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USACE / NAVFAC / AFCESA / NASA | **UFGS-27 41 00.00 10 (April 2006)**

Preparing Activity: USACE | **Replacing without change UFGS-16731A (November 2002)**

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated 19 March 2007
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DIVISION 27 - COMMUNICATIONS

SECTION 27 41 00.00 10

NURSE CALL AUDIO-VISUAL (NCAV) SYSTEM

04/06

-- End of Section Table of Contents --

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SECTION 27 41 00.00 10

NURSE CALL AUDIO-VISUAL (NCAV) SYSTEM
04/06

****
NOTE: This guide specification covers the requirements for a NURSE CALL AUDIO-VISUAL (NCAV) SYSTEM in medical facilities. This guide specification does NOT cover requirements for a NURSE CALL TONE-VISUAL SYSTEM, which is covered in Section 27 52 32.00 10 NURSE CALL TONE-VISUAL SYSTEM.

Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable items(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments and suggestions on this guide specification are welcome and should be directed to the technical proponent of the specification. A listing of technical proponents, including their organization designation and telephone number, is on the Internet.

Recommended changes to a UFGS should be submitted as a Criteria Change Request (CCR).
****

PART 1 GENERAL

****
NOTE: This Section may be used in conjunction with Section 27 52 32.00 10 NURSE CALL TONE-VISUAL SYSTEM, Section 27 51 13.00 10 RADIO PAGING SYSTEM, and any other Sections required by the system design.

Communications requirements between caregivers and patients, and among caregivers, dictate the type of nurse call system to be installed, and nurse call system equipment locations.

The system designer developing the specifications and telecommunications drawings for the NCAV System should have at least five years of current experience in the application of similar nurse call systems, and have a good understanding of the capabilities and limitations of such nurse call systems currently available in the marketplace.

The NCAV System specification should reflect a thorough analysis of the facility design and the user requirements for the communications needed between caregivers and patients, and among caregivers.

If the NCAV System is to be procured and provided as part of the facility construction contract, the design drawings for the NCAV System that are part of the telecommunications systems drawings need to indicate the system legend, physical location of all equipment, cable tray sizes and routing, minimum conduit sizes, and zone plans that indicate the boundaries of each patient care area to be served by the system. Each zone light indicated on the drawings must include an individual identification number (ID) that is used in the Zone Light Activation Matrices that must be developed and included in this specification. Reference the Call Routing - Zone Lights paragraph, and the Schedule Zone Light Activation Matrices paragraphs for further requirement information.

If the NCAV System is to be provided as part of a separate procurement of telecommunications systems, two sets of design drawings are required: one set for the facility construction contract; and one set for the separate telecommunications systems contract.

The telecommunications systems design drawings for the facility construction contract need to indicate the infrastructure and rough-in required to accommodate the installation of the system equipment and cabling, including the system legend, physical location of all equipment, cable tray sizes and routing, minimum conduit sizes, typical empty conduit riser diagrams, and empty back box types and sizes.

The telecommunications systems design drawings for the separate procurement contract need to indicate the infrastructure and rough-in provided by the facility construction contract, the system legend, physical location of all equipment, and zone plans that indicate the boundaries of each patient care area to be served by the system. Each zone light indicated on the drawings must include an individual identification number (ID) that is used in the Zone Light Activation Matrices that must be developed and included in this specification. Reference the Call

Routing - Zone Lights paragraph, and the Schedule Zone light Activation Matrices paragraphs for further requirement information.

Throughout this specification requirements are indicated for a Radio Page and a Wireless Telephone interface capability and performance features. These capabilities and features are valid only if there is a Radio Paging System or a Wireless Telephone System, or both, that are part of the project, or are provided by the medical facility. The system designer should verify that these systems are available and coordinate the requirements and interface. If either, or both, of these systems are not part of the project, or are not available from the medical facility, then the required Radio Page and Wireless Telephone capability and performance need to be deleted throughout the specification.

****

1.1 REFERENCES

****

NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a RID outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

****

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2005; TIA 2005) National Electrical Code
NFPA 99	(2005; Errata 2005) Health Care Facilities

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)

TIA-569-B	(2004) Commercial Building Standard for Telecommunications Pathways and Spaces

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

47 CFR 15	Radio Frequency Devices

UNDERWRITERS LABORATORIES (UL)

UL 1069	(2001; Rev thru Mar 2006) Standard for Safety Hospital Signaling and Nurse Call Equipment
UL 1778	(2003) Uninterruptible Power Systems

1.2 DEFINITIONS

****
NOTE: Add any new definitions needed for the specific project being specified.
****

1.2.1 General Definitions

The glossary of definitions, abbreviations and acronyms, and units set forth in TIA-569-B and UL 1069 shall apply to this Section, unless otherwise noted.

1.2.2 Additional Acronyms

For the purposes of this Section, the following definitions shall apply.

ADT	Admission, Discharge, and Transfer (Computer Program)
CFR	Code of Federal Regulations
COTS	Commercial-Off-The-Shelf (Products)
CPU	Central Processing Unit
LAN	Local Area Network
NC	Nurse Call (Subsystems)
NCAV	Nurse Call Audio-Visual (System)
NCTV	Nurse Call Tone-Visual (Systems)
O&M	Operation and Maintenance (Manuals)
UON	Unless Otherwise Noted
UPS	Uninterruptible Power Supply

1.2.3 Additional Terms

For the purposes of this Section, following definitions shall apply.

Attendant	The person that is operating a master station.
Audio Call Station	Stations with voice intercom capability where patients or staff can originate calls. Includes patient stations, staff stations, and duty stations.
Call	Communications between patients and caregivers, and among caregivers, that are transmitted through the NCAV System and interconnected supplementary systems. Call communications modes for the NCAV System include alert tones, visual indicators, voice intercom, and digital display of alphanumeric data and text messages.
Caregiver	A person who is directly involved in the care of

	patients.
Pager	Radio Page Receiver.
SideCom	Registered trademark of the Hill-Rom Company, Inc. Hill-Rom bed side rails can be equipped with a SideCom unit which incorporates controls to place a nurse call, controls for the remote operation the patient TV set, and speakers for the TV sound.
Software	Operating systems and application programs that enable a computer, or computer-based system, to function as specified. Software shall include the documentation to describe, maintain and use the programs.
System	NCAV System, UON.
System Application Design	Contractor performed systems engineering to combine and configure a collection of hardware and software components into a functioning system that has been customized and tailored to satisfy the specified and indicated requirements. The system application design shall assure that the configuration and working relationships among all of the components of the system and all interfaces provides the specified capability and performance.
Telecommunications Systems	All low voltage and power limited Communications and Security Systems installed in the facility. This does NOT include Fire Alarm Systems, Environmental Control Systems, and Special Building Alarm Systems.
Telecommunications Rooms	Controlled environment rooms on each floor level that provide the floor and wall space for the mounting of equipment and cable distribution terminations and devices for all telecommunications systems
24x7 Staffed	A workplace that is constantly staffed 24 hours per day, 7 days per week, 365 days per year.

1.3 SUBMITTALS

****

NOTE: Review submittal description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in

context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

****

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for [Contractor Quality Control approval.][information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Qualifications[; G][; G, [_____]]

NCAV System Contractor, Installer, and Manufacturer qualifications. Proposed system information.

SD-02 Shop Drawings

Detail Drawings[; G][; G, [_____]]

Drawings and diagrams specifically prepared to indicate the work of this project.

Coordination Drawings[; G][; G, [_____]]

Coordination drawings indicating the details of all electronic and physical interfaces between the NCAV System and all interfaced telecommunications systems, including the exact point and type of demarcation.

As-Built System Drawings[; G][; G, [_____]]

As-built drawings including all approved detail drawings and coordination drawings that have been updated to indicate the final as-built configuration of all equipment and cables as installed. In addition to the architectural room names and numbers, as-built drawings shall indicate the medical facility user room names and numbers for all rooms where equipment has been installed.

SD-03 Product Data

Material and Equipment[; G][; G, [_____]]

The Manufacturer's product data and specifications, and other information in sufficient detail and scope to verify that each product item is in compliance with requirements of the contract documents. Include a description of the system operating characteristics and individual product data sheets for each item of equipment indicating descriptive and technical data, operating temperature limits, heat dissipated, electrical requirements, dimensions and mounting restrictions. If a product data sheet covers several types or sizes of the product, the sheet shall be marked to indicate the specific item provided. A letter from the Manufacturer, stating that the medical facility will be notified whenever system upgrades and enhancements are available, shall accompany the submittal. Listing of all hardware, software, cables, and materials products arranged in the order of the specification, including the specification paragraph number, name, Manufacturer and model for each item, and a reference to the Manufacturer's product data sheet for the item.

Warranty[; G][; G, [_____]]

Warranty document indicating the warranty period for the system and all component products.

Maintenance Service[; G][; G, [_____]]

For maintenance service after the warranty period, the system Contractor shall submit a service agreement proposal to the medical facility.

SD-04 Samples

Product Samples[; G][; G, [_____]]

****
NOTE: If the Design Agency or Using Service requests samples, include this submittal.
****

One sample unit of each type of station, light, and cord set for approval.

SD-05 Design Data

Power Supply Design[; G][; G, [_____]]

a. Analysis and calculations to define power supply requirements for each Major Functional Component of the system in accordance with the Manufacturer's instructions, and the worst-case power loading conditions.

b. Analysis and calculations to define the type and size of all cables for the system in accordance with Manufacturers instructions and power drop calculations.

c. Analysis and supporting result from specified preparation and application items, and all coordination items. Includes definition of all interface protocols.

d. AC power consumption and heat dissipation data under both normal and maximum operating conditions.

SD-06 Test Reports

Acceptance Test Plan[; G][; G, [_____]]

Step-by-step actions and the expected results to demonstrate system compliance with the requirements of this specification. Include tests defined in the Manufacturers installation instructions; list of all test equipment to be used, including data indicating that calibration of the test equipment is current; test data sheets; and names and qualifications of the person(s) who will perform the tests.

Acceptance Test Report[; G][; G, [_____]]

Test reports in both electronic media form and hard copy booklet form. Test reports shall indicate all field tests performed to adjust each component and to prove compliance with the specified performance criteria. Each test report shall indicate the final position of controls and operating mode of the system, and the Manufacturer, model number, and serial number of the test equipment used in each test. The final acceptance test report shall include a statement that all specified requirements and conditions have been satisfied.

SD-07 Certificates

Certificates of Compliance[; G][; G, [_____]]

Proof that the items conform to the specified codes or standards, including the requirements of CFR, NFPA, and UL.

SD-08 Manufacturer's Instructions

Installation[; G][; G, [_____]]

Preprinted material from the Manufacturer describing installation requirements and safety precautions. Manufacturer's requirements for the use of specific products.

SD-10 Operation and Maintenance Data

Operating and Maintenance Manuals[; G][; G, [_____]]

Submit O&M data in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA, Data Package 5. Reproduced copies of O&M Manuals will not acceptable if a printed manual is available from the Manufacturer. O&M Manuals available from the Manufacturer on a CD shall be submitted in addition to the hard copy manuals. Submit addenda to the O&M Manuals from the Manufacturer that describe any part of the system application design that is either not covered by, or deviates from, the O&M Manuals from the Manufacturer.

Software Manuals[; G][; G, [_____]];

The software manual describing the functions of all software and including all other information necessary to enable proper loading, setup, testing, and operation. The software manual shall include:

a. Definition of terms and functions.

b. Use of system and applications software.

c. Procedures for system initialization, start-up and a shutdown.

d. Alarm reports.

e. Reports generation.

f. Database format and requirements for data entry.

g. Directory of all disk files.

h. Description of all communications protocols, including data formats, command characters, and a sample of each type of data transfer.

Backup Software[; G][; G, [_____]]

Copy of all operating system and application software, on the type of electronic media acceptable to the Contracting Officer. Ghost copy of all hard disks in the system after all setup procedures have been completed, the system has been programmed for the required user operation, and acceptance tests have been successfully completed.

Training Plan[; G][; G, [_____]]

Description of the training programs and materials to be provided. Identification and qualification of training instructors. Instructional schedules for all classes. The Contractor shall submit training materials used as part of the specified training programs including all training media, such as video recordings, CDs, and DVDs, that are available from the Manufacturer.

1.4 SYSTEM DESCRIPTION

****
NOTE: Delete any specified system requirement that is not required for the project being specified. Add any system requirement that is required for the project being specified, but is not specified herein.
****

1.4.1 Design Requirements

1.4.1.1 System Application Design

The system Contractor shall perform the system application design required to provide a NCAV System that complies with and satisfies all of the requirements specified in this Section and indicated on the drawings for this application and project.

1.4.1.2 Standard Products

The system application design shall utilize a standard, UL 1069 listed NCAV System that is the product of a Manufacturer regularly engaged in the manufacture of NCAV Systems, and a system that has been in satisfactory use for at least six months. The system shall be supported by a service organization that is, in the opinion of the Contracting Officer, reasonably convenient to the medical facility installation site.

1.4.1.3 Minimal Requirements

Specifications are minimal requirements. If the provided system requires enhanced specifications that exceed those specified herein in order to satisfy the specified design, configuration, capability, and performance requirements, then a system with the enhanced specifications shall be provided at no additional cost to the Government.

1.4.1.4 Current State-Of-The-Art Technology

The NCAV System application design and products shall utilize current state-of-the-art computer, networking, and communications technology to provide the enhanced capability and performance specified herein.

1.4.1.5 Continuous Duty Design

All equipment shall be designed for 24 hours per day, 365 days per year continuous 100 percent duty operation.

1.4.1.6 Power Supply Design

a. Power supplies shall provide sufficient power capacity for the worst-case condition of system operation and signaling that could occur in the application environment without any loss or perceptible degradation of signal quality. Design analysis shall include calculations to size power supplies for worst-case conditions, and this calculation shall be included with the design data submittal.

b. AC powered equipment shall operate per specifications over the range of 105V to 130V, 60 Hz, unless otherwise noted.

c. All equipment connected to ac power circuits shall be protected from power line transients and surges as likely to be subjected in service from a commercial utility ac power system. Protection shall be integral to the equipment or installed as an accessory item in accordance with Manufacturer's recommendations. Fuses shall not be used for this protection.

d. Power distributed over system cables shall be low voltage and power limited in accordance with NFPA 70 and UL 1069.

1.4.1.7 Shielding and Grounding

All products shall be shielded and grounded as required by the system design, Manufacturer's instructions, UL 1069 listing, and regulatory requirements.

1.4.1.8 Station Connectors

All stations shall plug into system cabling. Stations hardwired to system cabling are not acceptable.

1.4.1.9 User Room Numbers and Names

Architectural room numbers and names indicated on the contract documents may be used for the initial system application design and installation work. However, in the final system application design, medical facility user room numbers and names that have been designated by the Contracting Officer shall be used for all system functions and as-built documentation.

a. In medical facilities that have multi-bed patient bedrooms, the user room number shall also identify each bed in the bedroom.

b. User room numbers and names shall be consistent with the room numbers and names used in the medical facility information system ADT program, and on the medical facility signage.

c. Programmable assignment of patient room/bed number identification shall provide for up to ten alphanumeric characters for each room/bed. It shall be possible to program any identifying alphanumeric characters to any room or bed in any sequence regardless of the physical location of the patient station.

1.4.2 System Capability and Configuration

1.4.2.1 System Capability

****

NOTE: If a the NCTV System is being specified for a project or medical facility which provides a Radio Paging System and/or a Wireless Telephone System capability, then include the following Radio Paging System and/or Wireless Telephone System interface capability here and throughout this specification. If such a Radio Paging System capability is NOT available from the project or medical facility, then delete this requirement here and throughout this specification.

If the NCTV System is being specified for a medical facility, which also requires a NCTV System that is specified with supplemental enhanced operations, then include the following capability.

****

The NCAV System shall communicate patient and caregiver calls for assistance and information. The NCAV System capabilities shall include the following:

a. Fundamental operation for communication of patient and caregiver calls for assistance and information, medical device alarms, and patient safety and security alarms, from patient care spaces and areas.

b. Supplemental operation, as an enhanced adjunct to the fundamental operation, for communication of patient ADT data, networked call routing, call logging and reporting, and system maintenance.

c. Supplemental enhanced communication of call data and messages to alphanumeric pagers and the messaging capability of wireless telephones carried by appropriate medical facility staff.

d. Interface with the Section 27 52 32.00 10 NURSE CALL TONE-VISUAL (NCTV) SYSTEM for integrated use by the NCTV System of the supplemental enhanced operations provided by the NCAV System.

1.4.2.2 System Configuration and Major Functional Components

The NCAV System shall be an integrated configuration of the Major Functional Components listed below to provide the required system capability and performance. The capability and configuration of each of these Major Functional Components are defined below.

Nurse Call (NC) Subsystems
Central Code Annunciator Stations
Call Logging Workstation
Maintenance Workstation
Local Area Network (LAN)
System Servers
Call Logging Server
Information System Server
Radio Page Interface Server
NCTV System Integration Server
Wireless Telephone Server

1.4.2.3 NC Subsystems

****
NOTE: List all patient care areas that require a NC Subsystem. These patient care areas should be clearly indicated on the telecommunications drawings, including the location and boundaries of the areas served.
****

a. Subsystems. A NC Subsystem shall serve each of the patient care areas listed below for the communication of patient and caregiver calls. The telecommunications drawings indicate the location and boundaries of the patient care areas listed.

NC Subsystem Number	Patient Care Area Served
[_____]	[_____]

b. Major NC Subsystem Components.

(1) The major components listed below shall be provided for the NC Subsystems at locations as indicated on the telecommunications drawings.

Patient Stations
Bed Interface Outlet Stations
Code Blue Stations
Infant Code Blue Stations
Device Alarm Jack Stations

Dome Lights
Duty Stations
Emergency Push Button Stations
Emergency Pull Cord Stations
Master Stations
Psychiatric Key Control Stations
Remote Cord Sets Outlet Stations
Staff Stations
Zone Lights
Main Terminal/Equipment Panels

(2) The major components listed below, which are not indicated on the telecommunications drawings, shall be provided as required by the NC Subsystems design.

Cord Sets: Push Button, Pneumatic, and Pillow Speaker
Cord Set Wall Brackets
UPS for ac powered equipment

c. NC Subsystem Interfaces

****
NOTE: System designer should coordinate the interface requirements defined below with the specifications for the interfaced equipment to assure that such equipment provides the capability and compatibility required.
****

The system shall provide the capability, interface protocols, and interconnections as required for interfacing with the following equipment and systems:

(1) Control of Overbed Lights

Interface with the low voltage controller for the overbed lights at each patient bed shall allow remote on/off control of the overbed reading light from a single push button toggle switch on the pillow speaker cord set and on the bed SideCom [, and remote on/off control of the overbed indirect room light from a single push button toggle switch on the pillow speaker cord set and on the bed SideCom].

****
NOTE: If patient bedside personal TV Sets (the small size TV Sets which hang on an arm that is mounted on the headwall adjacent to the patient bed) are used, then delete the following paragraph "(2)" and all subsequent references to this TV interface function.
****

(2) Patient TV Control and Sound

Interface with the TV Set in each patient room shall allow TV Set control and remote sound from a pillow speaker cord set and a bed SideCom.

(3) Bed SideCom Functions and Bed Exit Safety Alarms

Interface with the patient bed SideCom, via the bed communications cable,

shall allow initiation of a routine patient call, TV Set controls and remote sound, and Bed Exit System safety alarm calls from the SideCom.

****
NOTE: If Infant Protection Systems are NOT provided by the project or the medical facility, then deleted the following paragraph "(4)" and all subsequent references to this interface function.
****

(4) Infant Protection Security Alarms

In patient care areas equipped with an Infant Protection System, interface with the Infant Protection System to receive and communicate infant abduction alarm calls.

****
NOTE: If Patient Wandering Systems are NOT provided by the project or the medical facility, then deleted the following paragraph "(5)" and all subsequent references to this interface function.
****

(5) Patient Wandering Security Alarms

In patient care areas equipped with a Patient Wandering System, interface with the Patient Wandering System to receive and communicate patient wandering alarm calls.

****
NOTE: If an Intrusion Detection System is NOT provided by the project or the medical facility for patient care exit doors, then deleted the following paragraph "(6)" and all subsequent references to this interface function.
****

(6) Intrusion Detection Security Alarms

In patient care areas that have exit doors that the staff needs to know are or have been opened, interface with the Intrusion Detection System to receive and communicate door open alarm calls from these doors.

****
NOTE: If a Wireless Telephone System is NOT provided by the project or the medical facility, then deleted the following paragraph "(7)" and all subsequent references to this interface function.
****

(7) Wireless Telephone Voice Intercom

Each NC Subsystem shall be interfaced with the [medical facility] Wireless Telephone System for voice communications with wireless phones carried by on-duty caregivers.

(8) LAN and System Servers

Each NC Subsystem shall be interfaced with the dedicated system LAN for

data communication with the system Central Code Annunciator Stations, Call Logging Workstation, Maintenance Workstation, and system Servers for Call Logging, Information System Interface, Radio Page Interface, Wireless Telephone Interface, and NCTV System Integration.

(9) Voice Intercom Network

Each NC Subsystem shall be interfaced with the system Voice Intercom Network for full-duplex voice intercom among all NC Subsystems.

1.4.2.4 Voice Intercom Network

A voice intercom network shall provide full-duplex voice communications among all NC Subsystems. Voice intercom network components shall be located as required by the system application design.

1.4.2.5 LAN

****
NOTE: If the NCAV System is to be interfaced with a networked NCTV System in the same medical facility, include item "d." below.
****

a. A dedicated NCAV System LAN shall connect all Major Functional Components of the system into an integrated network for system wide data communications for the functions specified in this Section.

b. The NCAV System LAN shall be interfaced with the medical facility Information Systems LAN through the Information System Server and the Call Logging Server for functions as specified in this Section.

c. LAN equipment shall be located as required by the system application design.

d. Integrate the NCAV System LAN with the NCTV System LAN for data communications of NCTV System calls to the NCAV System Central Code Annunciator Station [, Call Logging,][and Radio Page].

1.4.2.6 Central Code Annunciator Stations

****
NOTE: As indicated below, there are two annunciation points for Infant Code Blue alarms: on the Master Code Annunciator Station, and on the Infant Code Blue Annunciator Station.
****

a. A Master Code Annunciation Station for the central annunciation of all Code Blue and all Infant Code Blue calls from all NC Subsystems equipped with code blue stations or infant code blue stations [, and all NCTV NC Subsystems that are equipped with code blue stations]. The Master Code Annunciator Station shall be located at a central 24x7 staffed location as indicated on the telecommunications drawings.

b. An Infant Code Annunciation Station for the central annunciation of all Infant Code Blue calls from NC Subsystems equipped with infant code blue stations. The Infant Code Blue Annunciator Station shall be located at a 24x7 staffed Neonatal Intensive Care Unit location as indicated on the

telecommunications drawings.

1.4.2.7 Call Logging Workstation

A computer workstation for the central processing and generation of call data statistical reports from all NC Subsystems. The workstation shall be located as indicated on the telecommunications drawings.

1.4.2.8 Maintenance Workstation

A computer workstation for remote monitoring and troubleshooting of failures throughout the system, and for down loading and installation of software upgrades from the Manufacturer. The Maintenance Workstation shall be located as indicated on the telecommunications drawings.

1.4.2.9 Servers

a. One or more servers, connected to the system LAN, shall be provided as required by the system application design for the following functions:

(1) Call Logging Server. Provides the central database for all call logging data from all NC Subsystems, and the data interface with the medical facility Information System LAN to allow medical facility Information System terminals and computers to access call logging data and reports.

(2) Information System Server. Provides the data interface with the medical facility Information System for the downloading of patient ADT data to all NC Subsystems.

(3) Radio Page Server. Provides the data interface with the Radio Paging System to communicate calls from throughout the system for transmission to alphanumeric pagers that are carried by the medical facility on-duty staff.

(4) Wireless Telephone Server. Provides the data interface with the Wireless Telephone System to communicate calls from throughout the system for transmission to the alphanumeric text messaging feature of wireless phones that are carried by the medical facility on-duty staff.

b. Each server shall provide the protocols and interconnections as required for each specified interface function.

c. The location of servers shall be as required by the system application design.

1.4.2.10 Central Master Station - Future Option

The system shall have the capability and system architecture to allow the future addition of an optional central master station that can receive and answer calls from any combination of all patient care areas. The future implementation of this option shall not require any changes in the system architecture nor require the replacement of any installed system equipment.

1.4.3 Performance Requirements

1.4.3.1 NC Subsystems Functions and Features

a. Communication of calls for assistance and information, medical device

alarms, and patient safety and security alarms.

(1) Patient safety alarm calls are from the interfaced Bed Exit System.

(2) Security alarm calls are from the interfaced Infant Protection System, Patient Wandering System, and the medical facility Intrusion Detection System.

(3) Call features shall be as specified herein.

b. Within each patient bedroom, operate and listen to the sound from the patient TV Set via a hardwired interface with the TV Set. This function shall utilize the control and speaker features of both the connected pillow speaker and bed SideCom simultaneously. The TV sound shall be muted during any voice intercom call.

c. Within each patient bedroom, on/off control of the overbed reading light [and indirect room light]. On/off control shall use a single push button toggle switch [for the reading light, and a second single push button toggle switch for the indirect room light].

d. All NC Subsystems shall have the same basic feature package for standardization and to simplify maintenance problems. Features not required in a particular patient care area shall not be activated on the NC Subsystem serving the area at the time of installation. However, the medical facility user shall be able to easily program the activation of these inactive features at any time thereafter without any assistance from the system Contractor.

1.4.3.2 Voice Intercom Features

a. Master stations and audio call stations shall be equipped for voice intercom. Audio call stations include patient stations, staff stations, and duty stations.

b. Voice intercom shall be full-duplex to provide clear and distinct bi-directional, simultaneous two-way communications between the calling and answering stations throughout the system. Simplex talk/listen intercom systems that utilize voice activated (VOX) or other switching circuits that permit transmission in only one direction at a time, or which may clip portions of a two-way conversation, shall not be permitted.

c. Through an interface with a Wireless Telephone System, voice communications can be held between wireless phones and any audio call station in the system.

d. Audio Call Stations: These stations shall provide a full-duplex intercom with the serving master station, and with wireless phones interfaced with the system. The audio call station microphone shall be whisper-sensitive capable of picking up very soft-spoken conversations from anywhere in the room. The audio call station speaker shall be of permanent magnet design, of sufficient quality to provide low distortion voice reproduction anywhere in the room at reasonable volume levels.

e. Master Stations: Master stations shall be equipped with a telephone style handset with a self-coiling cord and cradle assembly with built-in hookswitch. The handset shall provide a natural, full-duplex, uninterrupted voice intercom with all audio call stations and master

stations in the system. No voice activated switching or push to talk circuitry shall be permitted at the master station. The handset earpiece volume shall be adjustable. Master Stations shall include the capability to plug-in and utilize a headset in place of the handset. The headset shall include a noise canceling microphone, ear cushions, and a volume control, and shall provide the same quality natural, full-duplex voice intercom as provided by the handset. The headset shall be fully adjustable to fit the attendant.

f. There shall be at least two simultaneous full-duplex voice intercom paths per NC Subsystem to allow voice intercom between a master station and an audio call station while there is a simultaneous voice intercom between a wireless phone and another audio call station.

g. A separate, system wide, full-duplex voice intercom path shall serve as a voice communications network among all NC Subsystems.

1.4.3.3 Call Types and Points of Origin

NCAV System shall communicate the call types defined below from the noted points of origin.

a. Patient Routine Call. Patient call for routine assistance that is originated from a call cord or bed SideCom attached to a patient station. This may include voice intercom between the patient station and the master station or wireless phone handling the call.

b. Patient Priority Call. Patient call for priority assistance that is originated from a call cord or bed SideCom attached to a patient station that has been programmed for the patient priority call type. The patient priority call type is used to accommodate patients that cannot adequately communicate, or who require immediate assistance because of their medical condition. This may include voice intercom between the patient station and the master station or wireless phone handling the call.

c. Cord Disconnect Call. Disconnect of a call cord set from a patient station or a remote cord sets outlet station.

d. Bed Disconnected Call. Disconnect of the bed SideCom communications cable from the bed interface outlet station.

e. Emergency Call. Patient or caregiver calls for emergency assistance from a patient station, emergency push button station, emergency pull cord station, or staff station that is equipped with an emergency push button.

f. Code Blue Call. Caregiver calls for code blue assistance from a code blue station.

g. Infant Code Blue Call. Caregiver calls for infant code blue assistance from a infant code blue station.

h. Medical Device Service Alarm Call. Alarm calls from a medical device attached to a device alarm jack station indicating that the attached medical device needs service. This may be a routine priority level call or an emergency priority level call depending upon which jack the medical device is attached to.

i. Bed Exit Alarm Call. Alarm calls from a Bed Exit System attached to the bed communications cable and bed interface outlet station indicating

that the patient has exited the bed.

j. Infant Abduction Alarm Call. Alarm calls from a Infant Protection Alarm System indicating that someone is attempting to abduct an infant from the protected patient care area.

k. Patient Wandering Alarm Call. Alarm calls from a Patient Wandering Alarm System indicating that a patient has wandered out of the protected patient care area.

l. Intrusion Detection Alarm Call. Alarm calls from a Intrusion Detection System indicating that a secured perimeter door of the patient care area has been opened.

m. Voice Intercom Call. A voice intercom call from a patient station, staff station, or duty station, to the master station [and/or wireless phone] handing the calls from the patient care area. Also, a voice intercom call from a master station to any other master station, and to any audio call station within the patient care area served by the master station.

n. Service Dispatch Call. When an attendant at a master station verbally responds to a patient or caregiver call via voice intercom with the caller, and determines that a caregiver needs to go to the calling location to perform a service, the attendant can initiate a service dispatch call that will automatically route an alphanumeric service message to the pagers and/or wireless phones carried by the required caregivers indicating the specific type of assistance that is needed at the patient care location.

o. Information Message Call. Using a standard computer type keyboard that is part of the master station, an attendant can manually originate a free form plain English alphanumeric text message, and dispatch it for transmission to pagers and wireless phones carried by on-duty staff.

p. Failure Alarm Call. Failure alarm calls from all electronically supervised circuits and equipment, and from all failure diagnostic programs throughout the system.

1.4.3.4 Call Annunciation Modes

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NOTE: If there is both a NCAV System and a NCTV System in the medical facility, then add paragraph "j." below.

****

a. Each call shall annunciate throughout the system by various combinations of visual indications, alert tones, and the digital display of alphanumeric data and text messages. The specific annunciation for each call type shall be as specified herein for each type and source of call.

b. When a call is placed from any call station, including patient stations, code blue stations, infant code blue stations, device alarm jack stations, emergency stations, duty stations, or staff stations, a call assurance indicator lamp on the station shall illuminate to indicate that the call has been registered on the system. Also, when a call is placed from a pillow speaker or bed SideCom, a call assurance indicator lamp on these devices shall illuminate. This call assurance lamp shall remain illuminated until the call is cancelled.

c. On dome lights and zone lights, a variety of colored lamps with steady or flashing illumination shall provide clear and absolute distinction between call priority levels. Call indications on zone lights shall be absolutely identical to the call indication on dome lights for each call type. The dome light for any patient toilet room that opens into a procedure room shall be equipped with an electronic call alert tone device that shall sound when a call is initiated.

d. On master stations:

(1) A call alert tone shall sound.

(2) The LCD monitor shall digitally display alphanumeric data and text message information identifying the call type, call origination room/bed, associated patient data, associated caregiver duty assignment data, associated radio pager assignment data, and associated wireless phone assignment data. The user room name/number shall identify the call origination room.

(3) Call data, information and status shall remain displayed on the monitor until the call is canceled.

e. On code annunciator stations, a visual display shall indicate the call type and call origination patient care area and room, and sound an alert tone. The visual display shall either indicate all calls simultaneously, or scroll through multiple calls that are not simultaneously displayed. The user room name and number shall identify the call origination room.

f. On duty stations, LED lamp(s) with steady or flashing illumination shall indicate calls by the call priority level, and sound an alert tone. If multiple call indicator lamps are provided, the call indication patterns shall be identical to the call indication patterns on dome lights.

g. Call alert tone signals on dome lights, zone lights, duty stations, master stations, and annunciator stations shall sound at different intermittent pulse rates to provide a clear and absolute distinction between call priorities. The volume level of alert tones shall be adjustable. The actual sound volume level setting for each device in each area shall be adjusted as coordinated with and defined by the medical facility user.

h. On pagers and wireless phones, an alert tone or vibration shall activate, and an alphanumeric data and text message shall indicate the identification of the room/bed where the call originated, and the call type. For routine calls that have first been answered by an attendant, the pager or wireless phone shall also indicate a service dispatch message that has been sent by the attendant. The user room name and number shall identify the call origination room/bed.

i. The alert tones and visual indication displays for all types and priorities of calls shall continue until the call has been answered and canceled. Except for routine calls, all calls shall be canceled at the originating call station. Routine calls can be canceled at either the originating station or the answering master station.

j. Tone and light signals for each call type on the NCAV System shall be consistent with the tone and light signals for the same call type on any NCTV System in the same medical facility.

1.4.3.5 Call Annunciation Priorities

a. The annunciation of call types shall be sequenced in a four level priority rank order, from a high of Number 1 to a low of Number 4, as listed below.

Priority Level	Call Type
#1 Code	Code Blue
	Infant Code Blue
	Infant Protection Alarm
	Patient Wandering Alarm
#2 Emergency	Emergency
	Bed Exit Alarm
	Medical Device Emergency Alarm
	Failure Alarm
#3 Priority	Patient Priority
	Cord or Bed Disconnected
#4 Routine	Patient Routine
	Medical Device Routine Alarm
	Voice Intercom

b. The system shall simultaneous process all calls regardless of the priority. However, when several different priority calls are present on the system at any one time, the highest priority call shall take precedence over lower priority calls.

(1) For annunciation on duty stations, dome lights, and zone lights that use common tone and visual indicators for multiple types of calls, the highest priority call shall override the lower priority call. For example, if dome or zone lights indicate an emergency call by a solid red light and a code blue by a flashing red light, the dome and zone lights shall display a flashing red light when there are both an emergency call and a code call at the same time.

(2) For master stations that display calls in a list, the displayed list of calls shall be in priority order, with the highest priority calls at the top of the displayed list. Existing lower priority calls shall be displaced in the displayed list by the occurrence of a higher priority call. For example, if a routine call is first in the list and a code call occurs, the code call shall jump ahead of the routine call in the displayed list.

(3) When more then one call is being processed at the same time through the radio page server and/or wireless phone server, the highest priority call type shall take precedence and be transmitted ahead of lower priority calls.

1.4.3.6 Call Routing

Call routing throughout the system shall be software programmable to provide the selectable call routing defined below. All patient data and caregiver data associated with any call shall automatically accompany the call routing.

a. Call Routing - Dome Lights

All call types from any call station within a patient care room or cubicle shall annunciate on the dome light(s) located outside the entry into the room or cubicle. Calls from patient toilet/shower rooms off of a patient bedroom shall annunciate on the dome light located outside the entry into the patient bedroom.

b. Call Routing - Zone Lights

(1) Within a patient care area, the routing of any call type from any call station to each zone light shall be programmable to allow annunciation of calls on a zone light from any combination of call stations. Each zone light shall be programmed to present a pattern of illuminated zone lights that the caregiver can follow from any corridor in the patient care area to get to the corridor where a call has been initiated from a patient care room along the corridor.

(2) Outside entries to patient care areas that are equipped with code blue or infant code blue stations, zone lights are provided to direct code response teams into the patient care area. These zone lights shall be programmed to only indicate code calls. Once the code response team is inside the patient care area, they will then follow the code call indications on the zone lights within the area.

****
NOTE: Prepare and add Zone Light Activation Matrices as noted below. Include the Matrices as part of Schedules as indicated at the end of this Section.
****

(3) The Zone Light Activation Matrices at the end of this Section lists the identification (ID) number of all zone lights indicated on the telecommunications plans, and relates these to the patient care rooms where calls are originated that activate the zone lights.

c. Call Routing - Master Stations

Master station features shall provide the attendant with the selectable call routing defined below. This shall include the routing of voice intercom between any master station and any audio call station.

(1) A default call routing scheme within each patient care area shall be established for calls between each call originating station and the master station(s) in a NC Subsystem. If there is more then one master station in a NC Subsystem, then the default call routing to each master station shall be user defined and approved by the Contracting Officer.

(2) Any call from any call originating station can be selectively routed to, and answered from, any master station in any NC Subsystem throughout the entire integrated NCAV System.

(3) Any one master station in any NC Subsystem shall be able to handle any combination of calls, or all of the calls, from any call originating station in any NC Subsystem.

(4) Any combination of master stations throughout all NC Subsystem can be programmed to operate in a parallel mode. In this parallel mode, all calls that would normally be routed to a master station will now be routed

to all master stations in the parallel mode at the same time. The parallel mode can be either a default setting or an attendant selectable mode at any master station.

(5) An attendant at any master station shall be able to perform a selective call capture function whereby any call originating station that has been default programmed for call routing to any other master station shall be rerouted to the capturing master station. The attendant shall be able to selectively capture single rooms, groups of rooms, or all the rooms that have been default assigned to another master station. The rerouting of calls from any room shall include all associated patient and caregiver data that has been programmed for the room, including caregiver duty assignments.

(6) Master stations that have relinquished reception of calls to another master station via the call capture function shall retain the capability to originate radio and wireless phone pages.

(7) An attendant at any master station shall be able to recapture calls from any NC Subsystem or any call station that has been captured by another master station by performing a selectable recapture function.

d. Call Routing - Code Annunciator Stations

(1) All code blue and infant code blue calls from all NC Subsystems that are equipped with code blue stations or infant code blue stations shall be routed to a central Master Code Annunciation Station in addition to the normal local annunciation on a master station.

****
NOTE: If the NCAV System is being specified for a medical facility that also requires a NCTV System with a central code blue annunciator capability, then the NCTV system shall be interface with the NCAV System central code annunciator capability instead of providing a separate NCTV System central code blue annunciator station. In this case, include the following paragraph.
****

[All code blue calls from the Section 27 52 32.00 10 NURSE CALL TONE-VISUAL SYSTEM shall be routed to the NCAV central Master Code Annunciator Station.] [Exceptions: identify all exceptions for code call routing].

(2) All infant code blue calls from all NC Subsystems that are equipped with infant code blue stations shall be routed to a central Infant Code Blue Annunciation Station in addition to the central Master Code Annunciator Station and the normal local annunciation on a master station.

e. Call Routing - Duty Stations

(1) All duty stations shall be equipped to annunciate all call types.

(2) Call routing from any call station to each duty station shall be programmable to allow annunciation of calls on a duty station from any combination of call stations within a patient care area.

f. Call Routing - Call Logging Server and Workstation

All call data from throughout the entire system shall be routed to the call logging database in the Call Logging Server. This call logging database can then be accessed from the Call Logging Workstation and authorized medical facility Information System computers and terminals attached to the Information System LAN.

g. Call Routing - Maintenance Workstation

All failure alarm calls from all Major Functional Components of the system shall be locally indicted and also routed to the Maintenance Workstation.

h. Call Routing - Radio and Wireless Phone Servers and Paging

All calls from throughout the entire system shall be routed by selectable duty assignment programming to radio pagers and wireless phones via the Radio Page and Wireless Telephone Servers.

[i. Call Routing - Special

Identify any special call routing requirements].

1.4.3.7 Call Processing Rates

a. The total elapsed time between the initiation of a call from a call station to the display of that call on a master station or annunciator station shall not exceed four (4) seconds.

b. The total elapsed time between the initiation of a call from a call station to the input of that call to the Radio Paging System or the Wireless Telephone System shall not exceed four (4) seconds.

1.4.3.8 Radio and Wireless Phone Paging

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NOTE: The system designer should coordinate interface requirements with the project or medical facility Wireless Telephone System and/or Radio Paging System to be used with the NCAV System to assure that these systems have the capability to provide the paging functions specified below, and to define the interface requirements.

****

a. The system shall be interfaced with the Radio Paging System and or the Wireless Telephone System so that calls can be manually or automatically transmitted to alphanumeric text pagers and the text messaging function of wireless phones carried by the on-duty staff.

b. The interface with the Radio Paging System and Wireless Telephone System shall provide the capability to transmit, and the pagers and wireless phones shall be able to receive, all call information as described below.

(1) Alert tones.

(a) Pagers shall have two distinct alert tones, one for routine and priority calls, and one for emergency and code calls. If the pager vibrator alert mode is used, there shall be no alert distinction between different priority calls.

(b) Wireless phones shall have two distinct alert tones to distinguish between voice and text message calls.

(2) An alphanumeric text display message indicating the date and time of the service message, identification of the room/bed where the call originated, call type, and a service message. The message display shall provide for at least 32 alphanumeric text characters. The user room name and number shall identify the call origination room/bed.

(3) The room identification and call type message shall be full English words and not any abbreviation or code.

c. Calls shall be processed in accordance with the priority requirements of the system.

d. The master stations in each NC Subsystem shall provide the capability to input, store and transmit at least 48 preprogrammed alphanumeric text service messages for each NC Subsystem. Preprogrammed service messages can be added, changed or deleted, at any time prior to or after system activation, from any master station keyboard with a security log on procedure. These preprogrammed messages shall be accessible from any master station where one of the messages can be selected and linked to a call for transmission to a pager or group of pagers, and/or a wireless phone or group of wireless phones.

Typical examples of preprogrammed service messages are as follows:

BEDPAN REQUEST	DIZZINESS	NAUSEATED
BEDPAN REMOVAL	DRESSING CHANGE	PAIN MEDICATION
BLEEDING	IV PROBLEM	SLEEPING PILL
BREATH SHORTNESS	LAV ASSISTANCE	WATER
CHEST PAIN	MEAL ASSISTANCE	

Just prior to System Commissioning, the system Contractor shall coordinate with the medical facility user the exact preprogrammed service messages to be installed by the system Contractor in the NC Subsystem for each patient care area.

e. Each master station shall provide the input capability for manual keyboard entry of alphanumeric text messages. This shall allow normal computer type keyboard entry of alphanumeric text messages that can be linked to a call for transmission to a pager or group of pagers, and a wireless phone or group of wireless phones, or transmitted directly to a specific pager or wireless phone without any link to a call on the system.

f. Duty assignments shall be programmed for each individual caregiver and each individual room/bed call origination point. Such caregiver duty assignment programming shall be entered from the master station(s) in the patient care area where the duty assignment is made. Programming that only allows duty assignment by zones or groups of rooms is not acceptable. Call capture functions shall include transfer of caregiver duty assignments along with the patient data.

g. Typically, duty assignment data programming shall occur at the start of each work shift. The data shall correlate the pager and/or a wireless phone assigned to a caregiver with the caregiver name, and with their unique duty assignment by individual room/bed, level of care and work shift. The data shall also contain group pager and group wireless phone

numbers.

h. Caregivers can be assigned to a radio page group and/or wireless phone group whereby all assigned members of the group shall simultaneously receive the same message. Groups shall be established with a single address/number per group for team response to calls such as emergency or code.

i. Duty assignments shall include primary and backup assignments. The primary assignment shall initially route calls to the caregivers primarily responsible for responding to the call. If the call has not been answered and canceled within a programmed length of time, the call shall be automatically transmitted a second time to the primary caregivers and the first tier backup caregivers. If the call still is not answered within a programmed length of time, the call shall then be automatically transmitted a third time to the primary caregivers and the second tier backup caregivers. Calls shall continue to be transmitted until they are answered and cancelled.

j. Any call from a patient care location can be relayed directly to the individual pager or group of pagers, wireless phone or group of wireless phones, carried by the caregivers assigned to the call origination point and level of care on each shift. The system shall automatically perform this direct relay function to the appropriate pagers and wireless phones by cross?referencing each individual caregiver duty assignment data with each pager and wireless phone assignment, and address/number data.

k. Call relay function for all master stations shall be able to be initiated in any one of three ways.

(1) Attended, Semiautomatic Mode: When calls are being handled at a master station the attendant shall be able to relay a call to the appropriate pager or wireless phone by activating a transmit function while the call is still registered on the NC Subsystem. Before relaying the call, the attendant shall be able to add a service-required message of up to at least 16 characters to the call that is in addition to the room/bed number. Service messages could be any one of at least 48 preprogrammed messages or an alphanumeric text message that is manually entered from the master station keyboard.

(2) Unattended, Automatic Mode: When a master station is unattended, the station can be switched to an automatic transmission mode whereby all calls coming to the master station shall automatically be relayed to the appropriate pagers and wireless phones. The transmission shall include the room/bed number and call type.

(3) Preprogrammed, Automatic Mode: Specific call types can be programmed for automatic relay to the appropriate pagers and wireless phones even if the master station that normally handles the call is attended. This mode can typically include calls such as code and emergency calls, and all types of alarm and service calls. Additionally, each patient station can be individually programmed for patient priority call status whereby all patient calls shall be automatically relayed to the appropriate pager or wireless phone. Such automatic relayed calls shall include the room/bed number and the call type.

l. Radio pager or wireless phone messages can be originated from any master station. A preprogrammed or a manually entered alphanumeric text message can be originated by use of the master station keyboard. This can

be routed via duty assignments by keying in the room/bed number, or directly to an individual or group by keying in their name or pager address or wireless phone number.

m. Master stations where calls have been captured by another master station in the system (call capture function) shall retain the capability to originate and transmit radio pages and wireless phone messages.

n. Whenever a fault is detected by the built-in fault diagnostics of the system, pagers or wireless phones assigned to the maintenance staff shall indicate a fault condition and the location of the faulty component.

1.4.3.9 Failure Modes, Alarms and Diagnostics

a. Failure of the LAN shall not affect the functional integrity of any other Major Functional Component connected to the LAN.

b. If any master station fails, the dome lights and zone lights shall continue to indicate calls from patient care rooms.

c. At a minimum, a failure alarm shall be automatically initiated by a total failure of the NCAV System, by failure of any Major Functional Component of the system, by failure of any power supply, by failure of any supervised circuit, and by failure of any circuit or component monitored by built-in fault diagnostics.

d. If the installed system includes any other built-in fault diagnostics designed in by the Manufacturer, there shall be automatic failure alarm indications resulting from these built-in fault diagnostics.

e. Failure alarms shall be annunciated locally on the individual Major Functional Component, communicated to the Maintenance Workstation, and transmitted to pagers carried by the medical facility maintenance staff.

1.4.4 Detail Drawings

The Contractor shall submit Coordination Drawings as specified in the Submittals paragraph and detail drawings to scale including:

a. System block diagram, LAN diagram including all servers and interfaces, voice intercom network diagram, riser diagrams, wiring and schematic diagrams, run sheets including number of conductors and wire number (ID), custom assembly details, and installation details.

b. Riser diagrams shall indicate the identification number (ID) for all zone lights as shown on the plan drawings.

c. Installation details shall indicate layout and mounting of equipment, equipment relationship to other parts of the work, including clearances required for maintenance and operation, and plan and elevation details that indicate the exact and totally coordinated physical location and size of each individual item of equipment.

d. Details for the custom assembly of equipment shall indicate the assembly configuration, elevations and dimensions. Typical custom assembly details include equipment panels, and equipment mounted in a rack or cabinet.

1.5 QUALITY ASSURANCE

1.5.1 Qualifications

1.5.1.1 General Qualification Requirements

a. The NCAV System Contractor, Installer and Manufacturer shall each have the minimum qualifications specified, related to the type of system specified for this project.

b. The Government reserves the right to accept or reject the system Contractor, Installer or Manufacturer based upon qualifications and ability to conform to specified requirements of this Section. System Contractors, Installers and Manufacturers that do not have the specified qualifications will not be acceptable and shall not be allowed to perform the work of this Section.

c. The Government will determine the acceptability of any proposed system Contractor, Installer and Manufacturer based on submitted and verified documentation that substantiates that the proposed system Contractor, Installer and Manufacturer have the qualifications specified in this Section.

d. The project Electrical Contractor shall not procure or install the system cabling or equipment unless said Electrical Contractor is separately and distinctly qualified as the system Contractor and or Installer in accordance with the qualifications specified in this Section.

e. The system Contractor shall submit documented verification of the specified qualifications as part of the Preconstruction qualification submittal. The Government will have the right to request, inspect and verify references and resumes of all technical and managerial personnel assigned to the project. Qualification documentation shall include, but not be limited to the information outlined below.

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NOTE: If the NCTV System is to be procured and provided as part of the facility construction contract, include the following paragraph "(1)".

If the NCTV System is to be provided as part of a separate RFP procurement of telecommunications systems, then delete the following paragraph "(1)".

****

(1 A list of projects performed by the system Contractor and Installer during the last five years explicitly involving the type of system specified in this Section. The list shall include the name of the facility where the work was done, and the name, title, address and telephone number of a point of contact for the listed facility that can verify the work done. Lists shall be restricted to the facilities where the type of system delivered and installed are similar to and serve the same purpose as the system specified in this Section. Lists shall explicitly identify the make and model of the systems provided, and the total scope of work done for each and every facility on the list.

(2) An organization chart for the system Contractor and Installer project team that will perform the work of this Section.

(3) List and resumes of the principal personnel that will be assigned to work on this project and their assigned work responsibility and relationship with the project management structure. This shall include the following personnel:

System Project Manager
System Application Designer
CAD Staff (that will prepare submittal drawings)
Installation Technical and Supervisory Personnel
Acceptance Testing Personnel
Training Personnel

For each individual, this shall include his or her education and experience explicitly relevant to their work assignment on this project, and also include the certificate for factory training where this qualification is specified. Experiences with other types of systems unrelated to the type of system specified in this Section are irrelevant and shall not be included.

(4) Addresses of the system Contractor and Installer location where the work that is not done on the project site will be performed. This shall include, but not be limited to, the address for the following people, work, and services: principle responsible for this project; system application designer and documentation work; training personnel; repair and maintenance services; repair and maintenance supplies warehouse.

(5) Telephone number that will be answered by staff 24 hours per day, 365 days per year, to obtain repair parts and maintenance service.

(6) The Manufacturer's qualifications relative to the production of the type of system specified in this Section.

(7) A letter from the Manufacturer stating that the system Contractor is an authorized distributor and service organization for the Manufacturer of the provided system. The letter shall also state the length of time that the system Contractor has been an authorized distributor.

(8) A letter from the Manufacturer stating that system being provided satisfies all functional and product requirements specified in this Section.

(9) A letter from the Manufacturer guaranteeing the availability of parts as specified.

1.5.1.2 System Contractor Qualifications

a. The system Contractor shall be regularly engaged in the system application design, documentation, installation, testing, training, and maintenance of the type of system specified in this Section, with a minimum of five years experience providing these services for systems having the same level of features and functions as the system being provided.

b. The system Contractor shall be an authorized distributor and service organization for the Manufacturer of the provided systems for a minimum of at least five years.

c. System Contractor personnel assigned to this project shall be factory trained or certified for the make and model of systems provided by the system Contractor to satisfy the specifications in this Section and shall have a minimum of five years experience performing the services that they will perform for this project.

d. The system Contractor shall maintain a full complement of repair parts for the provided system and shall be able to furnish on-call maintenance service 24 hours per day, 365 days per year as specified herein.

1.5.1.3 Installer Qualifications

a. The Installer shall be regularly engaged in the business of installation of the type of system specified in this Section.

b. The installation supervisor that will be assigned to this project shall be factory trained or certified for the make and model of system provided by the system Contractor to satisfy the specifications in this Section and shall have a minimum of five years experience in the installation of the specified types of system equipment and cables.

c. Installer personnel that will be assigned to this project shall have a minimum of three years experience in the installation of the types of system equipment and cable specified in this Section.

1.5.1.4 Manufacturer Qualifications

a. The Manufacturer shall have a minimum of five years of experience in producing the type of system specified in this Section.

b. The Manufacturer shall produce a system that satisfies all specified functional and product requirements.

c. The Manufacturer shall guarantee availability of replacement parts for a minimum of seven years from date of final acceptance of the installed system by the Contracting Officer.

1.5.2 Regulatory Requirements

1.5.2.1 UL 1069 Listing

a. Fundamental devices and operations of the NCAV System shall be UL 1069 listed and labeled.

b. Supplementary devices and operations of the NCAV System that enhance the fundamental nurse call devices and operations shall be electrically isolated in accordance with UL 1069, and shall not in any way defeat the UL 1069 listing.

1.5.2.2 Design and Installation Work

All design and installation work shall comply with UL 1069, NFPA 70 NEC, NFPA 99, and TIA-569-B.

1.5.2.3 Electromagnetic Interference (EMI)

a. Installed system shall conform to the EMI standards specified in 47 CFR 15 rules and regulations, for EMI caused by computing devices.

b. Within the normal medical facility environment, the installed system shall not generate nor be susceptible to any harmful electromagnetic emission, radiation, or induction that degrades, obstructs, or interrupts the operation of the installed system, and any computer system, life safety system, or patient monitoring system in the facility.

c. In the event that any part of the system is subject to CFR technical standards different from those set forth herein, including without limitation the requirement that those computing devices marketed for use in business or industrial environments are certified by the FCC to comply with the Class B limit of the FCC Rules, such CFR standards shall apply in lieu of those set forth herein.

d. In the event that, at the time of system acceptance testing, the applicable CFR technical standards shall differ from those set forth above, the system as installed shall conform to such then applicable CFR technical standards.

e. In the event of a breach of the representations and warranties contained herein, the system Contractor shall, at their own expense, take all measures necessary to put the offending system into compliance with the applicable CFR technical standards.

1.6 DELIVERY, STORAGE AND HANDLING

1.6.1 Protection

All products delivered and placed in storage shall be stored with protection from the weather, humidity and temperature variation, dirt and dust, or other contaminants.

1.6.2 Delivery Coordination

Coordinate deliveries with the Contracting Officer to insure a timely installation.

1.6.3 Loss Liability

The system Contractor shall be liable for any loss due to delivery and storage problems.

1.6.4 Delivery Restrictions

a. No products or installation material shall be delivered to the job site more than one month prior to commencement of its installation.

b. System products shall not leave the factory prior to six months before the time that the facility is ready for installation of the products. Obtain prior written approval of the shipping date from the Contracting Officer.

1.6.5 Contractor Responsibility

The system Contractor shall be responsible for all handling and control of products provided under this contract.

1.7 SEQUENCING AND SCHEDULING

a. Each part of the system shall be installed and phased into operation as required by the project schedule.

b. Schedule and coordinate work with all other trades and suppliers whose work is critical to the successful installation of the system.

c. Furnish and install all required items for a complete and operating installation so as to cause no delay in work by Others, or completion of the facility project.

d. Final inspection and acceptance testing of each system shall be performed after the system installation and commissioning has been completed.

1.8 WARRANTY

a. Guarantee the operational and physical integrity of the provided system, including a warranty against all defects in design, equipment, materials, software, workmanship, and improper installation and adjustments, for a period of at least one year from the date that the fully operational system is accepted by the Government after satisfactory completion of final inspection and acceptance tests. This warranty shall not cover any malfunctions or damage caused by misuse, abuse or neglect. If the system Contractor or Manufacturer warranty is for a period longer than one year, the longest warranty period shall govern. The system Contractor shall furnish a warranty document with the Product Data submittal.

b. During the warranty period any maintenance, adjustments or repairs shall be made free of charge. Repair service response time shall be as specified herein under Maintenance and Repair Service. Warranty repair of minor malfunctions desired by the Government at other than normal working hours may be charged at current labor rates for the premium portion of time.

1.9 MAINTENANCE

1.9.1 Extra Materials

1.9.1.1 Off-The-Shelf Maintenance Parts

The system Contractor shall guarantee that a stock of the Manufacturer's parts required for maintenance service shall be available off-the-shelf from the system Contractor or Manufacturer, and can be express delivered to the medical facility if not available locally.

a. Parts that must be ordered from the Manufacturer for the repair of a major malfunction, as defined herein, shall be deliverable within one day after the major malfunction has been identified.

b. Parts that must be ordered from the Manufacturer for the repair of a minor malfunction, as defined herein, shall be deliverable within three days after the minor malfunction has been identified.

1.9.1.2 Installation Spare Parts

The system Contractor shall keep an adequate quantity of installation spare parts onsite to preclude work stoppages and to meet other contingencies that might arise prior to the final inspection and acceptance of the system.

1.9.1.3 Post Acceptance Spare Parts

****
NOTE: System designer should coordinate and validate with the Contracting Officer and user the onsite spare parts requirements to be itemized in "a." below, and the funding for these spare parts.
****

a. After the system has been acceptance tested and turned over to the Government for operation, furnish the minimum type and quantity of onsite spare parts as itemized below.

Quantity	Items
[_____]	Each type of incandescent lamp bulbs
[_____]	Each type of Station
[_____]	Each type of Light
[_____]	Each type of UPS
[_____]	Push Button Cord Sets
[_____]	Pneumatic Cord Sets
[_____]	Pillow Speaker Cord Sets
[_____]	Dummy Plugs
[_____]	Sets of Main Terminal/Equipment Panel plug-in modules

b. Spare parts shall be maintained onsite by the system Contractor during the warranty period to facilitate quick repair through plug-in module replacement of key system components, then replenished and turned over to the Government at the end of warranty period at no additional cost to the Government.

c. The system Contractor shall recommend any additional onsite spare parts deemed necessary by the Manufacturer and or the system Contractor. Furnish to the Contracting Officer the cost of recommended additional spare components as a separate line item.

1.9.1.4 Special Tools and Equipment

a. Furnish one (1) set of any special tools necessary for the installation or maintenance of any system component.

b. Furnish one (1) set of any special installation or maintenance equipment necessary for the proper setup, programming, and maintenance of any system component or function. This shall include any required setup or diagnostic software programs.

c. Deliver all special tools and equipment to the Government upon successful completion of the final inspection and acceptance testing of the system.

1.9.2 Maintenance Service

a. System Contractor shall perform warranty maintenance service on the system using qualified maintenance personnel that have been factory trained for the system being serviced.

b. For maintenance service after the warranty period, the system Contractor shall offer a Service Agreement to the medical facility. Include a copy of the proposed Service Agreement with the Product Data submittal.

c. As authorized by the medical facility, the system Contractor can utilize medical facility maintenance personnel that have been factory trained for maintenance of the provided system, for the first level of response to a call for service.

d. The system Contractor shall provide an on-line diagnostic maintenance support capability as specified herein.

1.9.3 Service Availability and Response Time

****
NOTE: System designer should coordinate and validate with the responsible Design Agency the response times specified below.
****

a. Maintenance service shall be available on a 24 hour per day, 7 days per week basis for on-premises maintenance service within 4 hours after notification of a major malfunction and within 24 hours after notification of a minor malfunction.

b. A 24-hour telephone answering service shall be available to receive after hour maintenance service calls and dispatch on-call service personnel within the required response time.

c. Repair of a major malfunction shall be accomplished within 8 hours of the reported failure. The occurrence of any of the following events shall constitute a major malfunction:

(1) Complete failure of any Major Functional Component of the system, including:

Nurse Call (NC) Subsystems
Central Code Annunciator Stations
Call Logging Workstation
Maintenance Workstation
Local Area Network (LAN)
System Servers
Call Logging Server
Information System Server
Radio Page Server
Wireless Telephone Server

(2) Failure of a power supply, exclusive of commercial ac power feed.

(3) Failure of 20% or more of all stations in any one NC Subsystem to function as specified.

(4) Failure of any NC Subsystem master station, code blue or infant code blue station, or emergency station.

d. Repair of minor malfunctions shall be completed within 48 hours of the reported failure. A minor malfunction is any failure that does not constitute a major malfunction.

PART 2 PRODUCTS

2.1 MATERIAL AND EQUIPMENT

****
NOTE: Delete the specifications for any Product that is not part of the system design. Modify the specifications for any Product as required to conform to the specified performance requirements.
****

2.1.1 New Products

All products shall be new and free of defects.

2.1.2 Unspecified Products

If the provided system requires additional products that are not specified or indicated on the drawings, in order to satisfy the specified performance requirements for the system, then these additional component products shall be provided at no additional cost to the Government.

2.1.3 Product Modifications

Modification of products that nullifies the UL listing or other agency approval is not permitted.

2.1.4 Identical Products

Products of the same classification shall be identical. This requirement includes all component equipment, modules, assemblies, parts, and materials.

2.1.5 Nameplates and Equipment Markings

a. Each major equipment component shall have the Manufacturer's name, model, and serial number on a plate secured to the equipment. Also, all compliance with regulatory requirements, such as UL and CFR, shall be indicated on the nameplate or on adjacent labels.

b. All controls on call stations shall be plainly and permanently labeled with the identification of the function served. Stick on marker tapes is not acceptable.

c. Markings on any exposed surfaces shall not be destroyed by housekeeping solutions normally used in medical facilities.

2.1.6 Mounting Alignment Capability

Wall mounted components shall have an adjustable mounting alignment capability to compensate for improperly aligned backboxes and to insure a plumb, square, and level installation.

2.1.7 Model and Enhancements

a. The system and all product components shall be the Manufacturer's latest model, design, version, and quality in production at time of delivery and installation.

b. Any product hardware or software enhancement that becomes available after delivery and installation, and up to time of system acceptance, shall be brought to the attention of the Contracting Officer upon announcement by the Manufacturer and shall be made available to the medical facility. If such enhancements customarily are provided at no additional cost, the Government shall automatically be entitled to such enhancements. If such enhancements customarily are provided at additional cost, the Contracting Officer has the option to accept or reject such enhancements.

c. Submit a letter to the Contracting Officer from the Manufacturer guaranteeing that the Manufacturer shall inform the Government of, and make available to the Government, all commercially available enhancements to the

system hardware or software at the then current price. Include the letter with the product data submittal.

d. Substitutions, modifications, or improvements to a system hardware and software are permissible provided that such substitution, modifications, or improvements shall not reduce or degrade the performance or product requirements, nor violate regulatory requirements. No such substitutions, modifications, or improvements shall be made without the written consent of the Manufacturer and Contracting Officer. Such consent shall not be unreasonably withheld or delayed.

2.1.8 Software and License

a. Provide all software required for the specified capability, configuration, performance, and operation of the system.

b. The Government shall be granted a nonexclusive, fully paid perpetual license to use software provided. The Government receives no title or ownership rights to such Software.

c. Software maintenance that is provided to any or all other customers without charge shall be provided to the Government at no additional cost to the Government.

2.1.9 Equipment Design for Wet Areas

All equipment that will be installed in wet areas shall be designed and constructed to withstand the UL 1069 Water Spray Test.

2.2 NC SUBSYSTEMS

2.2.1 Patient Stations

a. Flush mount units.

b. Three (3) types of patient stations as listed below. Each type shall have the required common characteristics, plus the defined additional characteristics.

Type 1: Common characteristics.
Type 2: Common characteristics plus call cord receptacles.
Type 3: Common characteristics plus tamper proof construction.

c. Common characteristic for all types of patient stations.

(1) A call push button switch that is clearly labeled with the term "CALL".

(2) A red color emergency push button call switch that is permanently labeled as an Emergency call switch on or directly adjacent to the call switch.

(3) A call cancel push button switch that is clearly labeled "CANCEL". Alternatively, the cancel function may be a toggle of the call switch.

(4) Full-duplex intercom as specified herein, including microphone and speaker.

(5) Circuitry for interface with a patient TV set, including automatic muting of TV audio during call voice intercom periods.

(6) Circuitry for interface with a bed SideCom for nurse call, TV operation and sound, and bed exit alarm call, via the interconnected bed interface outlet station.

(7) Circuitry for connection of cord sets that are plugged into the interconnected remote cord sets outlet station simultaneous with the connection of a bed SideCom that is plugged into the interconnected bed interface outlet station.

(8) An LED call assurance indicator lamp.

d. Additional Type 2 patient station characteristics.

(1) Cord set receptacles on Type 2 patient station that accepts any type of cord set as specified herein. As an alternate to the Type 2 patient station, use of the Type 1 patient station with a separate remote cord set outlet station, as specified herein, is acceptable. If this alternate is implemented, the system Contractor shall provide any additional rough-in required for this alternative at no additional cost to the Government.

(2) If the cord set is removed from the receptacle, a disconnected call shall be initiated. Reinserting the cord set and then activating a reset switch shall cancel the call.

(3) Dummy plugs for the cord set receptacles, attached with a chain to the station faceplate. If the cord set has been removed from the receptacle and the dummy plug inserted in its place, the disconnect call shall be cancelled. As an alternate to the dummy plug, fail proof built in cord out override circuitry that serves the same function as a dummy plug, is acceptable. If the alternate cord out override circuitry is provided, it shall include either an associated LED that illuminates when the override function has been activated, or an automatic override disable function when the cord has been plugged back into the system, or both.

e. Additional Type 3 patient station characteristics.

The Type 3 patient stations shall be constructed with a tamper proof faceplate and tamper proof mounting provisions.

2.2.2 Bed Interface Outlet Stations

a. Flush mount units.

b. A stainless steel faceplate.

c. A receptacle for a standard bed SideCom communications cable connector.

d. If a bed SideCom communications cable is removed from the receptacle, a bed disconnected call shall be initiated. Reinserting the communication cable and then activating a reset switch shall cancel the call.

e. Dummy plugs for the cord set receptacles, attached with a chain to the station faceplate. If the cord set has been removed from the receptacle and the dummy plug inserted in its place, the disconnect call shall be cancelled.

f. As an alternate to the dummy plug, fail proof built in cord out override circuitry that serves the same function as a dummy plug, is acceptable. If the alternate cord out override circuitry is provided, it shall include either an associated LED that illuminates when the override function has been activated, or an automatic override disable function when the cord has been plugged back into the system, or both.

2.2.3 Remote Cord Sets Outlet Stations

a. Flush mount units.

b. A stainless steel faceplate.

c. Receptacles that shall accept any of the types of cord sets specified herein.

d. It shall be possible to connect and operate both a pneumatic cord set and a pillow speaker cord set simultaneously.

e. If a cord set is removed from a receptacle, a cord disconnected call shall be initiated. Reinserting the cord set and then activating a reset switch shall cancel the call.

f. Dummy plugs for the cord set receptacles, attached with a chain to the station faceplate. If the cord set has been removed from the receptacle and the dummy plug inserted in its place, the disconnect call shall be cancelled.

g. As an alternate to the dummy plug, fail proof built in cord out override circuitry that serves the same function as a dummy plug is acceptable. If the alternate cord out override circuitry is provided, it shall include either an associated LED that illuminates when the override function has been activated, or an automatic override disable function when the cord has been plugged back into the system, or both.

2.2.4 Cord Sets

a. Three (3) types of cord sets shall be provided:
   Push Button
   Pneumatic
   Pillow Speaker

b. Common characteristics for all types of cord sets.

(1) Fits into and operates from a receptacle on the patient station faceplate or the remote cord sets outlet station.

(2) Station connector plug includes built-in strain relief.

(3) Highly flexible cable at least 12 feet long with an integral sheet attachment clamp.

(4) Shock proof, alcohol resistant, and withstand gas sterilization without discoloration or deterioration.

c. Push button type cord sets shall be configured for placing a call by momentarily activating a push button in a plastic housing at the cable end.

d. Pneumatic type cord sets shall be configured for placing a call through very slight squeezing or pressing of a pressure sensitive pneumatic bulb at the cable end. The plug end of the pneumatic cord set shall not require any specific orientation in order to function properly when connected to the receptacle on the patient station or remote cord sets outlet station.

e. Pillow speaker type cord set shall be configured with the features listed below.

(1) A "NURSE CALL" push button for placing a routine or priority call as programmed for the associated patient station.

(2) A single "READ" push button toggle switch for on/off control of the overbed reading light [, and a single "ROOM" push button toggle switch for on/off control of the overbed indirect room light].

(3) Switches for TV set control and a remote speaker for the TV set in the patient room. TV controls shall be fully compatible with the make and model of the patient TV set installed in patient bedrooms. TV controls shall include separate push button switches for each of the following TV functions: a single "TV ON/OFF" toggle push button; a channel "UP" push button; a channel "DOWN" push button; and a single "CLOSED CAPTION (CC)" toggle push button. If the TV set being controlled has a built-in radio capability, then a single "RADIO" toggle push button shall be also be provided.

(4) An LED call assurance indicator lamp.

f. A wall bracket that shall be wall mounted next to each patient station to hold the call end of cord sets when not in use.

2.2.5 Device Alarm Jack Stations

****
NOTE: System designer must coordinate and verify the type of medical device interface described below with the medical facility biomedical staff and the project equipment planner.
****

a. Flush mount units.

b. A stainless steel faceplate or a plastic faceplate that is manufactured of high impact thermoplastic (e.g., Nylon).

c. Three 6 mm 1/4 inch phone jack receptacles per station to accept connectors on remote alarm signal cables from medical devices.

(1) Two jacks shall be labeled "ALARM" and shall signal a routine level device alarm call when an alarm signal is received from an attached medical device.

(2) One jack shall be labeled "EMERGENCY" and shall signal an emergency level device alarm call when an alarm signal is received from an attached medical device.

d. Attached medical devices will provide a maintained contact closure when an alarm event occurs, through which no direct current flows from the medical device. When there is no alarm event, the alarm circuit in the

medical device alarm will provide a normally open contact. The medical device alarm signal will continue until the alarm condition is corrected and cancelled on the attached medical device.

e. An LED call assurance indicator lamp shall be located adjacent to each jack.

f. A dummy plug shall be provided for each jack and attached with a chain to the station faceplate.

g. If a dummy plug, or an attached cable is removed from a jack, a medical device alarm call shall be placed. Reinserting the dummy plug or cable shall cancel the call.

2.2.6 Emergency Pull Cord Stations

a. Flush mount units.

b. An emergency call switch that is activated by pulling a nylon cord attached to the switch. The cord shall have a pendant attached to the end of the cord, and length extended to within 50 mm 2 inches of the floor. The term "PULL FOR HELP" shall be located directly adjacent to the call switch.

c. A call cancel push button switch that is clearly labeled either "CANCEL" or "RESET". Alternatively, the cancel function may be a toggle of the emergency call switch. For stations installed in showers or baths that are located in the same room as a toilet, it is acceptable to have the cancel function for the shower/bath station operated from the adjacent emergency pull cord toilet station.

d. An LED call assurance indicator.

e. Stations installed in wet areas shall be water resistant and shall comply with water spray exposure requirements of UL 1069.

f. Waterproof gaskets for stations installed in wet areas.

2.2.7 Emergency Push Button Stations

a. Flush mount units.

b. A red color emergency push button call switch that is permanently labeled as an Emergency call switch on or directly adjacent to the call switch.

c. A call cancel push button switch that is clearly labeled "CANCEL". Alternatively, the cancel function may be a toggle of the emergency call switch.

d. An LED call assurance indicator.

e. Stations installed in wet areas shall be water resistant and shall comply with water spray exposure requirements of UL 1069.

f. Waterproof gaskets for stations installed in wet areas.

2.2.8 Code Blue Stations

a. Flush mount units in independent enclosures. Code blue stations that are physically part of any other call station shall not be acceptable.

b. A blue color code blue push button call switch with the term "CODE" or "CODE BLUE" located on or directly adjacent to the push button.

c. A call cancel push button switch that is clearly labeled "CANCEL". Alternatively, the cancel function may be a toggle of the code blue call switch.

d. An LED call assurance indicator.

2.2.9 Infant Code Blue Stations

a. Flush mount units in independent enclosures. Infant code blue stations that are physically part of any other call station shall not be acceptable.

b. A pink color infant code blue push button call switch with the term "CODE" OR "INFANT CODE" located on or directly adjacent to the call switch.

c. A call cancel push button switch that is clearly labeled "CANCEL". Alternatively, the cancel function may be a toggle of the infant code blue call switch.

d. An LED call assurance indicator.

2.2.10 Psychiatric Key Control Stations

a. Flush mount tamper proof unit.

b. A key operated switch to turn on/off the emergency and code blue call capability in the rooms that are equipped with a Type 3 patient station.

c. The key shall be removable from the switch when the switch is in either the on or off position.

d. An LED indicator that shall illuminate when the key switch is turned in the ON position.

2.2.11 Staff Stations

a. Flush mount units.

b. Two types of staff stations. Each type shall have the required common characteristics, plus the defined additional characteristics.

Type 1: Common characteristics.
Type 2: Common characteristics plus an emergency push button call switch.

c. Common characteristics for all types of staff stations.

(1) A staff routine call push button switch with the term "CALL" located on or directly adjacent to the push button.

(2) A call cancel push button switch that is clearly labeled "CANCEL". Alternatively, the cancel function may be a toggle of the staff

routine call switch.

(3) Full-duplex voice intercom as specified herein, including microphone and speaker.

(4) An LED call assurance indicator lamp.

d. Additional Type 2 staff station characteristics:

A red color emergency push button call switch that is permanently labeled as an Emergency call switch on or directly adjacent to the call switch.

2.2.12 Duty Stations

a. Flush mount units.

b. Full-duplex voice intercom as specified herein, including microphone and speaker.

c. A staff routine call push button switch with the term "CALL" located on or directly adjacent to the push button.

d. A call cancel push button switch that is clearly labeled "CANCEL". Alternatively, the cancel function may be a toggle of the staff routine call switch.

e. An LED call assurance indicator lamp.

f. System monitor LED lamp(s) to indicate calls on the system.

g. An electronic alert tone device.

2.2.13 Dome Lights

a. Flush mount units

b. Two (2) configurations:

Type 1: Light only
Type 2: Light with an electronic alert tone device

c. Indicator lamps and color filters for each type of call, with heat resistant barriers between multiple lamps. All indicator lamps shall be electronically supervised.

d. Where required, the dome lights shall include an electronic alert tone device. The alert tone device may be integral to the dome light or a separate unit mounted within the dome light enclosure.

e. The lens covers shall be shatterproof, heat resistant, and snap on and off for changing of lamps without the use of tools. Lens cover shall not deform, yellow, or craze with use or age.

2.2.14 Zone Lights

a. Flush mount units.

b. Indicator lamps and color filters for each type of call, with heat resistant barriers between multiple lamps.

c. The lens covers shall be shatterproof, heat resistant, and snap on and off for changing of lamps without the use of tools. Lens cover shall not deform, yellow, or craze with use or age.

2.2.15 Master Stations

a. Each master station shall be configured with a LCD touch screen monitor, computer type keyboard, full-duplex voice intercom with handset and plug-in headset, and all software for master station operation as required by the specified performance and the system application design. If the master station is locally ac powered, then a UPS is required.

b. Equipped capacity of each master station shall correspond to the maximum system application design capacity of the total system.

c. The monitor shall indicate all programming, functional and transaction data.

(1) Data shall include call room/bed data, call priority level, calls pending, call reminder data, patient data, call elapsed time, service dispatch data, caregiver duty assignment data, caregiver pager and wireless phone assignment data, pager and wireless phone preprogrammed and manually entered text service messages, operational mode, patient care area programming data, and system failure diagnostics data.

(2) At least 4 calls shall be simultaneously viewable on the monitor screen. All other active calls that are not simultaneously viewable on the monitor screen shall be available for viewing by use of a screen scrolling function.

d. At least three full-duplex voice intercom paths as specified herein for voice communications as follow:

(1) Non-blocking intercom path for local voice intercom between the master station and all associated audio stations being served by the master station. This shall include all captured call stations.

(2) Non-blocking intercom path, with connecting telephone jack, for voice intercom between a wireless phone and associated audio stations being served by the master station.

(3) Non-blocking system wide voice intercom network for voice communications among all master stations in the system.

e. Attendants operating a local NC Subsystem and any other captured NC Subsystem shall be able to:

(1) Program and review patient priority call status of each patient station.

(2) Initialize, review and update all programmable system features, variable data, caregiver duty assignment data, pagers and wireless phones assignments, and patient data.

(3) Program and select call routing.

(4) Bypass the normal call sequence and manually answer calls in any order.

(5) Dispatch a patient call with an added service message to pagers and wireless phones.

(6) Manually initiate alphanumeric text messages directly to pagers and wireless phones.

(7) Have full-dedicated use of all system features and voice intercom paths.

(8) Select operating modes.

f. Whenever a fault is detected by the built-in fault diagnostics in a NC Subsystem, the fault type and location data shall be displayed on the master station video monitor and forwarded to the maintenance workstation.

2.2.16 Main Terminal/Equipment Panels

a. Panel cabinets shall be surface mount units with knockouts and a hinged door with keyed lock. Each panel cabinet shall be plainly and permanently labeled with the identification of the function served.

b. Any of the logic or programming features specified below for the main terminal/equipment panel may be provided as part of the master station if this is the standard product design of the system.

c. Equipment shall provide control, switching, logic, memory, programming, timing, signaling, voice intercom, power and interconnection circuitry as required for the patient care areas served. All functions may be implemented through hardware and/or software.

d. Equipment shall be of modular construction with all components as plug-in modules. Equipment components may be housed in one or more cabinets.

e. System shall operate at or below 30V level, with overload and electronic short circuit protection for primary and secondary circuits.

f. Interruption or loss of ac line power, or the failure of a power supply shall not cause loss of any stored programs that control operation or user programmed features, and any call registered prior to loss of power. When power is restored, all normal operations shall continue and all registered calls and associated signals automatically restored.

g. A standby power supply shall automatically provide at least 15 minutes of full load uninterrupted power within 4 milliseconds of an ac power failure. Batteries used in the standby power supply shall be maintenance free, completely sealed, and continuously recharged during normal operation. Power calculations shall be included with the design data submittal to verify power requirements.

h. Electronic supervision circuitry shall activate a failure alarm call in the event of a station or line failure, power supply failure, total NC Subsystem failure, and any LAN interface failure. Other diagnostic circuitry that is a standard part of the installed system shall be provided. The failure alarm call shall be communicated to a master station connected to the panel, and to the maintenance station.

i. LAN network interface circuitry, software and ports as required to

communicate data/information for the central code annunciation functions, call logging functions, maintenance functions, information system interface functions, radio page interface functions, and wireless phone interface functions.

j. Failure diagnostic circuitry for remote failure diagnosis.

k. Equipped capacity for each patient care area shall provide for at least a 25 percent expansion in the installed quantity of call points in the patient care area, with a minimum of four expansion call points, whichever is greater. These call points shall include all patient stations, staff stations, duty stations and any other type of call station that operates from the panel.

2.3 CENTRAL CODE ANNUNCIATOR STATIONS

a. Flush mount units.

b. Two (2) applications.

(1) The Central Code Annunciator Station shall annunciate all code blue and infant code blue calls from throughout the entire system until they are canceled at the call origination point.

(2) The Central Infant Code Blue Annunciator Station shall annunciate infant code blue calls from throughout the entire system until they are canceled at the call origination point.

c. Call information displayed shall include the type of call, and the call origination point by patient care area and room number.

d. Visual Indicator Display

(1) Electronic programmable display panel. Acceptable visual indicator display technologies include LED or LCD digital displays. Incandescent-lamp displays are not acceptable.

(2) The font size of the alphanumeric text call information displayed shall be large enough to assure clear readability from the workstations in the area where the annunciator is located.

(3) The visual display shall either indicate all calls simultaneously, or scroll through multiple calls that are not simultaneously displayed so that all code calls are visible at least every four seconds.

e. An electronic alert tone device. A momentary tone defeat switch shall temporarily silence the current call alert tone, with automatic reset so that the alert tone will again sound when the next call is placed.

f. Electronic supervision of the station to assure the annunciation of code calls.

2.4 CALL LOGGING WORKSTATION

a. Hardware configuration shall include a computer, keyboard, mouse, video monitor, printer, and UPS.

(1) The computer hardware shall include on-line storage capacity for one year=s report data, a network interface card, and input/output drives as

required for setup programming and maintenance.

(2) A 17-inch LCD video monitor.

(3) A laser printer with a print rate of at least six pages per minute, and a paper tray that holds at least 250 sheets of paper.

(4) UPS as specified herein.

b. The workstation shall provide for the processing, statistical analysis, report generation and printout of all call data.

c. Only one Call Logging Workstation shall be required to process the call data from the total system.

d. Software application programs shall allow sorting, report generation, and printout of call data by any parameter, any patient care area, and globally for the entire system.

e. Security log on and password features are required.

2.5 MAINTENANCE WORKSTATION

a. Hardware configuration shall include a computer, keyboard, mouse, video monitor, printer, and UPS.

(1) The computer hardware shall include on-line storage capacity for one year=s data, high speed modem, a network interface card, and input/output drives as required for setup programming, date archiving, and maintenance.

(2) A 17-inch LCD monitor.

(3) A laser printer with a print rate of at least six pages per minute, and a paper tray that holds at least 250 sheets of paper.

(4) UPS as specified herein.

b. Software application programs shall be provided as required to allow on-line system wide maintenance functions, troubleshooting and failure diagnostics, on-line data communications, and modem dial-up.

c. A multitasking operating system with a windowing environment shall allow continuous on-line, real time collection and storage of failure data in the background while simultaneously performing maintenance procedure, troubleshooting and printout tasks in the foreground. Security log on and password features are required.

d. The workstation shall link to the medical facility Telephone System via the modem to facilitate the following functions:

(1) Under log on and password control features, the Manufacturer or NCAV System Contractor can dial into the system and remotely perform troubleshooting routines throughout the system in order to identify the cause of a failure.

(2) Download software upgrades from the system Manufacturer.

2.6 LAN

a. The LAN shall be a dedicated network for the system. Except for interface functions as specified herein, use of the medical facility Information System LAN is not acceptable.

b. LAN hardware and software shall be as required by the system Manufacturer and the system application design for the configuration, capability and performance specified in this Section.

c. The LAN shall be fault tolerant and include network administration with alarms that indicate any failures which would prevent the transmission of code calls, and radio and wireless phone paging data. The alarms shall be indicated on the failed LAN hardware and transmitted to the Maintenance Station.

2.7 SERVERS

2.7.1 General

a. One or more system servers shall be provided as required by the system application design, and connected to the system LAN.

b. Each server shall include a server computer, keyboard, mouse, video monitor, UPS, and software.

(1) The computer shall be specifically designed for network server application. Server computers hardware shall include raid level 1 storage with 2 hard disk drives, a network interface card, and input/output drives as required for setup programming, date archiving, and maintenance.

(2) A 15-inch LCD video monitor.

(3) UPS as specified herein.

c. Server operating system, and application programs for each function served.

d. Servers shall provide the capability and performance specified in this Section.

e. All data communication across any interface shall be in real time.

2.7.2 Call Logging Server

****
NOTE: If the NCAV System is being specified for a medical facility that also requires a NCTV System specified with a call logging capability, then include item "f." below.
****

a. Physical connection, protocol, and data communications as required for collecting and processing call logging data from the entire system.

b. Interface with the medical facility Information System LAN so that the call logging function can be accessed from authorized terminals and computers on the medical facility Information System LAN. The interface shall include security controls for screening and limiting access to this

database by appropriate staff.

c. Patient call data that is collected, processed, and stored shall include patient data, room/bed number, call type, date and time each call is placed and answered at the master station, time set on service reminder, time and call message transmitted to the Radio Paging System and the Wireless Telephone System, and call canceled. Patient data for each call shall include the patients name, sex, and age.

d. The server shall provide on-line storage capacity for at least 6 months of logging data.

e. The server shall provide the hardware and software for archiving of data on a periodic basis.

[f. The NCAV System shall be interfaced with the Section 27 52 32.00 10 NURSE CALL TONE-VISUAL (NCTV) SYSTEM for call recording and reporting for the specified NCTV system.]

2.7.3 Information System Server

a. Physical connection, protocol, and data communications as required for interfacing with the medical facility Information System.

b. The server shall receive ADT information from the medical facility Information System. The server shall provide any filtering of ADT data required for use by the system.

c. The Information System Server shall be 100 percent compatible with the interface requirements of the medical facility Information System.

2.7.4 Radio Page Server

a. Physical connection, protocol, and data communications as required for interfacing with the Radio Paging System.

b. Capacity for at least [____] pager addresses.

c. The Radio Page Server shall be 100 percent compatible with the input requirements of the Radio Paging System CPU.

d. Calls shall be processed in accordance with the priority requirements of the system, and forwarded to the Radio Paging System CPU with priority level inputs as required by the CPU.

2.7.5 Wireless Telephone Server

a. Physical connection, protocol, and data communications as required for interfacing with the messaging capability of the Wireless Telephone System.

b. Capacity for at least [____] wireless phone numbers.

c. The Wireless Telephone Server shall be 100 percent compatible with the input requirements of the Wireless Telephone System.

d. Calls shall be processed in accordance with the priority requirements of the system, and forwarded to the Wireless Telephone System with priority level inputs as required.

2.8 UPS

a. UPS shall be UL 1778 listed, and comply with the requirements of 47 CFR 15.

b. UPS Volt-Amp capacity shall be at least 130 percent of the total volt-amp load of the equipment connected to the UPS. Power requirement calculations shall be included with design data submittal to verify power requirements.

c. Upon an ac power line outage, the UPS shall automatically transfer to battery power within 4.2 milliseconds of sensing ac power line loss, and provide at least 15 minutes of full power for operation of the equipment connected to the UPS. On-battery output voltage shall be 115 VAC, +/- 5 percent.

d. The UPS shall use sealed, maintenance free type batteries that have an expected life of at least three years. The batteries shall always be powered from a constant voltage or "float type" battery charger. Recharge time to 90 percent capacity after discharge to 50 percent capacity shall not exceed 10 hours.

e. Surge energy rating shall be at least 320 joules. Surge peak current capability shall be at least 26 ka.

f. UPS visual indicators on the UPS front panel shall indicate on-line operation, output overload, low battery, and replace battery.

2.9 SYSTEM CABLING

a. System cabling shall be of the type, size and specifications as required by: the system Manufacturer; the configuration of the installed equipment that is being interconnected by the cabling; the system application design; interconnecting wiring requirements of UL 1069; and the requirements of NFPA 70 NEC.

b. The size of system power cable wires shall be as calculated using the system Manufacturer's instructions and guidelines, and system power requirements. Calculations shall be included with the design data submittal.

PART 3 EXECUTION

3.1 EXAMINATION

System Contractor shall perform a site survey to verify all field conditions, become familiar with the details of the work and working conditions, verify dimensions in the field, and advise the Contracting Officer of any discrepancies before performing the work.

3.2 PREPARATIONS

3.2.1 User Room Numbers and Names

a. User room numbers and names for the final system application design, all system functions, and indication on as-built drawings, shall be as directed by the Contracting Officer six months prior to the beneficial occupancy date for the medical facility.

b. The system Contractor shall verify that the user room numbers and names used in the system are consistent with the room numbers and names used on the medical facility signage and in the information system ADT program.

3.2.2 Interface with Other Products

****
NOTE: Include this paragraph if the NCAV System is to be interfaced with a Radio Paging System, Wireless Phone System, and/or the NCTV System.
****

Coordinate and define the details of all interfaces and interconnections with other products. This shall include a detailed definition of all electronic and physical interface requirements, interface protocols, and physical demarcation points. Provide details as part of shop drawings and design data submittals.

3.3 INSTALLATION

3.3.1 General

a. Installation shall be accomplished as indicated and specified, and in accordance with acknowledged industry and professional standards and practices, and the Manufacturer's instructions.

b. Installation shall comply with the requirements of NFPA 70, NFPA 99, and TIA-569-B.

c. The Installer as qualified in Paragraph QUALITY ASSURANCE, subparagraph Installer Qualifications, shall install and connect all equipment and system cabling.

d. During the entire installation the system Contractor shall maintain onsite a supervisor as qualified in Paragraph QUALITY ASSURANCE, subparagraph Installer Qualifications.

e. Provide all tools and equipment needed to install the system.

f. All ac power plugs shall be tightly strapped to the ac power receptacle to prevent accidental unplugging of the ac power.

3.3.2 Equipment Installation

a. Appropriate waterproof gaskets shall be used for station installations in wet areas (toilet rooms, showers, etc.).

b. Main Terminal/Equipment Panels shall be surface mounted in the telecommunications rooms indicated on the drawings. Mounting of these panels in any other room, area or above finished ceilings shall not be acceptable. Panels shall be marked with the NC Subsystem number and function served.

c. The system LAN, server, and UPS equipment housed in telecommunications rooms shall be [rack] [cabinet] mounted. Under no circumstance shall any of this equipment be mounted on the floor.

d. Master station equipment that does not require attendant access for programming or call activities (such as the CPU and UPS) shall be wall

mounted in a protected area under the counter top at the master station location. If the under counter mounted equipment can be kicked and damaged by staff sitting at the counter, then a protective shield shall be provided for the equipment.

e. Mounted equipment shall be firmly secured in place, plumb, square, and level.

f. Provide adequate equipment ventilation and adequate equipment accessibility for service and repair.

3.3.3 System Cabling Installation

****
NOTE: If the NCAV System is to be procured as part of a facility construction project contract, include item "c." below.
****

a. Installation of system cabling shall be by the qualified Installer.

b. System cables shall be installed without kinks, sharp bends or deformations, in a manner to prevent abrasion.

[c. System cabling shall be installed in cable trays, conduits and boxes specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM.]

3.3.4 Grounding

Equipment enclosures and all other non-current carrying metal parts of electric equipment shall be grounded.

3.3.5 Related Trades

****
NOTE: If the NCAV System is to be procured as part of a facility construction project contract, include this.paragraph.
****

a. Coordinate all efforts with those of related trades. In the event of any conflicts, delayed or improper preparatory work by Others, notify the Contracting Officer for resolution. The Contracting Officer decision shall be binding.

b. The Electrical Contractor for the project shall furnish and install all cable trays, conduits, boxes, grounding system and buss bars, and all primary ac power wiring required to accommodate the installation of the system specified in this Section.

c. Coordinate the system cable routing with the cable routing of other systems to assure that there will not be any EMI problems that will adversely affect the performance of this system or any other specified project system.

3.3.6 Infrastructure and Rough-in: Facility Construction Project

****
NOTE: If the NCAV System is to be installed in a

facility construction project (new, addition or renovation), but is to be procured by the Government directly from a system Contractor and completely separate from the facility construction project contract, then include this paragraph.

****

a. Coordinate all efforts with those of related trades that have provided the infrastructure and rough-in, as indicated below, in the facility construction project to accommodate the installation of the system. In the event of any conflicts, delayed or improper preparatory work by Others, notify the Contracting Officer for resolution. The Contracting Officer decision shall be binding.

b. The infrastructure and rough-in provided by the facility construction project are generically designed to accommodate the installation of typical systems available in the marketplace. This includes cable trays, conduits, boxes, grounding system and buss bars, and all primary power wiring, as indicated in the facility construction project contract documents.

c. If the provided system requires any infrastructure or rough-in, in addition to or different from what has been provided as part of the facility construction project contract, then the NCAV System Contractor shall provide all such additional infrastructures and rough-in at no additional cost to the Government.

d. Provide trim plates as required to adapt faceplates to the boxes provided by the facility construction project at no additional cost to the Government.

3.3.7 Infrastructure and Rough-in: Existing Facility

****

NOTE: If the NCAV System is to be procured by the Government directly from a system Contractor for installation as a replacement system in an existing facility, and not associated in any way with a facility construction project (new, addition or renovation), then include this paragraph.

****

a. Installation of the system shall utilize existing [cable trays,] conduits, boxes, grounding system and buss bars, and all primary power wiring to the maximum extent possible, provided these items accommodate the installation and operation of the system as specified in this Section.

b. If the provided system requires any infrastructure or rough-in that is in addition to, or different from, available existing conditions, then the NCAV System Contractor shall provide all such additional infrastructures and rough-in at no additional cost to the Government. The NCAV System Contractor shall be responsible for any costs associated with the installation of these items by Others.

c. Provide trim plates as required to adapt faceplates to existing boxes at no additional cost to the Government.

d. Completely remove and discard all existing system cabling that is not being reused as part of the NCAV System being installed.

e. Completely remove all existing systems equipment that is not being reused as parts of the NCAV System being installed, and dispose of the equipment as directed by the Contracting Officer.

3.4 APPLICATION

3.4.1 AC Power Connections

****
NOTE: If the NCAV System is to be installed in a stand-alone clinic facility that does not have emergency power, delete this paragraph.
****

AC power for all equipment shall be circuited to the emergency system critical branch in accordance with NFPA 70 and NFPA 99.

3.4.2 Zone Lights

Zone lights shall be mounted and oriented in each corridor to assure that the zone indicator lamps can be clearly seen anywhere in the corridor by caregivers that need to respond to a call.

3.4.3 Installation Setup

Contractor shall make all adjustments and perform all application programming as necessary to setup the system to function in accordance with specific user requirements for the overall system and each patient care area. Coordinate all such setup details with the medical facility users prior to system commissioning, install them as part of the system setup, and include the setup details in the O&M documentation. Examples of installation setup details that require user coordination include the following:

a. Sound volume level for alert tone signals that have adjustable settings.

b. Time and date setup.

c. Default call routing for patient care areas that have multiple master stations.

d. Default settings for system networking, and for interfaces with the medical facility Information System, Radio Paging System, and Wireless Telephone System.

e. Preprogrammed pager and wireless phone service messages for each patient care area.

f. Default duty assignments, including primary and backup assignments.

g. Default pager and wireless phone listing and assignments.

h. Display layout configuration for systems that show a graphic representation of the patient care area floor plan on each master station monitor.

3.5 FIELD QUALITY CONTROL

3.5.1 Inspection, Checkout and Testing Services

a. Furnish required test equipment, tools, consumable supplies, and technically qualified personnel to perform inspections, checkout and tests of installed system.

b. Qualified NCAV System Contractor personnel conducting acceptance tests shall be factory trained or certified and shall be completely knowledgeable regarding the system application design, installation, and operation.

c. The Contracting Officer reserves the right to approve the system Contractor's choice of testing personnel, and, upon rejection of any testing personnel by the Contracting Officer at any time, the system Contractor shall replace such testing personnel as soon as reasonably possible. Upon request, the system Contractor shall provide the Contracting Officer the opportunity to interview and review the qualifications of each person proposed for testing work.

d. The system Contractor shall conduct all testing in accordance with submitted and approved test plans and procedure, and requirements specified herein.

e. Notification of any planned testing shall be given to the Contracting Officer at least 15 days prior to any test, and in no case shall notice be given until after the system Contractor has received written Government approval of the test plans and procedures.

f. Inspection and testing shall be conducted during normal working hours with prior notice to the Contracting Officer so as not to interfere with orderly work processes.

g. System Contractor shall allow inspection of all work and workmanship, and witnessing of system Contractor performed acceptance testing.

h. Any work that is enclosed or covered up before being inspected and tested shall be uncovered as required and, after it has been inspected and approved, shall be restored to its original condition at no additional cost to the Government.

i. Results of each inspection and test shall be reported in electronic and hard copy form to the Contracting Officer.

3.5.2 Periodic Inspection and Testing

a. All work and workmanship shall be subject to inspection and testing as requested by the Contracting Officer at any and all times during preparation and installation.

b. The Contracting Officer, in his or her sole discretion, may reject defective work and workmanship and require its correction. The Government right to inspect, test, and reject, or its failure to exercise such right, as provided herein, shall in no way diminish the system Contractor's duty to inspect and reject work as necessary to comply fully with the requirements of the contract documents.

3.5.3 System Commissioning

Prior to the start of final inspection and acceptance testing, the system shall be brought into complete working order in full compliance with all specified requirements. This commissioning shall include all necessary programming, adjustments, tuning and testing of the installed system.

3.5.4 Final Inspection and Acceptance Testing

a. Acceptance tests of the installed system shall be [phased] in accordance with the project [phasing] schedule.

b. After installation [for each phase] has been completed, and the system components installed [during the phase] have been completely inspected and checked out, the system Contractor shall conduct acceptance tests in accordance with the approved Acceptance Test Plan.

c. The system Contractor shall notify the Contracting Officer when the installation of a system is completed and operating per specifications and ready for final inspection and acceptance testing.

d. Draft as-built system drawings, and O&M manuals shall be made available by the system Contractor for use during performance of final inspection and acceptance testing. Final inspection or acceptance testing shall not be scheduled nor performed without this documentation.

e. The system Contractor shall demonstrate proper installation and performance [of each phase] of the system in full compliance with all contract documents.

f. Final acceptance tests shall demonstrate that the system operates in full accordance with all specified requirements for the system. Each system operating mode shall be demonstrated to perform as specified by operation of each individual system component under simulated normal system loading.

g. Upon successful completion of [all phased] final acceptance tests, and 30 calendar days of consecutive operation in accordance with specified requirements without the occurrence of any major malfunctions, the system Contractor shall submit the final acceptance test report, including certificates of compliance stating that all specified requirements and conditions have been satisfied. The effective date for completion of the final system acceptance shall be the date when the system has satisfied the 30 days of operation without a major malfunction as specified above.

3.5.5 Corrective Action for Rejected Work

a. All deficiencies shall be corrected at no cost to the Government and another inspection and test performed as required to demonstrate compliance with all specifications to the Contracting Officer.

b. All corrective action shall be completed in a reasonable time consistent with project schedules and acceptable to the Contracting Officer.

c. If, after 30 calendar days from the start of acceptance testing, the system or any equipment component thereof fails to demonstrate complete and proper performance, the Government shall have the right to return the total system or any equipment component to the system Contractor. The system Contractor shall refund all costs thereof to the Government and shall

indemnify the Government from damages, costs, and expenses incurred in connection with such activity.

d. The actual date of return of any rejected system or equipment component shall be under the absolute control of the Government. The Government shall have the right to continue to utilize such system and equipment until the actual date of removal.

3.5.6 Warranty Period Inspection and Testing

a. At the end of 3rd and 7th months of operation, the system Contractor shall, at no cost to Government, observe the system in operation and conduct tests to assure that the system is performing as specified. Include interviews of users to determine if the system is satisfying specified requirements and that training is adequate. This service shall be coordinated with the Contracting Officer and the results reported in writing to the Contracting Officer.

b. During the 11th month of operation an inspection and test of the system shall be conducted by the system Contractor to identify and correct any deficiencies before the end of warranty period. A medical facility representative shall witness this procedure and the system Contractor shall certify that all necessary corrective actions have been taken.

c. Results of each warranty period inspection and test shall be reported in writing to the Contracting Officer.

3.6 DEMONSTRATION AND TRAINING

All specified demonstration and training shall be provided at no additional cost to the Government. This includes all specified onsite training, and factory training at the Manufacturer's facility.

3.6.1 Training Plan

a. Develop and submit a training plan for approval by the Contracting Officer. The training plan shall include the basic training requirements set forth below.

b. Provide training to the medical facility staff in accordance with the approved training plan.

3.6.2 General Preparations

During the week prior to the start of training for any system, check the system to assure that it has been commissioned and is in full-specified operation condition.

3.6.3 Training Personnel

a. Furnish qualified factory trained or certified instructors to train designated medical facility staff in the operation and maintenance of the provided system.

b. The Contracting Officer reserves the right to approve the system Contractor's choice of training personnel, and, upon rejection of a trainer by the Contracting Officer at any time, the system Contractor shall immediately replace such trainers. Upon request, the system Contractor shall provide the Contracting Officer the opportunity to interview and

review the qualifications of each proposed trainer.

3.6.4 Training Instructions

a. Training instructions shall cover all specified performance and capabilities of the system, and all of the items contained in the operating and maintenance manuals.

b. Maintenance technician training shall also include preventive maintenance, routine maintenance, repair and troubleshooting procedures.

c. Training shall continue until the system Contractor is advised by the Contracting Officer that all training has been satisfactorily completed in accordance with the approved training plan.

3.6.5 Training Materials

a. Furnish all training materials and handouts. Handouts shall be provided in the quantity needed for all of the medical facility maintenance technicians, operations and user staff that will receive training.

b. [_____] copies of all multimedia training and tutorial programs, such as video recordings, CDs, and DVDs, that are available from the Manufacturer shall be furnished to the Contracting Officer at no additional cost to the Government. These programs shall provide for self-instruction on all operational and maintenance aspects of the system.

c. Video recordings of onsite training sessions shall be made and [_____] copies furnished to the Contracting Officer. This shall be a coordinated effort between the system Contractor training staff and the medical facility education department staff.

3.6.6 Onsite Training Programs and Requirements

a. Training shall be provided onsite to all medical facility staff as required throughout the contract and warranty period to train operations and maintenance staff for the provided system.

b. The onsite training program shall include two training courses, one for maintenance technicians, and one for user and operations staff.

c. Each course shall include classroom training and field training. Field training for medical facility staff shall take place in the area where the staff will be working.

d. Multiple instructional units for each onsite course shall be conducted on a three shift, seven days a week basis as required to train all staff during their normal on-duty working hours.

e. The Contracting Officer shall designate qualified personnel to be instructed in the operation and maintenance of each system, schedule instructional sessions, and provide suitable onsite instruction facilities.

3.6.7 User and Operational Staff Training

a. User and operational staff training shall commence at a time acceptable to the Contracting Officer and near the time the system is scheduled for operational use by the medical facility.

b. User and operational staff training shall be a minimum of [_____] hour(s) of classroom instructions for all Major Functional Components of the system, and [_____] hour(s) of field instructions in each area where equipment is installed.

c. Eleven months after the system is installed and accepted by the Government, the user and operational staff shall be given a refresher course. This refresher course shall include at least [_____] hour(s) of instruction for each group of trainees.

3.6.8 Technician Training

****

NOTE: If the system is to be phased into operation, add paragraph "c." below.

If factory training of the technicians is required, include paragraph "e." below.

****

a. Before the system is turned over to the Government for operational use, training shall be provided for [_____] maintenance technicians designated by the Contracting Officer.

b. The onsite technician training course shall provide the number of instructional hours necessary to cover all aspects of system setup, programming, operations, preventive maintenance, routine maintenance, routine repair, and troubleshooting procedures for the system as installed.

c. Immediately after the phased installation of each part of the system the technician staff shall be given additional classroom and field instructions as required to advance their training up the latest overall configuration.

d. Eleven months after the system is installed and accepted by the Contracting Officer, the technician staff shall be given a comprehensive refresher course covering the final configuration for the system. This refresher course shall include at least [_____] hour(s) of instruction.

e. Technician training shall be provided for [_____] technicians at the Manufacturer=s factory at no additional cost to the Government. Training shall include comprehensive instruction for complete setup, operation, maintenance and repair of the system, including the theory of operation, software installation and setup, maintenance programs, failure diagnostic programs, troubleshooting and repair. The hours of instruction shall be as required by the Manufacturer for complete and comprehensive training and certification.

3.7 PROTECTION

Items that can be easily stolen, such as desktop computer and monitor equipment, shall not be permanently installed until such time as the system Contractor has been notified by the Contracting Officer that the facility is secured.

3.8 SCHEDULES

3.8.1 NCAV System

a. Provide a complete and operational NCAV System as specified in this Section and indicated on the telecommunications systems drawings.

b. Deliver and install all product items as required to comply with the approved installation schedule.

3.8.2 Indicated Items

Provide the quantity and type of system components, such as stations, lights, and outlets, as indicated on the project drawings.

3.8.3 Main Terminal/Equipment Panels

The telecommunication drawings indicate space in telecommunications rooms that has been designated for the installation of system main terminal/equipment panels. As required by the system application design, furnish and install the type and quantity of main terminal/equipment panel(s) in these designated locations.

3.8.4 UPS

Provide an UPS for all equipment that operates directly off of ac line power. At locations where the installed equipment includes both a computer and a monitor, the UPS shall be used to power both the computer and monitor.

3.8.5 Software

a. Provide all software programs as required for all specified capabilities and performance, and pertinent software manuals. Include all operating systems, application programs, and a complete set of backup software.

b. Provide Call Logging application software for installation on the medical center Information System terminals and computers.

3.8.6 Cord Sets and Wall Brackets

a. Furnish one (1) pillow speaker cord set for each patient station that is located in a patient bedroom equipped with a patient TV Set.

b. Furnish one (1) push button cord set for each patient station that is located in a patient care room which in not equipped with a patient TV Set.

c. Furnish pneumatic cord sets for 25% of all patient stations.

d. Provide one (1) cord set wall bracket for each patient station.

3.8.7 LAN

Provide all system LAN hardware, software and cabling as required by the system Manufacturer and the system application design. Install all LAN hardware in telecommunications rooms.

3.8.8 Servers

a. Provide and interconnect all servers as required by system application design.

b. The telecommunication drawings indicate space in telecommunications rooms that has been designated for the installation of system equipment. As required by the system application design, furnish and install the type and quantity of servers in these designated locations.

3.8.9 Pagers

Provide [Qty.] [Make], [Model] alphanumeric text pagers. Furnish the pagers to the Contracting Officer.

3.8.10 Product Samples

****
NOTE: If the Design Agency or Using Service requests samples, include this paragraph.
****

Provide one sample unit of each type of station, light, and cord set for approval as part of the Samples submittal.

3.8.11 Temporary Wireless Nurse Call System

****
NOTE: If the system is a replacement for an existing system in existing facilities where ongoing patient care is to remain operational during the replacement installation, then include this paragraph.
****

Provide temporary wireless nurse call systems as required to keep the nurse call function operating in patient care areas during phased installation activities.

3.8.12 Zone Lights Activation Matrices

****
NOTE: Prepare and add a Zone Light Activation Matrix as noted below for each NC Subsystem. An example matrix is shown.
****

On the telecommunications plan drawings each Zone Light is identified by an ID Number (#). Each Zone Light shall be programmed to indicate calls originating from the patient care Calling Rooms as defined below in the Zone Lights Activation Matrix for each NC Subsystem serving a patient care area. In the following Table the "X" relates each Zone Light with the calling rooms from which calls shall be indicated on the Zone Light.

ZONE LIGHTS ACTIVATION MATRIX
NC SUBSYSTEM NO. 01: [INPATIENT SERVICES UNIT] [EXAMPLE]

CALLING	ZONE LIGHTS

ZONE LIGHTS ACTIVATION MATRIX

NC SUBSYSTEM NO. 01: [INPATIENT SERVICES UNIT] [EXAMPLE]

ROOM ID #	201	202	203	204	205	206	207
ROOM RM #	208-03	215-13	215-13	221-01	221-01	216-08	221-01
208-01		X		X		X	
208-02							
215-01	X	X		X		X	
215-02							
221-02	X		X			X	
221-03							
217-31	X		X			X	X

-- End of Section --