

Great Ideas Competition

War-Winning Capabilities ... On Time, On Cost



WR-ALC's LEAN Depot Management System (LDMS)

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402 EMXSS/MXDEA
13 Nov 07**

Integrity - Service - Excellence



402d Electronics Maintenance Group



Avionics Complex at Robins

EMXG Overview

- **Mission**
 - Provide combat ready avionics parts & services to the warfighters
- **Infrastructure**
 - 700,000 sq ft
- **Manpower**
 - 1434
- **FY07 Units Produced**
 - 78,637

LDMS

- 1000+ Active Users
- 580,000+ Part Orders

Support ALL Air Force Platforms, ALL Services, & ALL FMS



Bottom Line Up Front

LDMS is Progressively Saving Time

<u>Time Frame</u>	<u>Hours Saved</u>
2002	3,789 hours
2003	13,177 hours
2004	23,330 hours
2005	27,844 hours
2006	31,070 hours
2007 (Jan-6 Oct)	24,002 hours



**80%
Reduction!**

Total Savings: Over 123,000 hours!

and Time...is Money!

Cost Avoided: \$16.5M





LDMS Evolution

Supply

AWP, Material Issue,
Exchange processing

Reports

Reporting, analysis

Planning

Work Control Documents,
BOM, material forecasting

Admin

General Admin,
IPB Maintenance

Scheduling

End Item Induction

MDC

Records Maintenance,
Order Parts

R&M

(Reliability & Maintainability)
(Eng)



AFS021

Air Force Smart Ops For The 21st Century

LDMS.Net

2001

2002

2003

2004

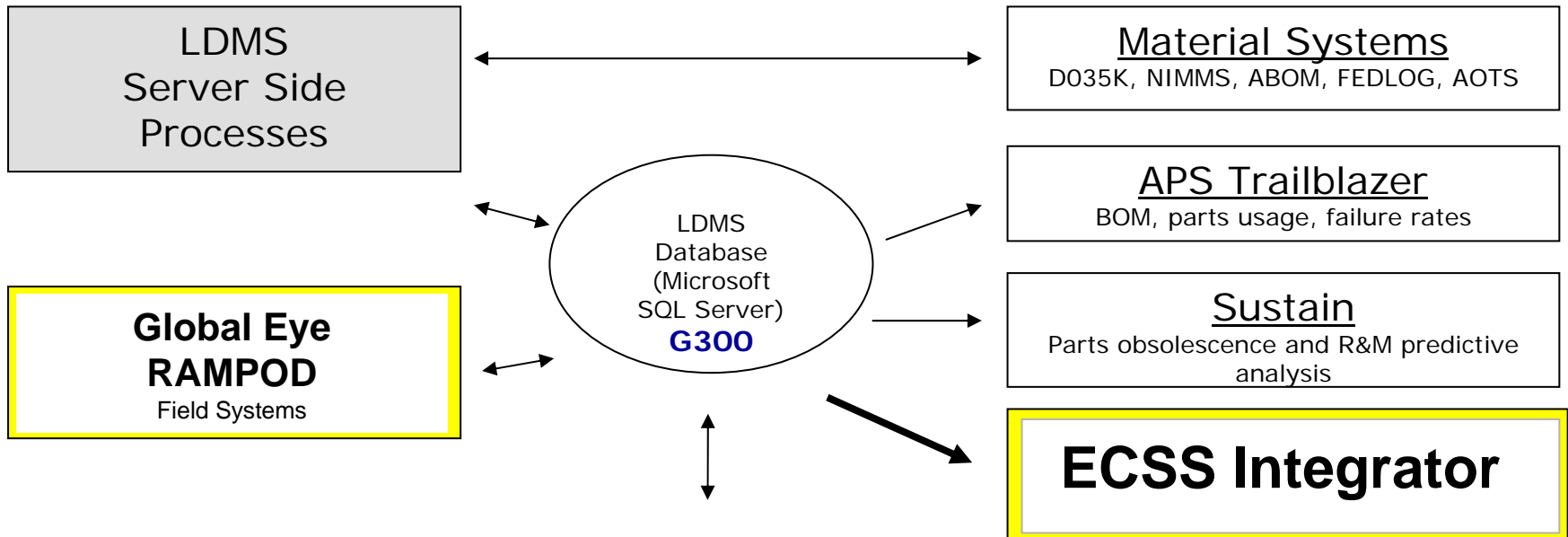
2005

2006

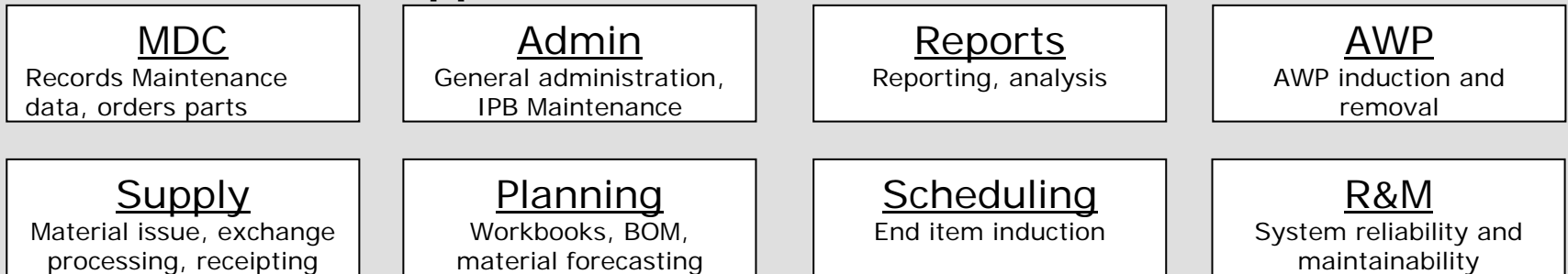
2007



LDMS System Architecture



LDMS Client-Side Applications



Approved Air Force System that minimizes the need for dual data entry.



How Is LDMS Different?



- **Designed with the Technician in Mind**
 - Frequent collaboration between designers and technicians
- **Tracks by Serial Number**
- **Data is live**
 - Not reliant on archived information
- **Search Capabilities**
 - Easy to find information quickly
- **Encourages technicians to use the tool**
 - Automatically prints out required forms
 - maintenance tags, parts ordering forms, awaiting parts forms
 - Automates parts ordering
- **Enforces Configuration Control**





Key LDMS Features



- **Documentation Generation**
 - Automates paperwork
 - Reduces errors
 - Saves time
 - Saves money



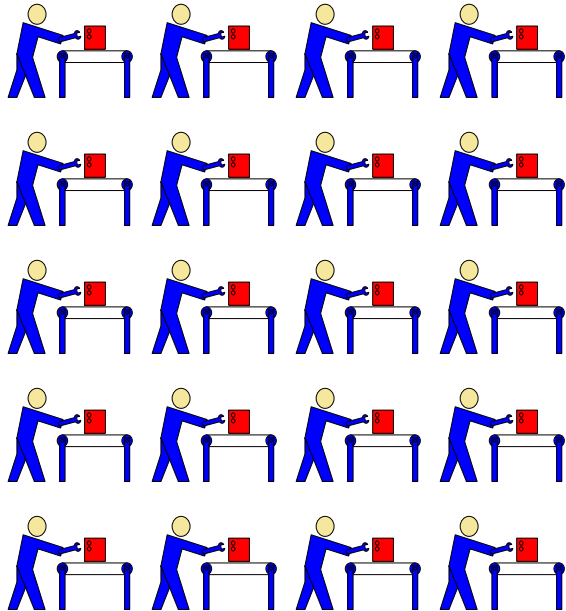
271,000 tags/year!



Old Parts Ordering Process



1. Hundreds of maintenance technicians fill out paper forms.



Technicians

2. Tens of thousands of paper forms are generated each year. Forms have to be maintained for years.

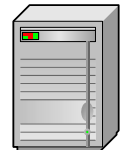
DC		ROUTE		A. REQUESTER TIME/DATE		B.													
1	2	3	4	5	6	7	8												
ALL CALLED TO																			
TIME																			
VERIFIED BY																			
TIME																			
SUF																			
C. STOCK NUMBER						D. QUANTITY		E. JOB NUMBER		F. DOCUMENT NUMBER									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
S. PART NUMBER/ MANUFACTURING CODE/DESCRIPTION										T. TO. REFERENCE/SEQUENCE									
DEL. DEST.		CONTROL NUMBER		PROJECT		REQ. DEL. DATE		APP. CODE		C. C.		OPERATION FACILITY NUMBER		ACT. SUF		F. ADDITIONAL INFORMATION			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
G. TIME/DATE OF DELIVERY						H. DELIVERY TIME				I. NOMENCLATURE									
AFMC FORM 46, AUG 87										PREVIOUS EDITIONS OBSOLETE									

Parts Ordering Forms

3. Tens of data entry clerks input the forms into the supply system



Data Entry Clerks



Supply System

Labor Intensive Process!

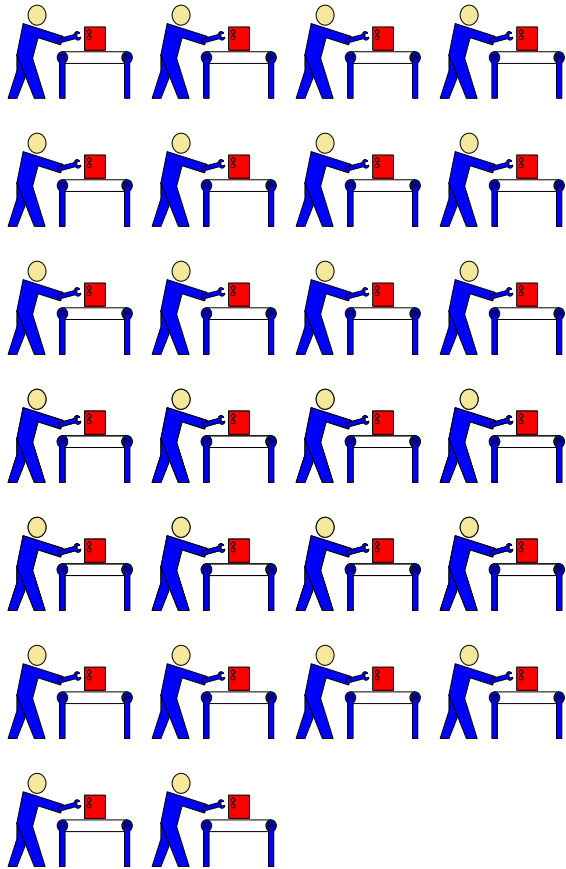




New Parts Ordering Process

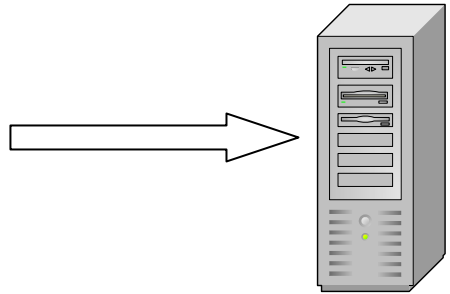


1. Hundreds of maintenance technicians order parts electrically.



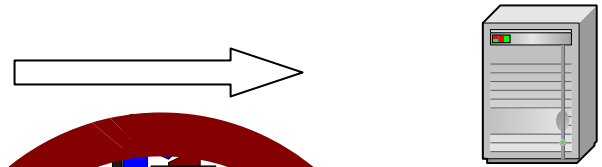
Technicians

2. Tens of thousands of orders are generated each year and stored in an industry standard database. Each order is time stamped.

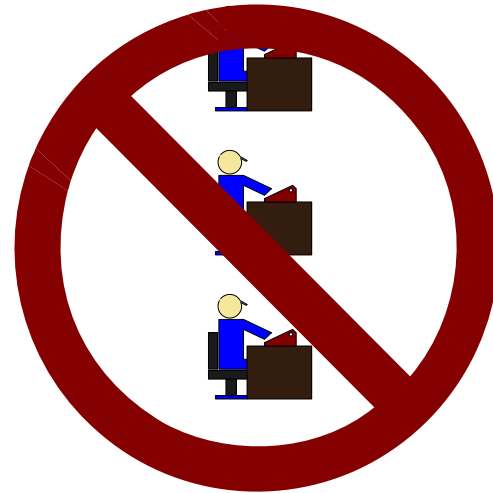


Database

3. LDMS eliminates the need for data entry clerks by feeding the order directly to the supply system.



Supply System



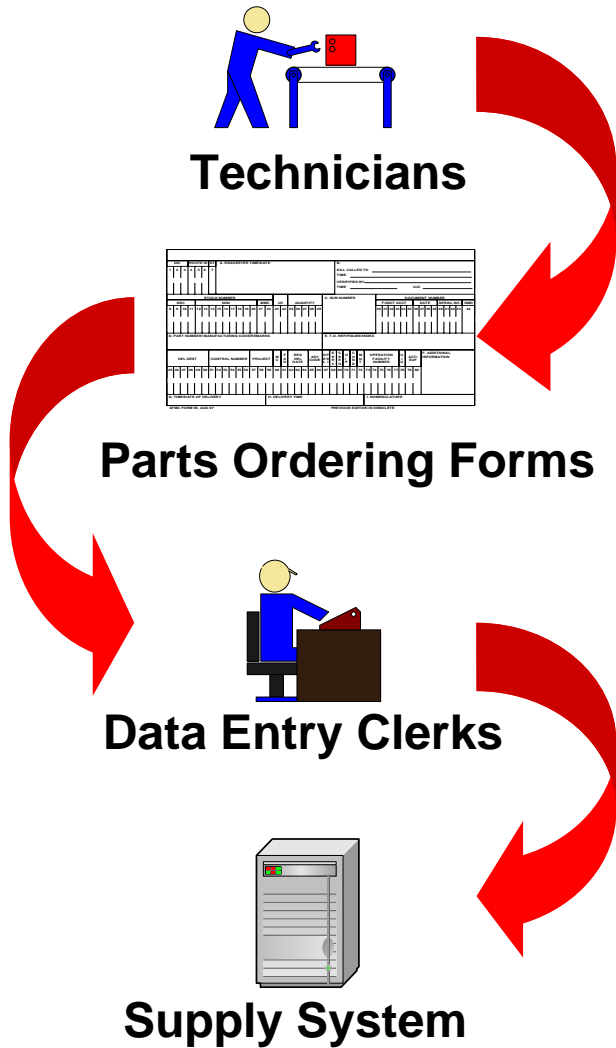
80%
Reduction!

LEAN Process!





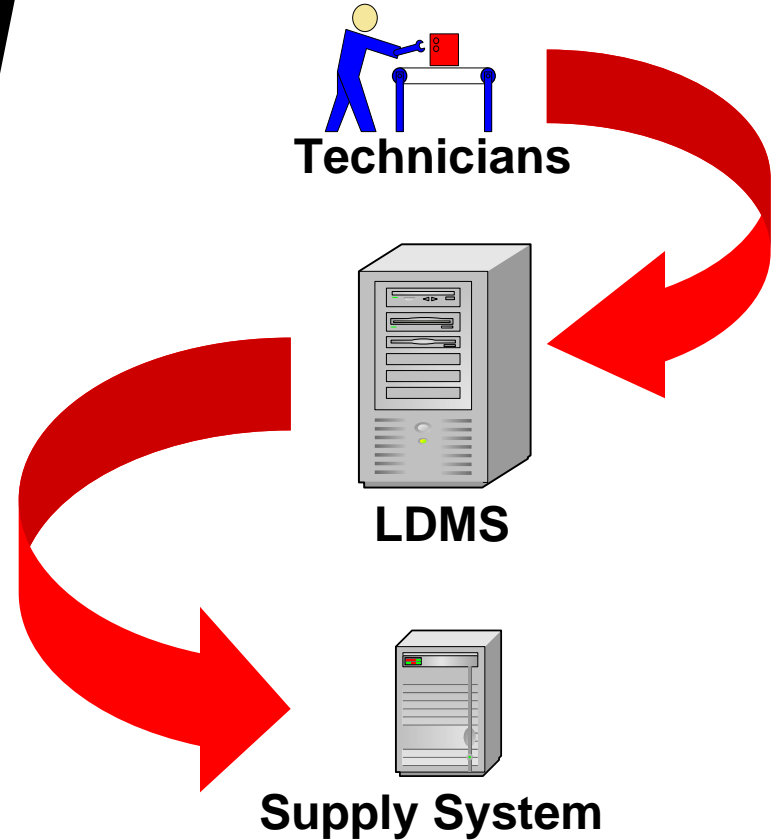
Old Parts Ordering Process



Labor Intensive Process!



New Parts Ordering Process



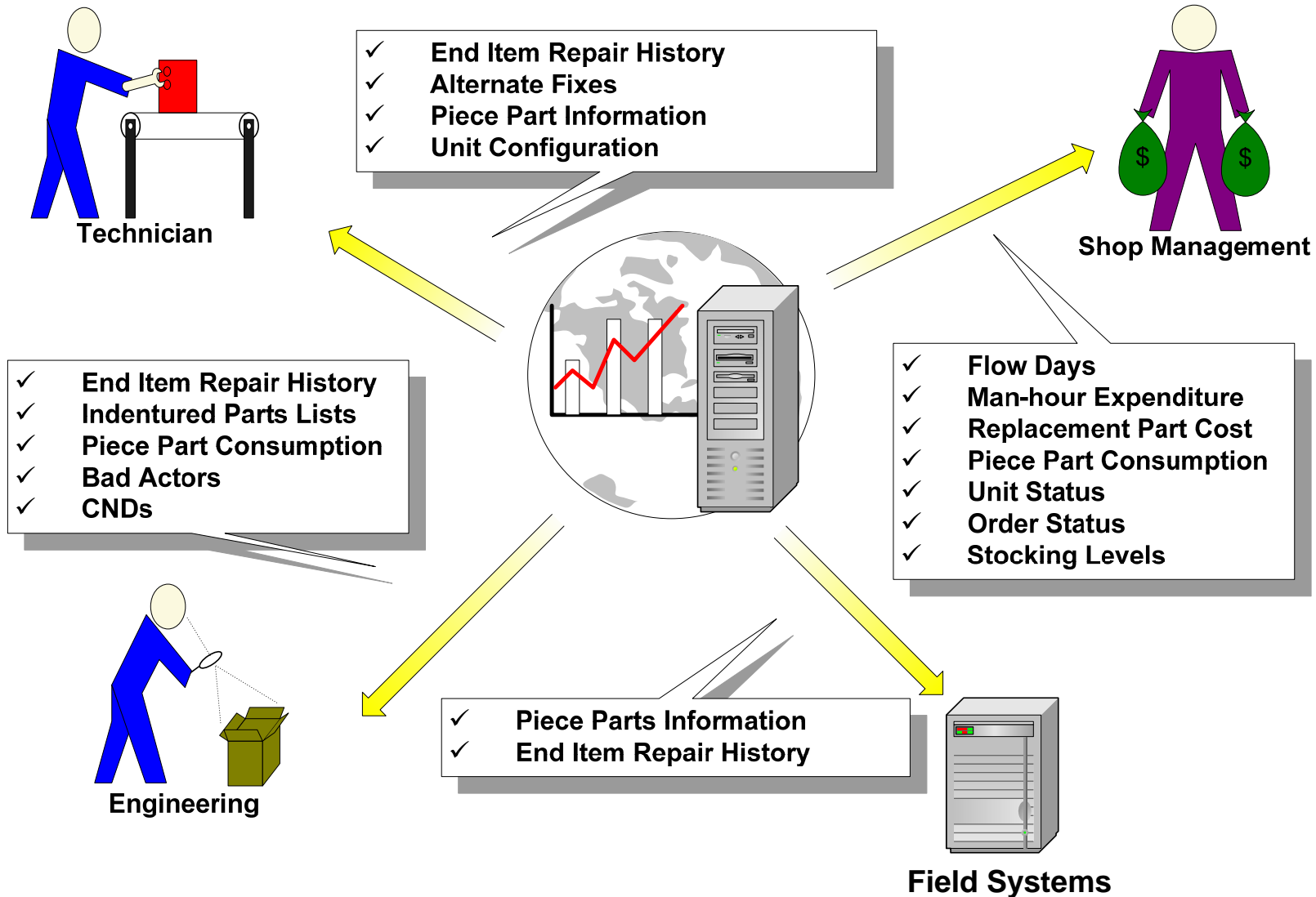
LEAN Process!

AFS021
Air Force Smart Ops For The 21st Century





How is the LDMS Data Used?





LDMS Maintenance Data Collection



LDMS - MDC 1.8 - User: ATKINS, LARRY

Job Detail

JOB #	START DATE	END DATE	EI DOCUMENT #	STATUS
486536	9/4/2007		MIFI9B72416769	PARTS ON ORDER

Unit Under Test

CONTROL #	PART #	SERIAL #	OWNER	DESCRIPTION	LOCATION
11129A	4044001-955	86021176	USAF	PROGRAMMABLE SIGNAL DATA PROCE	LAP4

Write Up 350 Tag

BROKEN OFF SWITCH

Repair Action 2 of 2

TESTER: ESTS - PN: AN/GSM-263, SN: 51

TECHNICIAN	TM	HM	AT	HRS	PGM ID	TEST #	MEASURED VALUE
3070	R	290	F	0.50		4750	

DISCREPANCY: A18 BAD. FAILS ESTS TN 4750.

CORRECTIVE ACTION: ORDERED REPLACEMENT.

Defective and Installed Parts

Operation	Ref Desg	Part #	Serial #	Qty	Status
Defective	A18	4044030-904	6091492	1	Order # 635674
Install	A23	8000655-903	6091500	1	

Maintenance Workbook | Notes | History | Config | All Parts | Save | Close

Job # for each asset

Field Information

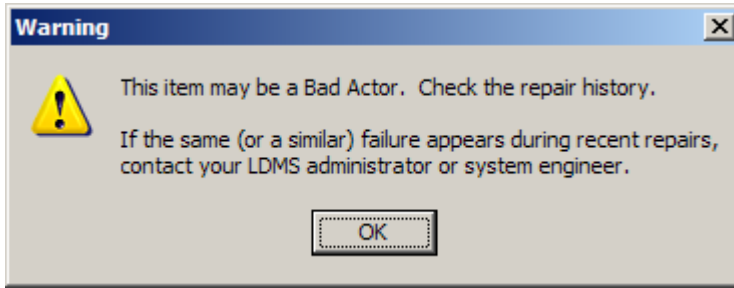
Repair Information

Parts Information

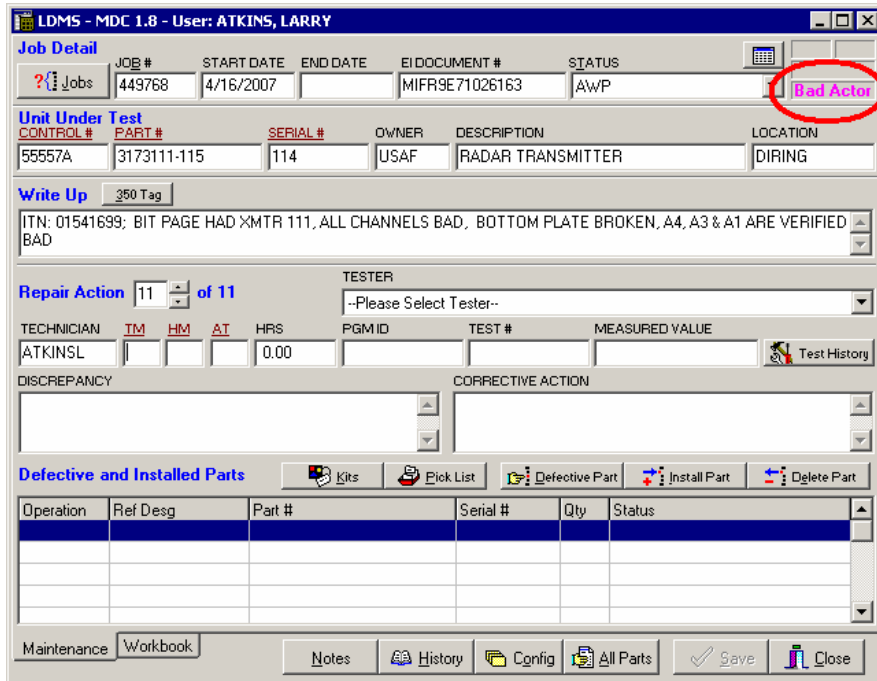
MDC Module records over 130 distinct data elements!



LDMS MDC – Bad Actor Detection



- Automatically warns the technician opening the job of the potential bad actor
- A Bad Actor flag is displayed on the job while the job is in work.
- Improves weapon system reliability



Automatic Bad Actor detection each time a job is created.



LDMS MDC – Maintenance History



End Item History Report

Maint Action # 11	** FIELD MAINTENANCE(Eagle Eye) **					
Part #:	3173082-115	Serial #:	99	Start:	12/10/05	Completed:
Org:	391FS			Job #:	160983	Control #:
350 Tag	JCN:053419317-3	Tail #:	0250	SRAN:		NRTS:
	Write Up: RDR FAILS FOR BIT 195. ELEVATION ERROR.					
Rx # 1	Tech: N/A	Date:	12/12/05	Tester:	ESTS	Failed:
	Failure: BC FS, FAILED FOR OFF, RELOADED OFF OF, PAT, BCS.					
	Corrective Action: INW					
Rx # 2	Tech: N/A	Date:	12/12/05	Tester:	ESTS	Failed:
	Failure: FAILED 7 LVL BOTTOM COVER COMES OFF.					
	Corrective Action: INW					
Rx # 3	Tech: N/A	Date:	12/20/05	Tester:	ESTS	Failed:
	Failure: UNIT IS AMP FOR A2. WE SWAPPED DOCS WITH 082#278. NEW DOC FOR THIS UNIT IS DOC# J713TS53370002. 082# 278 WENT OUT WITH DOC#J245RD53430070					
	Corrective Action: AMP					
Maint Action # 12	** DEPOT MAINTENANCE**					
Part #:	3173082-115	Serial #:	99	Start:	05/11/06	Completed:
Org:	WARNER ROBINS ALC			Job #:	371586	Control #:
350 Tag	JCN:	Tail #:	99	SRAN:	0000	NRTS:
	Write Up: NO 350 TAG. BROKEN BOTTOM COVER. ITN: 01409884					
Rx # 1	Tech: KIMSEY, KENNETH	Date:	05/15/06	Tester:		Failed:
	Failure: POWER SUPPLY FAIL TN 2110					
	Corrective Action: ORDERED POWER SUPPLY					
	Defective: A19	Part #:	5002110-17	Serial #:	158	Qty:
	Install: A19	Part #:	5002110-17	Serial #:	159	Qty:

Created by LDMS

- Reduces engineering research time
- Reduces troubleshooting time

Detailed maintenance history is available from both field & depot.



LDMS Configuration Management



LDMS - Admin 1.6 User: ATKINS, LARRY - [IPB]

File Depot Shop Parts IPB MDC Alerts Mail CPIN Lookup Tables Window

I.O.: 12P2-2APG70-44 Figure: 5 Index: 3A Change: 25 - 1 MAY 2007 Validation: Strong

T.O.	Figure	Index	Source	Date	Part #	Cage	ESD	NHA	UPA	SMR	Description
12P2-2APG70-44	5	0	DANSONT	08/02/06	200L474MER	23990	Y	All	73	PADZZ	CAPACITOR, FIXED
12P2-2APG70-44	5	1	SEIGLE	08/26/03	2C100Bx474M050B	2D307	Y	All	73	PADZZ	CAPACITOR, FIXED
12P2-2APG70-44	5	2	PITTMAN	04/15/02	H950067-001B	82577	Y	All	73	PADZZ	CAPACITOR, FIXED
12P2-2APG70-44	5	3	PITTMAN	07/18/07	SR685C474MHA3207	04222	N	All	73	PADZZ	CAPACITOR, FIXED
12P2-2APG70-44	5	3A	WOOD	04/15/02							
12P2-2APG70-44	5	3B	PITTMAN	04/15/02							
12P2-2APG70-44	5	3C	WOOD	04/15/02							
12P2-2APG70-44	5	3D	WOOD	04/15/02							
12P2-2APG70-44	5	3E	WOOD	04/15/02							
12P2-2APG70-44	5	3F	WOOD	04/18/02							
12P2-2APG70-44	5	3G	WOOD	04/15/02							
12P2-2APG70-44	5	3H	WOOD	04/15/02							
12P2-2APG70-44	5	3J	WOOD	04/15/02							
12P2-2APG70-44	5	3K	ATKINSL	04/15/02							
12P2-2APG70-44	5	4	FARIBA	08/15/06							
12P2-2APG70-44	5	5	WOOD	04/06/02							
12P2-2APG70-44	5	6	WOOD	04/06/02							
12P2-2APG70-44	5	7	WOOD	04/06/02							
12P2-2APG70-44	5	8	WOOD	04/06/02							
12P2-2APG70-44	5	9	WOOD	04/06/02							
12P2-2APG70-44	5	10	WOOD	04/06/02							
12P2-2APG70-44	5	11	WOOD	04/06/02							
12P2-2APG70-44	5	12	AVCOM	04/06/02							
12P2-2APG70-44	5	13	WOOD	04/06/02							
12P2-2APG70-44	5	14	SEIGLE	08/26/03							
12P2-2APG70-44	5	15	WOOD	04/06/02							
12P2-2APG70-44	5	16	SEIGLE	08/26/03							

Ref Desg	Can Prefix Ref Desg?	Hide Ref Desg?
C1	Yes	No
C10	Yes	No
C11	Yes	No
C12	Yes	No
C13	Yes	No
C14	Yes	No
C15	Yes	No
C16	Yes	No
C17	Yes	No
C18	Yes	No
C19	Yes	No
C2	Yes	No

Buttons: Add Part, Edit Part, Delete Part, Add IPB, Edit IPB, Delete IPB, Add Ref Desg, Delete Ref Desg, Find Part, Export, Import, Clear, Stamp, Close

- LDMS contains the Air Force Illustrated Parts Breakdowns (IPB) for each end item it tracks.

- Prevents technicians from ordering unapproved parts!

Critical to Operational Safety, Suitability, and Effectiveness (OSS&E).



Capturing TCTO Compliance



LDMS - MDC 1.8 - User: ATKINS, LARRY

Job Detail

JOB #	START DATE	END DATE	EIDOCUMENT #	STATUS
302169	7/21/2005		MIBP9L52011027	CLOSED

Unit Under Test

CONTROL #	PART #	SERIAL #	OWNER	DESCRIPTION	LOCATION
79256A	2689520-1	10049	USAF	TRANSMITTER	MIBPL

Write Up 350 Tag

Confirm

This unit is due TCTO/Modification: 11F1-AAQ13-537 (MODIFICATION OF INPUT/OUTPUT)

The end item part number is to be modified from 2689520-1 to 2689520-5.

Click Yes if the modification was performed. Press No if the modification will be done at a later time. Press Cancel to continue working the job.

Yes No Cancel

Defective and Installed Parts

Operation	Ref Desg	Part #	Serial #	Qty	Status
Install	B2	2902330-1		1	
Install	A1AV1	2901564-1		1	
Install	A1A6V1	772463-1		1	
Install	A1A6A6	2903420-4	10064	1	
Install	A1A2	2901714-4	10077	1	

Maintenance Workbook

Notes History Config All Parts Save Close

- LDMS identifies end items that need modification or have a pending TCTO.
- LDMS prompts technicians to verify modification was done when job is closed.
- Modification history is available for each end item.
- **NO MOD left behind!**

Helps ensure mods and TCTOs are performed as required.



LDMS Planning Module



LDMS - Planning 1.3 - [Workbook Editor]

File Workbook Window

Control #: T6539A NSN: 5895-01-444-5142FX Qp #: 00100

JON Suffix: 74A T.O.: IAW T.O. 33D7-48-4-8-1

Qty: 1 Optional: HONEYWELL PARTNERSHIP

Op #	RCC	Work To Be Accomplished	Tester	Skill Code
		****WARNING**** Chemicals may be hazardous to your health. Refer to your overhaul T.O. and the material safety data sheets on file with your supervisor for information on chemicals used in the repair of this unit.		
		****WARNING**** ESD Sensitive Device		
10		Initial Visual T.O. 00-25-234 & DRAWING #8520305-911		EA
20		Test on DMP Tester		EA
30		Disassemble DRAWING #8520305-911		EA
40		Temperature Test DRAWING #8520305-911		EA
50		Clean T.O. 00-25-234 & DRAWING		EA

Renumber Add Edit Delete Up Down

Quality: BOWDEN, WILLIAM Production: MCKINLEY, TERRY

Planner: PHILLIPS, PATRICIA Scheduler: FRANK, DONNA

This workbook has been approved. Delete Print Save As Save Close

Predefined Steps

Search: _____

Skill Code	Step Description
	*****NON-ESD ITEM*****
EA	Affix Quality Seals
EB	Align
EB	Align and Test
EB	Align And Test To Failed Sub-Assy/Component
EA	ANTENNA A FUNCTIONAL TEST
EA	APPLY SEALANT
EA	ASSEMBLE
EA	BORESIGHT
EF	CALIBRATE
EC	CHECK CLASSIFICATION OF UNIT
EC	Check for FOD
EA	CHECK FOR FOD
JA	CHECK FOR FOD
EB	CHECK FOR FOD REASSEMBLE TO ALIGN AND TEST
EC	CHECK FOR FOD/FINAL VISUAL

Insert Step New Step

Standard Library of Predefined Steps

Helps planners create Work Control Documents in a SNAP!



LDMS Material Management



LDMS - Parts Queue 1.7

Search for: (Press enter to search)

Filter by RCC: MIFICC

Sort By: Order # Document # Requestor NSN

Pending Issues: Show All Show BMs Show IMs

Issue Date	Status	Order #	Supply Doc #	MIC Bin Location	Requestor
9/18/2007 3:22:06 PM	BM	639762	MIFICC7261A895		LYLES, WILLIAM B
9/18/2007 12:39:27 PM	BM	639808	MIFICC7261A977	640MJB02D1B	CANADY, BRUCE
9/18/2007 1:32:36 PM	BM	639850	MIFICC7261B198	640MJB02D1B	CANADY, BRUCE

Pending Turn-ins:

Issue Date	Order #	Supply Doc #	Requestor	Exchange NSN	Part #
9/10/2007 11:08:20 AM	634511	MIFICC7243A280	BELL, MARK	5998-01-431-6988KV	A31U13544-3
9/12/2007 12:27:22 PM	635311	MIFICC7248A570	KENNEDY, ZACHARY W	6130-01-353-4659FX	478905-03-01
9/5/2007 10:29:56 AM	635356	MIFICC7248A732	ENGLISH, BENNIE	5998-01-310-2196SD	5065420-10
	635720	MIFICC7249A110	KENNEDY, ZACHARY W	5980-01-434-5755FX	DNM-100-103-0
	635883	MIFICC7249B081	BELL, MARK	6625-01-434-1238KV	1140A-SY12
9/7/2007 8:34:39 AM	636159	MIFICC7250A162	RYALS, DERRICK	6625-01-292-2809KV	A05G0523-1
	634797	MIFICC7250A591	BELL, MARK	5975-01-528-9305KV	A31U29681-7
9/10/2007 7:44:49 AM	636661	MIFICC7253A122	WALKER, ALTON	5998-01-148-4025NT	ED741886-5
	637135	MIFICC7253A736	KENNEDY, ZACHARY W	5980-01-434-5755FX	DNM-100-103-0

Details Print Refresh Turn-in Issue Exit

• Visual Mgmt Features

Helps prioritize work



Not issued in 3 days



Not issued in 2 days

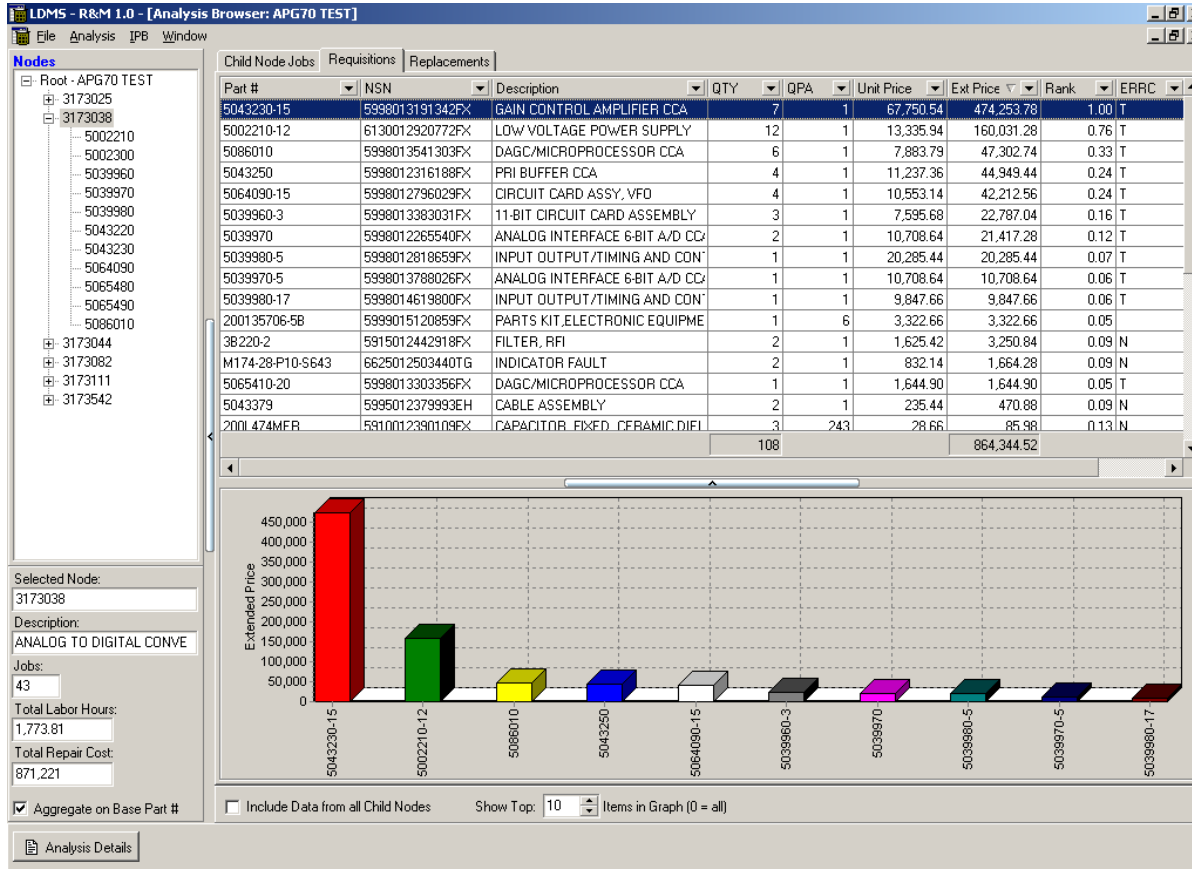


Issued within 1 day

Immediately shows supply clerk which piece parts are coming in and where they go.



LDMS R&M Module



Details associated with High Cost Drivers of LRU in APG-70 System

Graphical Representation of High Cost Drivers

The R&M module quickly analyzes systems & identifies cost drivers & high failure end items, modules, & components.



LDMS R&M – Reports



UUT Parts Usage Report

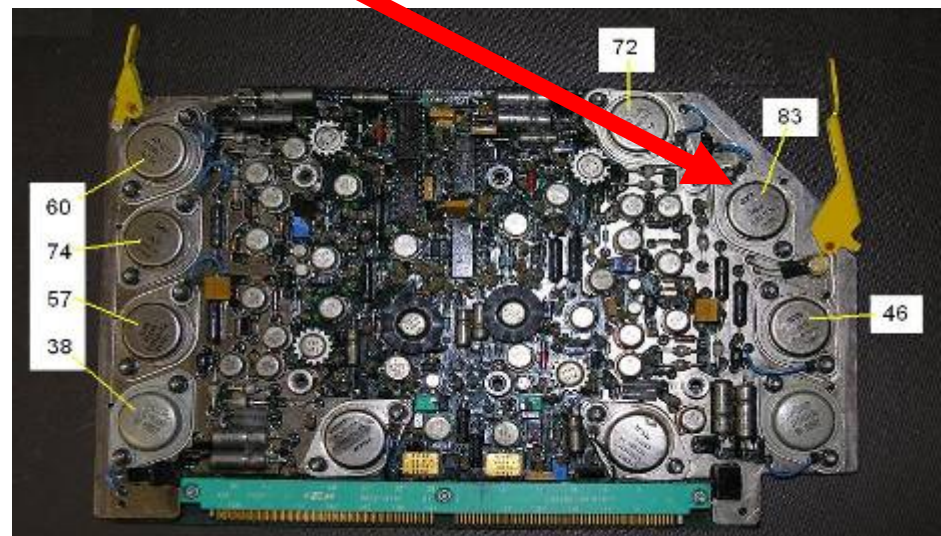
Sorted by QTY

Filtered by Control # = 31026A and Start Date >= 2004-09-25

UUT Part # 114010-19A

Reference Designator	Part #	QTY
INSULATOR	60-11-4305-1671	124
Q15	PC71636-1	83
Q34	PC71636-1	74
Q14	JANTX2N6341	72
Q33	JANTX2N6341	60
Q35	PC71636-2	
FEEDTHRU	NY-04-187-G	
Q16	PC71636-2	
Q36	JANTX2N6438	
U2	PC74631-1	
U3	PC74627-1	
FEED-THRU	NY-04-187-G	
U6	M38510/30008BCA	
U8	PC74626-1	
R172	RCR07G4R7JP	
R101	RJR26FW503P	
BUSHING	NY-04-187-G	

- Analysis by reference designator can show reliability problems caused by environmental factors, design flaws, and even improper ESD handling.



A Reference Designator identifies the physical location of a failed part.



LDMS Reports



Production Report
Sorted by RCC, Control #
Filtered by RCC = MIFICC

LDMS End Item Material Planning
Sorted by Quantity Ordered
End Item Control # 67000A
Projected Workload: 104

LDMS Order Detail
LDM S Job #: 133730
LDM S Order #: 273939
as of: 9/19/2007 2:02:30 PM

Consolidated Orders Report
General Report Options
Specify Filter
Line RCC: MIFICC Financial RCC: -All-
UUT Control #: UUT Part #:
Part NSN: Part #:
Sort By
Use what date for filtering and sorting?

NSN	Quantity Ordered
5960-01-289-5212	30
6130-01-243-8675	30
1210-01-439-6962	29
6130-01-308-7643	27

- Reports are provided for all aspects of LDMS including:

- Shops/RCCs
- Employees
- Maintenance data
- IPB data
- Parts usage
- Production
- AWP
- Orders
- R&M
- Supply

- All reports have numerous filtering options and are exportable to text, HTML, RTF, PDF, and MS Excel.

A sophisticated reporting module provides access to LDMS data.



LDMS Security



- User Login – **CAC is the primary user authentication mode.** Supports user ID and password for those without CAC (contractor sites).
- Role Level Security – Controls access to LDMS functions based on job.
- System Level Security – Controls access to LDMS data by aircraft system. Allows contractors to see failure data for specific systems but not others.
- Organizational Restrictive Access – Controls access to functions based on user's organization.

Edit Employee

Employee Information

Employee #: TEST Active

Name: LDMS TEST ACCOUNT (Last, First)

RCC: MIFIBB

Role Access:

- MDC Supervisor [WARNER ROBINS ALC]
- MDC Technician [WARNER ROBINS ALC]
- Planner [WARNER ROBINS ALC]
- Production Support [WARNER ROBINS ALC]
- Quality [WARNER ROBINS ALC]
- R&M Test Group [WARNER ROBINS ALC]
- RIM [WARNER ROBINS ALC]

System Access:

- AN/ALQ-184
- AN/ALR-56M
- AN/APG-63
- AN/APG-70
- AN/APQ-188
- APQ-170
- F-15 PROGRAM OFFICE

Organizational Restrictions: MI

OK Cancel

LDMS provides four levels of security.



LDMS.Net



A screenshot of a Microsoft Internet Explorer browser window displaying the LDMS.Net home page. The browser's address bar shows "http://localhost:2234/LDMS.Net/default.aspx". The page has a blue header with "LDMS.Net" in red and "Welcome to the LDMS web interface." in white. A left sidebar contains navigation links (Home, Contacts, Maintenance, Reports), quick links to a Users Manual and Form 2875, and a user login section for "ATKINS, LARRY" with "Log out" and "Change Password" buttons. The main content area, titled "Home", includes a welcome message, a description of LDMS as a Lean Depot Management System, a list of five key features (Serial Number Tracking, configuration control, Bad Actors identification, CNDs tracking, and parts consumption), and a note about field-level repair access. It also includes a small image of electronic components and a section for account access with a small image of a fighter jet and contact information for ASUG/ENB.

- Provides maintenance data collection and reporting.
- Easy to input data from different locales
- Provides complete control over who can access and modify it.
- Could be deployed to ALL sites doing repair for the Air Force.
- Expect deployment in the future.

LDMS.Net was designed for field sites and provides web access to LDMS data.



Conclusion



- **Automates Processes**
 - Enforces OSS&E
 - Reduces errors
 - Eliminates waste
- **Increases Aircraft Availability**
 - Reduces CNDs, MICAPs
- **Reduces Maintenance Costs**
 - Increases productivity
 - Reduces carcass requirements

