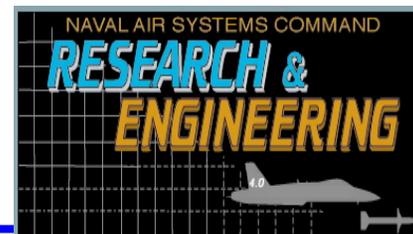


NAVAL AVIATION SYSTEMS

**TEAM**



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*NAWCADLKE*  
*Aviation Gold Disk Program*

*Richard C. Ferry*  
*NAVAIR 4.8.1.7*



## *Discussion Points*

*Affordable Readiness Challenges*  
*Filling the Niche*  
*AN/USM-646 Huntron Tracker*  
*NAWCADLKE Background*  
*Current Gold Disk Production*  
*Projected Gold Disk Production*  
*Projected Manpower Increases*  
*Aviation Gold Disk Milestones*  
*FAQ & Answers*  
*Gold Disk Repair Procedures*  
*Gold Disk Development Procedures*  
*Challenges*  
*Summary*  
*Points of Contact*



## *Affordable Readiness Challenges*



### *How do we Reduce Life Cycle Costs and Sustain Full Mission Capability?*

Attack Large Cost Drivers with Innovative Maintenance Concepts

Tailored to Individual Needs

Organizational Level Costs (Personnel, AVDLR, Consumables)

Consume 61% of Naval Aviation Total Costs

### *How do we Reduce Maintenance & Support Costs?*

Establish A Cost Effective Maintenance Capability that will Significantly

Reduce AVDLR & Consumable Costs



## *Filling the Niche!*



### *How does the Maintainer Repair/Replace?*



#### *PAGGD - CASS*

- CASS Suitable When:
  - 1 Low MTBF
  - 2 Medium/High Cost CCA
  - 3 Justify TPS Development Costs



#### *PAGDD - Depot/OEM*

- Depot Suitable Repair
  - 1 High/Medium Cost CCA
  - 2 Low MTBF
  - 3 BCM @ I Level
  - 4 CCA Complexity
  - 5 Platform Driven Maintenance Concept (O - D)



#### *PAGZZ - CONSUMABLE*

- Suitable When:
  - 1 Low Cost CCA
  - 2 Medium/High MTBF
  - 3 CCA Piece Parts not Available/Stocked



## *Filling the Niche!*



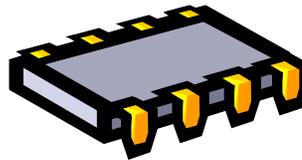
### *What is the Niche?*

Cost Effective Opportunity for Organic Support Between I Level TPS  
Development & Depot/OEM Repair

AN/USM-646 Huntron Tracker is A Cost Effective Solution to Compliment  
CASS TPS' for Low or Medium Cost CCA's



AN/USM-646



2M Repair



Reduced AVDLR Costs



# *AN/USM-646*

## *Huntron Tracker*



*The AN/USM-646 is a Computer Controlled Diagnostic System that uses Analog Signature Analysis (ASA) to isolate Malfunctions in Circuit Card Assemblies (CCA's)*

ASA is a Unique Power Off Troubleshooting Technique that uses Sine Wave Stimulus to Display the Current Versus Voltage Characteristic of an Un-Powered Component on a CRT.

Each pin on a Component can have a Unique Signature. When Components Fail, there Signature Changes

Troubleshooting using ASA is a Simple Procedure of Comparing Signatures

*Primary Fault Isolation Tool for the NAVSEA 2M MTR Program , over 4,000 Gold Disks Developed to Date*

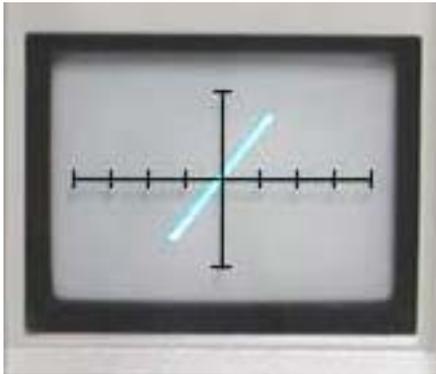
*There are Two Classes of Disks; Gold & Silver*

Gold Disks Require 3 “Learns” & Complete Data Package

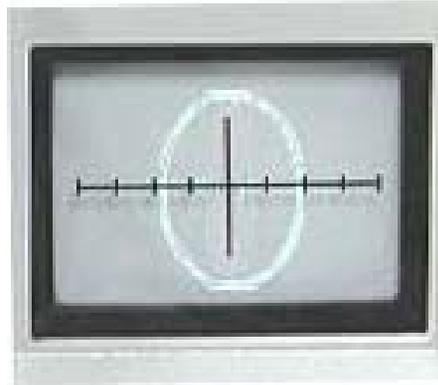
Silver Disks Require Minimum Of 1 “Learn” & can have Incomplete Data Package



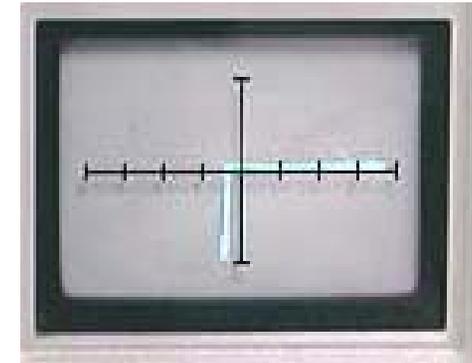
## *AN/USM-646 Huntron Tracker*



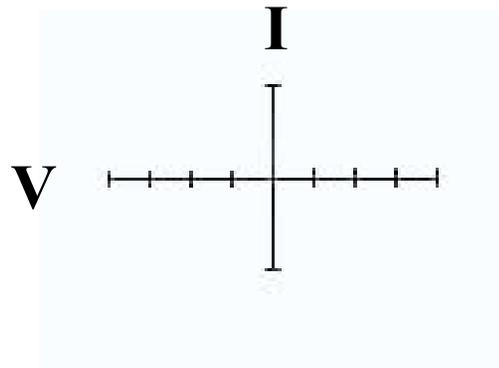
*Resistive Signature*



*Capacitive Signature*



*Biased PN Junction  
(Reversed)*





## *NAWCADLKE Background*



*We Recognized a Need for CCA I Level Repair Capability in FY97*

Legacy CCA's not being Offloaded to CASS would have to be Sent to Depots for Repair

Squadrons would Incur Large AVDLR Costs for CCA Repair

*AN/USM-646 Capability already in Place at all AIMD's*

Navy Technicians Develop "Ad Hoc" Disks with No First Hand Analysis to Determine Cost Effectiveness

Many AIMD's Developing Disks on the Same CCA's

*Our Plan is to Centralize Cost Effective Gold Disk Development*

In Many Cases, Gold Disk Development Pays for Itself with 1 or 2 AN/USM-646 Repairs



## Current Gold Disk Production



> 20 AV-8B CCAs' Funded in August 1999

- 17 Gold Disks Developed
- 2 Silver Disks Developed
- 1 CCA in Development



> 36 E-2C CCAs' Funded in August 2000

- 19 Gold Disks Developed
- 2 Silver Disks Developed
- 15 CCAs' in Development



# *AV-8B Development Status*



- *20 AV-8B CCA's Funded in August 1999*
  - *20 Gold Disk Numbers Assigned by NUWC Norfolk*

*683350001.R00 (NIIN 01-225-4639) - Complete & Delivered to the Fleet*  
*683350002.R00 (NIIN 01-185-4931) - Complete & Delivered to the Fleet*  
*683350003.S00 (NIIN 01-342-1499) - Silver Completed, Awaiting 3rd Asset*  
*683350004.R00 (NIIN 01-334-6958) - Complete & Delivered to the Fleet*  
*683350005.R00 (NIIN 01-335-1391) - Complete & Delivered to the Fleet*  
*683350006.R00 (NIIN 01-140-4042) - Complete & Delivered to the Fleet*  
*683350007.R00 (NIIN 01-336-0464) - Complete & Delivered to the Fleet*  
*683350008.R00 (NIIN 01-150-6807) - Complete & Delivered to the Fleet*  
*683350009.R00 (NIIN 01-156-0130) - Complete & Delivered to the Fleet*  
*683350010.R00 (NIIN 01-159-9098) - Complete & Delivered to the Fleet*  
*683350011.R00 (NIIN 01-162-9436) - Complete & Delivered to the Fleet*  
*683350012.R00 (NIIN 01-271-5662) - Complete & Delivered to the Fleet*



# *AV-8B Development Status*



– *Gold Disk Continued*

*683350013.R00 (NIIN 01-242-3817) - Subassy of P/S 01-242-3817, Complete*

*683350014.R00 (NIIN 01-355-5632) - Subassy of P/S 01-242-3817, Complete*

*683350015.R00 (NIIN 01-246-7440) - Subassy of P/S 01-242-3817, Complete*

*683350016.R00 (NIIN 01-242-3890) - Subassy of P/S 01-242-3817, Complete*

*683350017.R00 (NIIN 01-185-4925) - Complete & Delivered to the Fleet*

*683350018.R00 (NIIN 01-220-5322) - Complete & Delivered to the Fleet*

*683350019.S00 (NIIN 99-757-8227) - 2 Learns Complete, Sent for Verification*

*683350020.R00 (NIIN 99-976-1496) - 0 Learns Complete, CCA's on Order*



## *E2-C Development Status*



➤ *36 E2-C CCA's Funded in August 2000*

– *36 Gold Disk Numbers Assigned by NUWC Norfolk*

*683350021.R00 (NIIN 00-004-1240) - Complete & Delivered to the Fleet*  
*683350022.R00 (NIIN 00-004-1247) - Complete & Delivered to the Fleet*  
*683350023.R00 (NIIN 01-271-8871) - Silver Completed, Awaiting 3rd Asset*  
*683350024.R00 (NIIN 00-006-2240) - Complete & Delivered to the Fleet*  
*683350025.R00 (NIIN 00-006-4680) - Complete & Delivered to the Fleet*  
*683350026.S00 (NIIN 01-407-3381) - Complete & Delivered to the Fleet*  
*683350027.R00 (NIIN 00-298-2180) - Complete & Delivered to the Fleet*  
*683350028.S00 (NIIN 01-407-4923) - Complete & Delivered to the Fleet*  
*683350029.R00 (NIIN 00-007-8752) - Complete & Delivered to the Fleet*  
*683350030.R00 (NIIN 00-187-5142) - Complete & Delivered to the Fleet*  
*683350031.R00 (NIIN 00-005-0173) - Complete & Delivered to the Fleet*  
*683350032.R00 (NIIN 01-256-7919) - Complete & Delivered to the Fleet*



## *E2-C Development Status*



### *— Gold Disk Numbers Continued*

*683350033.R00 (NIIN 00-240-0025) - Complete & Delivered to the Fleet*

*683350034.R00 (NIIN 00-408-1496) - Complete & Delivered to the Fleet*

*683350035.R00 (NIIN 00-832-0694) - Complete & Delivered to the Fleet*

*683350036.R00 (NIIN 01-014-3368) - Complete & Delivered to NUWC*

*683350037.R00 (NIIN 01-201-6243) - Complete & Delivered to NUWC*

*683350038.R00 (NIIN 00-252-7910) - Complete & Delivered to the Fleet*

*683350039.R00 (NIIN 01-025-8709) - 2 Learns Complete, Awaiting 3rd Asset*

*683350040.R00 (NIIN 00-242-4265) - Complete & Delivered to the Fleet*

*683350041.R00 (NIIN 00-242-4355) - Complete & Delivered to the Fleet*

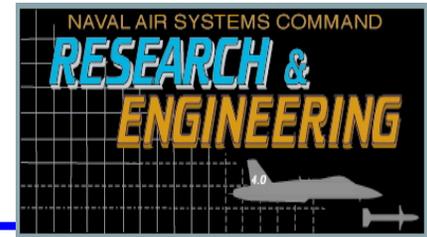
*683350042.R00 (NIIN 00-008-5785) - 0 Learns Complete, CCAs on Order*

*683350043.R00 (NIIN 01-407-4940) - Complete & Delivered to the Fleet*

*683350044.R00 (NIIN 01-407-6876) - 1 Learn Complete, Awaiting 2nd & 3rd Board*



## *E2-C Development Status*



### *— Gold Disk Numbers Continued*

*683350045.R00 (NIIN 01-407-7951) - 0 Learns Complete, CCAs on Order*

*683350046.R00 (NIIN 00-252-7847) - 1 Learn Complete, Awaiting 2nd & 3rd Board*

*683350047.R00 (NIIN 00-252-7891) - 2 Learns Complete, Awaiting 3rd Board*

*683350048.R00 (NIIN 01-407-3382) - 0 Learns Complete, CCAs on Order*

*683350049.R00 (NIIN 01-407-4941) - 0 Learns Complete, CCAs on Order*

*683350050.R00 (NIIN 01-407-3379) - 0 Learns Complete, CCAs on Order*

*683350051.R00 (NIIN 00-006-8105) - 0 Learns Complete, CCAs on Order*

*683350052.R00 (NIIN 01-274-7061) - 0 Learns Complete, CCAs on Order*

*683350053.R00 (NIIN 01-407-4943) - 0 Learns Complete, CCAs on Order*

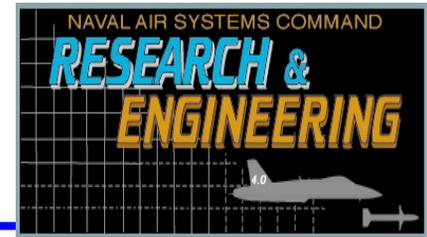
*683350054.R00 (NIIN 01-071-1826) - 1 Learn Complete, Awaiting 2nd & 3rd Board*

*683350055.R00 (NIIN 01-313-5206) - 0 Learns Complete, CCAs on Order*

*683350056.R00 (NIIN 01-407-6874) - 0 Learns Complete, CCAs on Order*



## *Projected Gold Disk Production*



SH-60B

- Candidates Submitted - May 2001
- 24 CCA's Funded - August 2001
- Brief NAVICP Item Mgrs - Sept 2001

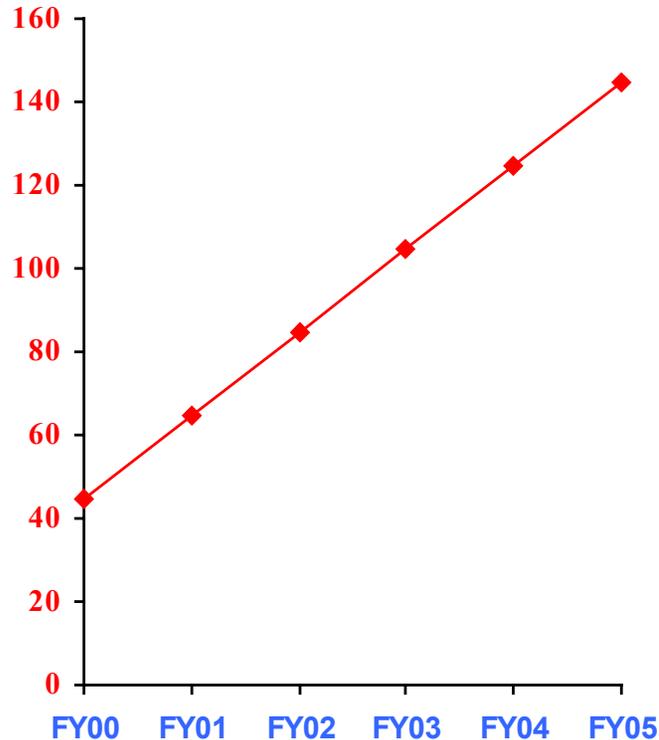


F/A-18-C/D

- 1st Candidate List Submitted - May 2001
- 2nd Candidate List Submitted - August 2001



## Projected Gold Disk Production



*E-2C CCA Development In-Process (36)*

*Currently Funded for 24 SH-60B CCA's*

*F/A-18-C/D Candidate List In-Process (61)*

*F/A-18 Remaining Candidates Pending (80+)*

*All Other Platforms Analyses On Going  
(500 +)*



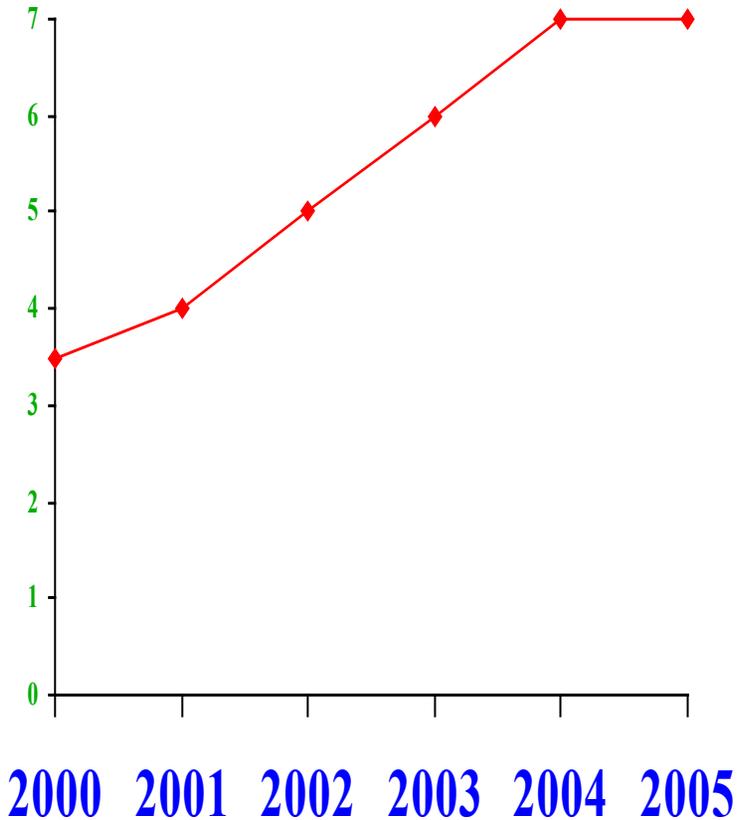
## *Projected Gold Disk Production*



- ***F/A-18A/B/C/D***
  - ***61 Candidates Submitted for Approval (150+ Candidates)***
- ***Out Year Platforms (Not in Order of Submittal)***
  - ***C-130CH-53***
  - ***CH-60S***
  - ***EA-6B***
  - ***F-14***
  - ***F/A-18E/F***
  - ***H-1***
  - ***P-3C***
  - ***S-3***
  - ***SH-60R***
  - ***V-22***



## Projected Manpower Increases



*Currently Utilizing 4 F/T Technicians*

*Increase to 5 Persons Planned for 2002*

*4 Gold Disk Developers*

*P/T Research Analyst*

*Shipping & Receiving*

*Candidate Research*

*Piece Part Identification*

*P/T Manager*

*Fleet Liaison*

*NAVICP Liaison*

*NAVSEA/NUWC Liaison*

*Project Growth to 7 Persons in 2004*

*4 Gold Disk Developers*

*2 Research Analysts*

*F/T Manager*



## *Aviation Gold Disk Milestones*



*Concept Exploration - 1998*

*Briefed NAVSEA 04M - 1998*

*Briefed PMA-260 - 1999*

*Cooperative Agreement with NUWC Norfolk - 1999*

*AV-8B Platform Selected - 1999*

*4 Technicians Trained - 1999*

*NAWCADLKE 1st Certified Civilian Aviation G/D Developer - 1999*

*20 AV-8B CCA's Funded - 1999*

*Briefed Spares Committee (SPARCOM) - 2000*

*36 E-2C CCA's Funded - July 2000*

*H-60 & F/A-18-C/D Candidates Submitted - May 2001*

*24 H-60 CCA's Funded - August 2001*



## *FAQ & Answers*



*AN/USM-646 is not Authorized for RFI*

CCA's are RFI in Next Higher Assembly on PMA-260 Approved ATE

CCA will Never Fly without WRA being RFI

*What if CCA Contains Expensive Components or Components not in the Navy Stock System?*

Components are Screened for NSN & Cost as Part of Development

Expensive IC's or IC's without NSN's can Delete CCA Gold Disk Candidacy

*The Aviation Navy has CASS, Why do we Need the Huntron?*

NAWCADLKE is Committed to CASS TPS Development

***AN/USM-646 is not an Alternative to CASS, But a Compliment to CASS***

***Gold Disk Development is for Non-CASS Offload Candidates & Medium Priced Throw Aways***



## *FAQ & Answers*



*As per PMA-260 Huntron Policy, Gold Disk Development is Not Justification for Changing SM&R Codes*

*Cost Of SM&R Code Changes would Decrease Proposed Cost Savings of this Initiative*

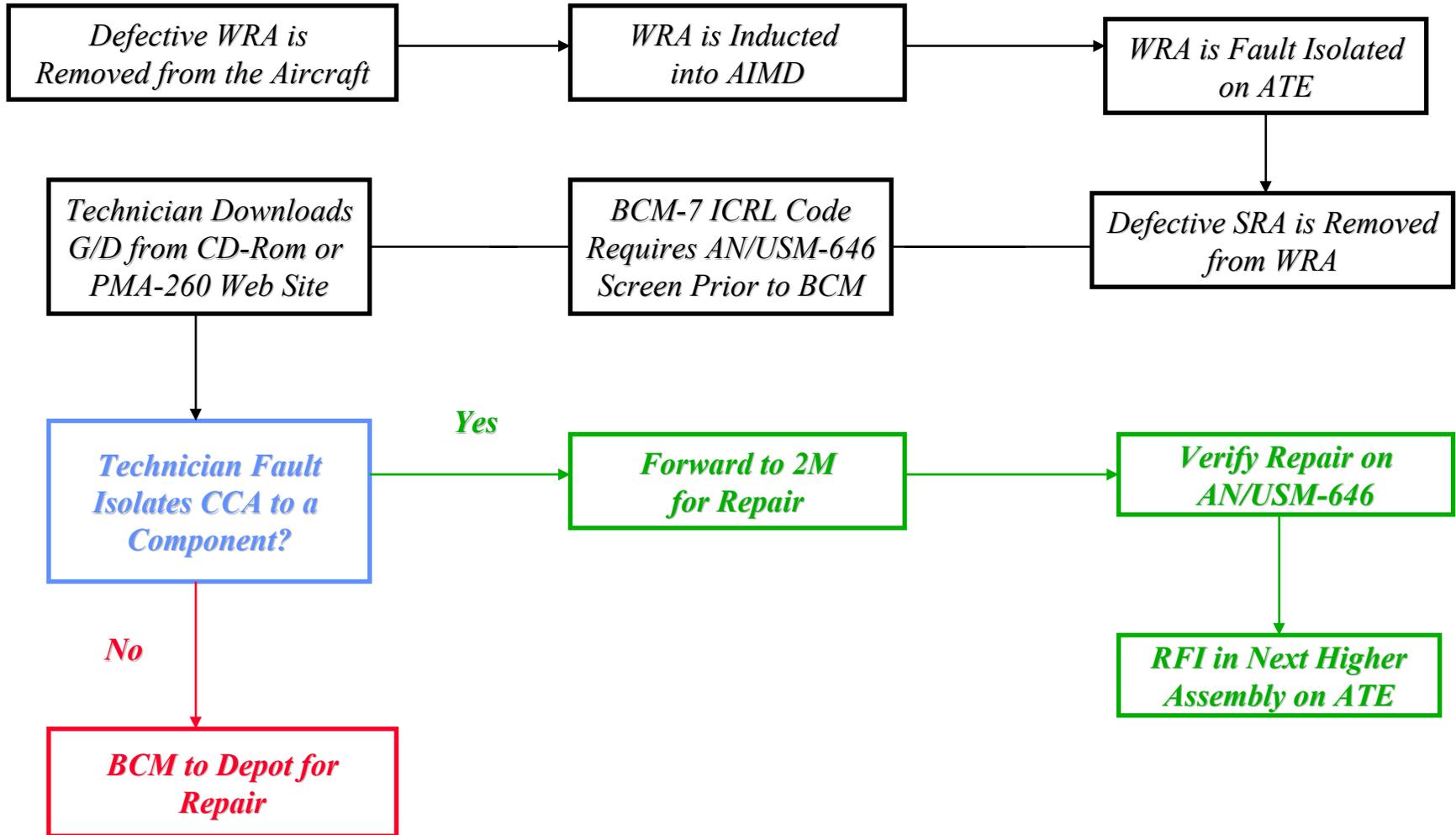
*3 MAL's can be Notified Via Message that I Level Repair Capability is Available Prior to BCM. ICRL Changes will be Made by MAL's*

*With NAVAIR Approval, NAMP Advocates Higher Maintenance Level Repair to Avoid AVDLR Costs (Paragraph 8.2.5.7)*

*Through NAVAIR APML, TYCOM will have to Authorize MAL's to Change their ICRL Codes to BCM-7*

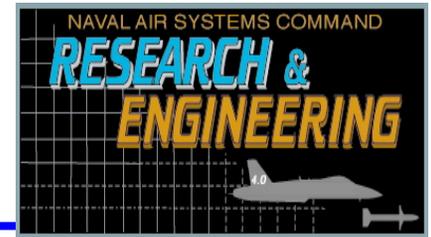


# Gold Disk Repair Procedures





## *Gold Disk Development Procedures*



*The Following Process is used To Develop Gold Disks:*

Obtain Schematics and Layout Drawings using JEDMICS or Other Resources

Compile Piece Parts List and Associated NSN's

Obtain Three Known Good Circuit Cards from NAVICP Item Managers

Create Disk Template & Accomplish 3 Circuit Card "Learns"

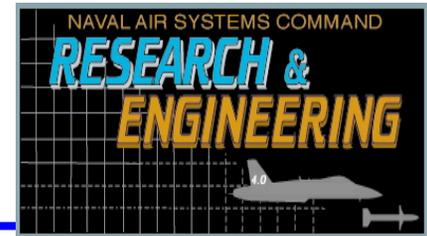
Forward Completed Disk to NUWC Norfolk for Verification

Disks Distributed to the Fleet on CD ROM Quarterly by NUWC Norfolk & New Disks Posted on Huntron Homepage By NAVAIR (PMA-260) until Distributed On CD

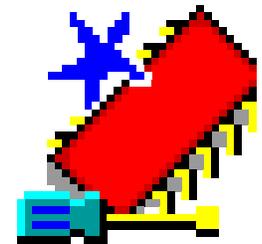
*Cost Per Gold Disk is \$10k and takes Approximately 1 - 2 Months (Analysis, Obtaining 3 Cards And Tech Data , Development, Verification, Distribution)*



## Challenges



- Asset Availability..... Catch 22
  - *Dynamic “A Condition” Status of CCA’s During Development*
    - Condition Code Constantly Changing in NAVICP’s Asset Visibility System, which is Driven by Fleet Demand
  - *Quarterly Demands Exceed Available RFI CCA’s*
    - Item Managers Reluctant to Release Assets for Development as this will Impact Fleet Readiness
    - Turn Around Time for Depot Repaired CCA’s, not Satisfying “Quarterly Demand” Requirements
    - Shortage of Spare Assets in the Field for Development
  
- Utilizing Intermediate Level Repair
  - *SM&R Code Changes will Impact Cost Savings*
  - *ICRL Code Change Without an SM&R Code Change*
  - *Message Traffic to TYCOMs Requesting Authorization for “I” Level Repair on Gold Disk CCA’s Prior to BCM*





## Summary



*Disk Development will be in Accordance with PMA-260 Huntron Policy*

*The AN/USM-646 has been Showing Significant Cost Savings in the NAVSEA Community Since 1992*

*As the NAVSEA Community has Proven, this Effort Will Save Money:*

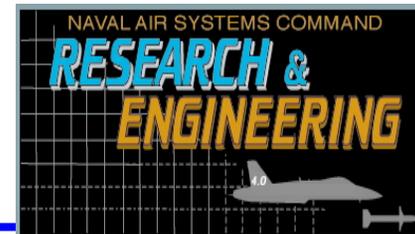
COMNASEASYSYSCOM was the 1998 Vice President Gore Hammer Award Recipient for Outstanding Success of their 2M MTR Program; Saving \$20 Million while Performing over 5,500 Repairs on Shipboard Systems During Three Quarters in FY 98. The AN/USM-646 is the 2M MTR Programs Most Frequently Used Test System

*AV-8B & E2C Research Completed and Funding Received:*

*Development is On-Going as Assets Become Available*

*H-60 Research Completed and Funding Received*

*NAWCADLKE has Completed A Similar Research Study on the F/A-18-C/D*



## *Points of Contact*

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