Title: A DMSMS Case Study

A Qualified Production IC Replacement For the X24C04DMB Using Die Extraction and Reassembly (DER) Processing

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AEA Project Description

Provide Jamming Capability Against Modern Integrated Air Defense Systems (Early Warning/Acquisition Radars and Communications Links)

- **DoD's primary tactical Airborne Electronic Attack (AEA) weapon**
  - **USN/USMC EA-6B (1971-2019)**
  - **Will fly on EA-18G to 2032 or beyond**
- **2,500 weapons replaceable assemblies (WRAs)**
- **100's pieces of PSE**
- **3 level maintenance**
- **12 original equipment manufacturers at WRA level alone!**
- **No active industrial or expertise base**
- **40+ years old to new production**
- **Numerous obsolete components**

Customer: ***PMA 234 AEA Systems***

PMA-234 focused (aligned) along three primary areas:

-EA-6B Aircraft / ICAP III Support / Upgrades

-Airborne Electronic Attack

ALQ-99 TJS (+ FMS)

Advanced AEA Products

Jammer Technique Optimization (JATO)

-Next Generation Jammer (NGJ)

NSWC Crane, Airborne Electronic Attack Systems Division (AEASD) provides Full Life Cycle Support: Engineering, Logistics and Sustainment

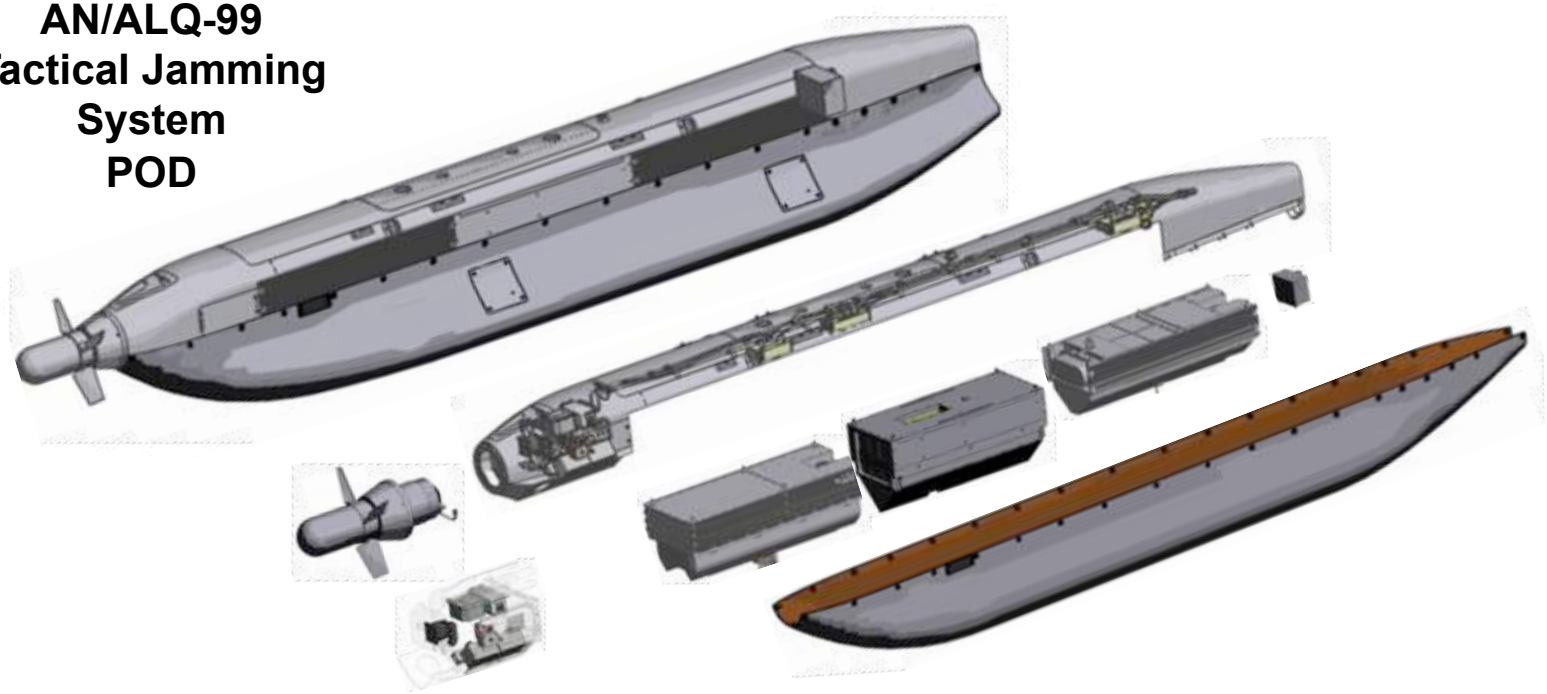
NSWC Crane AEASD ALQ-99 FST

- **OBJECTIVE**
  - Provide In-Service Engineering, Logistics, Program and Configuration Management expertise necessary to support the full life cycle of chartered cognizant systems
    - Under the direction of the PMA PSM/APML/DOL and APMS&E
  - Primary goal of the Fleet Support Team (FST) is to **ensure in-service safety and readiness** while reducing the operating and support costs

- **SCOPE**
  - The ALQ-99 FST is comprised of many primary functional areas including, but not limited to: Engineering, Technical Data, Product Support Data, Reliability and Maintainability, Configuration Management, DMSMS Management and Fleet maintenance support
  - Additionally, ALQ-99 FST personnel manage various acquisition programs and chair Working Groups and Tiger Teams as required by the Program Office

ALQ-99 TJS POD

AN/ALQ-99 Tactical Jamming System POD



LBT
Band 4
Band 5/6
Band 7
Band 8
Band 9/10
Exciters
Hardbacks
Radomes
PIU
RAT

NSWC Crane has been performing AN/ALQ-99 Tactical Jamming System (TJS) Acquisition, In-Service engineering, logistic, and depot sustainment tasking for approximately 40 years.

Emergent/Ongoing Need

- **<u>150 Overcurrent Sensor (OCS) CCA New Builds Required</u>**
  - OCS CCA is 2–time user in ALQ-99 TJS Pod
    - Located in Nose Section
  - AKA “Gold Box” Circuit Card, is the intelligence of the OCS
    - Monitors Voltage level
    - Monitors Current Flow
    - Enables BIT output when voltage exceeds threshold
    - Removes excitation to coil of power contactor when overvoltage
  - Contains 87C752 microcontroller
    - Internal 2 Kbytes ROM (operating program) and 64 bytes RAM
    - Connected to 512 byte serial EEPROM (X24C04) used as extra RAM

- **<u>Over 1100 OCS Exist In Current Inventory</u>**
  - Must support remaining 20 years expected service life
    - Navy
    - Marines
    - Foreign Military Sales (FMS)
    - NAVSUP

Part Procurement Problem

- **All OCS CCA Original Configuration Parts Procurable Except:**
  - P/N X24C04DMB, NSN 5962-01-406-0486
    - Primary Reference Number (RN) SMD P/N 5962-8959001PA
  - April 2015 Requested Qty 200 through IPV/IDIQ vendor
    - Vendor's QA rejected received parts
    - Re-manufactured parts (suspected counterfeit)
  - March 2016 Intersil advises they no longer Mfr these parts
    - Xicor EEPROM Product Lines sold to IC Microsystems as of January 20, 2005.
    - August 26th 2008 IC Microsystems announced the End-Of-Life (EOL) for their EEPROM product line.
    - Intersil authorized obsolete parts distributor is Rochester Electronics
    - Rochester showing no availability. (Xicor retired these parts before Intersil acquired Xicor)
  - All 150 OCS CCAs fully populated except P/N 5962-8959001PA
    - Work stoppage imminent

Options

- **DLA**
  - Zero stock on hand, Terminal Acquisition Advice Code “Y”
- **Distribution Chain**
  - Parts are available but due to no tractability they cannot be utilized
- **FFF Replacement**
  - None found
- **GEM (DLA’s General Emulation of Microcircuits Program)**
  - Not an option
    - Electrical reprogramming required
    - Even for 1-time programing, the DIP-8 package is too small for existing memory arrays
- **DER (GCI’s Die Extraction & Reassembly Process)**
  - Quick reaction and low cost
  - Aftermarket franchise die/parts available
    - Xicor, Fairchild, Atmel
- **CCA Redesign**
  - Last resort - Schedule and cost prohibitive

Resolution Path

- **April 2016 QSLD Vendor Recommended DER Parts From GCI**
  - No traceable stock available in required package
  - Traceable stock available in other packages
- **April 2016 GCI Sample DER Parts Tested Successfully At Crane**
  - Ambient temp on bench and in NHA
- **July 2016 GCI Sample DER Parts Tested Successfully At QTSL Lab**
  - Ambient, cold and hot temps for Group A Electricals
- **July 2016 Crane SoCD Released For Procurement**
  - Invokes SMD requirements
    - Exception to accommodate extracted die
- **September 2016 Crane Purchase Order to GCI w/ RDD 02-15-17**
  - Qualification to SMD
  - Production of 350 pieces
- **November 2016 – Scheduled Ship Date**

Estimated Redesign Cost

- **NHA Redesign Average Cost $1,112,528 (per SD-22)**
  - Purchase of engineering, design, or technical data
  - Qualification of new items
  - Revision of test procedures
  - Software changes
  - Start-up costs (after-market, etc.)
  - Testing
  - Tooling, equipment, test equipment, or software
  - Computer programs/documentation
  - Interim support
  - Supply/provisioning data
  - Support/test equipment
  - Technical manuals
  - Training/trainers
  - Item cost
  - Spares

DER Resolution Impact

- **Total DER Resolution Cost: $81,875**
  - Prototype procurement and NHA functional testing: $1500
  - Prototype Group A testing at hot/cold temperature: $2500
  - Production purchase order total price: $77,875
    - Qualification testing IAW Crane SoCD 802027393004: $40,323.50
    - Production qty 350 with screening IAW Crane SoCD 802027393004: $107.29

- **Cost Avoidance of DER vs. Redesign: $1,030,653**

- **DER Part vs DLA Cost Comparison**
  - Initial DER part unit cost: $222.50
    - Includes one time SMD qualification testing
  - Estimated future DER part unit cost: $158.00
    - Minimum order quantity 50
  - Current DLA stocklisted unit price: $122.89
    - Based on 2009/8 award for 133 pieces at $86.00 each.

Next Steps

- **Anticipate many similar scenarios going forward**
  - Aging Legacy System
    - Many obsoleted parts
    - Some parts obsolete not for die but for specific package (e.g. old DIPs)

- **Promote new QML class "R" device for DER parts**
  - Coordinate with DLA
    - Test data for subject part will be provided to DLA
  - MIL-PRF-38535 Revision to incorporate SMD requirements for DER parts
    - Precludes necessity of creating new SoCDs for procurement of DER parts

- **Petition DLA to re-establish NSN and resume stocking parts**
  - Will be ongoing need for P/N 5962-8959001PA
    - Sustainment required through year 2036
    - Historical part consumption for depot repair averages 60 pieces per year