



Performance Based Sustainment Model

(Making Opportunity out of a Mandate)

Feb 2008

Kevin Berk
(801) 731-2150
kberk@tqsinc.com

Innovative Product and Process Improvement



Overview

- Background
- Falcon Flex
- DRILS
- ASM
- Why SNT/UID/SIM?



Concerns and Challenges

- F-16 weapon system avionics concerns
 - High maintenance costs
 - Low reliability
 - Parts obsolescence

- Supply Chain Manager Flexible Sustainment = New Opportunities
 - Exploit commercial marketplace/latest technologies
 - Form/Fit/Function & Interface (F3I) parts replacement
 - Performance-Based Acquisitions (PBA)



Falcon Flex

- “Falcon Flex” (FF) developed as a new business practice to
 - Reduce sustainment costs
 - Increase system reliability & aircraft availability
 - Reduce obsolescence concerns
 - Enhance performance as a byproduct
- Root cause failure analysis is at the heart
- Keys to success
 - Innovative data capture and analytical techniques
 - Countercultural corrective actions
- Effectively manages obsolescence



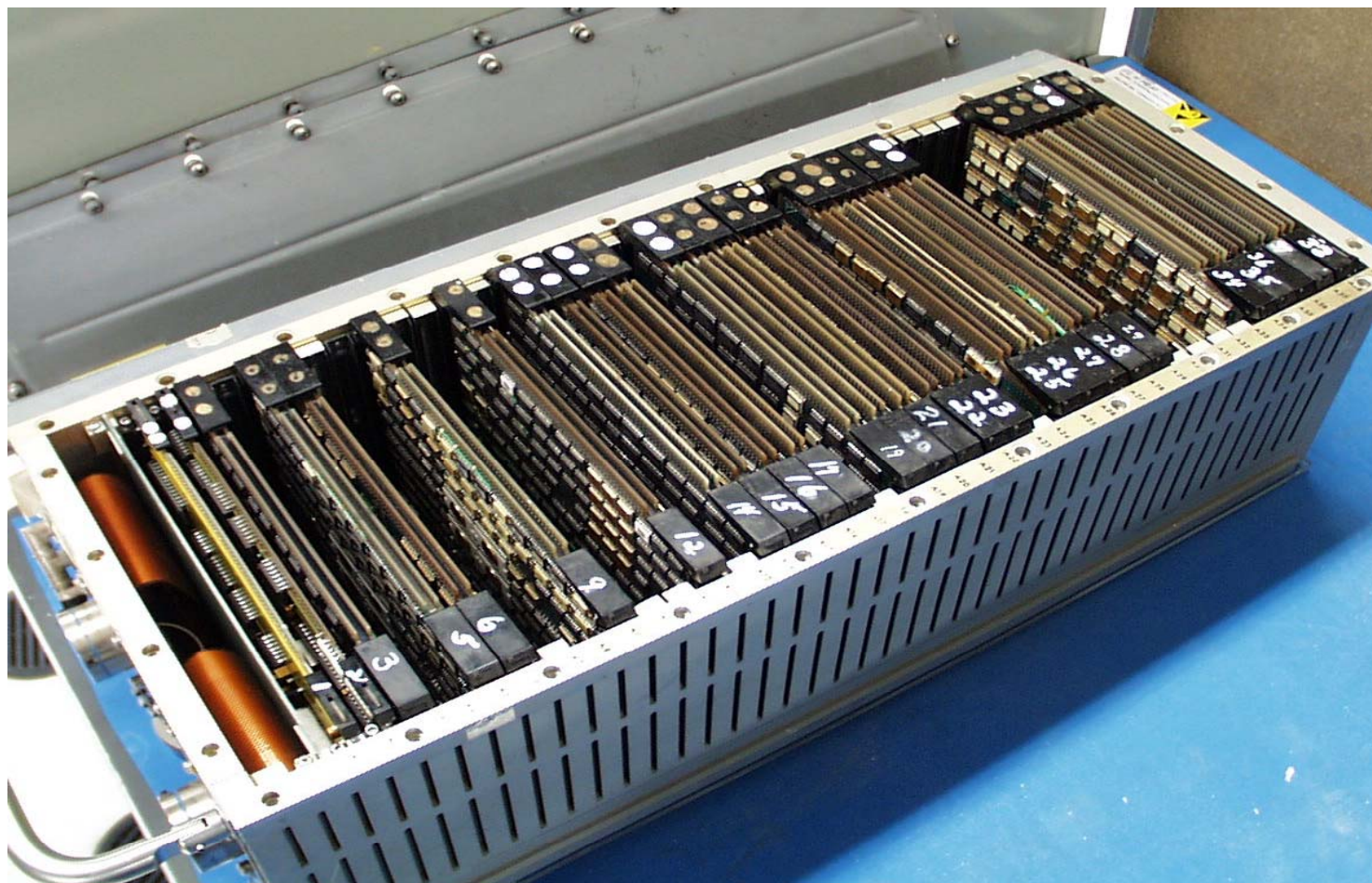
Falcon Flex Cost Savings Recommendations

- Engineering Proposals implemented:
 - 21 to date
 - \$142M savings realized (as of Sep 2007)
 - ~\$678M savings anticipated by F-16 end of life
- Engineering Proposals not yet implemented:
 - ~25 cost savings opportunities
 - \$350M additional savings available
- Further analyses will reveal additional cost savings opportunities

Innovative Product and Process Improvement



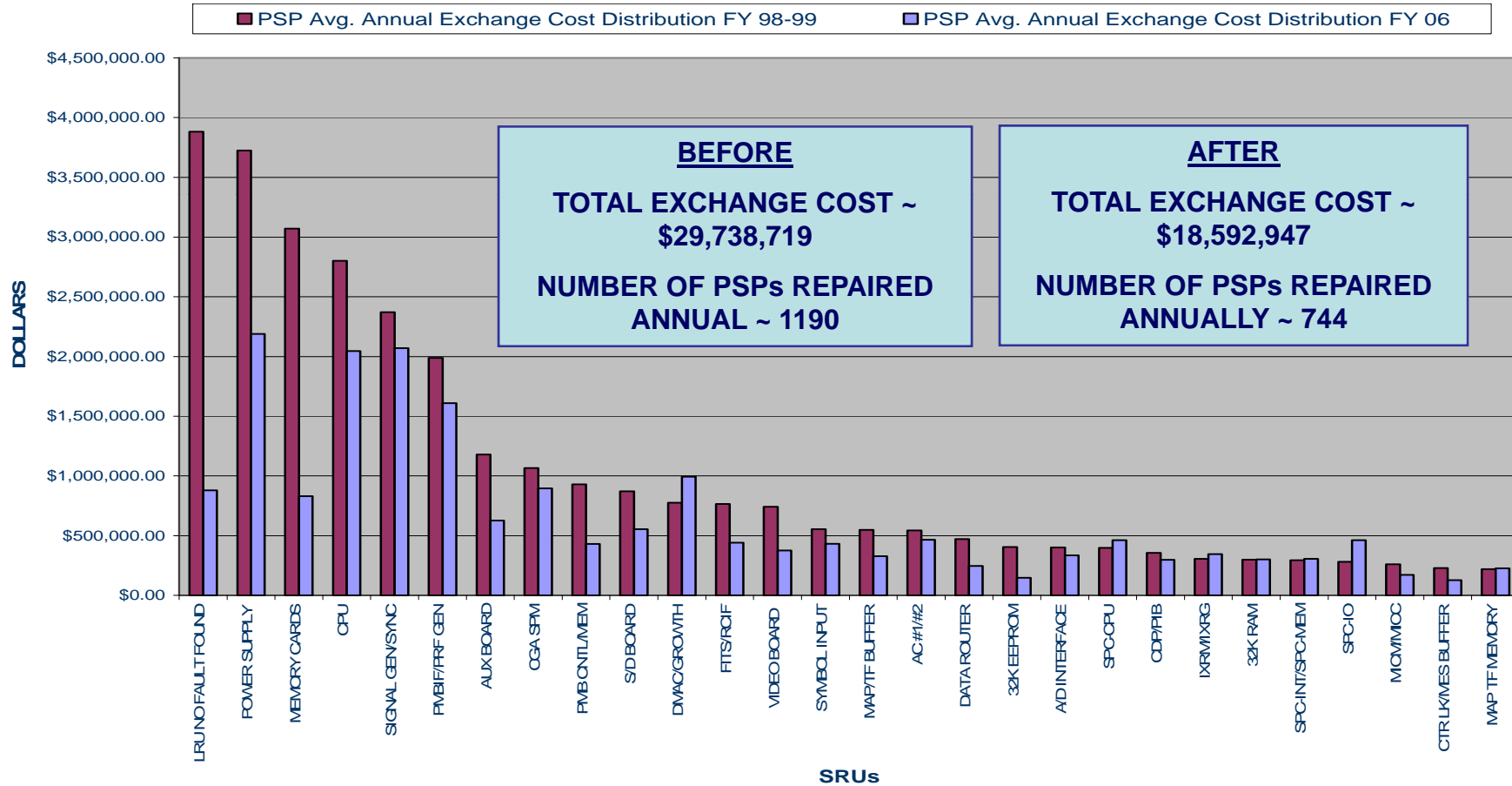
F-16 APG-68 Radar Programmable Signal Processor





FF Root Cause Analysis Example

Average Annual PSP Exchange Cost Distribution (Before vs. After)





APG-68 PROGRAMMABLE SIGNAL PROCESSOR MEMORY CARDS

BUILD TO PRINT

- \$14K - BUY
- \$ 3K - REPAIR
- 500 HR MTBF
- SEVERE DMS
PROBLEM

PERFORMANCE

- \$ 4K - BUY
- \$ 0 - REPAIR
- 40,000 HR MTBF*
- NO DMS PROBLEM
- DOUBLE MEMORY

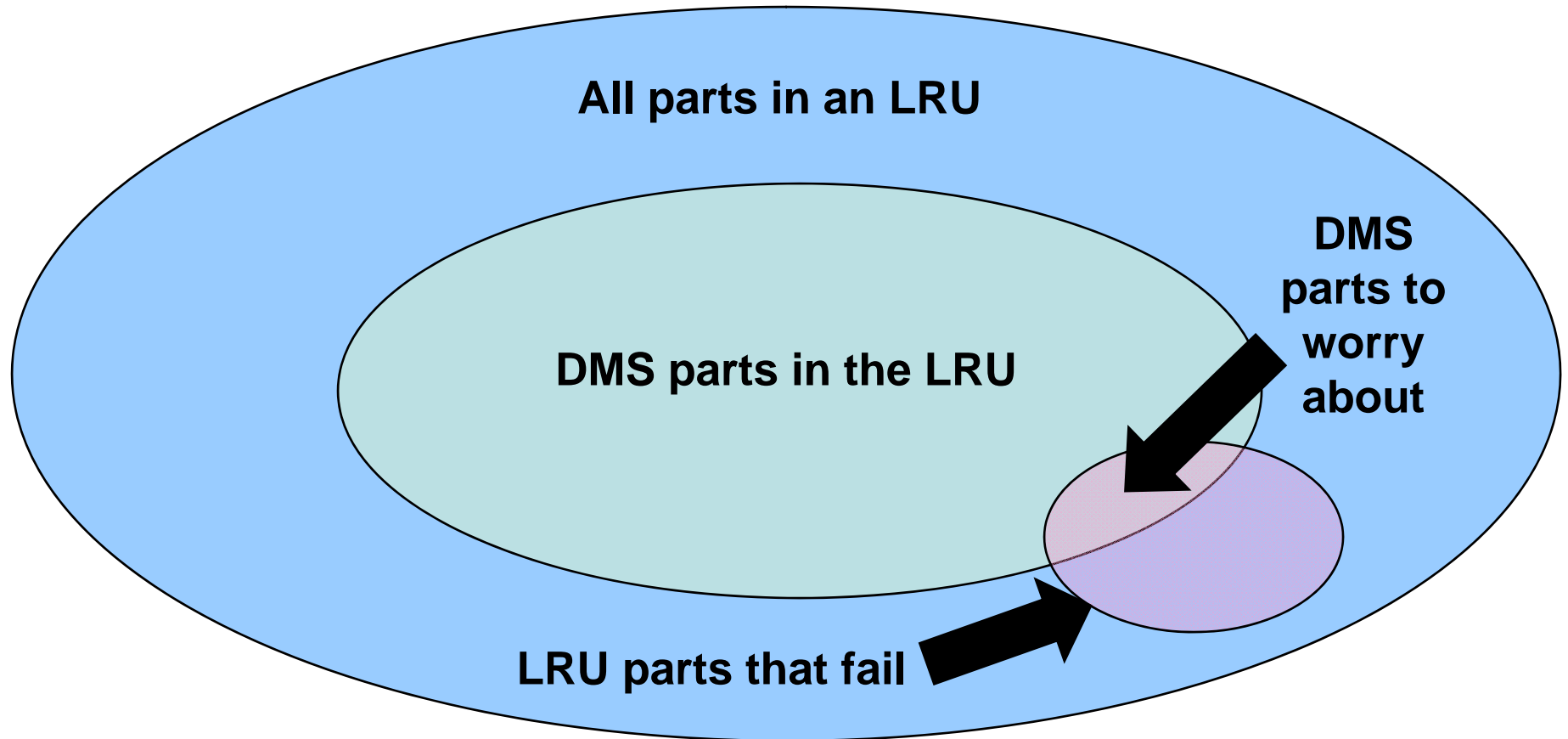
Investment = \$5.5M
Projected LCC Savings = \$54.8M

ROI = 10.0

***Estimated**



Advanced Obsolescence Management



Most of the parts in an LRU never fail



eLog21 Goal Support

- FF supports AFSSO21 and eLog21 goals:
 - What is Performance Based Logistics (PBL)?
 - System availability; Mission reliability
 - Improved stuff
 - Right place
 - Right time
 - Falcon Flex & DRILS
- FF applies AFSSO21 transformation tools plus root cause analysis to provide best business case for product improvements

} Supply and Distribution

FF prevents continually buying parts that fail the most



DRILS

- Defense Repair Information Logistics System (DRILS) G200
- Need for detailed dependable repair data to enable FF analysis
- Challenge: Lacked dependable data source
 - Paper logs, standard systems, homegrown databases
- Initiated manual data collection down to the discrete part level
 - Mined shop work control documents, technician logs, etc. starting 1997
 - DRILS Web-based started July 2000; data from 1997 to present
- Web-Based, Agile, User-Friendly Application
 - Accessible by [.mil] and [.gov] computers worldwide
 - [.com] access available through the AF Portal
 - Streamlined data entry



DRILS Data

- Meets A.F. T.O. 00-20-2
- Supports MIL-STD-130x
- Item Identification Information
 - Part Number
 - Serial Number
 - Manufacturer (CAGE) Code
 - National Stock Number
 - Nomenclature
 - UII
- Configuration Information
 - Work Unit Code
 - Mission Design Series
 - Standard Reporting Designator
 - Reference Designator
- Repair Shop Flow Time
 - Awaiting Maintenance
 - Awaiting Parts
 - In Work
- Repair Information
 - Discrepancy
 - Corrective Action
 - Serial Numbered Parts Replaced
 - Adjustments and Other Maintenance
 - Could Not Duplicate (CND)
 - Retest Okay (RTOK)
 - Quality Discrepancy Report (QDR)



SNT Enables Problem Solving

- MFD Power Supply
- Depot tech noticed early failures – after only a few hours
 - Power supply was throw away part – increased to ~ \$5,000 ea
- Serial numbers of removed power supplies were recorded in DRILS
- Retrieved failed parts by SN from DRMO
- Sent to OEM for failure analysis
- Discovered substandard part installed
- Solved problem
- MTBF returned to normal



USAF SNT/UID Pathfinder Support

- DRILS Chosen to support two pathfinders
- Managed by AFMC/LSO
 - Warranty Tracking Pathfinder (OO-ALC & WR-ALC)
 - APS-133 – mixed warranted and non-warranted
 - F-16 ACMFD and ACPDG – all under warranty
 - 10 Yr warranty – 2 year extension if items do not meet reliability performance requirements
 - Reliability Pathfinder (OC-ALC)
 - B-52 flight control parts
 - Yaw Electronic Control Unit (YECU) (274 items)
 - Pitch Electronic Control Unit (PECU) (174 items)

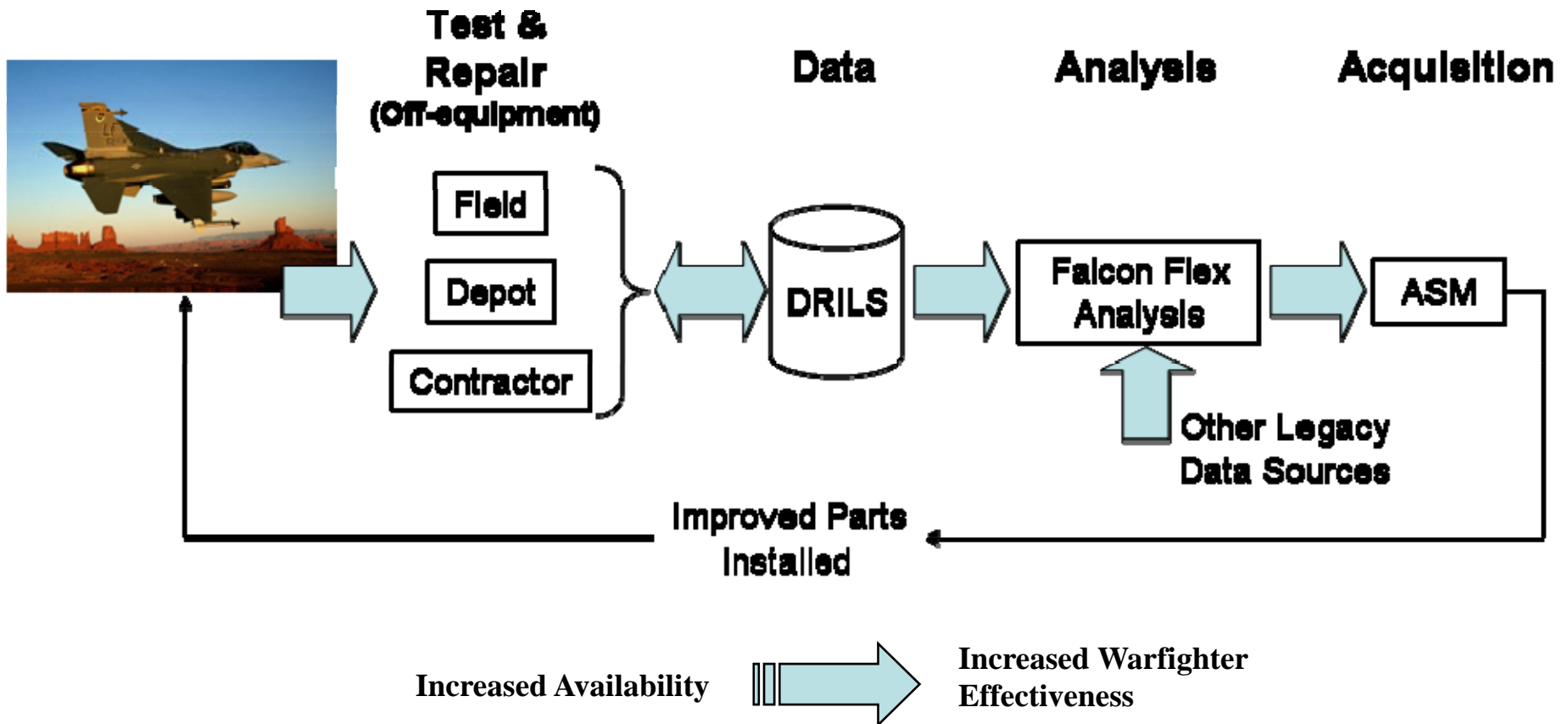


DRILS Lessons Learned

- Mark easiest parts first, e.g., avionics boxes to get results faster
- Help technicians do their job
 - Make data easy to input
 - System already knows who, where, when, etc.
 - Satisfy the “What’s in it for me?” from technician perspective
 - Ensure integration of barcode readers help rather than hinder technicians’ work
- Need dependable data for FF root cause analysis



Performance Based Sustainment Model





Procuring Solutions

- Many FF recommendations involve acquisition
 - Performance Based Acquisition (PBA)
 - Boiler plate documentation similar for each PBA
 - Each IPT starts from “scratch”
 - Not acquisition professionals
- Acquisition Support Model (ASM) developed through SBIR AF02-269
 - Developed matrix of required documents and when used
 - Identified about 90+ documents (SOO, SOW, etc)
 - Templates are stored in database, easy to update
 - Required by; who generates, approves, uses; functional area
 - Spares: PBA or Build to print; engineering or repair services, etc.



ASM

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- ASM uses “Turbo Tax” like front end
 - Answers determine which documents are required
 - Each role of IPT answers several specific questions
 - Answers stored as data in database
 - Used to populate and generate documents
 - Documents are version controlled
 - A change in data in one document proliferates throughout all documents and database
 - Data can be electronically fed to contract building system used by contracting officers



Why SNT/UID/SIM?

- Mark parts – So what?
- Track marked parts
- Collect data pertaining to the marked parts
- Analyze data to get actionable information
- Implement solutions to get RESULTS



Tracking Parts

- Know physical location of each marked asset
 - In aircraft or system
 - In transport
 - In warehouse
 - In repair facility: field, depot or contractor facility
 - Who is responsible/accountable for asset
- Benefits
 - Hold units accountable for ownership of assets
 - Detect and prevent theft



Data Collection

- Collect performance data (DRILS)
 - How long the asset performed before failure
 - End item from which the asset was removed
 - What specific piece part failed & replaced on the asset
 - Time to repair
- Benefits
 - Have data about each serially (UID) tracked part
 - Glean data about part number families' performance
 - Enables engineering solutions; product and process improvements
 - Processes data to facilitate analysis



Data Analysis

- Analyze data collected (Falcon Flex)
 - Use Serialized history to identify No Faults Found (NFF – Synonymous with CND-RTOK) and bad actors (DRILS data)
 - Determine part number family performance
 - Use Pareto charts to rank LRUs/SRUs by repair costs
 - Attack the cost drivers
 - Recommend solutions & Engineering Orders
 - TO changes
 - Training
 - Design and procure new F3I parts versus entire LRU
- Benefits
 - Identification of root causes of failures
 - Engineering & logistics trade-offs for best value solution



Implement Solutions

- Many solutions involve procurement/acquisition
 - Performance Based Acquisition
 - F³I – not build to print
 - Redesign a circuit card versus the entire box
 - TQS SBIR AF02-269 Acquisition Support Model
 - Current functionality operational
 - Further prototyping continues at OO-ALC
- Get results by replacing high failure parts with high reliability parts
- Measure performance of new parts



Summary

- Mark parts
 - Foundation for subsequent activities
- Track marked parts
 - Accountability
- Collect data pertaining to the marked parts
 - Performance
- Analyze data collected to identify solutions
 - Convert data to actionable information
- Implement solutions to get
RESULTS!



Questions?



Total Quality Systems Incorporated

4066 South 1900 West, Roy, UT 84067
Voice: (801) 731-2150 Fax: (801) 731-4457
<http://www.tqsinc.com>