

## **Project Implementation**

(UFGS-15951 -- 5 Oct 04)

The basic methodology for implementing UFGS-15951 is as follows:

- 1) It is strongly recommended that you develop a UMCS/DDC Master Plan and use it as a guide in the project implementation decision making process. UMCS/DDC Master Planning is described in UFC 3-401-01 "Utility Monitoring & Control Systems"
- 2) Use the decision flowchart shown in Figure 1.

a) **Is there an existing LONWORKS UMCS?**

- ◆ Yes: Use UFGS-15951 for the present building-level project, and use one of the following options to specify the integration:
  - 1 IDIQ or Services contract (through the Installation).
  - 2 IDIQ contract (through Huntsville).
  - 3 Two RFPs. Issue separate RFPs; one for the building-level (15951) work and one for the UMCS (13801) work.
  - 4 One RFP. Issue a single RFP which includes both 15951 and 13801 and thereby place the burden on the General Contractor to accomplish the integration according to the specification requirements.

When the integration services are to be performed independent of the 15951 contract (options 1, 2, and 3 above) the statement of work must minimally include UFGS-13801 and the 15951 (building-level) Points Schedule drawings submitted by the 15951 Contractor.

- ◆ No: Determine if there is a LONWORKS UMCS contract in-progress.

b) **Is a LONWORKS UMCS contract in-progress?** For example, another 'in-progress' project might include a UMCS. Or, development of an IDIQ contract for a basewide UMCS might be in 'in-progress'. In either case, 'in-progress' building-level DDC systems (UFGS-15951) can later be interfaced to the UMCS (upon installation of the future UMCS) using one of the four options described above.

- ◆ Yes: Assuming the intent is to eventually interface the present building-level (15951) system with the future UMCS, the designer might choose to include local display panels (LDP's) in the present project to serve as an O&M tool until the UMCS contract provides monitoring and control (M&C) software and a network configuration tool. Alternatively the designer might choose to include a network configuration tool (from 13801) in the present 15951 contract specification along with the accompanying workstation (laptop

computer) required to run the (software) tool, while bearing in mind that the UMCS will also include a configuration tool.

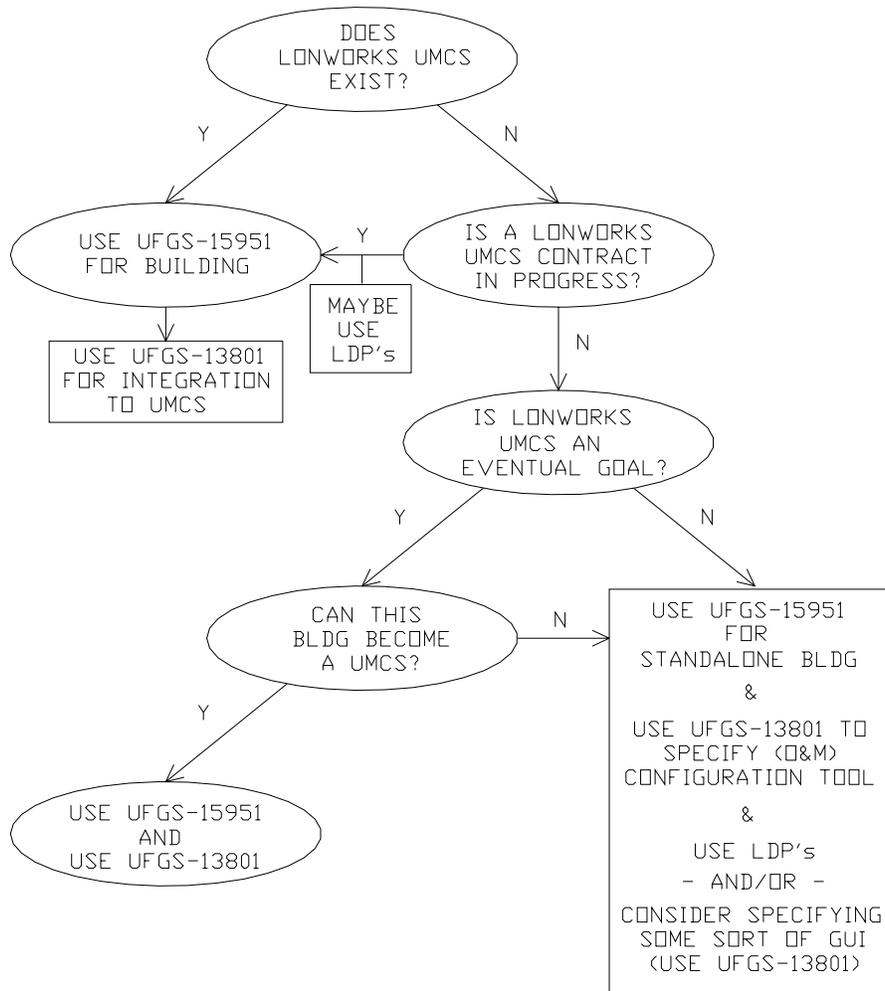
- ◆ No: Decide if a LONWORKS UMCS is an eventual goal.

c) **Is a LONWORKS UMCS is an eventual goal?**

- ◆ If Yes, **Can this building become ‘a UMCS’?** Essentially any building system project can become a UMCS by including 13801 in the project specification with only an incremental investment over a single-building standalone system. At its most basic level the creation of a UMCS consists of adding; a UMCS workstation, M&C software, a network configuration tool, a BPOC, and an Ethernet backbone for connection to the UMCS workstation. In addition, it is wise to pre-plan a contractual support mechanism, such as an IDIQ or Services contract, to support expansion of the UMCS as new buildings are added to the UMCS. Some additional planning and/or design may be required such as providing space for the UMCS workstation, server, and printers. Plus consideration might need to be given to identifying desirable added functionality that might otherwise not be included in the absence of a UMCS such as the inclusion of workstation graphical displays or the addition of client workstations. Many of these things are ordinarily addressed as part of a UMCS/DDC Master Plan. In summary, adding UMCS requirements as part of a single-building system provides a single-building system that may serve as the basis for all future system expansions where subsequent buildings and systems can be integrated with this first system. This is the first step towards a basewide UMCS.

- 1 Yes: If **this building can become a UMCS**, use both 15951 and 13801 in its entirety.
- 2 No: If **this building cannot become a UMCS**, use UFGS-15951 to specify a standalone building by using applicable portions of 13801 to specify operator interface and O&M tool requirements. For the operator interface use LDP's as specified in 15951 and/or consider specifying some sort of graphical user interface (GUI), such as that specified under Monitoring and Control software in 13801. You must also specify a configuration tool, such as that specified in 13801. The LDPs, GUI/M&C software, and configuration tool are necessary for O&M of the stand alone DDC system. While 13801 is primarily intended for implementing a basewide UMCS, it also pertains to smaller scale applications including a single system or single building. In this case, UFGS-13801 is necessary to obtain operator workstation (desktop or laptop) interface tools required by the O&M support staff. Edit 13801 to provide the required functionality and tools. Using only UFGS-15951 is

unadvisable. UFGS-15951 does not contain operator interface requirements/devices except for a local display panel (LDP) which is not sufficient to adequately support O&M activities. Tools necessary to support O&M activities will not be provided, such as an operator workstation (laptop).



**Figure 1. UFGS-15951 Implementation Decision Flowchart.**

- 3) Coordinate with project site's IT group (DOIM) (and 13801 designer as applicable)
  - a) Identify the location of the UMCS building point of connection (BPOC).
  - b) The DOIM will likely be interested in the type of network wiring and/or wiring methods/requirements.
- 4) Coordinate with the Mechanical designer.
  - a) Coordinate mechanical systems design with control system requirements. For example, most air systems will require a minimum outside air duct separate from the economizer duct.
  - b) Coordinate room sensor locations and show on M-plates.

- c) Coordinate duct and pipe mount sensor locations and show on M-plates. The primary goal is to help ensure that the mechanical design accommodates control instrumentation space, distance and access needs. A secondary goal is to ensure that the M-plates document instrument locations and other details to help ensure proper installation and to provide O&M documentation. This includes; air flow measurement arrays (AFMA), static pressure sensors, and relative humidity sensors. AFMA's generally should be located no less than 8 straight duct diameters downstream of obstructions and 3 diameters upstream. Duct static pressure sensors should be located near the end of the longest branch duct. Duct relative humidity sensors should be located 3 meters downstream of an injection element. Piping differential sensors should be located towards the end of the piping system. The specifications provide specific Contractor guidance.
  - d) Air flow measurement requirements for VAV systems. Provide upstream air filters, airflow station access door, and clearance for O&M access.
  - e) Coordinate air compressor and dryer locations with mechanical designer.
  - f) Make sure mechanical designer is providing access space to mech equip for 15951 Contractor
  - g) Coordinate interface to boilers, chillers, and other package units. ID interface type. Edit chiller/boiler specs.
- 5) Coordinate with the electrical designer.
- a) Make sure 120Vac power is available in all mechanical rooms for controls contractor use to provide power to instrumentation and controls.
  - b) Make sure there is power in the proper location for the air compressor based on estimated compressor size (horsepower). Provide an estimate of the air compressor size.
  - c) Occupancy sensor interface to electrical systems. Where occupancy sensors will be interfaced with lighting systems/ballasts, identify possible concerns or issues.
  - d) Where a variable frequency drive (VFD) is required ensure that there is a VFD specification and that it meets the application requirements as defined in the sequence of operation and ladder diagram drawing. In particular, note the fire alarm panel interface and H-O-A switch requirements.
  - e) Identify the location of the UMCS building point of connection (BPOC).
- 6) Coordinate with project site.
- a) Pneumatic versus electric actuation. Decide which to use. Consider the actuation needs in both mechanical rooms and at terminal units in the zones/spaces.
  - b) Valve type preferences.
  - c) Need for local display panel (LDP). Decide if LDP's are desired/required. Refer to the UFC Drawings chapter.
  - d) Domain and subnet range. Obtain for existing UMCS and show in spec. See Drawings Chapter.
  - e) Wire and cable. Need for raceway/conduit.

- f) Identify need for critical alarms. Obtain alarm notification info (who alarms are to be sent to, etc.). See Drawings Chapter.
  - g) Default system schedule and Terminal Units (TU) groupings. When a UMCS is used it will perform (primary) scheduling, but in the absence (or loss) of a UMCS, a 'default schedule' is will be active. Identify the default system schedule to be used for each piece of scheduled equipment. In addition, determine if it is desirable to use a common schedule for multiple TUs and identify this schedule.
  - h) Reset buttons. Decide how to implement DDC reset. Refer to Drawings Chapter and show selection on the Points Schedule.
  - i) Occupancy sensors. Occupancy sensor signal is used to turn the servicing AHU 'on'. Decide how many sensors must generate an occupied signal (from multiple spaces) to help avoid needless turning on of the servicing AHU (due to cleaning staff or security staff passing through after hours).
  - j) Stats / space sensors: Select desired functionality including pushbutton override and occupancy sensor time delay. Show in the Schedule drawing.
  - k) Filter pressure switches. Decide if these are required.
  - l) Training. Identify number of students, number of hours of training, and number of copies of training material.
- 7) Edit the specification
- a) Maintenance and Service. Coordinate with the Project site.
  - b) Pneumatic versus electric actuation
  - c) Smoke detectors. Coordinate with Section 1385x.
  - d) Foundation/housekeeping pad specs.
  - e) PVT. Make project specific.
- 8) Edit the drawing package. Refer to UFC 'Drawings' Chapter.
- 9) Perform biddability, constructability, operability, and environmental (BCOE) review.