wireless Access Points, and Ethernet Infrastructur**e** for the new hospital being constructed in Wrangell, Alaska. All elements of these systems are to be integrated, which integration will be achieved by a single prime vendor, and/or a prime vendor and a series of sub-vendors. The prime vendor will be the single point of contact and will be wholly responsible for the purchase, installation, integration, and commissioning of all of the following:

1. **General Requirements:**

   a. All systems and related devices will use TCP/IP Internet Protocol (IP) for a communication standard.
   b. Where feasible each peripheral device shall be energized with Power over Ethernet (PoE) compliant with the IEEE 802.3af or IEEE 802.3at standards.
   c. All wireless devices shall comply with the IEEE 802.11n standards.
   d. All wiring will be routed in j-hooks and/or cable trays and ladders using color-coded wire insulation.
   e. All Ethernet cabling shall be with CAT5e wire and shall comply with IEEE 802.3 standards.
   f. All devices shall be UL listed.
   g. The systems shall be HIPPA compliant.

2. **Nurse Call System**
   a. General Requirements:
      i. Comply with all aspects of UL 1069 for Acute Care Facilities.
      ii. Will include an HL7 Interface to the Hospital ADT and EMR systems
      iii. Will include remote paging through wireless devices to achieve a high level of privacy, security, and noise reduction in the hospital environment
      iv. Will integrated with an Electronic Whiteboard that can be viewed in 'List' or 'Room Map' format
      v. Will be integrated with a Real-time Locator Tracking System (RTLS) which includes location tracking of staff, patients, and equipment.

   b. Nurse Call Features and Functions will include:
      i. Single Patient Muting Station at each bedside location shown on the Schematic Plan.
         1. The single patient muting station will be interfaced with the TV to mute when the voice channel is open.
         2. The voice channel will be duplex.
         3. A pillow speaker will be provided with volume and channel control of the TV in addition to nurse call functions.
         4. The SPS will capable of integration to the side com rail of the bed

through a 37 pin bed interface unit

    ii. Dome Lights:
1. Shall be capable of multiple color and audible configurations, each of which is related to a specific type of call (e.g. code blue, staff emergency, urgent, or routine call).
2. Each call device will be linked to a specific dome light.

    iii. Zone Lights:
1. Shall be capable of multiple color and audible configurations, each of which is related to a specific type of call (e.g. code blue, staff emergency, urgent, or routine call).
2. Zone lights shall be configured to activate based on a selected group of call activation locations.

    iv. Visual Duty Stations shall be capable of multiple color and audible configurations, each of which is related to a specific type of call (e.g. code blue, staff emergency, urgent, or routine call).

    v. Central Monitors:
1. Patient Calls shall be displayed on a touch-screen monitor capable of being configured with the layout of the facility at the Central Nurse Station. Calls will display the location of the caller, the identity of the patient, the time of the call, until the call is cancelled.
2. The system shall be capable of displaying the Patient Calls on any monitor on the Facility's intranet, based on the user's privileges.
3. The system shall have multi-level security based on roles and individuals.

    vi. Reporting:
1. The system shall maintain a log of all calls, including the date and time, the location of the initiating device, the name of the patient located at that initiating device (if known), the urgency level of the call (e.g. code blue, staff emergency, urgent, routine), and the date/time the call was cancelled.
2. The system shall be capable of generating reports by authorized end-users at the Facility which demonstrate the number of calls by urgency level, the response time to such calls, the location of the calls, and the patient's identifier.

3. **Real Time Locator System (RTLS):**

    a. **General Requirements:**
        i. The RTLS shall use a combination of Infra-Red (IR) and Radio Frequency (RF) sensors
        ii. RF will operate at 433 MHZ and will comply with the periodic operation limits set forth in Section 15.231(e) of the FCC Rules, 47 C.F.R. S 15.231(e)
        iii. The system shall be able to identify the location of an RTLS tag in any corridor or room in the Facility.

    b. **RTLS Staff Functions:**

  i. The system will interface with the Nurse Call system to allow:
   1. Selective activation of the voice channel into the room where a particular staff member is located
   2. Automatic cancelling (response) of an active patient call when the staff member walks into the room in range of the staff-locating sensor
  ii. The Electronic Whiteboard will display the location of the staff member(s) in real-time based on the RTLS locator function.
  iii. The System will be capable of reporting on hand-washing activities of the staff

 c. **RTLS Patient Functions:**
   1. The Patient's location in the Facility will be continuously monitored and displayed on the Electronic Whiteboard
   2. The Electronic Whiteboard will display physician orders and/or lab test results when interfaced to the EMR.
   3. The Electronic Whiteboard will display the location of the patient and the patient's status (e.g. in-transit for a test, waiting to be seen, admitted, and discharged).

 d. **Real Time Equipment Locator (RTLS):**
   1. The system shall be able to identify the location of each tagged piece of equipment in any corridor or room in the Facility.
   2. The Electronic Whiteboard will display the location of the equipment.

 e. **RTLS - Patient Wandering:**
   1. Patient Wandering will be integrated with the RTLS patient location system.
   2. The RTLS will be integrated to an audible alarm and the Nurse Call paging system when a patient approaches an unauthorized exit point
   3. The RTLS will be integrated with an electronic key lock system and/or magnetic door lock system and/or magnetic fire-door hold-open system to prevent the patient's passage into the restricted area.
   4. Real-time video capture will be linked to the RTLS alarm condition through an integrated Digital Video Management System.

4. Video Surveillance System:

 a. All video cameras shall:
  i. Use TCP/IP communication protocol
  ii. Use Power over Ethernet (IEEE 802.3af)
  iii. Be vandal resistant
  iv. All cameras will be ceiling mounted to a UL Listed 4" Square Utility Box secured to the ceiling grid system with steel straps
  v. Provide a minimum of 1 Mega Pixel resolution for Interior Locations
  vi. Provide a minimum of 3 Mega Pixel resolution for Exterior Locations
  vii. Provide full frame rate and extended color fidelity
  viii. Comply with key parts of the SMPTE 274M and 296M standards
  ix. Provide two-way audio support with enhanced audio quality

    x. Provide advanced security and network management features including HTTPS encryption and Quality of Service

    xi. Indoor Surveillance Cameras shall have "Corridor View" and Digital P/T/Z, Tamper Alert, Motion Detection, Output Capability

    xii. Axis Communications Model M-3204 or Equal for Interior Facing Areas

    xiii. Axis Communications Model M-3304 with Wide Dynamic Range or Equal for Areas Subject to Bright Sunlight

    xiv. Axis Communications Model P-1347-E or P-1367-E or Equal for Exterior Locations

b. Video Management System shall:

    i. Be a networked solution based on TCP/IP protocols using either a client-server or browser based user interface

    ii. Provide multi-level security by user and/or user type

    iii. Use open standards that can be easily integrated with computer and Ethernet-based information systems, audio or security systems and other digital devices.

    iv. Support for multiple manufacturers and model numbers of IP video cameras

    v. Shall accommodate at least 48 video camera or capture devices

    vi. Shall be viewable from any location on the LAN or through a secure Internet connection

    vii. Shall have automatic camera discovery for new cameras added to the network

    viii. Shall provide a live view of no fewer than 16 cameras simultaneously

    ix. Shall provide the ability to search, playback and export recordings from one or many cameras in a desired time interval with timeline visualization.

    x. Shall maintain a log of all events

    xi. Shall have user-definable alarm conditions that can integrate with other applications on the LAN including but not limited to email and outbound text messaging to selected users

    xii. Shall support ONVIF and PSIA compliant cameras and devices

    xiii. Provide two independent configurable video streams (one for live viewing and one for recording).

    xiv. Built-in Video Motion Detection that is camera-independent for up to 48 cameras simultaneously

    xv. Shall allow integrated two-way audio control of microphones and speaker connected to IP cameras

    xvi. Shall provide notification by sound and/or email when triggered by a defined event at one or more video camera/device locations

    xvii. Shall be able to execute up to 25 pre-programmed Pan/Tilt/Zoom positions per camera

    xviii. Shall allow for absolute and relative PTZ positioning

5. Electronic Door Access Systems:

a. **General Features:**

    i. The system shall communicate with hosted access control software using TCP/IP protocol over Ethernet or Internet and/or Wireless Network utilizing a ZigBee 2.4 GHz Wireless Mesh with at least 16 available channels

    ii. The system shall allow programming of door level authorization with

1. No fewer than 3000 users per door
2. No fewer than six (6) access schedules per door
3. No fewer than 20 holiday/vacations per door
        iii. Power shall be supplied with Power over Ethernet (PoE) that complies with IEEE 802.3af or IEEE 802.3at and/or Battery Powered with Wireless Low Battery Alert
        iv. Outputs shall be capable of triggering alarms and video camera actions either directly or through software activation of the remote devices
        v. The system must be capable of performing an emergency lock-down
        vi. The system shall be capable of generating reports including lock events by time and user, operator activity at the central host, access groups, access schedules, Users by Door, Doors by Users, Users' Card IDs

b. **Door Controllers:**
    i. The network door controller shall provide access control processing, host functionality and power for a single door, including reader, lock, door status, request-to-exit device and auxiliary sounder.
    ii. The door controller shall provide a complete, fully featured access control hardware and firmware infrastructure for host-based access control software applications.
    iii. The network door controller shall provide full distributed processing of all access control functions. The unit shall provide fully functional off line operation when not actively communicating with the host access control software application; performing all access decisions and event logging. Upon connection with the host access control software application, the network door controller or network controller/reader shall upload all buffered off-line transactions (minimum of 1,000) to the host software
    iv. The network door controller shall be capable of employing AES 256 with symmetrical key encryption for all communications between the controller and host(s) system(s).
    v. The network door controller shall not be a proprietary product of the manufacturer of the host access control software application, and must have the ability to migrate to an alternative manufacturer's host access control software application by remote reconfiguration or firmware upgrade and without intervention from the original controller manufacturer.
    vi. The network door controller shall provide on-board Flash memory to allow program updates to be downloaded directly via the network.
    vii. The network door controller shall provide the following certifications:
        1. UL 294 Listed Access Control System Units
        2. FCC Class A Verification
    viii. Communication ports, connectors and cable:
        1. RJ-45 connector for Ethernet TCP/IP (10/100baseT)
        2. Door position input with programmable End of Line supervisory capability up to 6K Ohm.
        3. Request to exit (REX) input with programmable End of Line supervisory capability up to 6K Ohm.
        4. Non-latching configurable door lock output relay
            a. Unpowered (Dry) contact rated 2A @ 30VDC
            b. Powered (Wet) contact rated for up to 600mA @ 12VDC
               Note: The 600 mA is shared between two relays
        5. Non-latching alarm annunciation output relay
            a. Unpowered (Dry) contact rated 2A @ 30VDC

b. Powered (Wet) contact rated for up to 600mA @ 12VDC
        6. Maximum cable distance of TCP/IP: 328 feet (100m) using CAT 5e cable
   c. **Card Readers:**
        i. The reader shall be compatible with
            1. iClass
            2. MIFARE
            3. DESFire
        ii. The reader shall encrypt all RF data transmission between the smart card and reader using industry standard encryption techniques and advanced key management.
        iii. The network controller/reader shall communicate with hosted access control software using TCP/IP protocol over Ethernet or Internet. It will be energized with PoE that complies with IEEE 802.3af or IEEE 802.3at.
        iv. The card reader shall not be a proprietary product of the manufacturer of the host access control software application, and must have the ability to migrate to an alternative manufacturer's host access control software application by remote reconfiguration or firmware upgrade and without intervention from the original controller manufacturer.
        v. The network card reader shall provide the following certifications:
            1. UL 294 Listed Access Control System Units
            2. FCC Class A Verification
   d. **Self-Contained Wireless Locks and Card Readers**
        i. Shall support cards using the following standards (ISO 14443 A and B:
            1. Mifare® and
            2. DESFire® and
            3. iClass™ 13.56 MHz
        ii. Card Readers and Wireless Antenna shall be fully integrated with a battery energized door lock
        iii. Batteries shall be located in interior housing cover and must provide up to 120,000 cycles; lock data shall be maintained if batteries fail
        iv. Each Card Reader must be integrated to a centralized access control management system which must have the following features:
            1. Real time events and alarms
            2. Emergency global lockdown
            3. Compatible with existing WiFi Network
            4. Full reporting capabilities including door access logs and alarm events
            5. Multi-level security by user and user-type
            6. Card level audit trail
            7. Initiation of remote device (e.g. HDTV) commands
            8. Windows and/or HTML user interface
        v. Lock shall have a UL 3 Hour Fire Rating where required
        vi. Lock shall be certified to the UL/ANSI/BHMA Grade 1 standard
        vii. In addition to the foregoing, the device shall meet all the criteria set forth in the sections related to Door Controllers and Card Readers (except the PoE requirement).
   e. **Central Processing Hardware:**
        i. Windows or Linux as appropriate to manufacturer
        ii. Rack Mounted Server plus Rack Mount Server Fail-Over Unit
        iii. RAID Level 5
        iv. UPS (See Ethernet Infrastructure)

     v.   Ethernet Switch with PoE (See Ethernet Infrastructure)

6. **Synchronized Time Clocks:**
   a. Clocks shall be battery operated
   b. Clocks shall have wireless synchronization to the GPS
   c. Clocks shall report low battery condition at least 3 days prior to expected battery failure
   d. Alert when a clock is out of synch by more than 300 milliseconds
   e. Shall automatically update for Daylight Savings Time
   f. Perpetual log of time clock accuracy by time clock device and location

7. **Emergency Light Monitoring:**
   a. Shall communicate via an 802.11 b/g Wi-Fi or Ethernet network with TCP/IP Protocol
   b. Devices shall comply with Fire Protection Association 101 (NFPA), UL 924
   c. System shall automatically archive event logs and generate reports to demonstrate compliance to federal, state and local regulatory authorities with respect to testing and compliance of each Exit device

8. **Refrigerator/Freezer/Incubator Temperature Monitoring:**
   a. Shall communicate via an 802.11 b/g Wi-Fi or Ethernet network with TCP/IP Protocol
   b. System shall automatically archive event logs and generate reports to demonstrate compliance to federal, state and local regulatory authorities with respect to monitoring of temperature inside a refrigerator, freezer, or incubator
   c. Shall allow for multiple levels of alert and alarm escalation when an event occurs
   d. Event threshold can be defined at each sensor based on:
      i. Allowable range of temperatures
      ii. Change in temperature over a specified period of time
   e. Continuous and perpetual record of each temperature reading by location and time (synchronized to the GPS time system)

9. **Public Address System:**
   a. Speakers:
      i. Speakers shall be ceiling or wall mounted as shown on the schematic floor plan.
      ii. Each speaker shall be provide a minimum of 8 watts of power
      iii. Power and communication shall be provided via Ethernet with PoE that complies with IEEE 802.3af standards.
      iv. Shall be able to use as an SIP endpoint or multicast group member
   b. Architecture: The PA system shall be a network based system with the following features:
      i. It shall provide scalable distributed digital signal processing
      ii. Decentralized Ethernet based architecture with no single point of failure
      iii. It shall include a digital message server capable of playing pre-recorded messages based on specific input conditions (e.g. fire alarm activation, emergency lock down activation, etc).
      iv. The installation must meet NFPA 70 guidelines for sound intelligibility with a minimum STI of 0.45 and an average STI of 0.50
      v. Provide multiple paging options that include live paging, remote paging, delayed paging, and recorded message release
      vi. The system shall be integrated to the VOIP telephone system, and PC workstations

vii. System shall be Vocia™ (Biamp) or equal

10. VOIP Phone System

a. **Standards:**
   i. The system shall support SIP (Session Internet Protocol) and MGCP (Media Gateway Control Protocol) and related MEGACO standards.
   ii. Devices will communicate via TCP/IP over Ethernet
   iii. Devices, when feasible, will be energized with PoE (IEEE 802.3af)

b. **Integrated Messaging:** The system shall allow an e-mail client to retrieve voice mail, faxes and paged messages from the voice mail system.

   i. Voice Mail- The system shall provide voice mail service as a standard for all users. It shall require no additional hardware, consumes no ports, and storage is limited only by the size of the server hard disk.
   ii. Unified Messaging- The system shall provide integrated messaging for any PC desktop, as well as unified messaging with Microsoft Outlook. This includes voice mail in Outlook inbox, directory dialing using Outlook contacts and calendar integration. Voice mail messages shall be stored in the industry standard WAV Audio format.
   iii. The system shall provide uninterrupted service which automatically distributes voice mail and automated attendant to servers across the network in the event of a WAN outage. The remote voice mail shall continue to operate without interruption. In the event a remote voice mail server fails, calls are automatically routed to another server to ensure the calling party can be routed or leave a message.
   iv. Message Notification- The system shall provide a message notification feature that notifies users via email, cell phone or pager when a message has arrived.
   v. Dial-Out Queue- The system shall allow callers to dial out during or between recorded messages, if the caller cannot hold for the user to answer, or if they want to change their current action, such as leave a message instead.
   vi. Voice Mail- The system shall provide the ability to leave verbal message on a user's phone
   vii. Messaging System- The system shall have the ability to record a message from any phone.

c. **Reporting and Accounting**: The system shall include:
   i. SMDR (Station Message Detail Recording)
   ii. Busy reports on outbound trunk groups
   iii. Busy reports on incoming trunk groups
   iv. Usage reports base upon PIN or account numbers

d. **Reliability and Maintenance:**
   i. Uninterrupted Service: The system shall include functionality for the phone switches to automatically compensate for a failed switch thus ensuring uninterrupted service.
   ii. Power Failover – The system shall provide power failover such that a complete power outage exceeding the capacity of reserve power, the voice

switch will automatically connect to one analog telephone providing for an emergency dial tone.

   iii. Distributed Call Control – The system shall support a distributed call control architecture which eliminates a single point of failure by a failed phone switch or a network fault.

   iv. Systems and Component Status Check Capability: The System shall provide a single browser interface to manage all components of the system.

   v. The system shall include functionality to allow the automatic failover of phones or endpoints on a failed voice switch to another voice switch on the network.

   vi. System Status Monitoring- The system shall display in real-time the status of all components on one web-based administrative screen. Warnings and alerts shall be delivered by e-mail to defined recipients. Color-coded icons shall be used to identify the status of components.

e. **Architecture and Technical:**

   i. The system shall be agnostic as to the brand or manufacturer of LAN switching equipment in use on the network.

   ii. The system shall rely on a combination of TCP/IP over Ethernet (complying with IEEE 802.3af) and/or 802.11 b/g Wi-Fi.

   iii. The system will be able to interface with the selected Nurse Call system and RTLS to achieve wireless paging from either system utilizing hand-held devices that communicate via the IEEE 802.11 b/g Wi-Fi standard.

   iv. Endpoint Recognition- The system shall automatically recognize all endpoints when they are connected and configure them for immediate service. The endpoint shall automatically be discovered by the management interface.

   v. Integrated Software Distribution- The system shall provide automatic software updates for voice switches, endpoints, and desktop applications.

f. **Telephones – Desktop:**

   i. Audio- The system shall use IP telephones which have a wideband audio codec that supports seven full octaves of human sound and full-duplex speakerphones.

   ii. Key Labeling- The system shall provide IP telephones with preconfigured keys and self-labeling buttons.

   iii. Software Upgrades- The system shall provide IP telephones which are automatically updated via network downloads.

   iv. System Mobility- The system shall have the ability to move to another location in emergency situations

   v. Training and Usage- The system shall provide for ease of use and intuitive user help features that make the system easy to learn and to administer.

   vi. Desk Dialing- The system shall provide "Desk Dialing" from Outlook or other Contact Management software.

   vii. Network Requirements:
      a. Two-port Gigabit Ethernet switch
      b. 10/100/1000Base-Tx across LAN and PC ports
      c. Conformant to IEEE802.3-2005 (Clause 40) for Physical Media Attachment
      d. Conformant to IEEE802.3-2002 (Clause 28) for Link Partner Auto-Negotiation
      e. Manual or dynamic host configuration protocol

  f. (DHCP) network setup
  g. Time and date synchronization using SNTP
  h. FTP/TFTP/HTTP/HTTPS4 server-based central provisioning for mass deployments. Provisioning server redundancy supported
  i. Web portal for individual unit configuration
  j. QoS Support – IEEE 802.1p/Q tagging (VLAN),
  k. Layer 3 TOS, and DSCP
  l. Network Address Translation (NAT) support – static
  m. RTCP support (RFC 1889)
  n. Event logging
  o. Local digit map

 viii. Quantities**:**

Phone Type	Mfg and Model (or Equal)	Qty
Single Line Desk	Cisco 7911G	28
Single Line Wall Mount	Cisco 7911G	21
Two-Line Desk	Cisco7942G	15
Six-Line Desk Cisco	Cisco 7965G	4
24-Line Desk	Cisco 7931G	1
Conference Phone	Cisco 7937G	2

g. **Wireless VoWLAN Handsets**
 i. Network:
  1. 802.11a/b/g/n WIFI
  2. Server based central provisioning via FTP, TFTP, HTTP or HTTPs
  3. Embedded RTLS beacon for location tracking
  4. WMM (Wi-Fi Multimedia)
  5. WMM-Power Save
  6. IEEE 802.1p/Q tagging (VLAN)/DSCP tagging
 ii. Audio:
  1. TIA 810B, TIA 920 audio quality standards
  2. Full-duplex audio (compliant with IEEE 1329 full duplex standards
 iii. Security:
  1. WEP, WPA-Personal, WPA2-Personal, WPA2-Enterprise with 802.1X (EAP-FAST, PEAP-MSCHAPv2) with Opportunistic Key Caching (OKC) and Cisco Client Key Management (CCKM)
  2. Media encryption via Secure Real-Time Protocol (SRTP)
  3. SIP signaling encryption via Transport Layer Security (TLS)
  4. Server-based configuration file encryption (AES 128bit)
  5. HTTPS secure provisioning
  6. Address assignment via Manual or Dynamic host configuration protocol (DHCP)
  7. Domain name resolution via Domain Name Service (DNS)
  8. Time and date synchronization using Simple Network Time Protocol (SNTP)
  9. Lightweight Directory Access Protocol (LDAP) for directory lookup and download
  10. IEEE 802.1p/Q tagging (VLAN)/DSCP tagging

iv. Provide Cisco 7925G (or Equal) – Qty: 20

h. **Call Management:**

i. Automated Attendant- The system shall provide 24-hour automated call answering and routing to improve service for inbound callers. Outgoing prompts shall be customizable and linked to the time of day and/or day of week. The Auto-Attendant service shall consume no physical ports and shall be distributed at remote locations to save WAN bandwidth.

ii. Music Between Recordings/On-Hold Music- The system shall provide the ability to program music recordings between recordings or music while the caller is on hold.

iii. Presence Awareness-The system shall provide "Follow Me Find Me features" allowing calling parties the option to find a user at another number. If you do not answer, the system will pull the call back and the message will be left on the voice mail system.

iv. Call Handling Modes- The system shall provide user friendly call handling options to manage incoming calls when in a meeting, working from home or out of town. Users shall have the ability to customize their greetings, forward calls to another number, specify how quickly voice mail picks up a call and be notified when a voice mail message is received

v. Call Forwarding- The system shall provide the ability to forward calls to any location.

vi. Message Prompting Calls- The system shall be programmable by the user to route calls to another phone using messaging prompts. For example, if you are reporting a traffic light failure please press #, and this will route the call to an extension, a telephone number, and/or alert via e-mail.

vii. Three-Way Calling/System Transfer- The system shall have the ability to connect a call while staying on the line to ensure an answer from the third party, and the ability to speak to the third party without the caller hearing the conversation until allowed to join in

viii. User Mobility- The system shall have the ability to route calls to alternate numbers such as a person's cellular phone or any telephone.

ix. Skills Based Routing- The system shall be programmable so that the system will route calls based on "best qualified person" basis in order to address the specific requests.

x. Predictive Overflow- The system shall be a programmable system that when programmed determines whether a newly queued call to a group should be immediately overflowed or sent to the next group.

xi. Queue unavailable routing- The system shall have the ability to route calls to an answer point such as an attendant, voicemail. recorder announcement, or another path/system speed call # when the primary call path is unavailable. This allows the supervisor the choice of where to send calls received after hours or during holidays.

xii. Recorded Announcements- The system shall provide an unlimited amount of recorded announcements and their relative start times for callers waiting for a user to answer. The system shall also specify the programmed recording and its repeat interval. The recorded messaging shall be easily accessed from remote areas and shall be easily programmed. The messaging shall be easy to add addendums to without having to re-record everything.

xiii. Dial-Out Queue- The system shall allow callers to dial out during or between recorded messages, if the caller cannot hold for the user to

answer, or if they want to change their current action, such as leave a message instead

xiv. Call Delay- The system shall be user programmable to the number of rings before receipt of initial announcement delay.

xv. Inter-Group Overflow- The system shall have user ability to route calls from very "busy" groups to other groups with less call activity and/or wait time.

xvi. Announcement Flow- The system shall provide flow to second announcement, which allows more than one announcement within a specific queue

xvii. Call Routing to User Group or Queue- The system shall provide a programmable function of how calls are actually routed to a user group or a queue.

xviii. User No Answer Handling- The system shall have the ability to re-queue an unanswered call at a higher priority after a programmable amount of time.

xix. Queue Priority- The system shall have the ability to handle calls based on order of priority

xx. Threshold Alerting- The system shall provide visual indication of the longest call waiting in queue. This allows users and supervisors to know when the pre-defined threshold has been exceeded.

xxi. Queue status- The system shall provide group name, number of active user in the group, number of calls waiting and the length of time the longest call has been in queue.

i. **Call Monitoring**:

   i. Silent Monitor/Security Off-Hook Voice Announcement- The system shall have the ability to monitor a phone call and coach without the caller hearing the conversation.

   ii. User Service Observe- The system shall allow supervisors to monitor all call center calls.

   iii. Make Busy- The system shall prevent an extension from receiving calls when users are unavailable.

   iv. Users request for supervisor's assistance - The system shall include a help key that allows users to request a Supervisor's assistance. This allows assistance without disrupting the call.

11. **Wireless Access Point System:**

   a. Wireless Access points shall initially be placed at the locations shown on the schematic plan.

   b. The final location of such devices will be determined by actual field measurement of signal strength.

   c. Wireless access points shall conform to IEEE 802.11n and shall be a spectrum-aware, self-healing, and self-optimizing wireless network.

   d. Wireless Access Points shall be a dual-band (2.4GHZ and 5.0GHZ) with integrated antennae and capable of adjustable data rates.

   e. Wireless Access Points shall be place such that client devices shall main connectivity at data rates of 6 Mb/s or greater based on 5GHz operation.

   f. Wireless Access Points shall be energized with PoE (IEEE 802.3af standard).

   g. Wireless Access Points shall be the Cisco Aeronet 1140 model AIR-LAP1142N-A-K9 or equal, with Cisco Lightweight Access Point Protocol (LWAPP) software

or equal.
h. Wireless Access Points shall be networked with a Wireless LAN Controller with the following features (Cisco 5500 Series Wireless Controllers or equal):
    i. Scalable to 500 access points
    ii. Real time and historical RF interference reports
    iii. Support for Aironet 1140 Wireless Access Points (or equal)
    iv. Separate SSID tunnels for Hospital and Guest connections
    v. Support for streaming video (Cisco VideoStream or equal)
    vi. Support for Unified Communication for Wireless IP phones
    vii. All security features supported by Cisco 5500 Wireless LAN Controller

12. Ethernet Infrastructure:

a. Provide and install a complete data wiring system. This system shall include but not limited to patch panels, punch down blocks and terminators, plenum rated wiring of category specified, cable jacks, plates, labels, AutoCAD drawings that include corresponding device outlet designations for each and every outlet, and complete test meeting IEEE TIA 568b standards for each device/wire after completion of installation. All wiring to be installed and supported independent of all other support systems in a neat and organized fashion. Wiring shall be routed so there is separation from all electrical devices, fixtures, electrical power wiring, as shown on the plan details.

b. Conformance to the latest revision of the following is required under this specification:
    i. FCC Part 15 - Radio Frequency Devices and Radiation Limits
    ii. FCC Part 68 - Connection of Terminal Equipment to the Telephone Network
    iii. NEC
    iv. National, state, and local building and fire codes.
    v. TIA/EIA 568 - Commercial Building Telecommunications Cabling Standard
    vi. TIA/EIA 569 - Commercial Building Standard for Telecommunications Pathways and Spaces.
    vii. TIA/EIA 606 - Administration Standard for the Telecommunications Infrastructure of Commercial Buildings.
    viii. UL

c. **Central Server Room:**
    i. Server Racks – (2) Server Racks will be provided and installed as shown on the schematic drawing.
        1. Each will be anchored to the concrete floor
        2. One Rack will be used to support hospital information system servers
        3. One Rack will be used to support Ethernet Switches, Communications equipment, Security and Lock System Servers, Nurse Call, and RTLS Servers
        4. Racks shall be steel frame and shall include required accessories for floor installation, rack mounted devices and monitor shelves.
        5. Manufacturer and Model Number:
            a. Cooper B-Line – SB5841084 7'-0"H X 19"W
            b. Or Equal

    ii. The Central Ethernet Switch shall have:
1. 24 port switch capable of Fast Ethernet, Gigabit Ethernet, and 10 Gigabit Ethernet Connectivity
2. Integrated Power over Ethernet (PoE) complying with IEEE 802.3af supplying up to 15.4 watts
3. Integrated wireless LAN controller supporting up to 200 access points (Cisco 5500 or equal)
4. The Central Ethernet Switch will receive two Cat 6 cable feeds from each of the 12 Remote Ethernet Switches (see below).
5. The port on the Central Switch will be labeled with the Sequence Number of the Remote Ethernet Switch connected to it.
6. No cable from a Remote Ethernet to the Central Ethernet Switch will be more than 300 feet in length
7. Remote to Central Ethernet Switches shall be connected using the TIA/EIA-568-B to T-568-B RJ45 Wiring Standard with Cat 6 using cable with 4 twisted pairs of insulated copper conductors per cable, 24 AWG solid copper, fully insulated with retardant low-smoke thermoplastic material, plenum NEC CMP rated, and UL listed as such.
8. Central Ethernet Switch Manufacturer and Model Number:
   a. Cisco 3750
   b. Or Equal

d. **Remote Ethernet Switch Locations:**
    i. There will be a total of 20 Remote Ethernet Locations
    ii. Each location will have a 48 port Ethernet Switch with the following:
1. PoE+ with up to 30W per port
2. 740 Watt power supply (120 VAC)
3. 10 Gigabit Uplinks with 10/100/1000 Ethernet Connectivity
    iii. Each Remote Ethernet Switch will connected with (2) Cat 6 cables to the Ethernet Switch in the Central Data Room
1. Each Remote Ethernet Switch will be assigned a Sequence Number
2. Remote Ethernet Switch Manufacturer and Model Number:
   a. Cisco 2960-S
   b. Or Equal

e. **Data Outlets:**
    i. All data outlets will terminate in an RJ45 modular receptacle
    ii. All data outlets will be connected with Cat 6 cable to the closest Remote Ethernet Switch
    iii. No cable from a data outlet to a Remote Ethernet Switch will be more than 300 feet in length
    iv. All Data Terminating Equipment (DTE)outlets and equipment shall be connected using connectors wired using the TIA/EIA T-568-B to T-568-B RJ45 Wiring Standard, and using Cat 6 cable with 4 twisted pairs of insulated copper conductors per cable, 24 AWG solid copper, fully insulated with retardant low-smoke thermoplastic material, plenum NEC CMP rated, and UL listed as such.

     v. Each data outlet will be numbered with the Sequence Number of the Remote Ethernet Switch and the port number on that switch.

    f. **Cable Management:**
       i. All cable shall run in cable trays, wire ways, or j-hooks.
       ii. Cables running through rated walls will pass through a UL approved fire-stopping device or material
       iii. Cables will be labeled every 10 feet with the Sequence Number of the Remote Ethernet Switch, the data port from such switch, and the room number of the data port (or in the case of a cable running to the Central Ethernet Switch, the port number of the Central Ethernet Switch).
       iv. Cable which is connecting any element of the Nurse Call system shall be jacketed in green insulation.
       v. Cable which is connected to the VOIP system shall be jacketed in white.
       vi. Cable which is connected to the electric door locks, door controllers, and/or card reader devices will be jacketed in grey.
       vii. Cable which is connected to a Wireless Access Point will be jacketed in blue.

13. **Telemedicine:**
    a. Cameras shall be ceiling or wall mounted 8 feet from the foot of the patient bed (or the greatest distance feasible if less than 8 feet)
    b. Cameras shall be 3-MegaPixel with autofocus, digital P/T/Z, tamper alert, motion detection
    c. All cameras will be ceiling mounted to a UL Listed 4" Square Utility Box secured to the ceiling grid system with steel straps
    d. A high fidelity microphone shall be provided as a separate input to the Camera and mounted over the head of the patient
    e. A self-powered high fidelity speaker shall be provide as a separate output from the Camera and mounted near the foot of the patient
    f. The Camera image shall be partitioned to provide four simultaneous views, each of which can be zoomed to full screen by the remote operator
       i. Full Room View facing the patient
       ii. Mid-Chest to Head of Patient
       iii. Mid Chest to Foot of Patient
       iv. Cardiac Monitor View
    g. Viewing shall be security controlled in compliance with HIPAA
    h. Cameras will be Axis Communications Model P-3346 or Equal
    i. A total of 8 Cameras will be included with accompanying video management software to be located in the PACU (3), the ER (3), and the Variable Acuity Rooms (2)

14. **Television:**
    a. The television system shall be networked using CAT 6 Ethernet
    b. CATV or Satellite service entrance shall be connected with Coax Cable 75 Ohm with an 'F' connector to a rackmount headend amplifier. The amplifier shall be:
       i. 43 dB or greater

    ii.   The amplifier shall be calibrated to have the signal strength at every TV between -10 dB and + 15 dB, and to have the signal strength differential between the highest and lowest channel less than or equal to 11 dB.

    iii.   An amplifier will be used to serve up to 24 TV's.

    iv.   Blonder Tongue 55A-43P or Equal

c.   The amplified signal will be sent to an RF video distribution hub for use in CATV/MATV systems. The device will

    i.   Have 16 ports

    ii.   Comply with Part 15 of the FCC rules

    iii.   The hub can support distribution of standard digital channels (2 MHz bandwidth per channel) and HDTV channels (6 MHz bandwidth per channel).

    iv.   The hub will support frequencies up to 860 MHz

    v.   Hub to TV distance will not exceed 240 feet

    vi.   LYNX Broadband Model 040-0102 or Equal

d.   Each TV shall be connected to the CAT 6 network after conversion from unbalanced to balanced RF signals through a converter located at the TV.

    i.   Such converter will be connected to the TV through a coaxial cable with an F type connector.

    ii.   The device shall comply with Part 15 of the FCC rules

    iii.   (Lynx Broadband Model 040-0074 or Equal).

    iv.   Unused ports will be capped with a port terminator (LYNX Broadband 040-0069 or Equal)

15. Low Voltage Device Summary for Bid Purposes (as per schematic floor plan):

Description	Type	Qty	Ethernet Ports
PROJECTOR	A-V	2	0
WALL MOUNT PHONE	Data Device	38	38
PA SPEAKER	Data Device	32	32
TELEMEDICINE CAMERA	Data Device	8	8
RJ-45 -2 DATA	Network	96	192
RJ-45 -1 VOICE, 1 DATA	Network	88	176
V-M, V-D	Network	31	124
RJ-45 - 4 DATA	Network	21	84
WAP	Network	34	34
BED INTERFACE CONNECTOR	Nurse Call	27	0
CODE BLUE	Nurse Call	51	0
EMERGENCY PULL CORD	Nurse Call	57	0
SHOWER EMERGENCY PULL	Nurse Call	28	0
STAFF STATION	Nurse Call	10	0
VISUAL DUTY STATION	Nurse Call	26	0
SINGLE PATIENT STATION	Nurse Call	28	0
DOME LIGHT	Nurse Call	33	0
ZONE LIGHT	Nurse Call	5	0
TELEVISION	Nurse Call	56	0
IR STAFF SENSOR	RTLS	103	103
RF READER	RTLS	9	9
SECURITY CAMERA	Security	21	21
CARD READER	Security	8	8
CARD READER INTERIOR	Security	7	7
ATOMIC CLOCK	Wireless	100	0
WIRELESS TEMP PROBE	Wireless	20	0
Total		939	836