



MMCS Marine Monitoring & Automation Platform

Overview

COMMON HIGHLIGHTS OF ALL MMCS BASED APPLICATION SYSTEMS:

- MMCS is a highly sophisticated industrial monitoring and automation platform that can easily adapt to most marine or general industrial applications. Under the platform, the same group of unified core hardware and software, added with any necessary extension hardware (sensors / control devices) and middleware, can be used to form different application systems.
- Any combination of different MMCS application systems can be easily integrated into simultaneous “multi berth”, “multi channel”, “multi media”, “multi purpose”, “multi application” marine monitoring & control system.
- “Multi purpose” and “multi application” means a single MMCS system can integrated different single purpose application systems to achieve different purposes at the same time. Furthermore every user interface station / device allowed into the MMCS system, can handle all monitoring and control tasks across all application systems. To an MMCS user, every MMCS device could be his central control room.
- “Multi channel” means most monitoring and automation functions of a MMCS based system can be performed on every MMCS internal interface station, or every authorized network computing device via prevailing networks such as LAN / WIFI / WWW / GPRS / GSM / SMS / Edge / RF without sacrificing safety standard. AV alarms and large display panels under MMCS control are also supported as additional channels of information access.
- “Multimedia” stands for audio interface / signal, visual interfaces / signal, and surveillance video integration on MMCS platform interfaces. Multimedia monitoring makes it easier for MMCS system personnel to understand system status and make prompt decisions.
- Modular design allows any MMCS based system to easily modify system software and hardware configuration so that adaption to new system functions can be done with minimum cost and effort. Plug and play installation eliminates the turnkey headache associated with most PLC DCS style systems.
- Interactive network monitoring & control, real time automation programming, network power on-off control, surveillance video integration, audio assisted monitoring, and configurable mobile device platform are some of the “first of its kind” innovations amongst the peers.
- Current platform supports load / weight monitoring, linear and angular motion monitoring, hydraulic monitoring, ambient - environmental factor monitoring, inertial guidance 3D position monitoring, general on / off / range monitoring, as well as fixed course linear / rotary motion control, random direction motion control, synchronization & constant tension based automation, general on / off / pulse control with abundant wired and wireless network protocols support



MMCS ADVANTAGES:

■ Higher Base Design

Base design is the foundation of any system. MMCS platform was practically developed to fulfill ideas that are not yet conceived. Therefore we did everything we can think of to achieve a extremely capable, stable and versatile based design. For examples, MMCS MCUs has 2 CPUs -- one primary and one back up. When the primary fails, the backup CPU will take over to keep the system running and notify the system for maintenance; MMCS internal communication is encrypted using custom algorithm to protect against cyber attacks. These are just a few of the numerous base design features we have embeded in the platform.

■ Multi Purpose - Multi Function

A MMCS user can do everything intended by his MMCS system from every MMCS device simultaneously. Take our Local Interface Station (LIS) for a example, its base design allows for a large number of sensors (24 standard) and controls (24 standard) in mixed types to be connected simultaneously, with sufficient room for further expansion. Each Local Interface Station will have sufficient process power and storage room to monitor multiple type of information and control multiple devices at the same time. This enable an MMCS user to control hook release actuators, davits, AV alarms, and winches, while monitoring mooring load, berthing status, and current speed across the entire system on every LIS. In the future, the same set of interface stations can also be used for fender monitoring as well, if the new MMCS-BIM application is integrated into existing MMCS system. This might sound complicated but not really, as all MMCS applications on all MMCS stations share the same core base software and GUI layout. An user familiar with any one MMCS application automatically knows how to operate most core functions of all MMCS applications.

■ Total Network Capability

MMCS gives our customers the ability to "not just do anything, but also from anywhere". With a vision of tomorrow's fully automated digital harbor, Zalda designed the MMCS to be a part of the harbor's digital infrastructure to meet expanding future need, such as networking. Hence Zalda MMCS platform adds new network support every year, supporting traditional wired communication such as LAN & RS232/485, as well as wireless protocols under IEEE 802.11.X such as WIFI, Bluetooth and Zigbee. Good network base design gives MMCS "plug and play" capabilities, which means a MMCS system should run as tested in our factory, after 2 cables, power and network, are connected to every system device.

■ Expandability and Versatility

Unlike other single purpose single OS systems, MMCS systems are designed for now, and future. For examples, our systems are cross platform and well tested in mixed operating systems for data flow abuse and network intrusion; any single modular software and hardware blocks under the MMCS platform that can be individually removed and replaced with an updated version, without changing other parts of the system; new monitoring and automation functions can be easily added when necessary without major hardware upgrade. This gives MMCS systems infinite possibilities.

■ Cost Savings, Near and Far.

Everything boils down to costs. Zalda products are known for their cost competitiveness. This part is easy to see in project bidding process. However, it might take our customer some time to realize MMCS brings in a lot more saving in the long run. The modular design of MMCS systems not only brings in possibilities of future expansion, it also means significantly lower maintenance costs over the long run. For example, if the display module on one of the local stations is fried for whatever reason, that replacement module will cost less than a few hundred dollars delivered; any qualified electrician can follow instruction to plug in the new module in less than 15 min. With some other system, you might need to spend thousands of dollars to achieve the same purpose plus rewiring, a process that requires a good few hours for a pier electrician if he follows the complicated PLC diagram correctly. Over time, this amounts to significant cost difference.



MMCS CORE COMPONENTS AND FEATURES FOR ALL MMCS BASED APPLICATION SYSTEMS:

- Local Interface Station (MMCS-LIS), a stand alone, programmable, modular MCU based, local monitoring – control - storage device with network capability to simultaneously support a variety of monitoring and automation applications
 - ✓ Data acquisition and monitoring of different types of locally attached digital or analog sensors at quantity of 24 (standard), or expandable quantities (multiples of 24 with each additional IO expansion module).
 - ✓ Controls different types of locally attached on-off or pulse control devices at quantity of 24 (standard), or expandable quantities (multiples of 24 with each additional IO expansion module).
 - ✓ Record local data on expandable storage modules or mass storage devices.
 - ✓ Access real time sensor readings, control functions, historical and analyzed data stored on storage module with LED-LCD dual display and 26 key keyboard
 - ✓ Each Local Interface Station can serve as a central monitoring and control device of the entire MMCS network.
 - ✓ Special MMCS protocol and communication encryption for added safety

- Central Station (MMCS-CS), an advanced monitoring & automation server with MMCS platform communication extensions
 - ✓ Beautiful graphic user interface, industrial database & utilities with computing / storage / network capability to simultaneously support all MMCS platform software and serves as a central node of the MMCS network.
 - ✓ Sensor & automation control icons are laid out on a custom map similar to the actual geographic layout of the system jobsite. An user who is familiar to the layout of his jobsite, can easily understand the status of entire system with a glimpse of icon appearance. By click or touching the icons, users can quickly locate / acquire detailed sensor status, access relevant control - programming interfaces and quickly specify control programs and commands. If a MMCS system covers several berths / sites, the Site Navigation Views allow users to switch views amongst each site.
 - ✓ Setup alarm coordinates and actions easily from a unified alarm setup interface, which allows the user to customize alarm criteria and appearance at system and device levels.
 - ✓ Historical data replay, analyzed data reporting, automatic alarm reporting, system map design tools are some of the standard features of the MMCS utilities.
 - ✓ LAN / WIFI / WWW / GPRS / GSM / SMS / Edge / RF / LDMS network extensions let authorized users maintain control of his MMCS system virtually from anywhere on the planet. MMCS system administrators can easily specify, format, and revise the contents to be published on each extension and control remote user access of these contents, from an unified access administration interface, which also covers user authorization levels to all monitoring / automation functions on system and device levels.
 - ✓ Redundant server, remote data storage, special MMCS protocol and communication encryption provides added safety

- Handheld Station (MMCS-HMS / MMCS-HCS), an industrial grade handheld computer with wireless network capability and special interface for accessing MMCS monitoring and control function
 - ✓ GPRS / GSM / SMS / Edge / RF/ WIFI wireless communication with different range / data transmission rate limitation
 - ✓ Sensor & control map layout view similar to the one on the CS interface with similar monitoring and control operation
 - ✓ Special MMCS protocol for added safety

- Customer Devices
 - ✓ MMCS provides a sophisticated web interface, allowing access from most browser enabled handheld computing devices.
 - ✓ Special MMCS protocol for added safety



MMCS Marine Application Systems

MMCS platform is Zalda Technology's proprietary network monitoring and automation platform. To date over 15 applications were developed upon this platform. We offer the following application systems as part of our integrated berthing - fendering – mooring solution:

- Dock Based Ship Berthing Status Monitoring System (MMCS-BSM)

BSM system is designed to help preventing ship berthing – drifting accidents, by providing ship and dock personnel with visualized ship position - motion status during berthing and mooring process. Using dock based laser measuring technology, the BSM offers real time ship-to-dock distance / speed / angle / motion tendency information, along with other informational aids relevant to berthing and drifting monitoring. Our latest numeric controlled scanning technology adds curve identification capability to the BSM system to overcome target vessel hull shape and vessel elevation range limitations of traditional docking aid systems.

- Ship Berthing Impact Monitoring System / Fender Monitoring System (MMCS-BIM)

BIM system measures berthing impact, detects berthing accidents and evaluates fender damage with gyroscope / accelerometer based inertial guidance technology. By monitoring 3D movements of marine fender systems where the vessels dock on, the BIM can calculate ACTUAL berthing impact speed / angle / displacement / fender reaction force - energy absorption / fatigue of each fender on the pier and compound data into terminal wide berthing impact amplitude. The BIM generates value with its capabilities of precise berthing accident detection / evaluation, automatic fender maintenance guidance, and long term berthing impact database.

- Zalda Technology Mooring Load Monitoring System (MMCS-MLM)

MLM system monitors mooring loads with strain gauge based load sensors installed on quick release hook and other mooring devices. Vector monitoring is achieved by adding inputs of angle sensors. The MLM system alerts harbor and ship operators of various mooring line related hazards such as mooring line overload - under load / accidental line release / unexpected mooring load, etc. MLM system is also a building block of all Zalda tension monitoring related application products, such as fender davit automation system.

- Zalda Technology Marine Environment Monitoring System (MMCS-MEM)

Sensors of current / wave / tide / wind / air – gas / visibility, connected to MMCS central workstation, through a network of unified field equipment interface (Zalda MMCS Local Interface Stations), forms our MEM system. MEM is an environment monitoring system with a special emphasis on ambient variables that affect ship berthing and mooring safety.

- Zalda Technology Mooring Line Release Automation and Management (MMCS-ACM)

ACM system automates the release of quick release mooring hooks from control room or ship deck, with preset or real time programming capability and visualized equipment status monitoring. ACM is also a building block of all Zalda automation products that range from crane - davit automation to laser scanner – LED display turn table automation.

Refer to Zalda Technology application systems literatures for more information on each application system. Contact Zalda for other MMCS platform based applications, such as Network Power Control and Management (MMCS-SUPS), Crane-Davit Automation and Management (MMCS-CDAM), and General Purpose Random Programmed Control Automation (MMCS-RPA).