



Air Force Life Cycle Management Center



AFLCMC... Providing the Warfighter's Edge
TEAM TINKER



Field Data Collection & Automation Initiative



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Integrity - Service - Excellence



Field Data Collection & Automation Project Overview



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- **Project Description**

- Joint project with SPO engineering, Wyle, and Aspire
- Work process standardization for MOBs
- Automation of data collection and entry to legacy systems
- Provides accurate and in-depth data to engineering for analysis

- **Project Benefits**

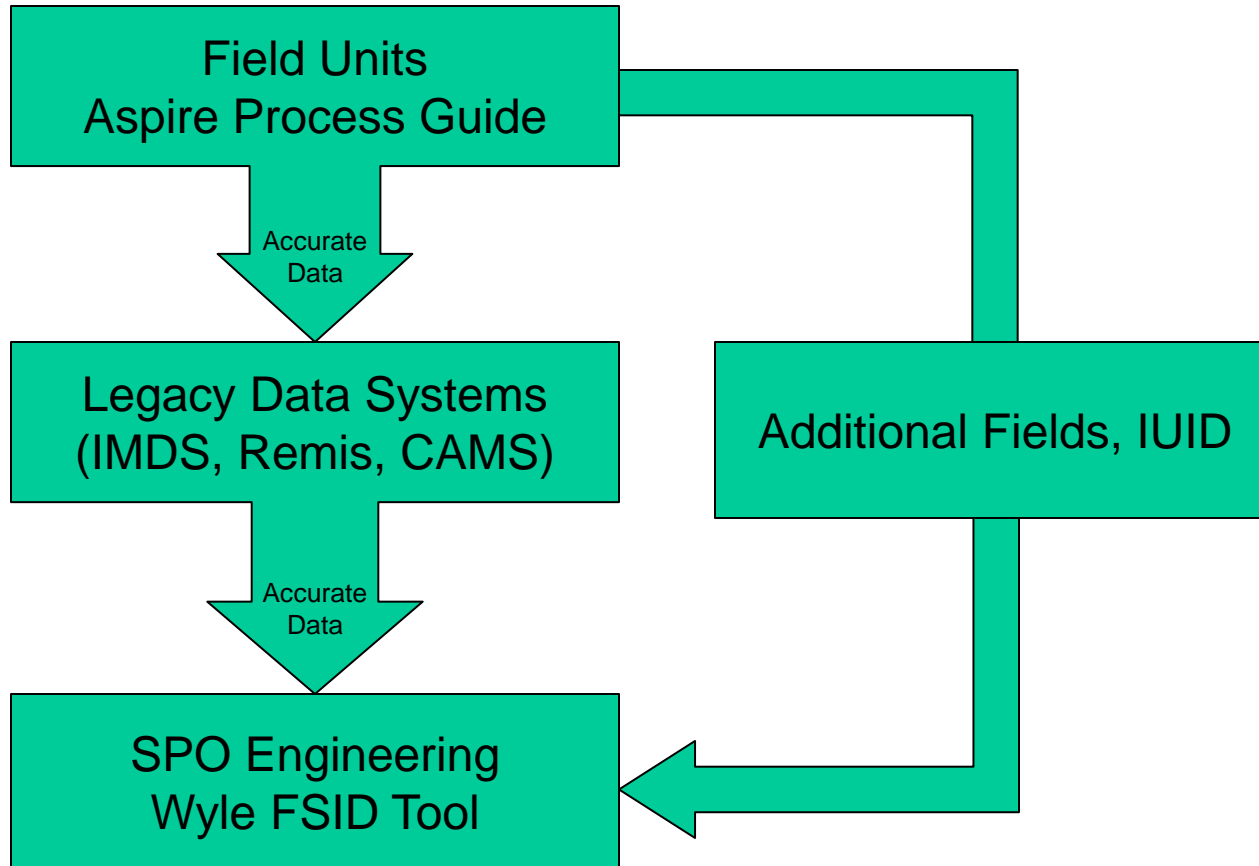
- Standardizes defect write-ups
- Eliminates manual data entry
- Improves fidelity of data
- Reduces labor man-hours
- Facilitates real-time analysis for aircraft and fleet health



Field Data Collection & Automation Concept



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Field Data Collection & Automation Background



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- **Lack of standardized data greatly hinders the ability to repair the aircraft and analyze trends/root cause to prevent problems from reoccurring.**
- **Personnel spend as much time doing paperwork as they do work, often at the end of a shift.**
- **Manual paper based process makes it difficult to ensure all necessary data is collected.**
- **Lack of standard work cards leads to different interpretations of technical data.**
- **High turnover rates lead to loss of tribal knowledge and experience.**
- **Inaccurate data negatively impacts the engineers' ability to proactively work issues impacting availability, reliability, and maintainability.**



Field Data Collection & Automation Aspire Process Guide

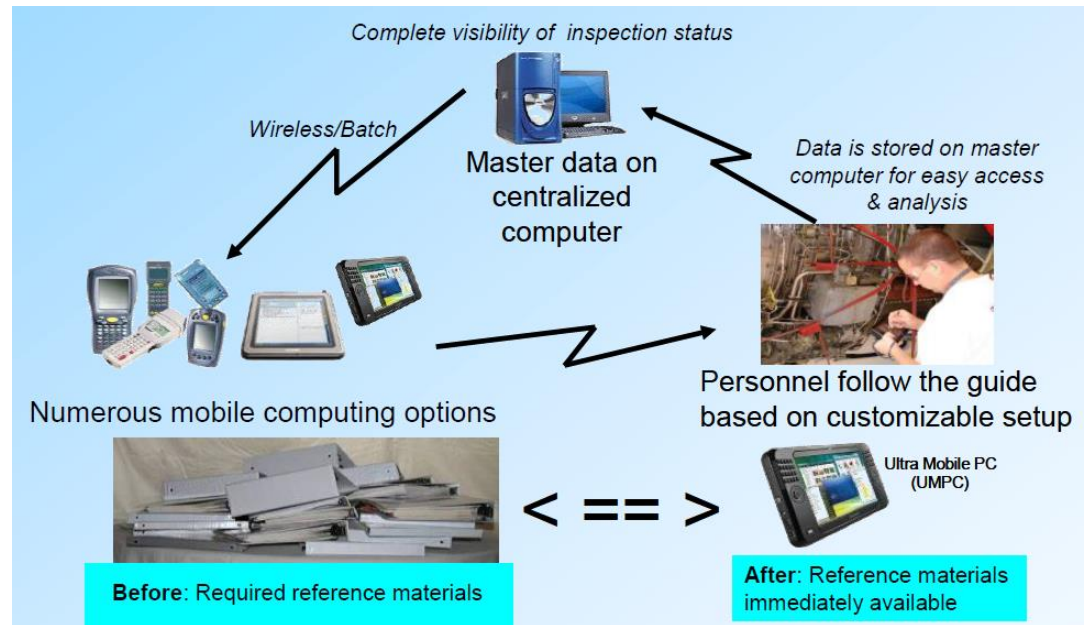


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• What is the process guide?

Streamlines processes by standardizing both the process and data results ensuring that every operation is performed the same way and has the same result regardless of who performs the process...

- Automates data collection
- Highly mobile
- Standardizes processes
- Easy to use
- Standardizes defects
- Extremely versatile
- Ensures accountability
- Eliminates paper
- Reference material at POU
- Actual photos
- Supports IUID data capture
- Points to specific tech data reference
- Prototyped at Dyess and Ellsworth for HVM initiative (HSC work cards are complete)





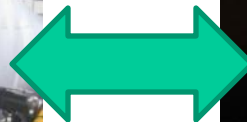
Field Data Collection & Automation

Automation Concept



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- **Interface Development for Automated Data Push**
 - Develop automation of required data entry from maintenance and inspection activities from field units to legacy data systems
 - Eliminates manual data entry to IMDS
 - Improved efficiency and accuracy
 - Reduction in man-hours
 - CAC Enabled hand held units, docked at end of the day to push data to legacy systems and FSID interface



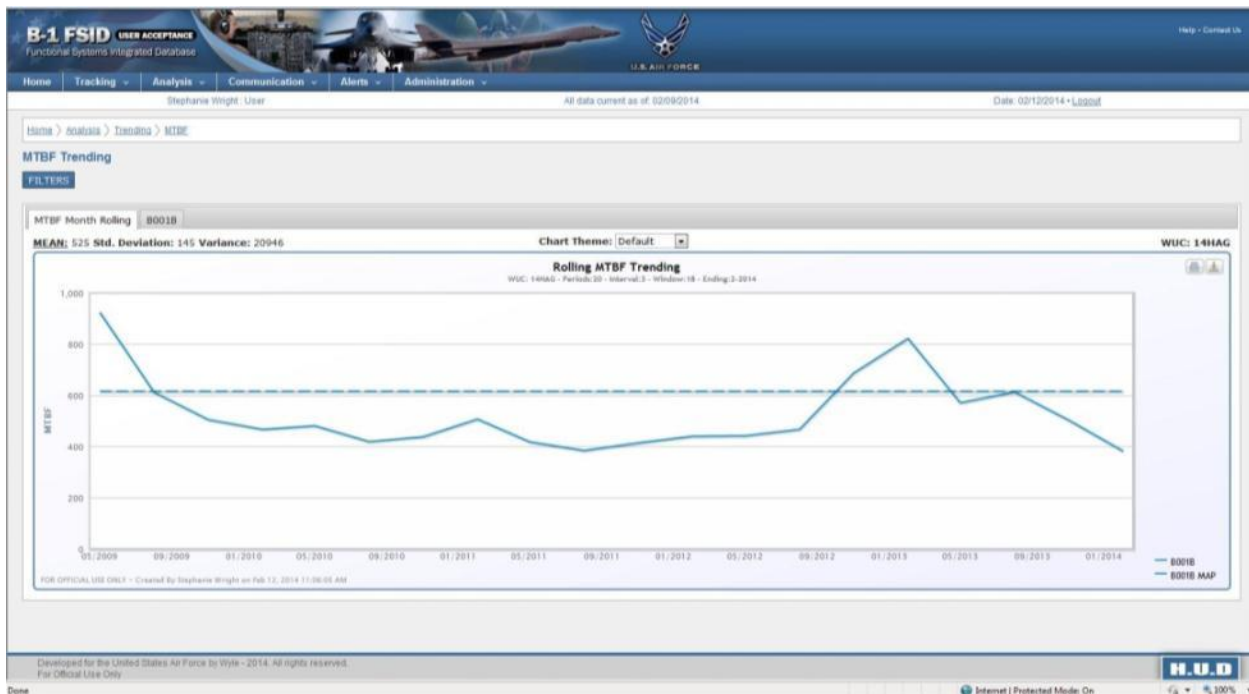


Field Data Collection & Automation FSID – Engineering Data Analysis



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- FSID Data System provides access to B-1 maintenance data which is used for trending analysis, ad-hoc queries, prioritization of engineering funding, alerts, WUC level analysis.
- Current data available for analysis is not accurate.
- Incorporation of better data from the field units will enable better forecasting and proactive problem solving.
- Serial number scanning will provide better MTBF data and allow identification of bad actors.





Field Data Collection & Automation Way Forward



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- **Next Steps**

- Development effort for interface for automated data push from field units is funded and in progress.
- Current project scope includes (funded):
 - Expansion of visual work cards from HSC only to include ISO inspections and common maintenance actions
 - IUID Scanning Capability
- Future work may include (unfunded):
 - B-1 PDM data systems automation
 - Other weapon system users
 - On-demand engineering support
 - ETAR submission capability



Field Data Collection & Automation



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Functional Systems Integrated Database (FSID) Overview

A screenshot of the B-1 FSID website header. The header is dark blue with a background image of a B-1 bomber. On the left, it says "B-1 FSID" in large white letters, followed by "USER ACCEPTANCE" in a black box, and "Functional Systems Integrated Database" below. On the right, there is a "U.S. AIR FORCE" logo and the text "Help Contact Us Site Map". Below the header is a navigation bar with the following items: "Home", "Tracking" (with a dropdown arrow), "Analysis" (with a dropdown arrow), "Communication" (with a dropdown arrow), "Alerts" (with a dropdown arrow), and "Administration" (with a dropdown arrow).



Functional Systems Integrated Database (FSID)



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- **Initially developed to address MECSIP requirements identified within MIL-STD 1798 rev B Appendix B**
- **Currently Supporting Six Air Force Platforms**
- **Identify, Analyze and Trend Issues That Impact Platform Specific RM&A**
- **Weekly Data Pulls Utilizing Customized GCSS Queries**
- **Enables Analysis, Trending, Tracking and Alerting on WUC, MTBF, MTBM, MMH, Tail Number, Flight Hours, Location, Parts Classification.**
- **Store/Access Reference Data, Chart/Import/Export Data/Analyses, Create/Store Customized Searches.**
- **Web-Based, DIACAP Compliant, Hosted on USG Servers.**
- **System and User Defined Data Triggered Alerting Provides for Proactive Maintenance/Failure Monitoring.**



Functional Systems Integrated Database (FSID)



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B-1 FSID **USER ACCEPTANCE**
Functional Systems Integrated Database

Home Tracking Analysis Communication Alerts Administration

Help Contact Us Site Map

U.S. AIR FORCE

Jeff Hotchkiss : Administrator

All data current as of: 03/16/2014

Date: 03/20/2014 • Logout

Home > B-1 FSID >

Notices: (0) Last 90 days

[View all notices](#)

No notices have been created in the last 90 days.

Alerts:

- [Alerts \(0\)](#)
- [Pending Users \(6\)](#)
- [MAP Alerts \(768\)](#)

Links:

[Air Force Portal](#)

Saved Filters:

- Abort MX Actions +
- Maint. Actions +
- Sortie Detail +
- TCTOs +

The Rockwell (now part of Boeing) B-1 Lancer[N 1] is a four-engine variable-sweep wing strategic bomber used by the United States Air Force (USAF). It was first envisioned in the 1960s as a supersonic bomber with Mach 2 speed, and sufficient range and payload to replace the Boeing B-52 Stratofortress. It was developed into the B-1B, primarily a low-level penetrator with long range and Mach 1.25 speed capability at high altitude.



Designed by Rockwell International, the bomber's development was delayed multiple times over its history, as the theory of strategic balance changed from flexible response to massive retaliation and back again. This change in stance repeatedly demanded then ignored the need for manned bombers. The initial B-1A version was developed in the early 1970s, but its production was canceled, and only four prototypes were built. The need for a new platform once again surfaced in the early 1980s, and the aircraft resurfaced as the B-1B version with the focus on low-level penetration bombing. However by this point development of stealth technology was promising an aircraft of dramatically improved capability. Production went ahead as this version would be operational before the 'Advanced Technology Bomber', during a period when the B-52 would be increasingly vulnerable. The B-1B entered service in 1986 with the USAF Strategic Air Command as a nuclear bomber.

Overview

Custom Date Test



Functional Systems Integrated Database (FSID)



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- Weekly Data Pulls Utilizing Customized GCSS Queries
 - Maintenance Actions, Aborts, CANNs, MICAP, Aircraft Status, TCTOs
- Integrate Locally Managed Data
 - ACIs, Bad Actors, DRs, Mishaps, MSIs
- Save Filter Set as Favorite / Export / Print

Maintenance Actions

Data Graphs

FILTERS EXPORT RESULTS PRINT ANALYSIS

Results: 23863

	Aircr#	Tail Num	JCN	WC	WUC	How	Actic	Whe	Type	Corrective Act	Discrepanc	WCE Narrat	Start D:	Stop Da	La	Base	Un	Hc
1	B001E	8600000	1403600			799	P	X	R		1B16B HOR	1B16B HOR	02/05/2	02/05/2	0	TINKER	1	6
2	B001E	8600000	1405763			800	S	X	B	PANEL CLOSE	#1 ATSCV RLT HYD SER		02/28/2	02/28/2	9	DYESS TX	1	6
3	B001E	8600000	1405765			800	S	X	B	PANEL INSTAL	#1 ATSCV RLT BUILD UF		02/28/2	02/28/2	9	DYESS TX	1	6
4	B001E	8500000	1400971			799	X	X	B	SPC LINE 515	SPC LINE P/ REMOVE SPC		02/01/2	02/01/2	1	DYESS TX	1	6
5	B001E	8600000	1405764			800	S	X	B	PANEL CLOSE	#1 ATSCV R#2 ADG ACC		02/28/2	02/28/2	6	DYESS TX	1	6
6	B001E	8600000	1405762			20	F	X	B	INW ON LINE	#1 ATSCV R#2 MSTR PL		02/27/2	02/27/2	32	DYESS TX	0	1
7	B001E	8500000	14021011			799	X	X	B	OPS CHK GOO	JOB CREATEUHF 3 DAM		02/05/2	02/05/2	6	DYESS TX	1	6
8	B001E	8600000	1405762			20	F	X	B	INW	#1 ATSCV R#2 MSTR PL		02/27/2	02/28/2	16	DYESS TX	0	1
9	B001E	8500000	1402108			799	X	X	B	OPS CHECK GO	JOB CREATE TOILET DUE		02/10/2	02/10/2	2	DYESS TX	1	6
10	B001E	8500000	14021010			799	X	X	B	OPS CHK GOO	JOB CREATEUHF 1 -V/U		02/05/2	02/05/2	6	DYESS TX	1	6
11	B001E	8500000	1403071			381	R	X	B	COPLT O2 BOT	COPLT O2 BR2 COPLT O		02/01/2	02/01/2	1	DYESS TX	1	1
12	B001E	8500000	1402103			799	X	X	B	CREW/CENTRA	JOB CREATE CREW/CENT		02/10/2	02/10/2	0	DYESS TX	1	6
13	B001E	8600000	1405769			800	S	X	B	3 CLAMPS, 1	B#1 ATSCV R3 CLAMPS,		02/28/2	02/28/2	8	DYESS TX	1	6
14	B001E	8500000	1405900			799	P	X	R		1B16B HOR	1B16B HOR	02/28/2	02/28/2	0	TINKER	1	6

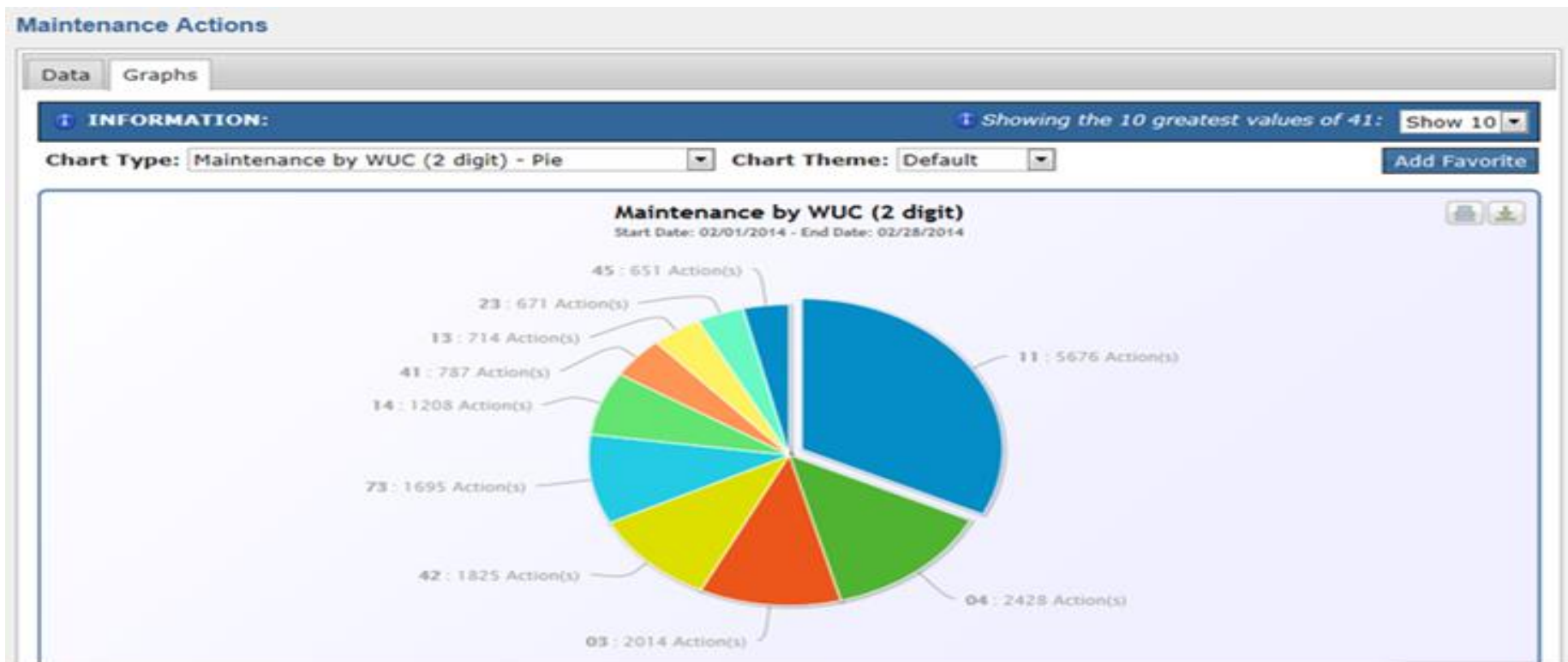


Functional Systems Integrated Database (FSID)



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- Graphical Display of Filtered Data Results
- Interactive Drill Down
- Save Filter Set as Favorite / Export / Print





Functional Systems Integrated Database (FSID)



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- Preview and In-depth Analyses Provides an Aggregate Metric Scoring Tool and Findings Repository
- Customizable Weighted Values

Preview Analysis

FILTERS

Summary View | Relative Rank View | Raw Value View | EXPORT RESULTS | PRINT ANALYSIS

Show 20 entries Search:

Rank	Score	WUC	Noun	In-Depth Analysis
1	10380		MAIN LANDING GEAR (MLG) DOORS	New Analysis
2	10369		HYDRAULIC, GENERAL TITANIUM LINES	New Analysis
3	10366		OFFENSIVE RADAR SYSTEM (ORS)	New Analysis
4	10360		GEAR W/S SUBASSY, L & R	New Analysis
5	10341		MAIN LDG GEAR/DOORS	New Analysis
6	10336		FUEL CENTER-OF-GRAVITY MANAGEMENT (FCGMS)	New Analysis
7	10327		SCOOP, RAM AIR, FUEL HEAT SINK, L/R	New Analysis
8	10326		FLAPS/SLATS CONTROL	New Analysis
8	10326		NO 2 FORWARD INTMD FUSELAGE TANK, L & R	New Analysis
9	10315		CYL, SERVO HYD, HORIZ STAB LOWER L&R	New Analysis
10	10298		GENERATOR (GEN) NO. 1,2, AND 4 CONTROL AND PROTECTION	New Analysis
10	10298		GENERATOR, IDG #1,2&4	New Analysis
11	10297		STRUCTURES	08/13/2013



Functional Systems Integrated Database (FSID)



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- Graphical Trending Data Display
- NMC, Mishap, Abort, MMH, MTBF, MTBM
- Displays Defined MAP Level





Functional Systems Integrated Database (FSID)



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- MAP Alerting View
 - Owner Defined Alerting Parameters
 - Percent MAP Limit / MTBF Threshold
 - Email Notification
 - MTBF Trending Link

Show 25 entries Search:

WUC	Noun	Program	0001B
	STRUCTURES	LGIP	66%
	NOC		33%
	ENTRY DOOR & LADDER		27%
	STAIRLADDER (6632-01)		24%
	CHAIN, DRIVE		67%
	GEARBOX/ACTR		72%
	MOTOR, ACTR		58%
	AFT EMER ESC HATCHS		17%
	HATCH, R (6834-01)		70%
	DOOR, (6823-08)/L/INTM (6824-05)/R/INTM		21%
	DOOR, AVIONICS LOWER, L (6113-01)		48%
	DOOR, AVIONICS LOWER, R 6114-01)		32%
	DOOR, AVIONICS UPPER, L (6211-01)		20%
	DOOR, AVIONICS, UPPER, R (6212-01)		63%
	DOOR, AVONICS, LOWER, AFT, L (6113-02)		67%
	DOOR, AVONICS, LOWER AFT, R (6114-02)		67%

WUC:
 MTBF: 6336.6
 MAP: 9470.7
 Date Run: 08/14/2013



Functional Systems Integrated Database (FSID)



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- **Additional Functionality**
 - **WUC Detail with Links to Associated Tracking and Trending**
 - **Parts Classification Details Analysis**
 - **Flight Hour Analysis by Tail Number or Location**
 - **Tail Number Analysis :Abort/CANN/Status/TCTO's etc**
 - **Communication: Forums / Website Notice / System Doc's**
 - **Alert: View Saved Alert Filters**
 - **Administration:**
 - **User/Data/Photo/Configuration/Navigation Management**
 - **Site Preferences/Transaction and Error logs**



Field Data Collection & Automation



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Aspire Tool Overview

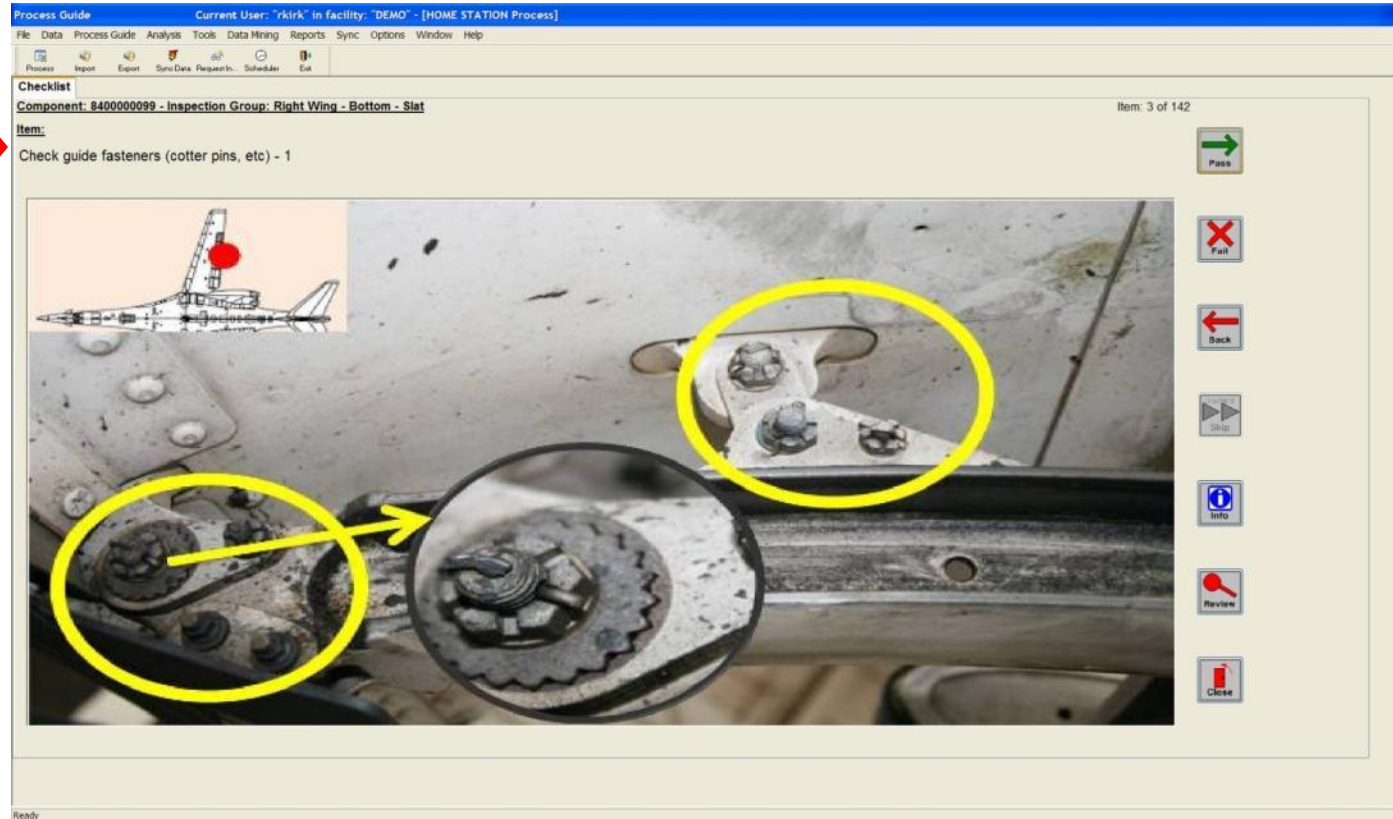


Aspire Visual Work Card



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Instructions



This is the process screen. In the upper left are the instructions that the mechanic/inspector follow for this step. An annotated picture is displayed further illustrating the step. On the right are the buttons that allow the person to pass/fail the item or access additional detail(next slide) about the operation.



Aspire Supporting Information



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The screenshot displays the Aspire software interface. At the top, the user is identified as "rkirk" in a "DEMO" facility. The main window shows a checklist item: "Component: 840000099 - Inspection Group: Right Wing - Bottom - Slat". The task is to "Check leading edge for corrosion, delamination (torn composite), cracks". A photograph of the aircraft's wing leading edge shows a yellowish, damaged area. An Adobe Reader window is open, displaying a technical document titled "11-2 (S7-51-00) SLATS". The document contains detailed descriptions of the slat sub-system, including its components and operation. A red arrow points to the "Info" button in the software's navigation pane, which is used to access additional supporting information for the current checklist item.

The user selected the info button to display additional details about the operation. The details can include head knowledge captured by experienced personnel, links to various TO/TM, Shop Work Instructions, illustrations, etc.



Aspire Data Collection



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Select Defective Part

The screenshot shows the Aspire Data Collection software interface. A red arrow points to the 'Issue' dropdown menu, which is open and displaying a list of defect types. The form fields are as follows:

Component	SubComponent	Part	SubPart
AIRFRAME	WING AND STRUT MIDSPAR FITTING - 11A00	AFT ACCESS HOLE-CENTER WING BL 30.5 R	WING STA. 700.5 L.H. AND R.H. - 11ARF

Location	Defect Type	Issue	Category
19	Damage	020-CUT, WORN, CHAFED, FRAYED OR TORN	Minor

Item Defect: AIRFRAME-WING AND STRUT MIDSPAR FITTING - 11A00-AFT ACCESS HOLE-CENTER WING BL 30.5 R FRAYED OR TORN Minor

Most common defects list (select item to replace defect)

NA
NA

Enables the mechanic/inspector to log standardized details about the individual defect. The screen can be configured to collected different data elements, take photos and annotate them, and route results (email, alerts, etc) to specific personnel for action.



Aspire Data Collection Focused References



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The screenshot displays the Aspire Data Collection software interface. The main window shows a defect entry for 'Component: 58-0051 - Inspection Group: Left Wing Leading Edge'. The defect description is 'Inspect IB FIRE SEAL-BELLOWS(BOOT) for defects'. The defect type is 'Damage' and the issue is '020-CUT, WORN, CHAFED, FRAYED OR TORN'. The defect is categorized as 'Minor'. A focused reference window is open, displaying a table of work unit codes and their corresponding descriptions. The table is titled 'AIRFRAME FIRELAGE (CONTINUED)' and lists various work unit codes and their descriptions. An arrow points to the 'NA' entry in the table.

WORK UNIT CODE	DESCRIPTION
11000	
11000	
1131B	COPILOTS SIDEWALL
1131C	APU EQUIPMENT CABINET (KC-RAT)
1131D	ELECTRICAL EQUIPMENT RACK
1131E	APU EQUIPMENT CABINET (100L APU)
1131G	INSTRUMENT PANEL
1131J	BOOM EMERGENCY HYDRAULIC PANEL
1131M	BOOM INSTRUMENT PANEL
1131R	AIR CONDITIONING PANEL
1131S	AIR CONDITIONING RELAY PANEL
1131T	OXYGEN REGULATOR PANEL
1131U	FUEL CONTROL PANEL LIGHT PLATE ASSEMBLY

Focused reference enable TO/TM to be opened directly to the volume/page needed regardless of the size of the TO/TM. This makes it easy to view TO/TM's on mobile devices, saves significant search time, minimizes training, and minimizes variability



Aspire Data Collection Corrective Action Prognostics



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Corrective Action

Search Corrective Action


Facility: TAFB

Part: 4070349

Model: %

Inspection: %

Group: %



Search

Close

Row 1 of 3					
ITN	Pass	Count	Process	Group	Delay?
1234		1	Tech Asst Request	%	<input type="checkbox"/>
TE7536	exp	2	Masking Wax	%	<input type="checkbox"/>
TEST2468	exp	5	Tape Masking	%	<input type="checkbox"/>

Add >

< Remove

Row 1 of 2					
ITN	Pass	Count	Process	Group	
1234		1	3 Tech Asst Req - All	%	G
TE4552	exp	2	Tape Masking	%	

Corrective actions are logged for each issue that is resolved upon correction.

Data collected when corrective actions are performed yields valuable root / cause data for future reference.

Corrective Action

Search Corrective Action

5 of 13 Group: Tape Mask

Defect: 4070349:DRIVE SHAFT:DRIVE SHAFT:DRIVE SHAFT:NA:NDI TYPES:Damaged Hole:Major:

Inspect Item: After both rings of tape have been applied around the inner heat shield, the interior of the drive shaft should look like this.

Inspect Result	User	Supervisor	ITN
FAIL	kwhite		TE4552

Date	Reinspect Date	Pass	Status
2/19/2014		exp	OPEN

Review Info: Hole does not meet requirements.


Workstation: Rework Manhrs: 1 (hours) 15 (minutes)

Work Card: TA144888569A Reinspect Time:

Responsible Workstation: CHR DWAX Repair Workstation: T200

Rework Cause: Corrosion Corrective Action: Blended Part

Rework Comments: Issue resolved.



This picture represents inspection step and may not represent actual defect

Next >

< Back

Skip

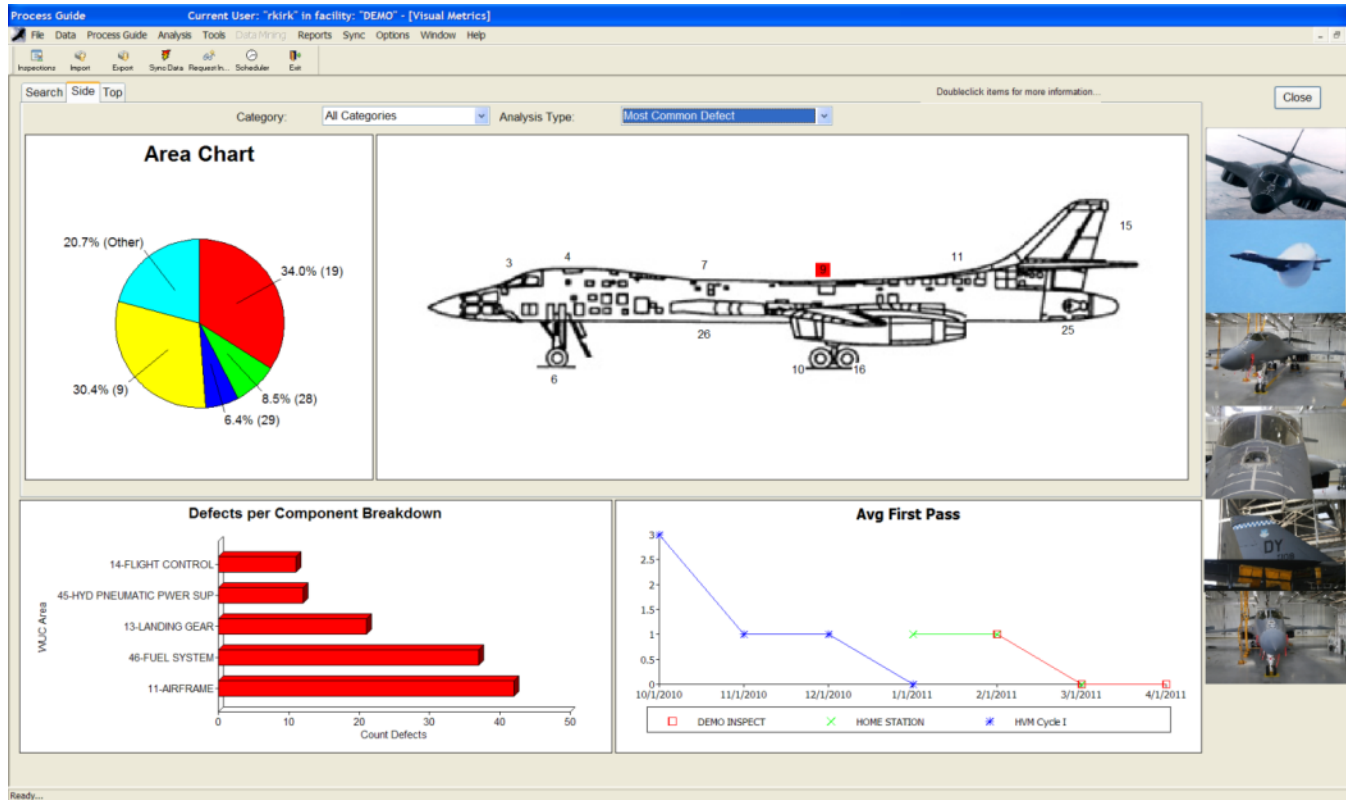
IM



Aspire Data Collection Analysis



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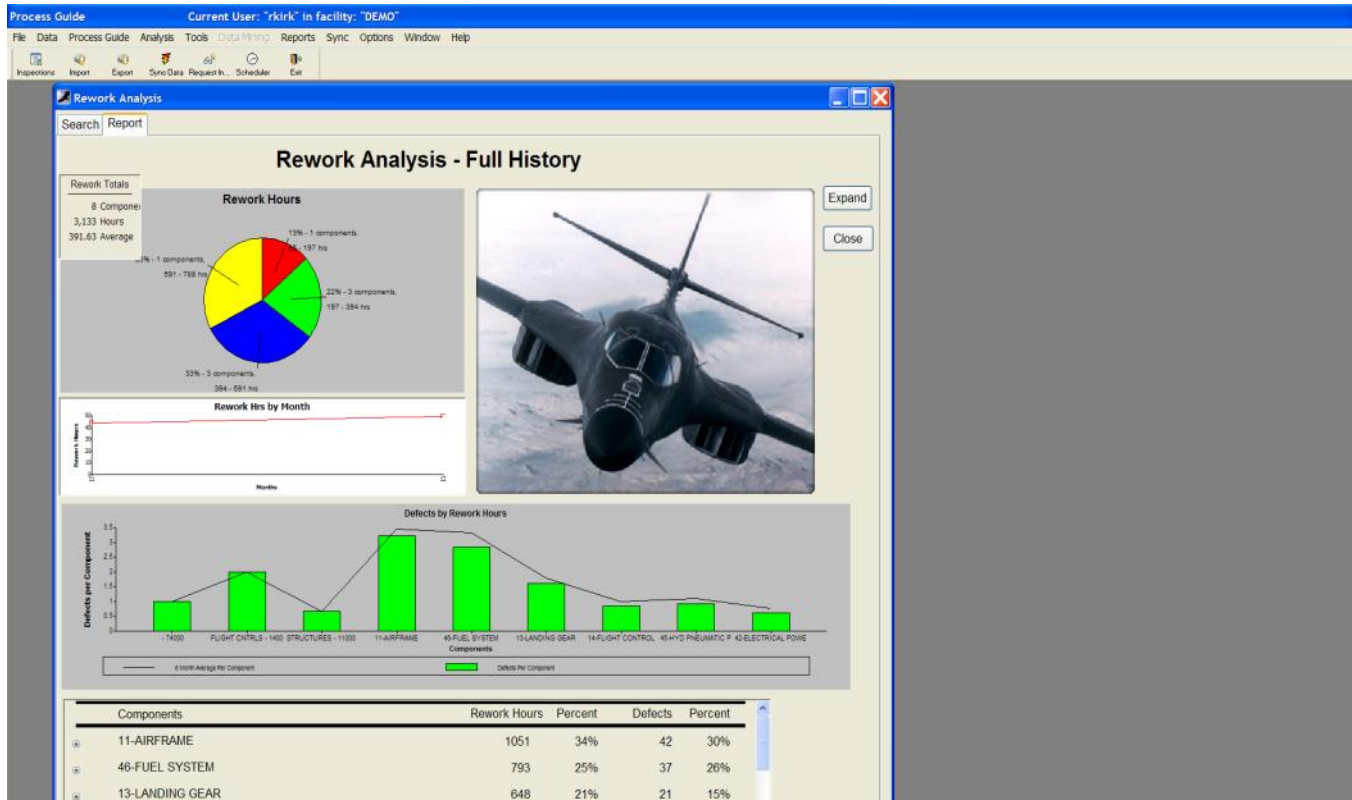


Because data is captured in a standardized format, real time analysis is possible without data mining. The information can be displayed in many different ways including area charts that overlay the defect onto the actual system. Double clicking areas enables drill down capability for root cause analysis.



Aspire Data Collection Analysis

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The rework analysis displays a snap concerning the health of the asset. It shows current month, historical trend, root cause, and drill down capability in a single chart. Multiple analysis options exist throughout the Process Guide.



Field Data Collection Project Points of Contact



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