

SECTION 28 13 00.11 – AUTOMATED ACCESS CONTROL SYSTEM - ONGUARD

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide all labor, materials, and equipment for the complete installation of Work called for in the Contract Documents.
- B. This Section includes the minimum requirements for Automated Access Control System integration. The primary function of the AACS is to regulate access through specific portals to secured areas and provide ID badge validation.
- C. The Automated Access Control System (AACS) specified herein utilizes the Lenel OnGuard (7.6) system as its head end. It is the Owner's intent that all expansions to the system utilize like and, where specified, approved materials and that the resulting operations are in the same form and function as the existing system.
- D. Installation of the AACS specified herein (Lenel OnGuard) may encounter works that are part of the airport-wide replacement program of the legacy AACS (Casi-Rusco; Picture Perfect). Migration to the OnGuard system must be accomplished without interruption to airport AACS services. As such, work execution may require coordination of equipment mounting space, especially in Communication Rooms, for pre-migration testing, cut-over, and post-migration "go live" operations.
- E. Install the distributed AACS as required and participate in migration tasks as specified herein to provide a complete operating system as described herein and shown on the Drawings. Installation includes all necessary relays, interfaces, and power supplies to interface security access controls and locks with automatic door openers or door locking devices provided by the door hardware vendor.
- F. Included in this section are the minimum composition requirements and installation methods for the following:
 - 1. Intelligent System Controller / Power Supply
 - 2. Reader Controllers and Input/Output Boards
 - 3. Credential Readers
 - 4. Biometric Readers
 - 5. Audiovisual Annunciation Devices
 - 6. Door Position Switches
 - 7. Electrified Door Hardware
- G. Designer to coordinate components between trade subcontractors of various Divisions (e.g., 08; 27; 28; etc.) as necessary.

- H. Power to the AACS must be supplied from an Uninterruptable Power System (UPS), which is supplied under a different scope of work. The UPS must provide power the AACS and door power supplies for a minimum of eight (8) hours during a power failure.
- I. The AACS is interconnected using the converged Airport Local Area Network (LAN), which segregates security services that support AACS devices, including computer workstations, badging stations, biometric devices, and Intelligent System Controller (ISC) field panels.
- J. The head-end possesses sufficient capacity to accommodate the alterations specified in these contract documents. Should additional system licensing or capacity be required, the Owner will provide this.

1.2 DEFINITIONS AND TERMS

- A. Trade association names and communications terminology are frequently abbreviated. The following acronyms or abbreviations may be referenced within this Section:
 - 1. AACS Automated Access Control System
 - 2. AHJ Authority Having Jurisdiction
 - 3. ANSI American National Standards Institute
 - 4. AWG American Wire Gauge
 - 5. BICSI Building Industry Consulting Service International
 - 6. CBP U.S. Customs and Border Protection
 - 7. DCM Design Criteria Manual
 - 8. DFW Dallas Fort Worth International Airport
 - 9. DPDT Dual Pole, Double Throw
 - 10. EMI Electromagnetic Interference
 - 11. EPT Electrical Power Transfer
 - 12. FCC Federal Communications Commission
 - 13. IEEE Institute of Electrical and Electronics Engineers
 - 14. ISC Intelligent System Controller
 - 15. LAN Local Area Network
 - 16. NEC National Electric Code
 - 17. NEMA National Electric Manufacturers Association
 - 18. NECA National Electrical Contractors Association
 - 19. NFPA National Fire Protection Association
 - 20. RU Rack Unit(s)
 - 21. SPDT Single Pole, Double Throw
 - 22. TIA Telecommunications Industry Association
 - 23. TSA Transportation Security Administration
 - 24. UL Underwriters Laboratories
 - 25. UPS Uninterruptable Power System
- B. Architecture
 - 1. The names assigned to the equipment in this Section and the methods of interconnecting them are intended to describe equipment consistent with the expansion of the existing system. These descriptions are not intended to prevent the implementation of any upgraded equipment or devices on the part of Contractor.

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- C. Intelligent System Controller (ISC)
 - 1. The Intelligent System Controller (ISC) serves as the access control engine for an OnGuard system. The ISC provides power and interface functionality for the credential reader, door monitor points, and door devices.
- D. Door Interface Box
 - 1. Enclosure serving to contain the door wiring service loops, the data outlet and as a makeup point to interconnect the cabling from ISC to the door devices.
- E. Portal
 - 1. Door or other access point (e.g., gate) monitored and/or controlled by the AACS.
- F. Credential Reader
 - 1. A portal device to read encoded portable credentials for the purpose of determining access rights.
- G. Biometric Reader:
 - 1. A portal device that determines the person's identity based upon a physical trait.
- H. Electrified Door Hardware
 - 1. Electromechanical devices that secure the portal and allow passage through the portal by means of remote control.
- I. Biased Magnetic Switch (BMS)
 - 1. A device used to monitor the open/closed status of the portal.
- J. Request to Exit Device
 - 1. A device used to allow egress through a secured portal without creating an alarm condition.
- K. Latch / Bolt Monitor
 - 1. A switch installed in a door jamb to mechanically verify the door's latch and bolt positions when the door is in the closed.
- L. Duress Button
 - 1. A device used to generate an immediate alarm condition at the alarm monitoring workstation.
- M. Audiovisual Horn/Strobe
 - 1. A local alarm device used to notify personnel in the area of a door alarm.
- N. Key Switch

1. A key controlled device used to arm, disarm, or reset certain functions of the AACS.
- O. Intercom
 1. A remote device used to dial programmed tenants and announce arrival, allowing tenant to release door for entry. This unit must be integrated into the AACS, via connection to an ISC, for signaling release of electrified door hardware. This is also called a Visitor Interface and Telephone Entry Device.

1.3 QUALITY ASSURANCE

- A. The Texas Department of Public Safety requires that portions of this work defined as regulated under the provisions of SB 1252, 78th Legislative Session of the State of Texas be performed by a contractor holding a valid and current Class B Security Contractor Company License.
- B. Installation and integration of components of the new access control system (OnGuard) is to be performed by Owner's sole-source provider, Convergent Technologies (Convergent).
 1. Convergent services are to be retained as a subcontractor to Contractor.
 2. The Convergent contact is Sean Hamilton via cell (469-853-2807) or email at sean.hamilton@convergent.com
 3. Convergent has a services agreement with Owner to provide maintenance and installation support services for the new AACS. This agreement includes contractual unit pricing for labor and product that Convergent is required to follow.
 4. Coordinate any sole source requirements with the Owner. Contact DFW ITS Gregg Weiland via cell (469-988-3294), or email at gweiland1@dfwairport.com to coordinate.
- C. Equipment and materials must be of the quality and manufacture indicated. The equipment specified is based upon the acceptable manufacturers listed. Where "approved or acceptable product" is stated, there will be no substitutions allowed unless approved by the Owner.
- D. Comply with NEC as applicable to construction and installation of security system components and accessories.
- E. Provide system components, which are UL-listed and labeled.
- F. All cable and equipment must be installed in a neat and workmanlike manner. All methods of construction that are not specifically described or indicated in the contract documents must be subject to the control and approval of the Owner.
- G. Contractor's Qualifications:
 1. The Owner has designated Convergent Technologies as the sole-source provider for the installation and maintenance of all access control components.
- H. Manufacturer's Qualifications:
 1. Firms regularly engaged in manufacture of products of the types, ratings and capacities required for this project; whose products have been in satisfactory use in similar service

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for not less than five (5) years, with production capabilities per applicable NEMA standards.

- I. Comply with all applicable codes, standards, regulations, and the most current issue of the following publications, including all amendments thereto of the issue that is current on the date of contract award. Applicable requirements of the following publications must apply to the work under this specification as if fully written herein. Where conflicts exist between the Technical Specification and the referenced publications, local codes must govern.
 - 1. American Standards Association (ASA)
 - 2. Institute of Electrical and Electronic Engineers (IEEE)
 - 3. National Fire Protection Association (NFPA)
 - 4. National Electrical Manufacturers Association (NEMA)
 - 5. Underwriters Laboratories, Inc. (UL)
 - 6. Federal, State and Municipal Building Codes and all other Authorities having jurisdiction
 - 7. National Electrical Code (NEC)
 - 8. Insulated Power Cable Engineers Association Specification (IPCEA)
 - 9. American Society for Testing Materials Specification (ASTM)
 - 10. Occupational Safety and Health Administration (OSHA)
 - 11. National Electrical Safety Code (NESC)

- J. Special attention must be made to the following specific codes, standards, and publications where applicable. Equipment References to codes and standards called for in the Specifications refer to the latest adopted edition, amendments, and revisions to the codes and standards in effect on the date of these Specifications. Designer must advise of any suggested edition changes to listing below for review and approval by Owner.
 - 1. ANSI B20.1 Conveyor Safety
 - 2. ANSI/TIA-568.0-E – Generic Telecommunications Cabling for Customer Premises
 - 3. ANSI/TIA-568.1-D – Commercial Building Telecommunications Infrastructure Standard
 - 4. ANSI/TIA-569-E – Telecommunications Pathways and Spaces
 - 5. ANSI/TIA-606-C – Administration Standard for Telecommunications Infrastructure
 - 6. ANSI/TIA-607-D – Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises
 - 7. BICSI – Telecommunications Distribution Methods Manual, 14th Edition
 - 8. TIA-232-F – Interface between Data Terminal Equipment and Data Circuit-Termination Equipment Serial Binary Data
 - 9. IEEE 802 – Local Area Network Standard
 - 10. NECA 1 – Standard Practice of Good Workmanship in Electrical Construction, 2015
 - 11. NFPA 70 – National Electric Code (currently adopted edition)
 - 12. NFPA 72-D – Installations, Maintenance and Use of Proprietary Protective Signaling Systems (currently adopted edition)
 - 13. NFPA 75 – Protection of Electronic Computer Data Processing Equipment
 - 14. NFPA 77 – Static Electricity
 - 15. NFPA 78 – Lightning Protection Code
 - 16. NFPA 101 – Life Safety Code
 - 17. Title 47 CFR Part 15 – Radio Frequency Devices
 - 18. Title 49 CFR 1520 – Protection of Sensitive Security Information
 - 19. Title 49 CFR 1540 – Civil Aviation Security General Requirements
 - 20. Title 49 CFR 1542 – Airport Security

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21. Title 49 CFR 1544 – Aircraft Operator Security
22. Title 49 CFR 1546 – Foreign Air Carrier Security
23. Title 49 CFR 1548 – Indirect Air Carrier Security.
24. Transportation Security Administration Recommended Security Guidelines for Airport Planning, Design and Construction
25. UL 13 – Standard for Safety for Power-Limited Circuit Cables
26. UL 294 – Access Control System Units
27. UL 444 – Standard for Safety for Communications Cables
28. UL 497B – Standard for Protectors for Data Communications and Fire-Alarm Circuits
29. UL 603 – Standard for Power Supplies for Use with Burglar-Alarm Systems
30. UL 864 – Standard for Control Units and Accessories for Fire Alarm Systems
31. UL 796 – Electrical Printed-Wiring Boards
32. UL 1076 - Standard for Safety Proprietary Burglar Alarm Units and Systems
33. UL 1950 – Information Technology Equipment, including Electrical Business
34. DFW Airport Design Criteria Manual
35. Applicable codes and directives of authorities having jurisdiction

K. In addition, the contractor must comply with all applicable Security Directives as issued by the TSA and CBP.

L. Work:

1. The Work must be performed in compliance with the applicable manufacturer's installation instructions, Standards, and certifications listed herein, the Contract Documents, and governing codes and regulations of the authorities having jurisdiction.
2. The drawing and specification requirements govern where they exceed Code and Regulation requirements.
3. Where requirements between governing Codes and Regulations vary, the more restrictive provision applies.
4. Nothing in the Contract Documents grants authority or permission to disregard or violate any legal requirements.

1.4 CONFLICTS

A. This installation must be made in strict accordance with the Specifications, Drawings, any applicable codes, referenced publications and standards.

B. Where the requirements of the specifications conflict with other documents the following shall apply:

1. Between Plans and Specifications, between different specifications, or between different plans: Comply with the one establishing the more stringent requirement.
2. Between referenced requirements or between industry standards: Comply with the one establishing the more stringent requirements.
3. Between referenced requirements and Contract documents: Comply with the one establishing the more stringent requirements.

1.5 SCHEDULING

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WARNING: This record contains Sensitive Security Information that is controlled under 49 CFR parts 15 and 1520. No part of this record may be disclosed to persons without a "need to know," as defined in 49 CFR parts 15 and 1520, except with the written permission of the Administrator of the Transportation Security Administration or the Secretary of Transportation. Unauthorized release may result in civil penalty or other action. For U.S. government agencies, public disclosure is governed by 5 U.S.C. 552 and 49 CFR parts 15 and 1520.

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- A. The Contractor must comply with all scheduling requests established by Owner, both prior to commencing Work, and during construction.
- B. The Contractor must provide a detailed schedule of work to be performed, which will be used to track work status.
- C. It must be the Contractor's responsibility to coordinate work with all trades and with the owner, in a timely manner, and in accordance with the construction schedule.
- D. The Contractor will be responsible for achieving a complete and fully functional installation on or before the contract scheduled completion date.

1.6 REQUIREMENTS

- A. All references to manufacturers, model numbers and other pertinent information herein are intended to establish standards of performance and quality of construction, except in the case of approved products, in which no substitutions are allowed. The Owner must always approve material submittal and substitutions in writing.
- B. Verification that all the components specified and installed meet the criteria specified by the respective component manufacturer, supplier and designer is the responsibility of the Contractor.
- C. All installation tools, special equipment and testing apparatus required to accomplish field connections and related work as described herein must be furnished by the Contractor at no additional cost.
- D. The Contractor is obligated to provide all materials necessary to complete this Scope of Work, with the sole exception of those items noted as "salvaged," "existing" or "provided by others."
- E. The requirements as given in this document are to be adhered to unless revised by the Owner in writing.
- F. The Contractor must verify engineering of the tasks outlined in these specifications. Any issues or concerns regarding adequacy/suitability of components or installation requirements should be brought to the attention of the Owner prior to commencement of the associated tasks.
- G. The requirements, as given in this document, are to be adhered to unless revised by the Designer or the Owner in writing.
- H. All equipment that uses radio frequency energy must be certified to comply with Subpart J of Title 47 CFR Part 15 of Federal Communication Commission rules, as those rules define a Class A computing device.
- I. This system is to be installed at an airport and is subject to background RF levels expected in such an area. It is the Contractor's responsibility to protect the systems specified here from

interference of other systems, and through compliance with H above, to prevent interference with other systems.

- J. The Owner reserves the right to waive these requirements at any time.

1.7 SUBMITTALS

- A. Comply with provisions of Division 01.
- B. Comply with provisions of Sections 270500 and 280500.
- C. Provide all submittal requirements under this section as a single package.
- D. Provide pricing to alter the existing System Maintenance Agreement as further defined in the Warranty section of these specifications.
- E. Submit manufacturer's data on AACS components including, but not limited to, electrical specifications, mechanical specifications, rough-in diagrams, and instructions for installation, operation, and maintenance, suitable for inclusion in maintenance manuals.
- F. Provide Shop Drawings showing equipment/locations and arrangements. Provide an assembly drawing of every equipment rack and card cage enclosure with location and dimensions shown. Provide wiring diagrams showing all field connected wiring.
- G. Prepare and submit Phased System Testing documents and plans, Final Testing and Acceptance Plans, Test Procedures, Test Reports, and System Availability Test documents as described in this specification section. The contractor must submit the standard forms used for these tasks for DFW Airport Board approval.

1.8 CONTRACTOR CLOSE-OUT SUBMITTALS

- A. The intent of this Section is to provide supplemental information to include with the complete documentation of the existing Automated Access Control System, for the purpose of system operation and maintenance during and after the Warranty period. It is intended that the operation and maintenance manuals be exhaustive in the coverage of the system to the extent that they may be used as the sole guide to the troubleshooting, identification, and repair of defective parts.
- B. The supplemental information requirement of this Section is in addition to Shop Drawing requirements. Information documentation and Drawing sets must be compiled after system fabrication and testing and must incorporate any changes made after Shop Drawing submittal.
- C. The Contractor must provide the DFW Airport Board with complete copies of the supplemental information.

1. This information must include wiring diagrams, schematics, and functional details such that any component, wire, or piece of equipment added to the system may be easily identified by going to the actual equipment and referring to this information.
2. It is required that all supplemental products be neatly labeled and easily identifiable. Every terminal, wire, component, or piece of equipment, relay, and other such items must have a number or letter designation.
3. All these identification characteristics must be included in the supplemental information documents.

D. Operation and Maintenance Manuals

1. Provide manufacturer's standard literature, covering all equipment included in the system expansion.
2. The supplemental information must contain specifications, adjustment procedures, circuit schematics, component location diagrams, and replacement parts identification. All references to equipment not supplied on this Project must be crossed out.

E. Drawing Books

1. All Drawings developed specifically for this Project must be reduced to 11" X 17", folded and bound with rigid plastic covers.
2. The Drawings provided must be easily readable after printing, even if this requires breaking large Drawings into several parts. The text height must be no smaller than 1/16-inch.
3. The drawing book documents must be produced with AutoCAD
4. The electronic files must be provided to the Airport at the completion of the Project on agreed media (e.g., flash drive; FTP).
5. Provide component identification and cross reference on the Drawings to allow the maintenance department to understand the function of each item (the block diagram), find the room where the device is mounted (Contract Document plans), find its location in a rack (Arrangement Drawings), find how it is wired (wiring diagrams), and its detailed Specifications (vendor data sheets), and how to repair it (spare part lists).
6. Include the following drawings as a minimum:
 - a. Functional Block Diagram
 - 1) Provide an overall block diagram showing the major interconnections between components and subsystems.
 - b. Arrangement Drawings
 - 1) Provide Drawings showing the physical arrangement of all major system components.
 - c. Floor Plans
 - 1) Provide floor plans showing the location of all components in the system and at each door.
 - 2) Provide floor plan of the communications rooms showing the location of each piece of related equipment in the room.

- d. Elevation Drawings
 - 1) Provide elevation drawings of all wall-mounted equipment showing the location of each component on the wall. Components on the walls must be identified as in the functional block diagrams.
- e. Wiring Diagrams
 - 1) Provide wire-by-wire diagrams showing all field installed interconnections. The wire color and identification on the diagrams must agree with the wire and wire markers installed on the equipment.
- F. Submit this Closeout documentation in accordance with Division 01 of the Project Manual and any applicable supplements.
- G. At a minimum, the Contractor must provide the following:
 - 1. Three (3) complete hard copies of the manufacturers' literature and of the drawing books.
 - 2. Three (3) complete soft copies of the above information in PDF format via digital storage device (e.g., USB flash drive) or FTP/download site link.
 - 3. Three (3) complete soft copies of the drawing books in AutoCAD "dwg" format.
 - a. All documents provided by the Contractor in digital format via the internet, email, etc. must be password protected.
 - b. Documents to be provided to DFW ITS (Gregg Weiland; via cell 469-988-3294, or gweiland1@dfwairport.com to coordinate); copy transmittal to DFW Project Manager.

1.9 INTELLECTUAL PROPERTY

- A. Should patented articles, methods, materials apparatus, etc., be used in this Work, the Contractor must acquire the right to use same. The Contractor must hold the DFW Airport Board and his agents harmless for any delay, action, suit, or cost growing out of the patent rights for any device on this Project.
- B. Should copyrighted software be used in this Work, the Contractor must acquire the right to use same. The Contractor must hold the DFW Airport Board and his agents harmless for any delay, action, suit, or cost growing out of the copyrights for any software on this Project.
- C. All software required for the complete operation of the system as specified herein must be delivered with either full Ownership transferred to the DFW Airport Board or a non-time limited license to use on each machine it is installed on, including the right to make backup copies.

1.10 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials factory-packaged in containers or reels and handle in accordance with manufacturer's recommendations. Store in a clean, dry space and protect products from damaging fumes and traffic. Handle materials carefully to avoid damage.

- B. Storage space on project site may be limited. Contractor must coordinate delivery and arrange storage of materials and equipment with the Owner.
- C. Components sensitive to damage in a harsh environment must be stored off-site and delivered as needed.
- D. Provide protective covering during construction to prevent damage or entrance of foreign matter.
- E. Contractor is responsible for on-site security of tools, test equipment and materials.
- F. Replace at no expense to Owner, product damaged during storage, handling, or the course of construction.

1.11 PROJECT CONDITIONS

- A. Verify conditions on the job site are applicable to this Work. Notify Architect in writing of discrepancies, conflicts, or omissions promptly upon discovery.
- B. The drawings diagrammatically show cabling and arrangements of equipment fitting the space available without interference. If conditions exist which make it impossible to install Work as shown, recommend solutions and/or submit drawings to the Architect for approval, showing how the Work may be installed.

1.12 MATERIAL PURCHASES

- A. Latest Technology
 - 1. The Contractor must purchase materials in a timely manner to meet construction schedules but must not be purchased so far advanced of the date(s) of installation that they become technologically obsolete or replaced with newer technologies.
 - 2. In the event the manufacturer(s) of submitted products and materials have upgraded or replaced their products and materials with newer or improved technologies at the time of purchase, the newer or improved products or materials must be provided unless they are incompatible with the rest of the AACCS, or so directed by the Owner.
 - 3. Latest technology products and materials must be operationally and functionally equivalent or superior to the submitted products and materials. These products must be submitted to the Owner for approval before ordering.

1.13 WARRANTY

- A. Warrant labor and product to be free of defects and deficiencies, and to conform to the drawings and specifications as to kind, quality, function, and characteristics, following Contractor Warranty requirements defined in Division 01. Should a failure occur within the Contractor's warranty period, the Contractor must provide all labor and materials necessary to restore the

system to the condition required for the Final Test and Acceptance for this Contract, at no cost to the DFW Airport Board.

- B. During the Warranty period, additional credential readers and components may be connected, and their use entered in database. New devices will be connected in the same manner as shown on the Drawings for this Contract and the existence of the new connections must not void this guarantee.
- C. At completion of this project, Contractor must provide to Owner a written quote for extending the existing System Maintenance Agreement to cover components installed or removed by this project. Quote must itemize added and removed components, and pricing must be provided as a monthly rate.
 - 1. Coordinate with DFW ITS to determine any existing agreements to be added to as appropriate (Gregg Weiland; via cell 469-988-3294, or gweiland1@dfwairport.com to coordinate); copy transmittal to DFW Project Manager
- D. All surplus parts and pieces to the installation must be maintained as a spare parts inventory at the building site. Parts replaced during the warranty period must have a warranty matching that of the original part from date of replacement.

PART 2 - PRODUCTS

2.1 GENERAL

- A. The products specified in this document do not necessarily constitute the exhaustive list of products required to complete the statement of work. Except where described in the SUMMARY subpart of this document, the contractor is responsible for providing any other parts and materials needed to deliver a complete and working system.

2.2 ACCEPTABLE DISTRIBUTORS

- A. Subject to compliance with requirements set forth in DFW Design Criteria Manual, the Contractor must procure all components through manufacturer authorized product distributors.

2.3 INTELLIGENT SYSTEM CONTROLLER (ISC)

- A. Overview
 - 1. The Intelligent System Controller (ISC) is the AACS system controller, centrally located in DFW Communications Rooms, which connects portal devices to the Lenel OnGuard system. It provides standardized processing power to access equipment across the Airport for uniform operation, maintenance, and servicing.
 - 2. The ISC provides local control and monitoring of AACS devices and related AACS equipment. System interfaces may include, but not be limited to:

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- a. Credential readers
- b. Keypads
- c. Combination credential reader with keypad
- d. Biometric readers
- e. Electric door locks and lock controllers
- f. Electric lock bond sensors or position switches
- g. Balanced magnetic switches
- h. Emergency exit pull stations
- i. Fire system
- j. Intercom system field stations or intercom exchange
- k. Baggage belts and motor controllers
- l. Coiling rollup doors, grilles, and motor controllers
- m. Vehicle detection loops
- n. Gate operators and traffic arms
- o. Vehicle crash barriers
- p. Other equipment, devices, and appurtenances as required for a fully functional access control system

B. ISC Enclosure and Power Supply

1. Furnish an enclosure for each ISC and equip with the following components:
 - a. 12 VDC access control power supply.
 - b. 24 VDC door power supply.
 - c. Power distribution modules for sixteen (16) auxiliary circuits.
 - d. Managed power control modules for sixteen (16) locks.
 - e. Network management system.
 - f. Prewired for the above and for one Lenel dual reader controller and seven (7) dual reader interfaces.
2. The enclosure must have the following properties:
 - a. 16-gauge steel, with multiple knockouts on all four sides and a removable door.
 - b. Removable backplate, with universal board mounting pattern.
 - c. Protected AC input terminal, with on/off breaker switch.
 - d. Tamper switch.
 - e. Lock with two (2) keys.
 - f. Joint UL/CUL Listing.
 - g. Dimensions to be 36 inches high, by 30 inches wide, by 6.5 inches deep.
 - h. Pre-installed wire harness for panel power, lock control, faults, and tamper switch.
3. The power supplies must have the following features:
 - a. 120 VAC input.
 - b. 12 VDC / 24 VDC selectable output.
 - c. Separate continuous DC output and switched Fire Alarm controlled output.
 - d. Overload and short circuit protection, with auto-restart.
 - e. Built-in microprocessor-controlled battery charger, capable of charging sealed lead acid or lithium ion phosphate batteries.
 - f. Automatic switchover to battery, with transfer time.

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- g. Integrated low battery cut-off.
 - h. AC fail, battery fail and system fault form C relay outputs.
 - i. Fire alarm disconnect input, with optional latching.
 - j. Meets UL294 and UL319.
 - k. The access control power supply must be capable of supplying up to 150W of power.
 - l. The door power supply must be capable of supplying up to 250W of power.
- 4. The power distribution modules must have the following features:
 - a. Eight (8) 12 VDC / 24 VDC inputs.
 - b. Eight (8) 12 VDC / 24 VDC power limited outputs.
 - c. Each output protected by a Class II, 2.5A solid state circuit breaker.
 - d. Fire alarm interface per output.
 - e. Meets UL294 and UL319.
- 5. The power control modules must have the following features:
 - a. Eight (8) 12 VDC / 24 VDC inputs.
 - b. Eight (8) 12 VDC / 24 VDC power limited outputs.
 - c. Each output must have the following features:
 - 1) Protected by a 3A fuse.
 - 2) Individually controlled.
 - 3) Individually monitored, providing the following reporting:
 - a) Current draw
 - b) Voltage level
 - c) Power draw
 - d) Cycle count
 - 4) Programmable for fail-safe, fail-secure fire alarm override and AC loss override.
- 6. The network interface must include the following features:
 - a. One (1) 10/100Base-T Ethernet interface
 - b. Four (4) SPI ports
 - c. Two (2) current sensor inputs
 - d. One (1) remote temperature sensor input
 - e. One (1) voltage meter input.
 - f. One (1) contact monitor output.
 - g. Two (2) control outputs
 - h. Capable of supporting up to (2) power supplies and (16) managed outputs.
 - i. Capable of managing and monitoring the following items:
 - 1) Health and status of the power supplies, batteries, and managed outputs.
 - 2) Cabinet temperature
 - 3) Room temperature
 - 4) Auto-schedule test and report battery standby time.
 - 5) Remote supervision of battery state.
 - 6) Remote power cycling of remote equipment.

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- j. Meets UL294 and UL319.
 - 7. Internal wiring must consist of the following:
 - a. Pre-installed wiring harness for panel power, lock control, faults, and tamper switch.
 - b. Point-to-point wiring labeled, color coded, twisted pair, and shielded communication.
 - c. Wire management utilizes Panduit finger duct.
 - 8. Acceptable products:
 - a. LifeSafety Power FPO150/250-3D8P2M8NL4E8M2/P16-A
 - b. Owner approved equivalent
 - C. ISC CPU Controller (Dual Reader Controller)
 - 1. Provide one advanced ISC CPU Controller (dual reader controller) for each ISC.
 - 2. Controller must have the following general capabilities:
 - a. 32-bit processor and multiple-application operating system.
 - b. Cardholder database is stored in non-volatile flash memory.
 - c. Supports selective download of large cardholder databases.
 - d. Supports extended functionality for advanced applications
 - e. Battery-backed, non-volatile storage of events.
 - f. Configurable data encryption.
 - g. Firmware stored in flash memory.
 - h. AES128 or TLS 1.2, with AES256 communications to OnGuard.
 - i. Supports storage of biometric templates
 - j. Supports up to 64 doors.
 - k. Supports up to 16 different card formats.
 - l. Supports 32,000 access level permissions, with 255 per badge.
 - m. Elevator control support for up to 128 floors.
 - 3. The I/O capabilities must include the following:
 - a. Integrated 10/100Base-T Ethernet interface.
 - b. Two (2) reader interfaces supporting the following
 - 1) TTL-compatible inputs supporting Wiegand standards.
 - 2) RS-485 communications mode, supporting OSDP readers.
 - c. Inputs supporting unsupervised and supervised configurations:
 - 1) Eight (8) unsupervised/supervised inputs.
 - 2) Dedicated unsupervised input for cabinet tamper.
 - 3) Dedicated unsupervised input for power failure status.
 - d. Four (4) form C programmable relay outputs, with dry contacts.
 - 4. Environmental:

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- a. 0 to +70 degrees Celsius operating temperature.
 - b. 5 to 95 percent relative humidity, non-condensing.
- 5. Meets UL 294 and UL 1076
- 6. Acceptable products:
 - a. Lenel LNL-X4420
 - b. Owner approved equivalent.

D. Dual Reader Interface

- 1. Provide dual reader interfaces for each ISC.
- 2. Reader interfaces must have the following features:
 - a. Downloadable firmware.
 - b. Supports up to 16 different card formats.
 - c. Two (2) reader interfaces supporting the following
 - 1) TTL-compatible inputs supporting Wiegand standards.
 - 2) RS-485 communications mode, supporting OSDP readers.
 - d. Eight (8) unsupervised/supervised inputs.
 - e. Six (6) form C programmable relay outputs, with dry contacts.
- 3. Environmental:
 - a. 0 to +70 degrees Celsius operating temperature.
 - b. 5 to 95 percent relative humidity, non-condensing.
- 4. Meets UL 294 and UL 1076
- 5. Acceptable products:
 - a. Lenel LNL-1320-S3
 - b. Owner approved equivalent.

E. Input Control Module

- 1. Provide input control modules for ISCs, as required.
- 2. Input control modules must have the following features:
 - a. Sixteen (16) unsupervised/supervised inputs.
 - b. Two (2) form C relay outputs, with dry contacts.
- 3. Environmental:
 - a. 0 to +70 degrees Celsius operating temperature.
 - b. 5 to 95 percent relative humidity, non-condensing.
- 4. Meets UL 294 and UL 1076
- 5. Acceptable products:
 - a. Lenel LNL-1100-S3

- b. Owner approved equivalent.

F. Output Control Module

1. Provide output control modules for ISCs, as required.
2. Output control modules must have the following features:
 - a. Sixteen (16) form C programmable relay outputs, with dry contacts.
3. Environmental:
 - a. 0 to +70 degrees Celsius operating temperature.
 - b. 5 to 95 percent relative humidity, non-condensing.
4. Meets UL 294 and UL 1076
5. Acceptable products:
 - a. Lenel LNL-1200-S3
 - b. Owner approved equivalent.

2.4 CREDENTIAL READERS

A. Multi-technology Reader

1. Provide proximity credential readers, as indicated in the drawing set.
2. Reader must have the following capabilities:
 - a. Simultaneous compatibility for 13.56 MHz NFC contactless smartcard technologies and traditional 125 KHz credentials.
 - b. Tri-color LED and buzzer for user feedback.
 - c. Form C dry contact tamper relay.
 - d. RS-485 half duplex OSDP interface.
 - e. Single gang box mounting style.
 - f. Read range of up to 4 inches.
 - g. Meets UL 294.
3. Environmental:
 - a. Housing must be weather-resistant and meet IP65 for ingress protection.
 - b. Operating temperatures from -35 to +65 degrees Celsius.
4. Meets UL 294.
5. Furnish keypad and non-keypad readers, where indicated.
6. Acceptable products:
 - a. Blue Diamond LNL-R10325-05TB (with keypad)
 - b. Owner approved equivalent

B. Biometric Access Control Terminal

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1. Provide frictionless biometric access control terminals, utilizing facial recognition, as indicated in the drawing set.
2. Terminal must have the following features:
 - a. Provide near-motion 1-second verification through multiple angles and in all lighting conditions, for up to 40,000 users: resistant to spoofing attempts.
 - b. Provide wide angle coverage supporting persons of all heights, side approach, and all skin colors
 - c. Include contactless reader options for Prox iClass; MIFARE/DESFire; Natively supports PIN code.
 - d. Support 12 to 24 VDC power supply.
 - e. Equipped, as follows:
 - 1) 7-inch WVGA color capacitive touchscreen.
 - 2) Loudspeaker and microphone.
 - 3) Audio and video player.
 - 4) Touchless face sensor:
 - a) Visible light camera (2D)
 - b) Infrared light camera (2D)
 - c) 3D Camera
 - 5) Internal storage capacity for the following:
 - a) Up to 20,000 user records, with the ability to expand later.
 - b) 250,000 IDs.
 - c) 1,000,000 transaction log entries.
 - 6) Inputs and Outputs:
 - a) Ethernet and USB3 communications, with support for optional Wi-Fi and 4G.
 - b) Serial port supporting Wiegand in and out, RS-422 and RS-485 OSDP.
 - c) Form C, dry contact relay output, programmed for access granted.
 - d) Form C, dry contact tamper relay output.
 - e) Three (3) general purpose inputs
 - f) Three (3) general purpose outputs.
3. Environmental:
 - a. Housing must be weather-resistant and meet IP65 for ingress protection.
 - b. Operating temperatures from -10 to +45 degrees Celsius.
 - c. Relative humidity between 10 and 80 percent, non-condensing.
4. Meets UL 294
5. Cable
 - a. CAT 6a to network switch
 - b. 16 AWG 2 Conductor Cable for power
6. Acceptable products:
 - a. IDEMIA VisionPass MDPI

- b. Owner approved equivalent

2.5 SWITCHES AND CONTACTS

A. Biased Magnetic Switch

1. Provide high security biased magnetic switches on doors indicated on the drawing set.
2. Switch must have two independent form C contacts wired in a SPDT configuration, plus a separate set of tamper contacts.
3. Switch must be of rugged construction designed for flush mounting on new doors or surface mounting on existing doors.
4. Designed to operate in steel doorframes and doors.
5. The maximum allowable gap distance must be 1/8-inch.
6. UL-634 Level 2 listed for use with security systems.
7. Includes pry tamper detection.
8. Recessed switches are circular, or ANSI form factors, as required.
9. Surface mount switches must include an armored cable.
10. Approved products:

- a. Magnasphere

- 1) L2C-111 Series Recessed
- 2) L2C-111-A Series ANSI Form Factor
- 3) HSS-L2D Series Surface Mount

- b. Owner approved equivalent

B. Overhead Door Position Switch

1. Provide a pair door position switches for each overhead door.
2. Switch must have two independent form-C contacts wired in a SPDT configuration, plus a separate set of tamper contacts.
3. Switch must be of rugged construction designed for surface mounting.
4. Designed to operate on overhead doors.
5. The maximum allowable gap distance must not exceed 1/2-inch
6. UL-634 Level 1 listed for use with security systems.
7. Includes pry tamper detection.
8. Includes an armored cable.
9. Approved products:

- a. Magnasphere L1.5-111 Series (subject to update)

- b. Owner approved equivalent

C. Duress Switch

1. Provide duress switches, where indicated in the drawing set.
2. Switch must offer silent operation.
3. Switch type must be of a double-pole, double-throw (DPDT) design.
4. Switch to be equipped with EOL resistor splicing terminals.

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5. Include stainless steel cover.
6. These switches must be wired to a supervised Digital Input on an ISC.
7. Approved products:
 - a. Ademco 269R hold-up device.
 - b. Owner approved equivalent.

D. Tamper Switch

1. Provide a tamper switch for each door interface box, and each accessible enclosure containing a wiring makeup point.
2. Switch must be a SPST variety.
3. Approved products:
 - a. Ademco 955 Series
 - b. Owner approved equivalent.

E. Mortise Key Switch

1. Provide a key switch for disabling certain AACS alarm functions.
2. Switch must accommodate any 1-1/8, 1-1/4, or 1-1/2-inch mortise cylinder.
3. Switch must be a DPDT momentary variety.
4. Install switch a stainless steel single gang faceplate.
5. Approved products:
 - a. Securitron MK-2 series
 - b. Owner approved equivalent.

2.6 AUDIOVISUAL DEVICES

A. Horn/Strobe Appliance

1. Provide an audiovisual (horn/strobe) above each door shown in the drawing set.
2. The appliance must operate on 24 VDC power.
3. The appliance must be capable of being mounted on the wall or ceiling to a 2-gang box.
4. The horn must support 8 field selectable tones and two volume levels:
 - a. The higher volume level must be 92-99 dBA at 10' @ 24 VDC, depending on the selected tone.
 - b. The standard volume level must be 87-94 dBA at 10' @ 24 VDC, depending on the selected tone.
5. The strobe must support 4 field selectable candela settings of 15, 30, 75 and 95 cd.
6. The strobe must flash at 1 flash per second.
7. The strobe lens must be blue in color.
8. The appliance must be UL 1638 listed for general signaling.
9. Approved product:
 - a. Cooper Wheelock MTB-24MCCH-NW for indoor applications

- b. Cooper Wheelock MTWPB-24MCCH-NW for outdoor applications
- c. Owner approved equivalent

B. Multi-Status Indicator

1. Provide a multi-status indicator for badge verification readers and as a status indicator at interlocked doors.
2. The indicator must have the following capabilities:
 - a. LED technology.
 - 1) LED colors supported must be Red, Green and Amber.
 - b. NEMA 4X enclosure.
 - c. 24 VDC operation.
 - d. Operating temperatures from -35 to +65 degrees Celsius.
3. Approved products:
 - a. Edwards Signaling 125XBRiGA24D
 - b. Approved equivalent

2.7 DOOR INTERFACE BOX

A. Door Interface Box

1. Provide a door interface box at each door, containing cable service loops and to serve as a door wiring makeup point.
2. Enclosure must be 16 inches high, by 14 inches wide, by 4 inches deep.
3. The enclosure and cover must be fabricated from 16-gauge steel.
4. The cover must have a gasket.
5. Enclosure must conform to NEMA standard Type 12.
6. Include a back panel for mounting a terminal strip and other components.
7. Equip each box with a tamper switch.
8. The DIB enclosures should be surface mounted and not have any unused knockouts (meaning completely sealed).
9. All covers to the DIB must have security tamperproof screws and safety chains, if removable. Lockable covers are permitted.
10. Basis of design:
 - a. Eaton B-Line
 - 1) 16146-12SC Enclosure
 - 2) AW1614P Back Panel
 - b. Owner approved equivalent.

2.8 ELECTRIFIED DOOR HARDWARE

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- A. Coordinate with Division 08
 - B. Electrical Power Transfer (for doors with butt hinges)
 - 1. Provide concealed electrical power transfer devices for doors with electrified hardware.
 - 2. EPT must include the following characteristics:
 - a. All metal construction, including backboxes.
 - b. Tamper resistant.
 - c. Mortises into the door and frame.
 - 3. Approved products:
 - a. Von Duprin EPT-10
 - b. Approved equivalent
 - C. Exit Devices
 - 1. Provide exit devices where indicated.
 - 2. Exit device must have the following characteristics:
 - a. Listed under Fire Exit Hardware in accident equipment list of Underwriters Laboratories, BHMA certified ANSI A156.3
 - b. Chassis mounted unit construction with removable covers, identical wall thickness on all types of exit devices
 - c. Vertical rod devices:
 - 1) Minimum 3/8-inch diameter top and bottom rods.
 - 2) Single point latching at the top, where indicated in the architectural door schedule.
 - 3) Panic-rated strikes.
 - d. Stainless steel main arm pivot and springs.
 - e. Base metal stainless steel, brass, or bronze.
 - f. Heavy-duty pull trim, or lever trim to match locksets.
 - g. Electronic functions supplied with factory-installed request-to-exit monitor switch(s), latch bolt retraction system, latch bolt monitor switch, electrified trim components, as scheduled.
 - h. Remote latch retraction, with a current draw limited to 1 A @ 24 VDC.
 - i. Electrified functions with factory installed common connections with Molex-type connectors.
 - 3. Door width and opening height per the architectural door schedule.
 - 4. Satin chrome antimicrobial finish.
 - 5. Acceptable products:
 - a. Von Duprin QEL 99 series
 - b. Approved equivalent
 - D. Handsets

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1. Provide electrified mortised handsets, where indicated in the drawing set.
2. Handset must have the following features:
 - a. Heavy duty construction with wrought cases, minimum case thickness of 0.093", BHMA certified ANSI A156.13
 - b. Fronts: 8" x 1-1/4", adjustable to 1/8" in 2" with 2-3/4" backset.
 - c. Minimum projection of latch bolt: 3/4".
 - d. Minimum throw of dead bolt: 1".
 - e. Beveled, rounded, or rebated faces where required.
 - f. Where lock stiles are too narrow for backsets of locks specified, furnish special backsets.
 - g. Electronic functions supplied with factory-installed request-to-exit monitor switch, security monitor switch, latch bolt monitor switch, and electrified trim components, as scheduled.
 - h. Electrified functions with factory installed common connections with Molex-type connectors
 - i. Function as specified in the door schedule.
 - j. Satin chrome antimicrobial finish.
3. Approved products:
 - a. Schlage L9092EU RX LX DPS 626AM
 - b. Approved equivalent.

2.9 CABLES AND CONDUCTORS

A. General

1. Coordinate all cabling with Division 27 for installation and testing.

B. Conduit – Access Control Portals

1. Designer to evaluate conduit requirements and engineer most cost-effective solution according to conditions within applicable code requirements and standards clarifications below
2. Coordinate with Division 08 to ensure appropriate cable channels are provided in design and available for door construction to meet the requirements herein.
3. All security and electrical enclosures/boxes must be sealed (no unused knockouts) and must have security tamper proof screws for the covers.
4. Conduit sizes per DFW security typical drawings should be followed, any deviations must be approved by DFW ITS and DFW Code.
5. Conduit fill ratio must not exceed 40% to allow for future cable additions
6. Conduit sizing and cable installation must meet cable pull tension requirements (25lb) as well as the installation minimum bend ratio requirements per Manufacturer.
7. Conduit Bends
 - a. In general, no more than two 90-degree bends between pull boxes
 - b. Bends are cumulative and must adhere to fill ratio standard throughout, applying 15% reduction as required

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- c. Bends can total up to 180 degrees and any bends beyond this 180-degree requirement standard require the Contractor to communicate a request for variation to Designer/Owner prior to execution for approval from DFW ITS and DFW Code. Fill reductions (15% reduction per additional bend) will need to be applied.
 - d. Bends made so that the tubing is not damaged and internal diameter of the conduit is not effectively reduced
 - 8. Communications Room to DIB
 - a. Minimum: one inch
 - b. For conduit size of 1 inch, a 4-inch square outlet backbox can be used in lieu of pull box. Larger conduit sizes, if needed, will require pull boxes.
 - 9. DIB to Door/AACS Devices
 - a. Minimum: one-half (1/2) inch preferred, subject to fill ratio requirements and bend radius requirements, at a maximum of 180 degree between pull boxes. Contractor to communicate request for variation to Designer/ Owner prior to execution for approval
 - 10. Non-Conditioned Spaces to Communications Rooms
 - a. Use rigid conduit – ground level up to 8 feet
 - b. EMT above 8 feet is acceptable in non-conditioned areas (ramp) not susceptible to UV light.
 - c. The contractor must use of weatherproof fittings when using EMT outside in place of Rigid as well as the weatherproof boxes with approved weatherproof connectors for all outside installations per NEC 312.2
 - C. Typical Door Elevation
 - 1. Contact Designer/Owner for typical door samples
 - D. Credential Reader Composite Cable – RS-485
 - 1. Provide (2) multi-pair cables from each door to its respective ISC.
 - 2. Cable must be capable of accommodating half-duplex OSDP communications and power.
 - 3. The communications conductors must be constructed as follows:
 - a. Conductors must be made up of stranded 22 AWG, or larger copper wire.
 - b. Shielded plenum.
 - c. 120 Ohm characteristic impedance.
 - d. Fully TIA-485 compliant at data speeds between 9600 and 115,200 bps.
 - 4. Coordinate color with Owner
 - 5. Basis of design:
 - a. Windy City Wire 415110-30OSDP
 - b. Owner approved equivalent

E. Door Device Cabling

1. Provide multi-pair cabling to interface door devices to the ISC.
2. Shielded plenum.
3. Cables must provide a minimum of nine (9) additional pairs of conductors (18C total) to each door for simultaneously supporting the following devices:
 - a. Door Position Switch / Biased Magnetic Switch
 - b. Door Lock power
 - c. Request-to-Exit Switch
 - d. Latch/Bolt Monitor Switch
 - e. Local Alarm Sounder / Horn
 - f. Local Alarm Strobe
 - g. Electromagnetic Hold Open Power
 - h. Electromagnetic Lock Power
 - i. Electrical Power Transfer
 - j. Duress Switch
 - k. Tamper Switch
 - l. Mortise Key Switch
4. Conductors must be made of up of stranded 18 AWG, or larger copper wire.
5. These conductors are in addition to the reader cables.
6. Verify any additional cable requirements based on specific door design/drawings
7. Coordinate color with Owner
8. Basis of design:
 - a. Windy City Wire – 4423xx (e.g., 442320; 442340; 442351)

F. Wiring Harnesses – DIB to Door

1. Provide premanufactured wiring harnesses to run from DIB to door electrified hardware
2. Harness to consist of minimum 20 AWG stranded conductors, pre-terminated on one end with a Molex connector.
3. Cable to consist of 12 conductors.
4. Acceptable products:
 - a. Allegion Connect CON-192P
 - b. Approved equivalent
 - c. Owner approved equivalent

PART 3 - EXECUTION

3.1 GENERAL

- A. Installation of the AACS specified herein (Lenel OnGuard) may encounter works that are part of the airport-wide replacement program of the legacy AACS (Casi-Rusco; Picture Perfect). Migration to the On Guard system must be accomplished without interruption to airport AACS services. As such, work execution may require coordination of space and mounting, especially

in Communication Rooms, for pre-migration testing, cut-over, and post-migration "go live" operations.

- B. Install the equipment in accordance with the contract documents, all applicable codes and standards and the Manufacturer's written instructions. The installed system must meet all applicable equipment and performance requirements.
- C. Any disruption of service to the AACS must be coordinated with the Owner with a minimum 72-hour advance notice.
- D. Provide and install and make fully operational all components required for a fully functional system.
- E. An ISC must be populated with the maximum number of reader ports, but no more than 80% of reader ports may be utilized
- F. All OSDP readers must be terminated with a 120 Ohm, 1-percent tolerance resistor, across the RS-485 termination ends at the reader.
- G. All AACS equipment must operate on 120 VAC power.
 - 1. Any special power treatment required, such as filtering or spike elimination that may be required for proper operation and protection of the AACS, must be provided by the Contractor.
 - 2. The Project site is in an area prone to lightning. The Contractor must provide lightning surge suppressors as required to prevent lightning damage to the equipment.
 - 3. Provide surge protection for all wiring to exterior devices or panels. Fuses are not acceptable and group protection is not acceptable. Individual circuits are to be protected by MOV or SAD protection schemes. The proposed scheme must be submitted to the Airport Board for approval prior to installation.

3.2 EXAMINATION

- A. Inspect the jobsite and survey the conditions to be encountered during performance of the work. This must be accomplished prior to starting the work. Failure of the Contractor to become familiar with the site conditions must not relieve Contractor of responsibility for full completion of the work in accordance with the contract provisions.
- B. Verify that all conduit, wires, cables, security equipment are installed and ready for connection and integration with the rest of the system.
- C. Examine area to be protected and verify that environmental characteristics will not affect effective communication and interfacing. Report observed problems in writing.
- D. Determine that power supplies, conduit, wires, cables, connections, and equipment are ready for installation and interfacing before attempting installation.
- E. Check all power and communications cabling for continuity before making connections.

- F. Visually inspect each piece of equipment, determine defects, and correct.
- G. Inspect locations where installation work will be performed. Verify that site conditions found are in accordance with drawings and are acceptable for Contractor's installation work. Report any discrepancies in writing to the Design Consultant, stating suggested means of correction.

3.3 INSTALLATION

- A. The Contractor must investigate the Site and become thoroughly familiar with the existing AACS system, Airport security and Airport operations. The Contractor must be consistent in architecture, materials, and programming with existing environment. All AACS processing components must be installed and tested for proper communications before any portal is cut over to the AACS.
- B. DIBs, enclosures, pull boxes including surface mounted enclosures must not have any unused knockouts (they should be completely sealed) and have security tamper proof screws or a lockable cover.
- C. All electrical enclosures, pull boxes and DIBs must be supplied/provided with security screws by installer.
- D. Install all system components, including furnished equipment, and appurtenances in accordance with the manufacturer's instructions, and as shown, and must furnish all necessary interconnections, services, and adjustments required for a complete and operable system as specified and shown. Control signal, communications, and data transmission line grounding must be installed as necessary to preclude ground loops, noise, and surges from adversely affecting system operation.
- E. Install the equipment in accordance with the contract documents, all applicable codes and standards and the Manufacturer's written instructions. The installed system must meet all applicable equipment and performance requirements.
- F. Adhere to the installation sequencing called out in 3.7D, Functional Testing Approach.
- G. Standardize the installation practices and material to provide uniform materials and procedures to the maximum extent possible.
- H. Locate pull boxes, wire-ways or other items requiring inspection, removal, or replacement conveniently and accessibly with reference to the finished facilities.
- I. Locate door interface boxes (DIB) within 10 feet of the door, in an accessible ceiling space, to reduce troubleshooting time and effort, any deviations must be approved by DFW ITS and DFW Code.
- J. Installation of electrical service to equipment must conform to specific UBC Codes and Standards, NFPA 70, and other applicable requirements.

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- K. Provide electrical equipment inspection in accordance with NEMA PB 2.1 Part VII.
- L. Install the system equipment in accordance with the standards for safety, NFPA 70, UL 681, UL 1037 and UL 1076, and the appropriate installation manual for each equipment type.
- M. All wiring, including low voltage wiring outside the control console, cabinets, boxes, and similar enclosures, must be installed in rigid galvanized steel conduit conforming to UL 6 (when outdoors), or electric metallic tubing (EMT) when indoors. All other electrical work must be as specified with electrical specifications and drawings that are part of the contract document and as shown. Grounding must be installed as necessary to preclude ground loops, noise, and surges from adversely affecting system operation.
- N. All equipment connected to alternating current circuits must be protected from power line surges. Equipment protection must meet the requirements of ANSI C62.41. Fuses must not be used for surge protection.
- O. All inputs must be protected against surges induced on device wiring. Outputs must be protected against surges induced on control and device wiring installed outdoors and as shown. All communications equipment must be protected against surges induced on any communications circuit.
- P. All cables and conductors, except fiber-optics, which serve as communications circuits from the existing access control CPU to field equipment, and between field equipment, must have surge protection circuits installed at each end. Fuses must not be used for surge protection.
- Q. Calibrate all equipment.
- R. Inspect each component, determine obvious defects, and correct.
- S. All electrical service (not low voltage) work must be in accordance Division 26.
- T. Perform tests as recommended by manufacturer or as required to ensure the AACS equipment is operating properly and meets specified requirements.
- U. Correct all deficiencies detected and retest affected components.
- V. Record test data, tabulate, and write narrative describing tests, results, deficiencies found, corrective measures, and results of retesting. Certify that the security equipment has been tested and is ready for performance verification testing.
 - 1. Service Loops
 - 2. Service loops shall be provided for all AACS cabling within the Telecommunication Rooms. Service loops shall be of sufficient length to facilitate relocating wall mounted AACS control panels and power supplies to the Security racks without splices. Service loops shall be coiled and contained in appropriately sized pull boxes.
 - a. Service loop for all cabling at the DIB and CIB should be within 20 feet of the door

3.4 INSTALLATION OF CONDUCTORS

- A. Install all cabling in accordance with Division 27 for installation and testing. If conflict between this Section and Division 27, this Section must take precedence.
- B. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.
- C. Install receptacle outlet to accommodate connection with attachment plug.
- D. Install cord and cap for field-supplied attachment plug.
- E. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- F. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.
- G. Install terminal block jumpers to complete equipment wiring requirements.
- H. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements. Installation of conductors must comply with Division 26 Specification "Electrical Connections to Equipment", and meet all applicable Division 27 requirements, manufacturer recommendations, local, state, and national codes.

3.5 IDENTIFICATION AND LABELING

- A. All devices, cables, conduits, and cabinets must be labeled in accordance Specification Section 27 05 53, "Identification for Communications Systems".
- B. Control/Device and Display Labels:
 - 1. Each control, display and any other item of equipment that must be located, identified, read, or manipulated must be appropriately and clearly labeled to permit rapid and accurate identification of its operating state of position.
 - 2. Orient labels and information thereon horizontally so that they may be read quickly and easily. Vertical orientation must be used only where space is limited.
 - 3. Device labelling convention must be as follows:
 - a. Door number placard on top of door (Colum/Row-based)
 - b. Device ID as identified in drawings
 - c. Affix label to device
- C. Locate labels so that there is no confusion as to which item they identify. Labels must not obscure any other information required by the operator. Controls must not obscure labels. The location of labels must be consistent.

- D. Use Permanent Room Numbers as indicated on the Room Finish Schedules for construction period identification of rooms and building spaces. All required shop drawings and submittals, including manuals and Project Record Drawings must identify rooms and spaces using the Permanent Room Numbers. Permanent identification devices including signage, equipment nameplates, and panels must use the Permanent Room Numbers.

3.6 GROUNDING

- A. All cable shields and pair shields must be grounded at one (1) point only. Cables that originate from field panels and serve field devices must be grounded to the signal ground terminal in the field panel.

3.7 SYSTEM TESTING

- A. Provide all personnel, equipment, instrumentation and supplies necessary to perform all testing.
- B. Each AACS portal must not be cut over until:
 - 1. The contractor has completed the work and functional testing on the portal.
 - 2. DFW DPS is notified of the cut-over and agrees to the cut-over date.
 - 3. The portal devices can be installed, connected, and tested on the system.
 - 4. The security levels are determined by DFW Airport Security, and the security programming is complete.
- C. A phased installation and functional testing approach must be implemented to ensure that the system can operate as designed. Successful completion of each testing phase is required before proceeding to the next level of testing. Any problems discovered during these tests will be documented and brought to the attention of the Owner and corrected at Contractor's expense. The Contractor must promptly correct all problems encountered, providing field service personnel appropriately trained for the types of problems encountered. Prior to cut over of the first portal, the door configuration databases must be completely populated.
- D. Functional Testing Approach
 - 1. When the initial conduit installation is completed, an inspection must be called. Upon acceptance of the conduit installation by the Owner, wire may be installed in the conduit.
 - 2. When the installation of the wiring is completed, an inspection must be called. Upon acceptance of the wire installation by the Owner, devices may be installed, and the remaining work on the portal completed.
 - a. Upon completion of work at a portal, download the cardholder and door configuration databases and test each portal device for specified functionality with the test credentials.
 - b. Access requests are to be based on ISC decisions and valid site codes with communications to the ISC disabled. One (1) of the test cards must be disabled/enabled during the test. This test should prove the basic integrity of the

- Portal Interface, and the wiring and terminations between the ISC and the portal devices.
- c. At credential reader-controlled doors, tests must include, but not be limited to:
 - 1) Valid credential read.
 - 2) Invalid credential read.
 - 3) Valid request-to-exit.
 - 4) Door forced open.
 - 5) Door held open.
 - 6) Door shunt.
 - 7) Local alarm.
 - 8) Alarm and monitor points.
 - 9) AACS input and output interfaces.
 - 10) AACS integration with the SSS and its cameras.
 - d. Upon successful completion of the test, the portal must be in service, controlled by the AACS.
- 3. After the contractor testing is completed, the portal is turned over to the Owner for further functional testing and acceptance. Testing must be observed by a DFW DPS or another Owner representative or designee. The person observing the testing must sign and date (including time of day) all forms as required proving that the test was witnessed.
 - 4. Upon acceptance of these tests, the Owner will add the portal to the appropriate door groups and undertake active management. From this point forward, the contractor may not perform any further work on the portal, without submitting an impairment request.

3.8 ASSET INFORMATION AND TAGGING

- A. Provide inventory information and tag all equipment (generally greater than \$2,000 in value) as directed by the Owner for update in the Owner's Inventory System(s).
 - 1. Asset tracking systems may include BIM, ITS Inventory, and financial inventory systems
 - 2. Asset tags and inventory control sheet are to be obtained from the Owner. Data to be captured must include but not be limited to asset number, description, location, make/model, serial number, label name, etc.
 - 3. Data required to be obtained must be coordinated with Owner
 - 4. Signed, completed inventory control sheet must be provided at substantial completion and included in as-built documents.
 - 5. Asset inventory information must also be provided in Excel format to facilitate import by Owner into Owner system(s)

3.9 ACCEPTANCE

- A. Final acceptance will be withheld until the following activities have been successfully completed:
 - 1. Acceptance of all submittals.
 - 2. Delivery of final documentation.
 - 3. Successful testing.

SENSITIVE SECURITY INFORMATION

DFW CTAE Terminal C & A and PIO
DFW Contract No. 9500761
DFW Airport, Texas

C & A Renovation and Piers
Issued for Permit
2023/09/01

4. Successful training and demonstration, including operation of systems using the manuals, if called for in these specifications.
5. Purging of Contractor User privileges.

END OF SECTION 28 13 00.11