



Coastal Surveillance System Control Unit

Introduction

Coastal Surveillance systems must provide a means of detecting unknown vessels, allowing them to be identified and monitored, as well as providing 'Command and Control' to permit direction, vectoring and interception.

The Coastal Surveillance System Control Unit from Mistral is a test setup given to a Naval Base customer. This case study is a showcase of Mistral's capability in designing a low cost, low power and high performance Control Unit for Coastal Surveillance. The customer is expected to generate volume production of this product with additional features like graphics display capability, video capture and storage.



The Customer

A Naval Organization, looking to implement a Control Unit, for their Coastal Surveillance Systems approached Mistral for designing and developing the unit.

The Requirement

The customer required an integrated system that could be used to interface & monitor other Coastal Surveillance sub-systems. This was their first attempt at designing such a Control Unit & they approached Mistral to design & develop the same. This design needed to be a low-cost device with low power consumption, which would use their existing application software in Linux. The design also required to conform to marine regulatory standards as mentioned by the customer..

Solution Provided

Mistral offered a highly integrated, small form factor, cPCI system based on the Intel® Core™ 2 Duo Processor. The unit is a 5-slot, 3U cPCI based 1/2 ATR short conduction cooled system, containing conduction cooled 3U cPCI cards. The processor card provides RS-232, RS-422, Gigabit Ethernet, USB, DIO, SATA ports along with on-board flash. Additional RS-232 & RS-422 ports are provided with help of a PMC module. Analog to Digital Conversion & Synchro-Resolver functionality has been provided with an additional multi-functionality PMC module. The entire functionality of the system was validated using an in-house application built on Linux. The end application of the customer was also ported onto the system and thereby the entire system with the final application software was validated.

The Challenges

- The design constraint on Mistral was to build a ½ ATR short Conduction Cooled chassis.
 - The ATR was to be built with the capability to meet MIL810E, MIL461E and MIL704E compliance.
 - The ATR had to be hermetically sealed to withstand a corrosive environment which is part of any sea going vehicle.
 - The ATR was to operate in an ambient condition without a cold plate to conduct the heat generated by the electronic load within.
 - 18-hour Burn-in test to be carried out on the unit and tested at various temperatures.

“ Mistral designed a low cost, low power and high performance Control Unit for Coastal Surveillance ”

- Establishing the interoperability of the various I/O modules whereby an interface with Processor electronics as well as with Sensors in the external world was critical.
- MIL-38999 & Micro-D connectors selection & Sandwich backplane design to meet stringent signal integrity requirements, longevity, reliability, and mechanical constraints.
- Sandwich backplane designed to take all signals to MIL-38999 connectors through Micro-D connectors efficiently. Cable Harness construction to be carried out in-house.

Key Achievements

- Application study to arrive at an optimal Processing capability,
- Sensor Integration to maintain system integrity within the operational boundaries..

- Designing a product from concept and taking it to deployment.
- Designing a low-cost device with low power consumption.
- ATP carried out as per Customer requirements. All the cards tested for functionality & proven with customer's application.

Customer Benefits

- Helped customer in designing a low cost, small factor, cPCI system that is rugged & proven with their application.
- The powerful and highly integrated system designed by Mistral allows the customer a quick turn-around for future designs.
- The system has been designed with a modular approach, keeping future requirements in view.



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