

CHAPTER 1
INTRODUCTION

1. **PURPOSE.** This manual provides a methodology and standards for the design of Utility Monitoring and Control Systems (UMCS) and for other computer automation systems which sense the physical environment and control equipment. The methodology described will be used for design of each system.
2. **SCOPE.** This manual provides design guidance for new UMCS, expansion of existing UMCS, upgrade of existing Energy Monitoring and Control Systems (EMCS) to UMCS, and expansion of existing EMCS. This manual includes guidance for both direct digital control and supervisory control implementations of UMCS and EMCS.
3. **REFERENCES.** Appendix A contains a list of references used in this document.
4. **UMCS.** A UMCS is a utility management system which may be used to achieve utility cost, energy, and manpower savings for electrical systems, heating, ventilating, and air conditioning, water and sanitary sewer systems, process equipment, lighting, chillers, boilers and other utility systems and equipment. The UMCS may also be used to assist in building and maintenance management. The UMCS employs personal computers or workstations, associated peripherals, microprocessor-based field equipment panels, instrumentation, control equipment, and applications programs written in high level computer languages like FORTRAN, C, or PASCAL. The UMCS is configured as a network with control functions at multiple locations and one or more central points of operator control and supervision. The UMCS, depending on its configuration, may include a central station, one or more island stations, and various combinations of peripherals, data transmission systems, field equipment panels, necessary interfacing controls, and instruments. Field equipment panels include smart field panels, remote terminal units, universal programmable controllers and unitary controllers which perform field input/output (I/O) functions. The smart field panel contains a microprocessor and other supporting electronics, and performs local control functions and applications programs without requiring communications with the central station or island stations.
5. **EXISTING EMCS.** An EMCS is an energy management system similar to a UMCS. In the past, many EMCS have been installed primarily to save energy and reduce electrical demand. The new terminology, UMCS, reflects the broader use of the system to improve the operation of utility systems and equipment. Existing EMCS which are operating satisfactorily may be expanded provided that the required equipment is commercially available and the Government has the necessary documentation and technical data and computer software licenses. Existing EMCS which are not operating satisfactorily or for which the Government does not have the necessary documentation and technical data and computer software licenses can be upgraded to or replaced by UMCS. The EMCS, depending on its configuration, consists of a central control unit with various combinations of peripherals, data communication systems, field equipment panels, necessary interfacing controls, and instruments. Field equipment panels, referred to as field interface devices, contain a microprocessor and other supporting electronics. Field I/O functions are performed by a multiplexer which is functionally part of the field interface device, although it may be remotely located. In the non-communicating or "stand-alone" mode, the field interface device performs certain local control functions and applications programs (utilizing default values for global information) without requiring communications with the central control unit.

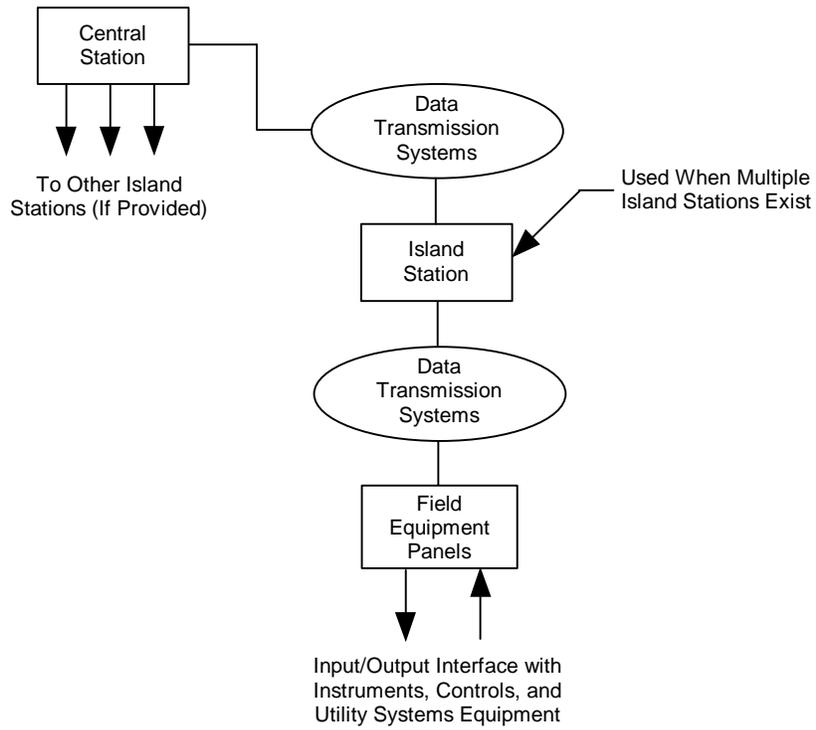


Figure 1-1. Typical UMCS Configuration.

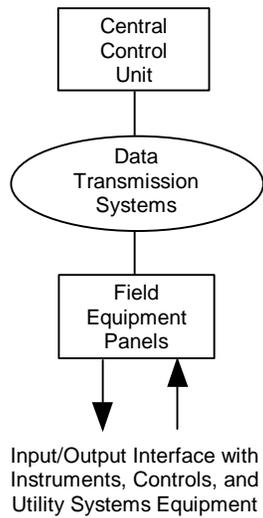


Figure 1-2. Typical EMCS Configuration.