Case Study

Radar Control Terminal (RCT) Sustainment & Modernization

System: AN/MPQ-64 Sentinel Radar
Client: Raytheon

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INNOVATION BEYOND IMAGINATION

Background

The AN/MPQ-64 Sentinel system utilizes a Radar Control Terminal (RCT) (TRS P/N 13563900-2) as a critical interface for system control and operation.
The original RCT design incorporated legacy components that became progressively obsolete, resulting in:

- Increased failure rates
- Reduced repairability
- Supply chain constraints for critical assemblies

This created a sustainment risk for deployed radar systems.

Objective

Maintain operational availability of the RCT while addressing component obsolescence and ensuring long-term system supportability without altering system integration or performance.

Phase 1

Sustainment Through Component-Level Repair

Ensil performed ongoing repair and refurbishment of RCT units, including:

- PCB-level diagnostics and repair
- Replacement of failed components (motherboards, display modules, power supplies)
- Restoration of functionality using available legacy inventory

All repairs were executed in accordance with applicable military and quality standards.

Outcome:
Extended operational life of deployed units while obsolescence mitigation strategy was developed.

Phase 2

Reverse Engineering & System Modernization

With component obsolescence reaching critical levels, Ensil developed a replacement solution based on:

Design Approach

- Full reverse engineering of the RCT architecture
- Identification of obsolete components and functional dependencies
- Redesign using currently available, supportable

Key Requirements

- Maintain form, fit, and function
- Ensure full compatibility with existing Sentinel radar interfaces
- Meet applicable mil-spec operational and environmental requirements

Implementation

- Re-engineered computing platform within existing chassis
- Maintained electrical and mechanical interfaces
- Validated functional equivalence

Verification & Qualification

1. Prototype developed and delivered within Raytheon schedule constraints
2. Functional testing conducted in operational environment
3. Successfully passed Raytheon Enterprise Supplier Assessment (RESA)

Following validation:
Production approval granted
Initial production batch **+ 49** units delivered

Engineering Impact

This program demonstrates an effective obsolescence management strategy, strong capability in reverse engineering complex electronic systems, and a clear transition from repair-based sustainment to engineered replacement, while successfully delivering production-ready hardware within operational timelines.

Deployment & Field Performance

A subsequent order of 55 additional units was placed based on field performance, bringing the total number of deployed units to 105. The performance outcomes include stable operation under field conditions, elimination of dependency on obsolete components, and improved maintainability and lifecycle support.

Conclusion

Ensil successfully sustained and modernized a mission-critical subsystem by combining:

Component-level repair expertise **System-level reverse engineering** **Production-grade implementation**

Contact

Ensil Inc.
8 Denison St. Markham, ON, Canada, L3R 1B6

Ensil Technical Services Inc.
1901 Maryland Av. NF, NY, USA, 14305

info@ensil.com www.ensil.com +1.800.265.0009