CRCMS

O.C.E.M.® S.p.A.

Computerized Remote Control Monitoring System

CRCMS

The OCEM Computerized Remote Control System (CRCMS) features an advanced distributed structure which guarantees flexibility, modularity and availability.
Its design is such that no single element may affect the operation of the entire system, or any mayor part of it. For example the single failure of an interface will only affect the remote control of one controllable item such as a constant current regulator (CCR).
No matter what mode of failure occurs in the control system the fail-safe feature assures continued operation of all visual aids at the levels requested prior to the failure.

The CRCMS is based on a network ready operating system.

The application database and graphic software are customized for airport needs.

The unique distribution structure of the system simplifies its installation and maintenance: each controllable element in the system (CCR, selector switch, parallel users, etc.) has its own interface which is connected to the communication network.

The CRCMS includes an user-friendly data entry system designed especially for airport lighting applications, and supports field programming and downloading techniques that simplify system start-up and future modifications and expansions.

The OCEM CRCMS provides a comprehensive integrated solution for airport lighting control and monitoring system requirements, including Surface Movement Guidance and Control System (SMGCS), single burnt-out lamp location for AFL Categorization, and insulation resistance monitoring.

The CRCMS, because of its modular design and low cost of installation, now makes available to the smaller airports, the control options and maintenance information previously available to only the larger airports.

Contact OCEM for further information.

CRCMS INTERFACE SYSTEM UNITS

The OCEM CRCMS has a unique distributed structure. Each CCR and each controllable element is connected to an Interface System Unit (ISU). The ISU is a microprocessor based module that includes all the communication, command, monito-ring, input/output, and fail-safe fun-ctions. The connection of the ISU to the communication network is via quick connectors.
When possible to simplify installation and tests, the ISU are factory installed in the OCEM CCRs during the manufacturing phase.
For existing CCRs and other control-lable elements, such as parallel users, the ISU will be installed in the field and will be connected to the com-munications network via quick connectors.
This distributed structure not only simplifies installation of the CRCMS, but also increases significantly the reliability of the system and makes easy the maintenance.
The controllable elements receive the air traffic controller commands via the communication network, execute the command and transfer back the status of the controlled element to air traffic control and maintenance and operation stations.

SOFTWARE

The system is based on a network ready operating system.
The system is flexible enough to allow the introduction of interlock between various operator stations and the operational procedures used to define who can do what and how.
The operator station registers the traffic controller action as a command, and in response generates the data for transmission to the electrical vault(s) for execution.
Monitoring information is sent from the vault(s) to the tower, maintenance and/or operation stations for displaying. This feature allows maintenance personnel to add CCRs and other control elements to the system by simply installing an ISU for the new CCR or control element, connecting to the local vault network, and adding its parameters to the system through a simple menu driven interface.

CONTROL PANELS AND TOUCH SCREENS

CRCMS will accept input from conventional air traffic control tower panels or from dedicated keyboards with colour CRTs. The keyboards may be replaced by colour CRTs with integrated touch screen. Single or multiple touch screens of various types and sizes can be used for control and monitoring. This includes flat screens coupled together to display a large area in sufficient detail to facilitate the use of visual aids for ground traffic control of aircraft and vehicle movements. Multiple touch screens in the air control tower can be operated simultaneously or separately. Any operator station can operate independently, and any failure in an operator station does not affect the performance of the other stations or any other element of the control system. The design of the system is such that any operator can access any page available in the system and can initiate commands for all the controllable elements in the system, provided that the relevant station has the clearance to access and command those elements.

NETWORK

CRCMS is a network based system which utilizes an airport LAN (local area network) to provide communication around the airport. The airport network can be configurated in the most convenient method for the airport such as a circle or star configuration. The network can use fiber optic cable, hardwire or wireless methods for communication. For redundancy two airport networks may be installed. The CRCMS network facilities the easy addition of new control and monitoring points. An electrical local network based on one or two highly reliable independent communication networks is installed in each vault.

This network communication link is based on a dedicated 48-bit neuron chip, a sophisticated VLSI device, which provides the key functions of the protocol through a combination of hardware and firmware. The protocol is designed for highly time and reliability critical applications and is used in fly-by-wire control systems for aircraft. It supports end to end acknowledgement with automatic retries. The protocol supports communications on a variety of wired and wireless media including twisted pair, power line, infrared, radio frequency, fiber optic and coaxial cable.

CONTROL/MONITORING SYSTEM

The Control/Monitoring System, interfacing with the CRCMS, provides a comprehensive and flexible solution for the Surface Movement Guidance Control System (SMGCS) and/or for single burnt-out lamp location for AFL Categorization, based on minimal additions to the existing airport infrastructure. This system provides the means to control and monitor each individual light and/or each group of lights that are connected to the series lighting circuit, as well to monitor and process the signals received from the sensors and the detectors on the runway/taxiway. The installation of the Control/Monitoring System does not require any additional wires between the lamps in the field and the electrical vault. The series lighting cable is used as a signal carrier.

The only installation activity required in the airfield is to plug the Lamp Control/ Monitoring Units (MCC Devices) into the series circuit at a predetermined location. No other elements like filter or by-passes are required. For communication between the CRCMS and the MCCs, a Communication Equipment (ECB) is coupled to each CCR and connected to the series lighting circuit.

The Lamp Control/ Monitoring Unit is a microproces-sor based device designed to control and/or monitor airport lights, signs, stop-bars, segments of lights, runway guard lights and other on field devices. Data are transmitted to and from the MCC Devices via the constant current series circuit. The MCC Device is placed in the circuit between the isolating transformer and the device being controlled or monitored. The MCC Devices are easily programmed for the intended function by airport personnel and the same MCC Device is used for all applications. Power for the MCC Device is obtained from the series circuit. Programs within the MCC Device allow it when required to function independent of the central vault computer thus minimizing the transmissions required on the series circuit. MCC Devices can also receive input from various types of aircraft position sensors and detectors and transmit this data back to a central computer via the series circuit or other modes of communication.

IRM SYSTEM

The IRM (Insulation Resistance Monitoring) unit is an automatic unit that performs insulation-resistance tests on an airfield constant current series lighting circuit and displays in MΩ the resistance to ground. The IRM unit provides test results that can be transmitted to a PC used for IRM system monitoring. The IRM unit can also be programmed to provide dry contact closures at operator defined warning and alarm levels. The unit can be installed at any convenient location in the vault where access to the series circuit being monitored is available.

Power for the DC test voltage (max 1000VDC) is applied to the circuit when the CCR is on only.

An isolation relay connects the series lighting circuit to the measurement module during the two second test. The measurement circuit converts the leakage current to appropriate microprocessor analog input levels. The microprocessor processes these signals and provides actual megohm results to the digital display. The test result is continuously displayed until the next test is performed.

The IRM unit will show the current reading of each unit, any warning or alarm conditions, operational mode, CCR status (on or off), communication status of each unit circuit characteristics (i.e. circuit name, length of circuit, number of transformers), and a trend report that shows each circuit history over time in a graph format. This comprehensive reporting method simplifies the maintenance process of determining when a circuit should be repaired or replaced.

MAINTENANCE CAPABILITIES

The computers provide real-time and historical information on the status of the airport lighting and other controllable elements such as parallel users, generators, etc.

The computers alert the airport maintenance and operation personell of the airport lighting malfunctions at the time they occour, and provide accurate information as the time, type and nature of the problem and the system in which the malfunction occoured.

All the malfunctions and the associated information are stored in the system archives, and can be printed out.The scope and the depth of information available to the operator provides a full picture of the entire airfield lighting system in real time. The system has strong computing power and efficient data collection capabilities.

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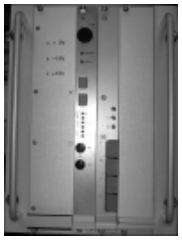
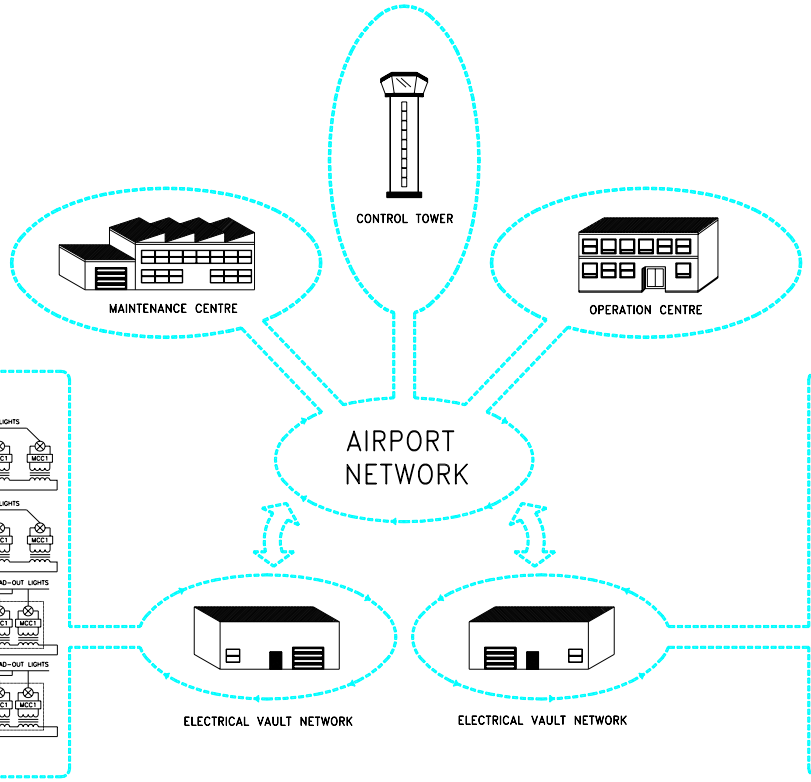
We reserve the right to change design or specification data without notice.

Control/Monitoring Station



Interface System Unit (ISU)

Interface Resistance Monitory Unit (IRMU)



Comiunication Equipment (ECB)

Single Lamp Control/Monitoring (MCC1)

Two Lamps Control/Monitoring (MCC2)

Programmer (LP)

Sensor Power Unit (MS)

Microwave Sensor