

An Open Architecture for an Embedded Signal Processing Subsystem for the Fire Control System MK 92 Combined Antenna System's Radar

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Abstract

This briefing describes the effort to implement advanced embedded signal processing for the MK 92 Fire Control System (FCS) Combined Antenna System's (CAS) search DSP with a focus on Open Architecture. The end goal of this effort was to achieve a low cost open architectural reconfigurable and generic DSP. A team of both US and international partners was assembled from LMC, INDRA Sistemas, and CSPI. LMC acted as the system design agent with responsibility for the definition of the COTS architecture, technical requirements and the MK 92 FCS integration. Indra's responsibility was for the software development that included design, implementation and test of embedded DSP. CSPI responsibilities included the development of the radar real-time hardware and interfaces for MK 92.

The goals of this effort were to:

- Develop requirements and open architecture implementation
 - Develop Matlab model of the signal processor
 - Analyze the processing requirements based on benchmarks from actual COTS hardware
 - Compare performance, size and cost with existing embedded COTS processor architectures
- Develop methodology for the radar processing algorithms
 - Object-oriented software design
 - Utilize actual hardware to develop and measure real-time algorithms
 - Matlab simulation for test vector generation and verification
- Develop a flexible interface concept
 - Develop hardware interfaces and software to legacy interfaces while still maintaining an open architecture approach

- Maintain the ability to program the DSP through the use of industry standard APIs and Portability Standards, such as VSIPL and MPI
- Integrate the subsystem
 - Demonstrated tactical system operation using the MK 92 Radar Stimulator and Scenario Scripting equipment. The ability to provide a realistic stimulus to the RGSD aided in the test and evaluation of the DSP

Key results associated with the usage of Open Hardware and Software COTS solutions are presented. Specific metrics of merit are used to compare the MK 92 COTS version with its previous legacy implementation, outlining the benefits of the subject approach for the implementation of an advanced tactical radar:

- Cost of Development
- Concurrent Engineering to minimize Development Time
- Power & Size reduction
- Recurring Cost
- Flexibility & Performance
- Radar Upgrade
- Future Technology Upgrade
- Supportability & Diminishing Manufacturing Sources