

MODULAR COMMAND POST SYSTEM WHITE PAPER

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Introduction to MCPS

The MCPS is a patented solution that provides a mechanical, electrical, video, and communication framework for mobile, modular, and extensible command missions. The design flexibility and building block architecture accommodates various sizes and types of command applications.

The MCPS is on the GSA Schedule GS-35F-0069L which can be found at the Raytheon Solipsys website (www.solipsys.com).

History

The MCPS was designed in 1998 to fill a void by providing a portable command and control structure for eight to 12 warfighters in a tent-based expeditionary configuration. Solipsys is in the business of designing and building various software systems and participated regularly in field events to demonstrate its software with fielded military systems in a wide variety of configurations. The original embodiment of the system demonstrated the ability to create a portable system that could be constructed in the field, with the ability to support computer and large screen displays as well as the infrastructure needed by operators and command structure for an event. The system evolved over time with extensive input from warfighters who use the MCPS in its various configurations. Such options as weapons racks, display boards, and storage for gear all resulted from end-user comments and observations.

The MCPS was designed as an in-house Solipsys research and development program to create a command and control system structure that could be marketed in a wide-variety of military and civilian applications. The design had to adapt to a variety of environments and applications as well as provide a structure for a system that provides services for various echelons of command or different civilian applications. Toward these goals, a set of MCPS cornerstones were developed to guide the design and implementation.

Characteristics

Modularity

- Infrastructure piece parts and units structures must have commonality and easily interconnect to form new, useful structures.
- The system would support a wide range of computer elements that could be scaled to meet warfighter requirements for a wide range of applications.
- Elements of the structure should be scalable from small operations to large systems using the same components.

Extensibility

- As new requirements emerge, they must be accommodated without major re-engineering of the structure.

- Third parties could build new functions that could be seamlessly integrated into the system.
- Technology refresh and infusion are accommodated by the design.

Mobility

- Size, weight and footprint are critical aspects of all structures and mechanical components.
- Different types of deployment sites can be accommodated.
- Rapid assembly and disassembly are key design factors.
- The level of ruggedization for transport and operation can be tailored to the application or operational environment.



Figure 1 - Standard MCPS Configuration

Scalability

- Structures can be replicated and/or interconnected to meet a wide variety of unit applications from a few personnel to hundreds of personnel.
- Hardware can be interconnected and interoperate across multiple structures.

MCPS Description

The MCPS is a self-contained, highly mobile, modular, extensible framework. It is designed so that a set of hardware information processing and display components can be tailored to meet a wide variety of military, law enforcement, disaster assistance, and civilian applications. Among other things, it can be configured for military and civilian command posts, mobile information centers, rural training sites, disaster assistance centers, or any application requiring an integrated shelter that accommodates internal networks, visual display systems, and workstations. The MCPS consists of a truss structure with built-in horizontal and vertical work surfaces, large screen displays, built-in power and cabling for networks and video distribution, collapsible chairs, lighting, and equipment racks to accommodate electronic equipment. The truss structure clips together and can be adapted to tent, building, ship, or aircraft use. The MCPS is comprised of four (4) subsystems as follows:

- **Infrastructure Subsystem:** This consists of a framed structure used to support video displays, horizontal and vertical work surfaces; furniture to accommodate users; and

modular smart tables used to contain network and video distribution cables and interface components.

- **Local Area Network (LAN) Subsystem:** This provides a hub-based Local Area Network (LAN) in single or dual network configurations embedded in tables which can be interconnected to form larger LANs inside the structure.

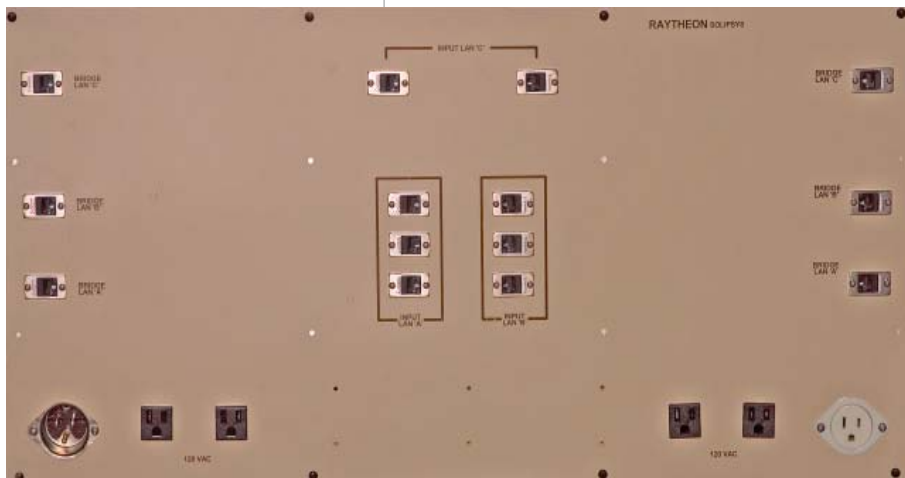


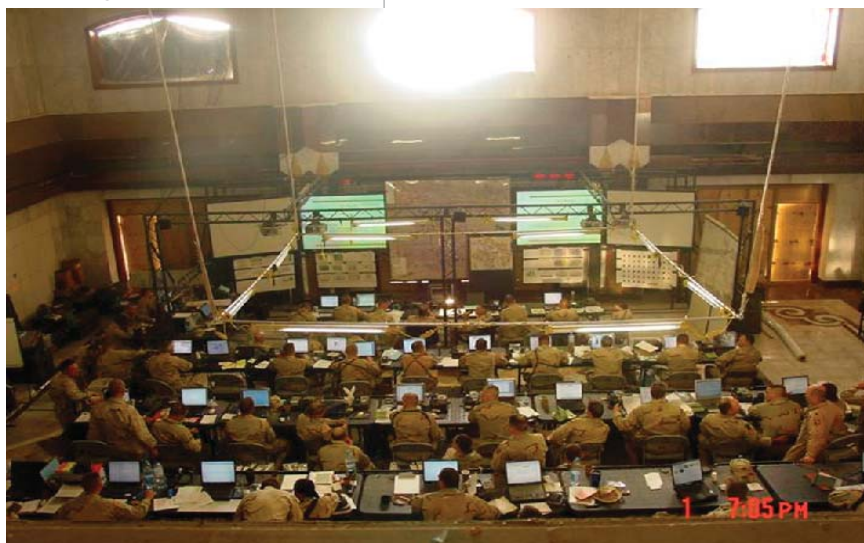
Figure 2 - SmartTable Connection Panel

Video Distribution Subsystem: This provides a means to connect computer video outputs into a video switch that can distribute the video to one or more large screen displays for viewing by multiple users.

Optional Support Subsystem: This supplies “hotel” support services that include interior lighting, power distribution, environmental control unit (ECU) and a Mobile Electric Power (MEP) unit.

- Rapid deployment and near-immediate employment are made possible through the use of a quick-connect tubular aluminum structure and light weight tables with built-in network components and clip-on video distribution units. The use of SmartTables, Figure 2, simplifies the interconnection of the end-user’s equipment suite and enables for rapid setup and take-down with no need to troubleshoot a complicated cable plant that would normally have to be constructed from scratch. The video distribution system and video switching technology simplifies the use of large screens (projector or flat panels) while simplifying the interconnection of such devices with end-user provided computers.

Figure 3 - Mobile Imagery Processing Center



While Raytheon Solipsys sells a variety of software that can be employed in an MCPS, the design is flexible enough to allow the end user to configure the system to work with its existing computers, systems and work flow applications. Elements such as video switching can be configured for specific end-user applications as can various rack components and power distribution systems.

MCPS Utility

The MCPS has been used all over the world in a wide variety of applications. It has been installed aboard aircraft carriers and amphibious assault ships, in special purpose vehicle systems, in fixed buildings as well as buildings

of opportunity and is regularly used in tents from different manufacturers. It has been used in classified environments, multi-level operating environments and by both small and large units. Some recent applications are described in the paragraphs to follow.

Figure 3 shows a mobile imagery processing center application commissioned by the Office of Defense Preparedness. The MCPS was used to provide a mobile gigabit, high-frequency downlink of 3-inch resolution imagery from a specially equipped plane. The tent was populated with image processing computers, a high-speed microwave link, large screen display, mobile power and air conditioning. A microwave communications link on the circling aircraft beamed the imagery to the MCPS where it was processed immediately. The system was designed to provide such imagery to first responders for disaster assistance and recovery situations either from terrorist or natural disasters.



In **Figure 4**, a large unit application is installed in a captured Iraqi palace. It employs large screen displays and an extensive array of SmartTable technology. The laptops, supplied by the end-user, were connected through the embedded networks in the SmartTables. Several similar and smaller structures are in use throughout Iraq and in neighboring areas.

Figure 4 - Large Unit Application

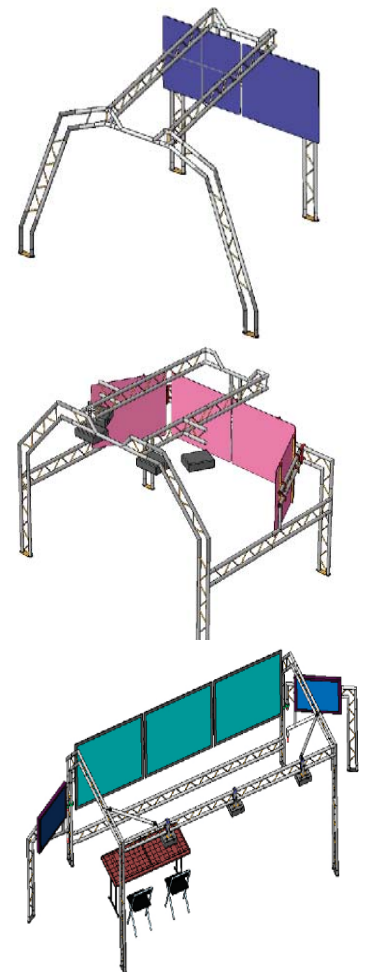


Figure 5 - Example MCPS Configurations

Customizing an MCPS

The GSA schedule provides the ability to customize various aspects of an MCPS to meet the needs of the end-users. This includes the size of the truss structure, the number and type of large screens, video distribution methods, video switching capacity and resolution, heating and cooling options, tent types and styles, number and type of SmartTables, special rack and storage options for equipment carried by the anticipated user community, lighting options, power options, seating number and type, packaging options for different types of transport of the MCPS and optional shelving and rack space to accommodate electronic components.

Trusses

Custom sizes will typically take 2 days to design and 14 days to fabricate. Trusses can be interconnected without tools and are designed to be set up and taken down quickly. The trusses can also be treated with different finishes. **Figure 5** shows a selection of available configurations.



Figure 6 - One Configuration of a SmartTable System

SmartTables

SmartTables are the building blocks of a single MCPS' scalable architecture. SmartTable technology integrates built-in cable and network components within modern, lightweight materials. The tables can be joined in various configurations and interconnected with other tables in other MCPSs, as shown in Figure 6. Power and multiple networks are standard with each table. Power distribution can connect directly to mobile power equipment or be isolated by Uninterruptible Power Systems (UPSs). Internal table components support 120V or 230V. The infrastructure accommodates user-supplied laptops or desktops.

SmartTable 2LP is a folding polypropylene and steel table that includes two separate networks and a power infrastructure.

SmartTable 3LA is an aluminum table with folding legs that includes three separate networks and a power infrastructure.



Figure 7 - Multi-display Installation

Video

The truss framework is designed so that special projector hangers can be quickly attached and throw distances are locked to decrease setup time. A variety of screen materials can be provided based on environmental conditions and situational requirements. Flat Panel Displays can also be attached to the framework as required. A pre-wired video distribution system allows a commander to show video data from all connected inputs including operator computer connections. Video switching can be performed through a manual switch or via a software application that runs under a MS Windows environment. Picture-in-picture and

multi-view images on a single screen are also available, as shown in **Figure 7**.

Spare Parts

Spare parts kits can be provided for specific applications. Damaged parts can also be returned to Raytheon Solipsys for repair or replacement.

Warranty

Solipsys warrants to Buyer that items manufactured by Solipsys shall be free of defective materials or faulty workmanship for a period of one year from date of shipment of said item by Solipsys. Please see Solipsys' product catalog for full warranty details.