

Modular Robotic Control System



ARRA's Modular Robotic Control System installed on a Caterpillar 247B

System Description

The Modular Robotic Control System (MRCS) kit provides the software and hardware to outfit vehicles with the necessary equipment for remote controlled operation. The system is offered in a standard configuration; however it is fully customizable for monitoring and controlling different vehicles. The equipment has been successfully implemented on platforms ranging from small skid steer loaders to large scrapers.

Communications

Radio frequency (RF) radios for transmission of video and data are standard equipment with the MRCS. There are two RF links to the MRCS. The first is an ethernet link used for transmitting JAUS messages from the Universal Operator Control Station (UOCS) to the platform. This link can also be accomplished via fiber-optic cable. The second link is a video link with many options to choose from. The 2 most common are the analog video radio and the digital video radio. The analog radio has a range of 1.5 miles line of sight and the digital radio has a range of 1.5 miles non line of sight.

Software

The MRCS software is compliant with the requirements of the Joint Architecture for Unmanned Systems (JAUS). The software also provides password protection at operating system level (operator and administrator) and at application level. Application upgrades can be made in the field, and software can be developed for a wide variety of applications.



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Hardware

Vehicle Control Unit (VCU)

- Digital Inputs: eight optically isolated inputs configurable for internal or external power
- Digital Outputs: sixteen 5-amp fused relays configurable for internal or external power
- Analog Inputs: sixteen filtered precision inputs configurable for internal or external power
- Analog Outputs: eight outputs individually configurable for sourcing current or voltage
- One USB connection
- Four Ethernet connections
- Two RS-422 ports
- One RS-232 port
- One GPS interface

Vehicle Radio Unit (VRU)

- Ethernet data radios are available in various frequencies
- Analog video radios are available in various frequencies
- Digital video radios available

Camera Multiplexer Unit (CMU)

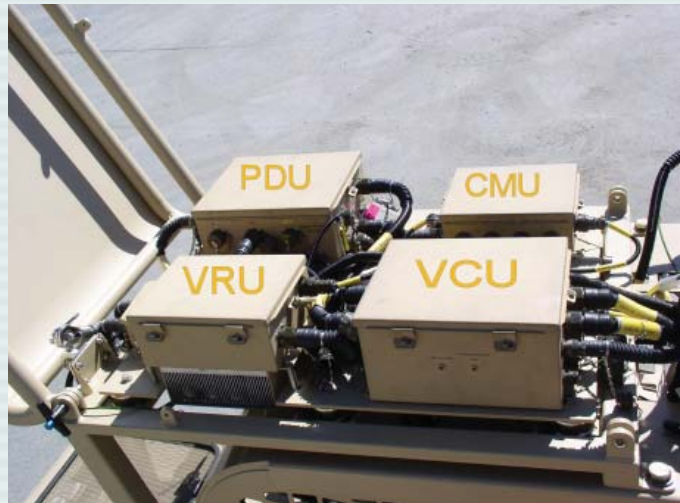
- Connections for up to eight cameras
- Picture-in-Picture with configurable video output

Power Distribution Unit (PDU)

- Five 20-amp vehicle voltage outputs with back-up battery to maintain voltage
- Three 30-amp vehicle voltage outputs with control relays
- Three 50-amp vehicle voltage outputs
- One 24V, 4-amp output

Pan/Tilt Controller (PTC)

- Microprocessor controlled
- Two H-Bridge outputs for controlling motors
- One RS-232 port
- One Ethernet interface
- One 5-amp power output with control relay



Electrical

Input Voltage: 12 or 24VDC

Power: 100W typical base system

Power consumption is dependent on accessories being used

Environmental

NEMA 4 rated

EMI gaskets on enclosures

Shielded cables