

# FRCS Guide Deliverables - This checklist replaces the FRCS Guide that is referenced. This is a standalone document. Do not provide references to KTR

Yes No N/A

1. Provide licensing for all control systems within each building sufficient to cover the integration of that building into Siemens Desigo CC. Page 3
2. Provide shop drawings for all control systems to allow port count determination for network connectivity (the OT switches). Page 22
3. Provide as-built drawings for all control systems, regardless of whether they use BACnet or another protocol. Page 4
4. Provide Network Architecture (Riser Diagram) Page 4
5. Provide a Sequence of Operations with a narrative on the step-by-step instruction on control system operations, including unoccupied periods. Page 4
  - A. (need humidity requirements. after hours 55-65%)
6. Provide Training Requirements. Page 5
7. Integrate into the EMCS in accordance with UFGS 25 10 10 and UFC 3-470-01 and use the EMCS Front End as the only front end for the systems listed below: Page 3

Yes No N/A

- A. Heating, Ventilation, and Air Conditioning (HVAC) Page 3
  - a. HVAC Equipment (as required by SOW)
  - b. Devices (as required by SOW)
  - c. Additional Features (as required by SOW)
  - d. Points (Tyndall Standard points and acronyms)
  - e. Graphics (Tyndall Standard graphics and acronyms)
  - f. Kiosks Page 16 (as required by SOW)
  - g. Occupancy Analysis Page 19 (as required by SOW)
- B. Domestic Hot Water Page 3 (as required by SOW)
- C. Lighting Controls Page 3 (as required by SOW)
- D. Moisture Detection Page 3 (as required by SOW)
- E. Leak Detection Page 3 (as required by SOW)
- F. Fire Protection System Page 3 (as required by SOW)
- G. Fire Detection System Page 3 (as required by SOW)
- H. Utility Metering (Water, Gas, Electrical) Page 3 (as required by SOW)

# FRCS Guide Deliverables

Yes No N/A

- I. Submetering Page 3 (as required by SOW)
- J. Electronic Security System (Front end capable only) Page 3
- K. Gunshot Detection System Page 3 (as required by SOW)
- L. Fault Detection Page 13 (low/med/high categories TBD) (as required by SOW)

## 8. Heating, Ventilation, and Air Conditioning (HVAC) Equipment (as required by SOW)

- A. Heating, Ventilation, and Air Conditioning (HVAC) Equipment are classified with a CIA rating of L-L-L.
- B. Provide equipment with BACnet cards and integrate into the EMCS front end. Page 3
- C. Provide HVAC equipment usage report requirements. Page 14
- D. Provide an Occupancy and Thermostat Sensor Schedule. Page 4
- E. Collect sub-metered electrical data for:

- a. All major building systems. Also, this includes central HVAC systems > 5 kW. The list is not all inclusive. Page 11

- 1. Pumps Page 11
- 2. Chillers Page 11
- 3. Cooling Towers Page 11
- 4. Boilers Page 11
- 5. Air Handling Units Page 11

- b. Data centers > 5 kW Page 11
- c. Other building-level IT loads > 5 kW Page 11

## F. Data Required:

- a. Provide data for Equipment Runtime Page 14
- b. Provide data for Alarm Counts Page 14
- c. Provide data for End-of-Interval Status Page 14
- d. Provide data for Predictive maintenance projections. Page 14

Yes No N/A

Yes No N/A

# FRCS Guide Deliverables

## G. Automated Notifications for Flow or Temperature Leak by Systems

Yes No N/A

- a. Alarm when outside of setpoint
  - 1. Notify when condition exist for Central or Terminal HVAC valve.
  - 2. Notify when condition exist for Central or Terminal HVAC Damper.
  - 3. Notify when condition exist for Central or Terminal HVAC Energy Recovery Wheel.

Yes No N/A

### b. Recommendations Flow or Temperature on Air or Water Leak by:

- a. Suppress downstream supply or zone temperature deviation faults when this fault is triggered. Page 14

Yes No N/A

## H. Simultaneous Heating & Cooling Page 14

- a. Provide automated notifications for prolonged instances within HVAC systems that results in simultaneous heating and cooling operations. Page 14
- b. Do not handle this condition on the FDD as an automated fault, air handler or terminal reheat following dehumidification Processes. Page 14
- c. Notify for excessive reheat associated with overventilation, inconsistent setpoints, or reduced occupancy must provide faults. Page 14

Yes No N/A

## I. Controller/Network Failure Page 15

- a. Provide automated notifications to identify all sustained losses in communication or overall controller failure. Page 15
- b. Roll-up communication issues for faults into single fault (e.g., single alert for 8 controllers with loss of communication vs 8 separate simultaneous alarms). Page 15
- c. Notify when there is a loss in overall EMCS network and thus cannot rely solely on EMCS network infrastructure to accomplish fault transmission for overall network loss. Page 15

Yes No N/A

## J. Failed or Mis calibrated Sensor: Page 15 (Provide a report, bring in a failed point and make sure it shows on a report)

- a. Fault all central HVAC system sensors used in sequences of operation. Page 15
- b. Fault all central HVAC system sensors being monitored as part of FDD functionality. Page 15

Yes No N/A

## K. Signal Tuning Needs: Page 15. (Done initially by Siemens, maintenance item later)

- a. Monitor all HVAC system analog using configurable thresholds. Page 15
- b. Monitor all HVAC system floating output commands using configurable thresholds. Page 15
- c. Automatically notify when persistent signal output issues occur. Page 15 (PVT testing would flus these out. The FFD process would observe process)

# FRCS Guide Deliverables

Yes No N/A

1. Hunting Page 15
2. Over Shooting Page 15
3. Over Dampening Page 15
4. Wind-up Page 15
5. Improper loop enabling has been identified. Page 15

## M. High Minimum Setpoints Page 15

- a. Automatically notify for any HVAC system relative during low load conditions as defined by outside air temperatures or occupancy levels for the following: Page 15

Yes No N/A

1. Excessive Ventilation Page 15
2. Excessive Reheat Page 15
3. Excessive variable speed motor commands Page 15

## M. Restricted Setpoint Reset: Page 15

- a. Automatically notify when all HVAC setpoint resets that are persistently limited by rouge zone or are otherwise unresponsive to overall load condition changes for the following: Page 15
  1. Pressure Page 15
  2. Temperature Page 15
  3. Flow setpoints Page 15

Yes No N/A

## MI. Record High Pressure Drops for the following: Page 15

Yes No N/A

- a. Equipment
  1. HVAC filters Page 15
  2. Recovery Wheels Page 15
  3. Strainers Page 15 4in and larger, including chiller strainers.

Yes No N/A

- b. Provide automated notifications for the following:
  1. Pressure drops exceed configured thresholds for a prolonged period of time. Page 15

# FRCS Guide Deliverables

## P. FDD Features:

- Yes No N/A
- a. Provide notifications for the following: Page 15
    - 1. Start-up reports Page 15
    - 2. End-of-day reports Page 15
    - 3. Equipment trip conditions reports. Page 15
    - 4. User-specific dashboards Page 15
    - 5. Alarm Counts Page 15
    - 6. Fault Counts Page 15
    - 7. Normalized smoothed performance profiles. Page 15
    - 8. Aggregated equipment operation data for specific buildings sets. Page 15

## 9. Devices

- Yes No N/A
- A. Use appropriate protocols such as DNP 3.0, Modbus, or IEC-61850 as appropriate to the systems and their integration with the EMCS Front End for each system interfacing with the EMCS at the base wide system level. Page 3
  - B. Use BACnet IP, BACnet MS/TP, or hardware I/O (4-20 mA, 0-10 V or binary) for the communication protocol for the use case control system. Page 5
  - C. Provide all DDC controllers located in mechanical rooms in lockable enclosures. Page 6

## D. Ethernet switches: Page 6

- Yes No N/A
- a. Provide Ethernet switches integral with controllers to allow “daisy chaining” of IP controllers. Page 6
  - b. Provide connection to the Air Force provided OT switch to the IP. Page 6
  - c. Some contracts have government furnished switched, if the switch is not available at the time of control system installation, a temporary Ethernet switch may be installed at or near the location of the future switch to allow for the control system installation, start-up and testing activities. Page 6
  - d. Provide all network cabling of sufficient length to allow for connection to Air Force provided IP switch. Page 6
  - e. Include on As-built (including “design” as-builts and draft as-builts) the number of required Ethernet ports for connection at the Air Force provided switch. Page 6
  - f. Configure and provide Local Display Panels (LDPs) as required by Points Schedules for all central and terminal DDC equipment and collocate in mechanical rooms spaces as indicated on drawings. Page 6
  - g. Hand-of-Auto (HOA) functionality: Page 6

# FRCS Guide Deliverables

Yes No N/A

1. Provide functionality on all analog and binary BCS outputs other than terminal units. Page 6
  2. Provide functionality either through local display panel or DDC controller hardware 0 to 100%required for all analog outputs. Page 6
  3. Provide HOA feedback on all HVAC damper, HVAC valves, and HVAC motor commands other than for terminal units. Page 6
- h. Provide for each terminal unit including thermostats a wall network interface jack accessible within the boundaries of the thermal zone, consistently located and limited within the building, and shown on plans. Page 6

Yes No N/A

- i. Configure the DDC thermostat or non-DDC space sensor modules with the following functionality and represented on design Temperature Control Module schedules: Page 6
1. Provide a temperature indicating device. Page 6
  2. Provide a User Input Device which must adjust a temperature setpoint output. Page 6
  3. Provide a User Input Momentary Contact Button and an output to the control system indicating zone occupancy. Page 6

Yes No N/A

- j. Gateways: Page 7
1. Not used unless already approved by the base. Page 7
  2. Use Points Schedule requirements for integration of non-BACnet field control systems (e.g., Modbus, chiller, boiler, or VFD interface) and determination of points to map, share, trend, display, or alarm. Page 7
  3. Provide capacity for mapping an additional 10% of points more than what is indicated on Point Schedule drawings. Page 7

Yes No N/A

- k. Media:
1. For Contractor Furnished Equipment: Deliver BCS and EMCS as a complete functional system described by the IP network Page 7
  2. 3-wire media is required for MS/TP communication. Page 7

# FRCS Guide Deliverables

## 10. EMCS Features:

### A. Scheduling: Page 7

Yes No N/A

- a. Group terminal units into common zone-level schedules based on design zone type. Page 7

### B. Trends:

Yes No N/A

- a. Initial interval required for analog values is 5 minutes. Page 7 – Memo FRCS Point Naming Convention and Graphics Standards signed 04/18/2023, Attachment 1 has trending information)
- b. Provide the ability to store all FRCS trending data for a minimum of two weeks in the event of communication failure between the operations center and the building to ensure consistent trending. Page 4. Based on DXR limitations the duration will be consistent with the amount of data provided by the installed equipment.

### C. Alarms: Page 7

Yes No N/A

- a. Provide no less than 10,000 ASHRAE 135 alarm event notifications. Page 7
- b. Follow existing TAFB EMCS alarm group conventions; if none exist, provide the following groups/levels: Page 7

Yes No N/A

1. Level 1: Life-safety message Page 7
2. Level 2: Critical equipment message Page 7
3. Level 3: Urgent message Page 7
4. Level 4: Normal message Page 7

### D. Testing:

Yes No N/A

- a. Provide Commissioning and Performance Verification Testing (PVT) procedures and requirements. Page 5
- b. Performance Verification Testing Endurance Testing must be for a minimum 10 consecutive days. Page 7

### c. Training Details: Page 8

Yes No N/A

1. Obtain approval of the training schedule from the Government at least 60 days prior to the first day of training. Page 8
2. Provide a minimum training criterion as follows for each building: Page 8

Yes No N/A

- i. Minimum 8 hours and 10 operating staff members for UFGS 23 09 23.02 BACnet Direct Digital Control for HVAC and Other Building Control Systems Page 8 (This will be tailored by what equipment was installed in the building with an approved testing plan reviewed by the commissioning agent)

### E. Controls Maintenance and Warranty: Page 8

# FRCS Guide Deliverables

Yes No N/A

- a. No network maintenance required. Page 8
- b. Provide Semi-annual Maintenance, Software/Firmware Updates, and related Maintenance Procedures as described in UFGS 25 10 10 – Utility Monitoring and Control System (EMCS) Front End and Integration over the warranty period. Page 8 (This will be tailored by what equipment was installed in the building with an approved maintenance plan reviewed by the commissioning agent and input from ISSM)

Yes No N/A

## F. Sequences: Page 8

- a. Include warm-up/cool-down sequences on all air-side systems and thermal zones. Page 8
- b. Include chiller optimization sequences on all chiller systems. Page 8 – This may require coordination with chiller vendor (Trane)-
- c. Monitor zones served by the hydronic system enable status, and enable the hydronic system whenever it is needed: Page 8
  - 1. More than 5 zones served AND 5% of all zones served become enabled. Page 8
  - 2. Critical zones and units as assigned by TAFB CES staff become enabled. Page 8

Yes No N/A

## G. Hardware Input/Output: Page 8

- a. Provide all BCS sensors using the highest accuracy designer option available in UFGS 23 09 13 – Instrumentation and Control Devices for HVAC Page 8 - Sensors being installed per UFGS specs
- b. Tailor all enclosure designer options in UFGS 23 09 13 – Instrumentation and Control Devices for HVAC and UFGS 23 09 00 – Instrumentation and Control for HVAC based on location of the enclosures. Locate all BCS away from hazardous areas, such as indoors and not underneath potentially leaking hydronic systems. Page 8
- c. Provide all HVAC control dampers and valves using the most stringent leakage rating available in UFGS 23 09 13 – Instrumentation and Control Devices for HVAC. Page 8 – Control Dampers provided by Mech Contractor and installed per UFGS specs.

Yes No N/A

## H. Commissioning Specification:

- a. Cite UFGS 01 91 00.15 Total Building Commissioning as a related work commissioning specification in UFGS 23 09 00 Instrumentation and Control for HVAC and in any other specification instances requiring commissioning requirement references. Page 8

Yes No N/A

## I. POCs: Page 8 – Copies delivered per the UFGS Specs.

- a. Submittal Distribution: for all UFGS 23 09 00 and UFGS 25 10 10 hard copies: Page 8
  - 1. CES – two copies Page 9
  - 2. TAFB Program Management Office – one copy Page 9
  - 3. USACE Mobile Project Office – one copy Page 9
- b. Submittal Distribution: for all UFGS 23 09 00 and UFGS 25 10 10 CD-ROMs: Page 9
  - 1. CES – one copy Page 9
  - 2. TAFB Program Management Office (PMO) – one copy Page 9

Yes No N/A

Yes No N/A



# FRCS Guide Deliverables

Yes No N/A

3. USACE Mobile Project Office Copy – one copy Page 9
4. Coordinate with CES into total building commissioning planning process. Page 9
5. Coordinate TAFB EMCS Submittal Review, Points Schedule Naming Review (excel preferred), and Device ID/Network Number Coordination with CES Page 9 Coordinate prior to Redzone - Show Floorplan Graphics building specific and AHU graphic backgrounds. Refer to Memo\_FRCS Point Naming Convention and Graphics Standards signed 04/18/2023, Attachments 1 through 3 for additional details.

Yes No N/A

6. Coordinate TAFB Training with CES Page 9

11. At a minimum, represent the following points and all applicable type, protocol, and interface feature information on Points Schedule documentation using UFC 3-410-02 - DDC for HVAC and other Building Control Systems approaches and conventions and using the approved Master Acronym list for items not listed in the UFC 03-410-02 as prescribed in the MFR” Memo\_FRCS Point Naming Convention and Graphics Standards signed 04/18/2023” as delineated by change orders.

- A. Provide Points Schedules for all systems controlled by BACnet devices. All BACnet devices must be addressed on a Points Schedule and contain the following: Page 3 (The vendor such as Trane may need to provide some of this capability. The Prime will be required to provide these items) – Trane points and graphics will be integrated into the Desigo CC

Yes No N/A

- a. View Ability Page 3
- b. Override Capability Page 3
- c. Configurability Page 3
- d. Trending Page 3
- e. Alarming Page 3
- f. Fault Monitoring Page 3
- g. Troubleshooting Page 3 – Done by EMCS Technicians

12. At a minimum, represent the following points and all applicable type, protocol, and interface feature information on Points Schedule. Additional requirements detail is contained in other sections. Page 12 (The vendor such as Trane may need to provide some of this capability. The Prime will be required to provide these items) - Trane points and graphics will be integrated into the Desigo CC

- A. Provide Chiller Points: Page 12
  - a. Chiller Page 12

# FRCS Guide Deliverables

Yes No N/A

1. Status Page 12
2. Enable Page 12
3. Start-Stop Page 12
4. Alarm State Page 12
5. Alarm Description Page 12

Yes No N/A

- b. Compressor Page 12
1. Power Page 12
  2. Run Status Page 12
  3. Oil Temperature Page 12
  4. High Oil Pressures Page 12
  5. Low Oil Pressures Page 12

Yes No N/A

- c. Evaporator Page 12
1. Pressure Page 12
  2. Water Flow Rate Page 12
  3. Inlet Temperatures Page 12
  4. Outlet Temperatures Page 12
  5. Pump Start-Stop. Page 12
  6. Pump Status Page 12
  7. Refrigerant Temperature Page 12
  8. Refrigerant Pressure Page 12
  9. Strainer Delta Pressure Page 12 – This may be combined with Coil Delta Pressure per Trane
  10. Coil Delta Pressure (accomplished by moving filter Dp downstream of the filter)

Yes No N/A

- d. Condenser Page 12 (If installed in the field)
1. Pressures Page 12
  2. Inlet temperatures Page 12
  3. Outlet temperatures Page 12
  4. Pump Start-Stop Page 12
  5. Pump Status Page 12
  6. Pump Flow Page 12
  7. Fan Start-Stop Page 12

# FRCS Guide Deliverables

Yes No N/A

- 8. Fan status Page 12
- 9. Fan flow Page 12
- 10. Refrigerant Temperature Page 12
- 11. Refrigerant Pressure – Optional
- 12. Strainer Delta Pressure – This applies to Water Cooled Chillers
- 13. Coil Delta Pressure (accomplished by moving filter Dp downstream of the filter)
- e. Electrical Voltage Page 12
- f. Current Page 12
- g. Power Each Chiller Phase Page 12
- h. System Setpoints Page 12
- i. Reset Information Page 12
- j. Cooling Load Page 12
- k. Diagnostics Points Page 12

Yes No N/A

- B. Provide these typical Boiler points: Page 12 (This will vary based on electric vs gas boiler)
  - a. Enable Command Page 12
  - b. Flame Page 12
  - c. Flow Switch Page 12
  - d. Fan Start-Stop Page 12
  - e. Fan Status Page 12
  - f. Pump Start-Stop Page 12
  - g. Pump Status Page 12
  - h. Alarm Contacts Page 12
  - i. Alarm Codes Page 12
  - j. Firing Rate Page 12
  - k. Flue Temperature Page 12
  - l. Inlet Temperature Page 12
  - m. Outlet Temperature Page 12
  - n. Cascade Info Page 12 – This may not be applicable for all boilers.

# FRCS Guide Deliverables

Yes No N/A

- o. Reset Setpoints Page 12
- p. External Tank Temperatures - Where installed - Page 12
- q. Strainer Delta Pressure – Strainers provided for 4” and greater only

Yes No N/A

## C. Provide these typical VFD Points Page 12

- a. Operational Page 12
- b. Frequency Page 12
- c. Enable Page 12
- d. Setpoint Commands Page 12
- e. Output Frequency Page 12
- f. Voltage Page 12
- g. Current Page 12
- h. Power Page 12
- i. Drive Energy Page 12
- j. Control Method Page 12
- k. Acceleration Time Page 12
- l. Deceleration Time Page 12
- m. Drive Runtime Page 12
- n. Drive Status Page 12
- o. Hardware Error Page 12
- p. External Fault Page 12
- q. Fuse Blown Page 12
- r. Over Voltage Page 12
- s. Over Amperage Page 12
- t. Other Fault Data Page 12

Yes No N/A

## D. Provide these typical Central AHU Points: Page 12

- a. System Mode Command Page 12
- b. Unit Status Page 12
- c. Supply Air Pressure Page 12
- d. Supply Air Flow Page 12
- e. Fan Command Page 12

# FRCS Guide Deliverables

Yes No N/A

- f. Fan Minimum Page 12
- g. Fan Status Page 12
- h. Supply Air Temperature Page 12
- i. Supply Air Temperature Setpoint Page 12 –
- j. Return Air Flow Page 12
- k. Flow Different Setpoint Page 12
- l. Coil Discharge temperature Page 12
- m. Coil setpoint Page 12
- n. Valve Position Page 12
- o. Valve Feedback Page 12
- p. Outside air flow Page 12
- q. Outside Air Setpoint Page 12
- r. Damper Command Page 12
- s. Damper Feedback Page 12
- t. Outside and Return Air Temperatures Page 12
- u. Smoke Page 12
- v. Low Limit Setpoints Page 12
- w. Supply Pressure Limit Setpoints Page 12
- x. System Reset Button Page 12
- y. System Night Low Limit Page 12
- z. System Night Status Page 12
- aa. Air Filter Pressure or Switch Page 12
- bb. CO2 Setpoints Page 12
- cc. CO2 Reset Ranges Page 12

E. Provide these typical Terminal Equipment Zone Points: Page 12

- a. Zone System Scheduler Page 12
- b. Zone Effective Occupancy Points Page 12
- c. Zone Input Page 12 – Covered under Temp, Humidity, CO2, and etc.

Yes No N/A

# FRCS Guide Deliverables

Yes No N/A

- d. Zone Temperature Page 12
- e. Zone Occupied Page 12
- f. Zone Unoccupied Page 12
- g. Stand-by zone Temperature. Page 12
- h. Stand-by zone Temperature setpoints. Page 12
- i. Zone CO2 Page 12
- j. Zone Relative Humidity Values Page 12
- k. Zone Relative Humidity Values setpoints Page 12
- l. Terminal equipment Valve Commands Page 13
- m. Terminal equipment Fan Commands Page 13
- n. Terminal equipment Damper Commands Page 13
- o. Terminal equipment Valve Feedback Page 13
- p. Terminal equipment Fan Feedback Page 13
- q. Terminal equipment Damper Feedback Page 13
- r. Thermal Zone Airflow Values Page 13
- s. Thermal Zone Airflow Setpoints Page 13

Yes No N/A

- F. Provide these typical Lighting Zone Points Page 13
  - a. Lighting Zone System scheduler Page 13
  - b. Lighting Zone input Page 13
  - c. Lighting Zone effective occupancy Page 13
  - d. Lighting Zone run hours. Page 13
  - e. Lighting Zone timeout setting points. Page 13
  - f. Lighting Zone command Page 13
  - g. Lighting Zone status Page 13
  - h. Lighting Zone Photo sensor value Page 13
  - i. Lighting Zone Dimming / Level Command where installed. Page 13
  - j. Lighting Zone Scene settings, as applicable Page 13
  - k. Lighting Zone Consumption data where installed Page 13
- G. Provide these typical Energy and Water Metering Points: Page 13 - Approved Energy Graphics Samples have this information and is contained in the programmatic RFI

# FRCS Guide Deliverables

Yes No N/A

- a. Volts Page 13
  - b. Amps Page 13
  - c. Power Page 13
  - d. Frequency Page 13
  - e. Power Factor Page 13
  - f. Reactive Power for each electrical Metering Phase Page 13
  - g. Total power Page 13
  - h. Total Energy Page 13
  - i. Peak Demand (user-adjustable time period) Page 13
  - j. Average Line Page 13
  - k. Frequency for electrical metering Page 13
  - l. Flow rate for natural gas and water metering Page 13
  - m. Total Flow for natural gas and water metering Page 13
- H. Provide a Point Naming Conventions that follow TAFB Final Acronym List convention in conjunction with UFC 03-410-02 as described in MFR Memo FRCS Point Naming Convention and Graphics Standards signed 04/18/2023 and contained in the FRCS Guide 09/22/2021: Page 9 Part 1 TAFB designators (XLWU) (MFR Memo\_FRCS Point Naming Convention and Graphics Standards signed 04/18/2023).

Yes No N/A

- a. Part 2: TAFB Building # (e.g., “B430” for building #430) Page 9
  - b. Part 3: Real Property Unique Identifier or System Name (e.g., “AHU1”) Page 9
  - c. Part 4: Device description to describe signal source (e.g., “MA” for mixed air) Page 9
  - d. Part 5: Measured variable or controlled device (e.g., “T” for temperature) Page 9
  - e. Part 6: When applicable, a modifier to indicate some limit, command type, or enable signal (e.g., “LL” for low limit) Page 9
  - f. Part 7: When applicable, an additional modifier to indicate additional information about the signal (e.g., “SP” for setpoint) Page 9
  - g. Use “separators between point name parts, with exception between parts 3 and 4 (for this example, the entire point name would be “XLWU\_430\_AHU1\_MAT\_LL\_SP”). A “.” This may be displayed in the EMCS system. Page 9 and (MFR Memo\_FRCS Point Naming Convention and Graphics Standards signed 04/18/2023).
  - h. Use other conventions and examples from UFC 3-410-02 Appendix E and the Attachment 3 of the Memo\_FRCS Point Naming Convention and Graphics Standards signed 04/18/2023, Master Acronym List as mentioned in the MFR Memo\_FRCS Point Naming Convention and Graphics Standards signed 04/18/23 – DDC for HVAC and other Building Control Systems to ensure consistent point naming across TAFB buildings and projects. Page 9
- H. Features: Page 9
- a. Alarming: Page 9

# FRCS Guide Deliverables

Yes No N/A

1. Provide alarms that have user-adjustable time delays prior to triggering with the following default values: Page 9 - Memo\_FRCS Point Naming Convention and Graphics Standards signed 04/18/2023, Attachment 1 FRCS Hardware Software Map.
  - i. Provide Level 1 with 1 second at TRUE condition. Page 9
  - ii. Provide Level 2 with 10 seconds at TRUE condition. Page 9
  - iii. Provide Level 3 with 1 minute at TRUE condition. Page 9
  - iv. Provide Level 4 with 5 minutes at TRUE condition. Page 9

Yes No N/A

2. Provide alarms that meet exit hysteresis conditions prior to a return to normal: Page 10
  - i. Provide user-adjustable time-based hysteresis with a default of 5 seconds. Page 10
  - ii. Provide user-adjustable percent-of-limit hysteresis for analog alarms with a default of 0%Page 10
3. Provide physical or digital acknowledgement from operators before a return to normal for latching alarm levels 1 and 2. Page 10

Yes No N/A

4. Provide alarms that have adjustable suppression periods to prevent specific instances of alarms retriggering until the post-exit suppression time amount has elapsed with the following as default values: Page 10
  - i. Suppress Level 1 for 0 seconds. Page 10
  - ii. Suppress Level 2 for 5 minutes. Page 10
  - iii. Suppress Level 3 for 24 hours. Page 10
  - iv. Suppress Level 4 for 7 days. Page 10

Yes No N/A

5. Provide alarm functionality that suppresses interrelated level 2-4 alarm messages that are “downstream” of equipment in some failure alarm state, examples include: Page 10
  - i. Suppress Level 1 for 0 seconds. Page 10
  - ii. Suppress Level 2 for 5 minutes. Page 10
  - iii. Suppress Level 3 for 24 hours. Page 10
  - iv. Suppress Level 4 for 7 days. Page 10

Yes No N/A

6. Maintenance Mode: Page 10
  - i. Provide the ability for operators to place any BCS system in or out of a Maintenance Mode. Page 10.
    - a) Provide alarm suppression for Level 2-4 alarms when the system is in Maintenance Mode. Page 10
    - b) Provide level 3 alarm issued daily to indicate the system’s status as active in Maintenance Mode. Page 10



# FRCS Guide Deliverables

7. Sequences: include the following additional BCS sequence of operation features: Provide HVAC setpoint resets for the following sequences of operations through trim-and-response control with weighted factors for critical or high-volume zones and separate user-adjustable trim and respond rates: Page 10

Yes No N/A

- i. Primary or secondary hot water and chilled water supply temperature setpoint Page 10
- ii. Condenser water temperature setpoint Page 10
- iii. Duct static pressure setpoint Page 10
- iv. Zone and system-level minimum ventilation flow setpoint Page 10

8. Provide additional sequences for: Page 10

Yes No N/A

- i. Chilled water system optimization Page 10
- ii. Building-level global command of terminal equipment for balancing purposes Page 10
- iii. Default controller-level values for schedule and global temperature when network data is unavailable or out-of-range. Page 10

# FRCS Guide Deliverables

13. Provide a Graphical User Interface plan incorporating all operationally relevant points into a 3-dimensional floorplan graphic. The plan must also integrate the facility into the installation-level perspective view. Page 11

A. Graphics: Page 11 – See Memo\_FRCS Point Naming Convention and Graphics Standards signed 04/18/2023 and Attachment 2 for additional info.

- a. Provide dimensional representation of individual pieces of equipment. Page 7
- b. Provide Graphical User Interface plan incorporating all operationally relevant points into a dimensional floor plan. Page 7
- c. Integrate the facility into the installation-level perspective view of the Graphical User Interface plan. Page 7
- d. Provide floor plans which integrate all operationally relevant points within each building. Page 11
- e. Display all units in IP with consistent display accuracy per unit type. Page 7

14. EMCS Kiosks Page 16

- A. Provide Kiosks as required
- B. Kiosks are support on the BCS-level communication and are classified as Local Display Panels (LDPs) and meet all related specification requirements. Page 16
- C. Kiosks are to be touch-screen and navigable via menu buttons. Page 16
- D. Kiosks may be configured to share slideshows of user-specific data. Page 16
- E. Kiosks will require licensed configuration software to ensure long-term capability. Page 16
- F. Kiosks are installed at a height of 48” or 60” from the finished floor when mounted on the wall. Page 16
- G. Kiosks displays must include the following minimum data: Page 16

- a. Energy and Water usage Page 16
  - 1. Provide Related usage for the following: Page 16
    - i. This month Page 16
    - ii. Previous month Page 16
    - iii. Previous year with peer group comparisons Page 16
  - b. Electric Demand Information
  - c. Weather Status (3-day projections) Page 16 --TBD
  - d. Demand Reduction Status Page 16
  - e. TAFB CES Logo Page 16

# FRCS Guide Deliverables

Yes No N/A

- f. TAFB CES Logo Description Page 16
- g. TAFB CES Contact Info Page 16
- h. Pre-defined selectable best practices for user navigation Page 16
- i. Auto slideshow (contents, birds, etc) during periods of inactivity Page 16

Yes No N/A

## H. Kiosk Requirements: Page 16

- a. All required buildings must include kiosk functionality with the following criteria: Page 16
  - 1. Provide kiosks within 20 feet of main entrance but not in vestibules for buildings with multiple floors. Page 16 - An exception may be granted by CES.
  - 2. Provide kiosks in common areas for other facility types Page 16
  - 3. Provide additional kiosks within 20 feet of each floor's elevator area for buildings with multiple floors Page 16
  - 4. Provide kiosks for lodging buildings in common areas for each floor or for each separate organizational area of responsibility. Page 16
  - 5. Provide a minimum resolution of with 1920 x 1080. Page 16
  - 6. Provide LDP kiosks that have a minimum 32-inch diagonal display.
  - 7. Provide Kiosks on walls or standing or sitting on desks. Page 16
  - 8. Show kiosk locations on plans. Page 16
  - 9. Perform an endurance test on all kiosks to show no communication drop-out prior to acceptance. Page 16

Yes No N/A

## 15. Occupancy Analysis Page 19

- A. Provide occupancy counters for the FRCS plus buildings for building > 5000 sf.
- B. Provide data of the occupancy counts of the required buildings. Page 19
- C. Provide an occupancy analysis floor plan with graphical representation. Page 19
- D. Provide exportable report displaying the occupancy analysis of any single building.
- E. Provide space utilization metrics customizable by the user allowing reports to be run when requirements change. Page 19
- F. Integrate the occupancy sensors into the building automation system. Page 19
- G. Use the occupancy data for the HVAC system demand-controlled ventilation. Page 19
- H. Use the occupancy data for the lighting control system for scheduling purposes. Page 19

# FRCS Guide Deliverables

Yes No N/A

- I. Provide data visualization for individual spaces for maintenance to compare the scheduling of the building with the occupancy. Provide data visualization on individual rooms showing an occupancy analysis throughout the day. Page 19 (This will be provided as Occupied or unoccupied. The occupancy counter feature is not being utilized.)
- J. Use binary sensors for individual offices spaces (recommended). Use only binary sensors without photographic capabilities in secure designated spaces. Page 19
- K. Provide a total count of people occupying the space offices spaces (such as “cube farms”) by occupancy “zones”. Page 19
- L. Provide a total count of people occupying the space that have a designed occupancy density of 25 people/1000 ft<sup>2</sup> and greater than 500 ft<sup>2</sup> of conditioned floor space. Page 19
- M. Provide an output of the control system is a metric of people/1000 ft<sup>2</sup>. Page 19
- N. The use of personally identifiable information (PII) as a part of the analysis is not allowed. Page 20
- O. Provide on a consistent basis the ability to provide an occupancy analysis dashboard and report with customizable metrics. Page 20
- P. Provide a graphical represented analysis on the EMCS and at the operations center. Page 20
- Q. Provide a customizable report generation for communication. Page 20
- R. Provide notifications to maintenance staff of inadequate scheduling based on occupancy. Page 20
- S. Provide monitoring capabilities from other operation centers. Page 20

Yes No N/A

- 16. Domestic Hot Water – BACnet integration can be provided if equipment is supplied with BACnet card.
  - A. Provide equipment with BACnet cards and integrate into the EMCS front end. Page 3

Yes No N/A

- 17. Lighting Page 3 – Lighting Points/Graphics have been incorporated into RFI-2376
  - A. Lighting is classified with a CIA rating of L-L-L.
  - B. Integrate lighting control systems into the Building Control System (BCS)/Utility Monitoring and Control System (EMCS). Page 3

E0""Wug"DCEpgvHtqo "vj g'HtqpV'Gpf 'Hqt'Nki j vpi "eqpvtqnu{ ugo 0Rci g'5  
 F0""Rtqxf g'fki kcn'hi j vpi "eqpvtqnu'y kj 'cv'rgcu'5"eqphki wtdrg'uegpg'hi j vpi "uegpctkqu'cpf 'kpgi tcv  
 """"kpq'vj g'DEUIGO EU'ht'ur cegu'i tgcvg'vj cp'722UH'cpf 'y kj 'c'f'guki p'qeevr cpe{ 'f'gpkw' i tgcvg  
 """"vj cp'47'r gqr rg'r gt'3.222'us wctg'hggv'qh'eqpf kkp'gf 'l' qpg'ur ceg0Rci g'33  
 G0""F q'pq'v'wug'y ktgruu'qt'dnwg'vqqvj 'rki j vpi "eqpvtqnv'gej pqrqi { 0Rci g'43  
 H0""F q'pq'v'wug'RR'cf f tguucdr'hi j v'hz wtgu0Rci g'43"  
 I 0""Hqt'u{ ugo u'vj cv'tgs wkt'f ko o cdr'hi j vpi .r tqxf g'lpf kxf wcn'hi j w'hz wtgu'f ko o cdr'hwpe'kpu'vj cv"  
 wkt' g'ucpf ctf 'f ko o cdr'f tkg'gu'y kj 'xqnci g'eqpvtqno gy qf qmri { 'qt'cp{ 'qv'gt'equ'eqo r ctdrg solution  
 (ex 0-10V control or standard light switch replacement types). Page 21

# FRCS Guide Deliverables

Yes No N/A

H. Minimize the number controllers for maintainability. Page 21

I. Provide easily accessible controls systems for replacement. Page 21

Yes No N/A

J. Collect sub-metered electrical data for:

a. Provide data for Overall building-level lighting systems > 5kW. Page 11

b. Provide data for High-wattage lighting systems > 5kW Page 11

Yes No N/A

K. Provide these typical Lighting Zone Points Page 13

a. Lighting Zone System scheduler Page 13

b. Lighting Zone input Page 13

c. Lighting Zone **effective occupancy** Page 13

d. Lighting Zone run hours. Page 13

e. Lighting Zone timeout setting points. Page 13

f. Lighting Zone command Page 13

g. Lighting Zone status Page 13

h. Lighting Zone Photo sensor value Page 13

i. Lighting Zone Dimming / Level Command, as applicable. Page 13

j. Lighting Zone Scene settings, as applicable Page 13

k. Lighting Zone Consumption data, as applicable Page 13

L. Use the occupancy data for the lighting control system for scheduling purposes. Page 19

Yes No N/A

18. Hydronic and Gas Leak Detection as required

A. Hydronic and Gas Leak Detection are classified with a CIA rating of L-L-L.

B. Provide Hydronic and Gas Leak Detection Page 11

C. Provide standing water detectors/sensors as required. Page 11

D. Provide a real time quick alarm to operations center personnel. Page 18

E. Provide an alarm to maintenance personnel of any leaks in the building. Page 18

F. Provide customizable personnel notification and alarming by a control system administrator. Page 18

G. Provide sub metering for gas leak detection as required. Page 11

Yes No N/A

19. Moisture Detection as required

## FRCS Guide Deliverables

Yes No N/A

- A. Moisture Detection is classified with a CIA rating of L-L-L.
- B. Provide Moisture Detection Page 18
- C. Provide high humidity detection. Page 18
- D. Provide a system that monitors humidity conditions in conditioned spaces. Page 18
- E. Send alarming and notifications to the proper personnel when conditions in the space could begin to grow mold. Page 18 – When humidity conditions reach a certain point, Alarms will be issued.
- F. Provide data visualization for constant monitoring by operations and maintenance. Page 19
- G. Provide customizable personnel notification and alarming by a control system administrator. Page 19
- H. . Provide sub metering for hydronic leak detection as required. Page 11

Yes No N/A

### 20. Fire Alarm, Mass Notification and Suppression Systems Page 20

- A. Mass Notification is classified with a CIA rating of L-L-L.
- B. Fire Alarm and Fire Suppression is classified with a CIA rating of L-M-M.
- C. Fire dispatchers receive only fire alarm system notifications. Page 20
- D. Do not integrate the fire alarm system into the Security.
- E. Configure the fire alarm system as standalone system or a combination system with a facility mass notification system, and/or with a combination facility mass notification and public address system when mass notification is required. Page 20
- F. Provide specific pre-recorded messages for in-building notification for the fire alarm and Mass Notification systems. Page 20
- G. Do not allow the Local Operating Console (LCO) override active fire alarms. Page 20 – (Fire Department Response: MNS is permitted to override the fire alarm system during simultaneous fire and terrorist events. Local Operating Console (LOC) pre-recorded message buttons for active shooter and bomb threat are permitted to override active fire alarm notification appliances.)
- H. Only allow the Local Operating Consoles for MNS systems to override pre-recorded messages that are initiated at an LOC. Page 20 -. (Fire Department Response: LOC microphones are only permitted to override pre-recorded messages that are initiated at an LOC.).
- I. Do not allow the LOC microphones to override fire alarm notification. Page 20 -. (Fire department response: LOC microphones are permitted to override active fire alarm notification appliances when the MNS is used to override an active fire alarm. (i.e., active shooter or bomb threat pre-recorded message buttons are used

Yes No N/A

# FRCS Guide Deliverables

Yes No N/A

- J. Only send Fire alarm signals to the Emergency Communications Center. Page 20 – Fire Department Response: Sent to all Desigo but only Fire Credential will see.
- K. Provide the following for MNS text signs and voice activations: Page 20
  - a. The title of the activated MNS pre-recorded message (i.e., “Bomb Threat”, “Active Shooter”), “Announcement” and “Evacuate” Page 20. (Fire Department Response: Ensure text signs are programmed to display the title of the activated MNS pre-recorded message (i.e. “Bomb Threat”, “Active Shooter”), “Announcement” for live voice transmission and “Evacuate” for fire alarm activations. Do not scroll text. Program text messages to flash on and off at a similar rate as visual fire alarm appliances.)
  - b. Do not scroll text. Page 20
  - c. Program text messages to flash on and off at a similar rate as visual fire alarm appliances. Page 20
- L. Provide training to installation fire alarm technicians to be able to modify the programming to add/delete fire alarm devices. Page 20 – Repair, replace, bypass, set sensitivity, set addressing, disable fire alarm devices

Yes No N/A

Yes No N/A

- 21. Utility and Sub Meter Monitoring Page 14 As required by contract and meets the Energy Act requirements. Sub-metering RFI will provide additional meter requirements to meet the Energy Act. The energy graphics RFI will provide guidance on the Energy Graphics.
  - A. Utility and Sub Meter was classified with a CIA rating of L-L-L.
  - B. Provide a Usage Dashboard Page 14
  - C. Reports User Configurable Page 14
  - D. Reports Fixed One Month Interval Page 14
  - E. Provide usage data at building and base roll-up levels Page 14
  - F. Provide reports for Electric, Gas and Water Use Page 14

Yes No N/A

- a. Total usage compared to previous year’s same time period. Page 14
- b. Usage intensity/index (based on building square footage) Page 14
- c. Projected end-of-year usages Page 14
- d. Comparison to benchmark goals and peer-group Tyndall AFB buildings Page 14
- e. Normalization for weather and occupancy Page 14
- f. Highlights for spikes or dips in usage. Page 14
- g. Recommended actions for TAFB CES staff to pursue. Page 14

# FRCS Guide Deliverables

G. Collect building-level energy (electrical and natural gas) and water metering data using BCS for: Page 14

Yes No N/A

a. All major building systems and including central HVAC systems > 5 kW. Page 14 The list is not all inclusive.

1. Pumps Page 14

2. Chillers Page 14

3. Cooling Towers Page 14

4. Boilers Page 14

5. Air Handling Units Page 14

6. Data centers > 5 kW Page 14

7. Other building-level IT loads > 5 kW Page 14

8. Provide data for Overall building-level lighting systems > 5kW. Page 14

9. Provide data for High-wattage lighting systems > 5kW) Page 14

10. Collect sub-metered electrical data for all installed remote generators to provide status and information for backup generator.

Yes No N/A

b. Use a Siemens 9410 model electrical meter. Page 11

c. Collect sub-metered electrical data for all remote generator tie-in locations to provide status and information for potential backup generator. Page 11

Yes No N/A

H. Additional Information Required:

a. Provide data for Sub-Metered or Calculated Energy Usage Page 14

b. Provide data for Energy intensity KW or Btuh per air/water flow units. Page 14

c. Provide data for Energy intensity KW per space square footage served. Page 14

d. Provide data for Energy Efficiency Factors Page 14

e. Provide data for Energy Efficiency Factors Degradation Page 14

Yes No N/A

I. Electrical Power Demand Limiting:

a. Notify when periods of demand reduction are expected within the next 24-48 hours based on weather service data including projected temperatures approaches. Page 15

b. Notify when periods of demand reduction are expected within the next 24-48 hours based on exceeding 1% design conditions and hurricane or other severe storm watch conditions. Page 15

c. Include recommended the following actions: Page 15



# FRCS Guide Deliverables

Yes No N/A

1. Specific non-critical electrical circuits to disable. Page 15
2. Specific air handling unit ventilation rates to adjust based on live or calculated occupancy usage factors. Page 15
3. Specific building or zone-level temperature setpoints to adjust. Page 15

Yes No N/A 220 Gunshot Detection Systems: (as required by SOW and this is not real property)

- A. Fire dispatchers receive only gunshot detection system notifications. Page 20 – SOP under development. (Fire Department Response: Fire dispatchers should be able to view the GSD graphic and acknowledge, but not silence, reset, or otherwise interact with the system.)
- B. Gunshot detection shall be provided in all normally occupied common spaces within the facility - Page 22.
- C. Gunshot detection shall not be provided in single person offices/rooms, SCIFs, SAPFs, or other classified spaces. Page 22
- D. Contractor shall provide shop drawings indicating full coverage of required areas. Page 22
- E. Provide a gunshot detection system that provides security quick and accurate information on if a gun is fired in a building so security can respond quickly. Page 22
- F. Provide real-time alarms when a gun is fired in a building Page 22
- G. Provide an interface with the BMC/UMCS Siemens Desigo front end through an Application Programming Interface (API). Page 22
- H. Provide graphics that include floorplans which integrate all operationally relevant points within each building Page 22

## IO Sensors:

Yes No N/A

- c0 Gunshot Detection Sensors (GDS) must use dual mode, acoustic and Infrared (infrared or" otherwise) detection. Page 22
- d0 Gunshot detection sensors must be placed on the wall or ceiling, with full coverage of the spaces" the system is located. Page 22
- e0 Sensors must have no obstructions to prevent detection in the area that is being monitored. Page" 22
- f0 Gunshot detection sensors shall be installed in accordance with manufacturer's instructions and" ratings. Page 22
- g0 Do not place any other sensors, equipment, or device in a location that could diminish the" operational ability of the gunshot detection sensors. Page 22
- h0 Communication between the sensors and the control system must be IP based. Page 23
- i0 The camera feature is not allowed on base at this time.
- j0 Design all gunshot detection systems for 24/7 operations and require an uninterruptable power" supply (UPS) to be allow continuous operations. Page 23 – Div. 27 would need to be reviewed for" inclusion.

# FRCS Guide Deliverables

Yes No N/A

- i. Provide cable that meets the requirements of NFPA 70 and NFPA 90A. Page 23
- j. Network cabling for sensors and cameras may utilize open telecommunications pathways (cable tray, j-hooks) of the same classification when sufficient pathway capacity exists. New pathways shall be provided as required. Page 23
- k. Send alarming and notifications to the proper personnel, with facility number, location, and area where the gun was fired. Page 23
- l. Provide customization for personnel notification and alarming by a control system administrator. Page 23
- m. Provide graphical user interface (GUI) with a to-scale representation of the floor plan with sensor status, location and name represented. Page 23

Yes No N/A

## 23. Fault Detection & Diagnostics Page 13 (as required by the SOW)

- A. Provide Fault Detection and Diagnostics (FDD) functionality with the following: Page 13
  - a. Automated analytics scenarios Page 13 (This will be generated via the reports feature)
  - b. Dashboard summary graphics Page 13 (A standard energy dashboard was developed for the energy dashboard graphics.)
- B. Advanced notification capabilities Page 13 – alarms within system. Provide the ability to analyze data produced by utility meters and building systems. Page 13

Yes No N/A

- a. Provide action-oriented information: Page 13
  - 1. Building-level faults Page 13
  - 2. Trends Page 13
  - 3. Anomalies Page 13
  - 4. Opportunities for improved performance Page 13
  - 5. Opportunities for reduced energy use in the operation of facility equipment systems. Page 13

Yes No N/A

## 24. Additional Documentation: page 11

- A. Provide laminated 11”x17” control schematics, logic block diagrams, sequences of operation, points schedules, and ladder diagrams attached to every BCS control panels or nearby accessible wall space via velcro. Page 11
- B. Provide all project as-builts, manuals, and completed Performance Verification Test (including endurance test results) must be accessible to UMCS users via front-end web pages or links. Page 11