SECTION 25 06 11
INTEGRATED AUTOMATION DEFINITIONS

GENERAL

1.1 SUMMARY

A. Section includes the definitions for all Integrated Automation sections.

B. Related Sections:
   1. 25 05 13 Conductors and Cables
   2. 25 05 28 Pathways
   3. 25 05 53 Identification
   4. 25 11 19 Building Control Systems Server
   5. 25 12 19 Integration Protocols
   6. 25 12 23 Client-Server Information/Database Integration
   7. 25 13 00 Control and Monitoring Network
   8. 25 13 13 Building Level Controller
   9. 25 14 00 Local Control Units
  10. 25 14 23 Field Equipment Panels
  11. 25 15 00 Building Control Systems Server Software
  12. 25 15 16 Software for Programming Local Control Unit
  13. 25 15 23 Graphics
  14. 25 33 13 Thermal Utility Metering Interface
  15. 25 35 13 Actuators and Operators
  16. 25 35 15 Switches and Relays
  17. 25 35 16 Sensors and Transmitters
  18. 25 35 17 Air and Gas Pressure and Flow Measurement
  19. 25 35 18 Liquid Pressure and Flow Measurement
  20. 25 35 19 Control Valves
  21. 25 35 26 Compressed Air Supply
  22. 25 35 28 Guideline for Control Sequences

C. Where architectural features govern location of work, refer to architectural drawings and coordinate with other trades.

1.2 REFERENCES

A. This section includes any rules and regulations of Federal, State, local authorities, and utility companies in force at the time of execution of contract.

B. Agencies or publications referenced herein refer to the following:
   2. ANSI/CEA Standard 709.C LonTalk protocol
   3. ASHRAE American Society for Heating, Refrigeration, Air-Conditioning Engineers
   4. ASHRAE Fundamentals Heating and Cooling Load Calculation Methods
   5. ASHRAE Standard 55 Thermal Environmental Conditions for Human Occupancy
   6. ASHRAE Standard 62.1 Ventilation for Acceptable Indoor Air Quality
8. California Energy Commission (C.E.C.) Title 24
9. DIN-IEC 751 Standard for platinum sensors
10. FCC Federal Communications Commission
12. NEC 725 ......Class 1, Class 2, and Class 3 Remote Control, Signaling And Power-Limited Circuits
13. NEC 800 Communications Circuits
14. NEMA National Electrical Manufacturers Association
15. NEMA WD7 Occupancy Motion Sensors.
16. UL Underwriters Laboratories, Inc.
17. UL 773A Non-Industrial Photoelectric Switches for Lighting Controls.
18. Sheet Metal and Air Conditioning Contractor’s National Association (SMACNA)
20. Stanford Guidelines for Sustainable Buildings

Note: Edit the above list for each project. Make sure each item is appropriate and are coordinated.

1.3 DEFINITIONS

A. AHU  Air Handling Unit
B. AI  Analog Input
C. AO  Analog Output
D. Archive  Data storage
E. AWG  American Wire Gauge (standard wire size measurement)
F. Access  Process or effort to communicate to system.
G. BACnet  Building Automation and Control Network open communication protocol.
H. BTL  BACnet Testing Laboratory.
I. BAS  Building Automation System (Direct Digital Control)
J. Building Control System Server (BCSS)  Main control system server in each building. In Niagara, the term is Supervisor PC.
K. Building Level Controller  A network controller that has many functions including gateway between BCSS and Local Control Units. In Stanford Control System Architecture, the Building Level Controller is a JACE
L. Class 1,2, 3  Remote Control, Signaling And Power-Limited Circuits
M. CO2  Carbon Dioxide
N. Command Priorities  The order in which commands are allowed to be executed. (Command Hierarchy).
O. Commissioning  Process to ensure installation and functionality is per design
P. Continuous Pathway – Enclosed pathway system such as conduit, cable tray, flexible conduit, etc.
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tr>
<td>Q.</td>
<td>DI</td>
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<td>R.</td>
<td>DDC</td>
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<td>S.</td>
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<td>T.</td>
<td>Device</td>
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<td>V.</td>
<td>DO</td>
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<td>W.</td>
<td>Dry Contact</td>
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<td>X.</td>
<td>Event</td>
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<td>Y.</td>
<td>FDG</td>
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<td>Z.</td>
<td>FESO</td>
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<tr>
<td>AA.</td>
<td>Field Equipment Panel</td>
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<td>BB.</td>
<td>Field Terminal Panel</td>
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<td>CC.</td>
<td>Firmware</td>
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<td>DD.</td>
<td>Front End System</td>
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<td>FF.</td>
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<td>I/P</td>
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<td>II.</td>
<td>Instrument</td>
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<td>JJ.</td>
<td>Integration protocols</td>
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<td>KK.</td>
<td>IP Address</td>
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<td>LL.</td>
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<td>MM.</td>
<td>License</td>
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<td>NN.</td>
<td>LONWORKS®</td>
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<tr>
<td>OO.</td>
<td>LonTalk® Protocol</td>
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</table>
PP. LONMARK® International Association: An organization dedicated to issuing guidelines to ensure that devices from different vendors can coexist and operate on a single LONWORKS® network. The organization establishes functional profiles and LONMARK® certification to devices in order to ensure interoperability between vendors.

QQ. mA Milliamps

RR. Modbus Serial communication protocol developed by Modicon. Modbus protocol utilizes 3 frame formats:
   1. Modbus RTU Used to connect a supervisory computer with a remote terminal unit (RTU) for supervisory control and data acquisition.
   2. Modbus TCP/IP (More commonly Modbus TCP) is Modbus protocol encapsulated in a TCP frame.
   3. Modbus ASCII Not used for Stanford control systems.

SS. MS/TP Master/Slave Token Passing communications bus

TT. NEMA 1 General Purpose - for use in dry indoor locations.

UU. NEMA 3R Rain tight-for use in outdoor locations subjected to rainfall

VV. NEMA 4 Watertight - for use in outdoor locations and where subjected to direct water spray.

WW. Non-Continuous Pathway Open air pathway systems such as J-hooks, bridal rings, etc.

XX. NO/NC Normally Open/Closed

YY. Object Hardware or Software component such as a device or point.

ZZ. Ohm Unit of electrical resistance

AAA. Owner Stanford University

BBB. Pathways Support and protection system for conductors and cabling.

CCC. P-E Pressure to Electric Transducer

DDD. PICS Protocol Implementation Conformance Statement

EEE. PID Proportional Integral Derivative (the three parameters required in control loops)

FFF. Single hardware input/output or software data object such as setpoints and attributes.

GGG. Point Mapping The act of integrating data points from building level controllers to building control system server.

HHH. Points list List of inputs, outputs and parameters for specific systems.

III. Programming Interface Tools: Software utilized to set up custom control or application.

JJJ. Protocol An agreed-upon format for transmitting data between two devices.

KKK. Real-time Live data

LLL. RFI Request for Information

MMM. RH Relative Humidity

NNN. RTD Resistance Temperature Detector
OOO. PSIG Pounds per Square Inch Gauge

PPP. SCFM Standard Cubic Feet Per Minute

QQQ. Stand-Alone controllers. Capable to operate or control without the need to communicate to other controllers.

RRR. LON Segment devices A single piece of uninterrupted wire. One LON network segment (i.e. JACE to devices)

SSS. Network Segment A logical group of computers that share a network resource. This can be accomplished with a router, VLAN, switch segmentation, etc.

TTT. Trend Record data for specified time intervals

UUU. TAB Test Adjust and Balance

VVV. VAC Voltage Alternating Current

WWW. VDC Voltage Direct Current

XXX. Wiring Duct Pathway for wire management inside of panels.

YYY. Wire sheet Program logic diagram showing overall flow of control data to achieve sequence.

ZZZ. Wiring Trough Wiring enclosure used to manage wiring outside of panels.

AAAA. CAT Category rating based on ANSI/EIA Standard 568

BBBB. EMI Electromagnetic Interference

CCCC. Floor Level Communications between application controllers (air terminals, fan coils, etc.)

DDDD. Noise Unwanted electrical or electromagnetic energy

EEEE. Signal Wire Wire used to transmit an electrical signal such as voltage, amps, or resistance.

FFFF. IP Internet Protocol

GGGG. TCP Transmission Control Protocol

HHHH. TCP/IP Transmission Control Protocol / Internet Protocol

IIII. PICS Protocol Implementation Conformance Statement

JJJJ. SNMP Simple Network Management Protocol is a network-management protocol used almost exclusively in TCP/IP networks. SNMP provides a means to monitor and control network devices, and to manage configurations, statistics collection, performance and security on a network. SNMP uses a distributed architecture consisting of entities called “managers” and “agents”.

KKKK. oBIX Open Building Information Xchange

LLLL. Thin Client A thin client (sometimes also called a lean, zero or slim client) is a computer program that depends heavily on another computer (its server) to fulfill its computational roles. This is different from the traditional fat client, which is a computer designed to take on these roles by itself.

MMMM. NAT Network Address Translation. A methodology of remapping one IP address space into another by modifying network address information in Internet Protocol (IP) datagram
packet headers while they are in transit across a traffic routing device. Used extensively by Stanford University.

NNNN.   NAT-T  NAT Traversal is a general term for techniques that establish and maintain Internet protocol connections traversing network address translation (NAT) gateways, which break end-to-end connectivity. Intercepting and modifying traffic can only be performed transparently in the absence of secure encryption and authentication. Use of any NAT traversal technique is prohibited on any Stanford Control network.

OOOO.   BACnet Building Automation and Control Network communication protocol.

PPPP.   BTL   BACnet Testing Laboratory

QQQQ.   BBMD  BACnet broadcast management device. Use of BBMDs on BACnet/IP networks, is not permitted. Use of any other device or software that facilitates global message broadcasts across multiple IP subnets, is not permitted on any Stanford control network.

RRRR.   Protocol An agreed-upon format for transmitting data between two devices.

SSSS.   mA   Milliamps

TTTT.   MS/TP Master/Slave Token Passing communications bus

UUUU.   NO/NC Normally Open/Closed

VVVV.   Ohm   Unit of electrical resistance

WWWW.   PID Proportional Integral Derivative (the three parameters required in control loops)

XXXX.   Stand-Alone Capable to operate or control without the need to communicate to other controllers

YYYY.   TAB Test Adjust and Balance

ZZZZ.   CO2  Carbon Dioxide

AAAAA.  I/P  Current to Pneumatic (Pressure) Transducer

BBBBB.   P-E Pressure to Electric Transmitter

CCCCC.   RH Relative Humidity

DDDDD.   RTD Resistance Temperature Detector

Note: Edit the above list for each project. Make sure each item is appropriate. If the above referenced definitions are not included in the project, consider incorporating them or delete them from the list.

1.4 TRIDIUM NIAGARA-SPECIFIC DEFINITIONS

A.   oBIX  Open Building Information Xchange

B.   FOX  Fox is the TCP/IP protocol which is used for all network communication between Stations as well as between Workbench and stations. Fox is a multiplexed peer to peer protocol which sits on top of a TCP connection.

C.   FOXS  Secure Fox SSL. The Fox protocol run over an SSL encrypted connection following certificate based server authentication. The Niagara implementation of the industry-standard Secure Socket Layer (SSLv3) and Transport Layer Security (TLSv1) protocols
provides server authentication and encryption/decryption of data transmitted between client and server.

D. Workbench Tridium’s brand name for the Niagara configuration tool, a Java VM which hosts Niagara plugin components. The Distech-specific brand name for Workbench is EC-NetAX Pro.

E. BAJA Building Automation Java Architecture. The core framework that the Niagara framework is built upon is published as an open standard. This standard is being developed through Java Community Process JSR 60.

F. HTTP Hypertext Transfer Protocol is an application-level protocol for distributed, collaborative, hypermedia information systems. HTTP is the standard protocol used by web browsers to access web pages from a station.

G. HTTPS Hypertext Transfer Protocol Secure is a communications protocol for secure communication over a network. It is the result of layering the Hypertext Transfer Protocol (HTTP) on top of the SSL/TLS protocol, thus adding the security capabilities of SSL/TLS to standard HTTP communications.

H. HTML HyperText Markup Language is the standard markup language used to create web pages. Web browsers can read HTML files and compose them into visible web pages.

I. XML Extensible Markup Language is a markup language that defines a set of rules for encoding documents in a format which is both human-readable and machine-readable. XML code is similar to Hypertext Markup Language (HTML). XML is a text-based format that allows for the structuring of electronic documents and is not limited to a set of labels. XML is used to describe data. The XML standard is a flexible way to create information formats and electronically share structured data via the public Internet, as well as via corporate networks. Both XML and HTML contain markup symbols to describe page or file contents. HTML code describes Web page content (mainly text and graphic images) only in terms of how it is to be displayed and interacted with.

J. PX Presentation XML. A PX file is a special XML file, used by Niagara, to display webpages. PX describes the components in a database and can be any collection of components, up to a complete database. A PX view can be used to provide a complete variety of options in the development of dynamic user interfaces.

K. Niagara Framework The Niagara Framework is a system designed to manage and control information. Its primary application is for control systems because of its powerful and flexible integration capabilities. The system is made up of Stations that run the components of the Niagara Framework and views that provide the ability to view and command these components.

L. Niagarad The protocol used for workbench-to-daemon communication.

M. Daemon Typically refers to the Niagara platform daemon, a native daemon server process required by a Niagara host to run a station. The daemon is used to boot stations and to manage platform configuration such as IP settings.

N. Normalization In Niagara, this term is used to indicate “data normalization”. This is the process of making data and features from various different communications protocols work together so that they can be integrated. The Niagara framework provides a way to normalize data across various protocols so that it may be viewed and controlled from a single user interface.

O. Host This is a term for a hardware system (or platform) that provides the operating environment for a Niagara application. In a navigation tree, the host node is used to depict the platform, which is the first level of the navigation tree. Hosts always represent a physical piece of hardware. Localhost is a term used to indicate the local machine.
P. Platform  The name for everything that is installed on a Niagara host that is not part of a Niagara station. The platform interface provides a way to address all the support tasks that allow you to setup support and troubleshoot a Niagara host.

Q. Service  In the context of enterprise architecture, service-orientation and service-orientated architecture, the term service refers to a set of related software functionalities that can be reused for different purposes, together with the policies that should control its usage.

R. Station  A station is the main unit of server processing in the Niagara architecture. A station runs the components of the Niagara Framework and provides the access for client browsers to view and control these components. The primary parts of a station include components and services. It is the combination of a database, a web server, and a control engine. The station either runs on a Web Supervisor PC or a JACE controller. Often the term Supervisor or Jace will be used interchangeably with station. Technically the term station describes the component runtime environment common to all platforms, and Supervisor and Jace describe the hosting platform.

S. Supervisor  In Niagara, the Supervisor or Supervisor PC is a flexible network server used in applications where multiple Niagara-based stations are networked together. The Niagara Supervisor serves real time graphical information displays to standard web-browser clients and also provides server-level functions such as centralized data logging, archiving, alarming, real time graphical displays, master scheduling, and integration with enterprise software applications. Optional SQL and Oracle drivers enable seamless data transfer to these industry standard databases. In addition, the Niagara Supervisor provides a comprehensive, graphical engineering toolset for application development. On the Stanford Building Controls Network Architecture drawing, the Supervisor PC is designated as Building Controls System Server. Common industry generic terms for the Supervisor PC include: Operator Workstation, Front End Computer, Head End Computer, etc.

T. Supervisor Station  The station that is running on the Supervisor PC

U. JACE  JAVA Application Control Engine. A variety of headless embedded platforms. Typically a Jace runs on a Flash file system and provides battery backup or other means of orderly shutdown upon sudden power loss. Jaces usually host a Station and a Niagara Daemon process, but not Workbench. Jaces typically run QNX as their operating system. In Stanford Control System Architecture, the Building Level Controller is a JACE. The Distech-specific brand name for a JACE is EC-Bos.

V. ORD  Object Resolution Descriptor. The ORD is the Niagara universal identification system and is used throughout the Niagara framework. ORDs can be relative or absolute. An absolute ORD usually takes the general format of “host | session | space.” The ORD unifies and standardizes access to all information. It is designed to combine different naming systems into a single string and has the advantage of being parsable by a host of public APIs.

W. Thin Client  A thin client (sometimes also called a lean, zero or slim client) is a computer program that depends heavily on another computer (its server) to fulfill its computational roles. This is different from the traditional fat client, which is a computer designed to take on these roles by itself.

1.5  SYSTEM DESCRIPTION

|PRODUCTS|

2.1  NOT USED

Note: Products are defined in the various sections of Division 25
EXECUTION

3.1 NOT USED

END OF SECTION