

Structural Maintenance Information Management System (SMIMS)

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Improved Risk Analysis through Data Management



Development and Implementation of the Structural Maintenance Information Management System (SMIMS)

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via ASC/AESS PE**

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SMIMS Objectives



SMIMS focus is on capturing ASIP related data with emphasis on inspection and repair data

The A-10 was selected for the pilot project based on ASC/EN input

Objectives:

- Improved data collection, improved quality and integrity of data, and data relationships
- Improved data flow and data access, automated formatting for risk (PROF) type analyses and comparisons to DTA (AFGROW)
- Facilitate ASIP analyses, fleet management decision making

Methodology



- Develop data capture requirements with Sustainment Analysis group and ASC/EN
- Identify and Review capability of currently used engineering databases at Hill AFB
- Summarize existing best practices and document A-10 data shortfalls based on new MIL-STD-1530C requirements
- Identify all stakeholders and establish contact
- Develop alternative solutions & present recommendations to PM and customer

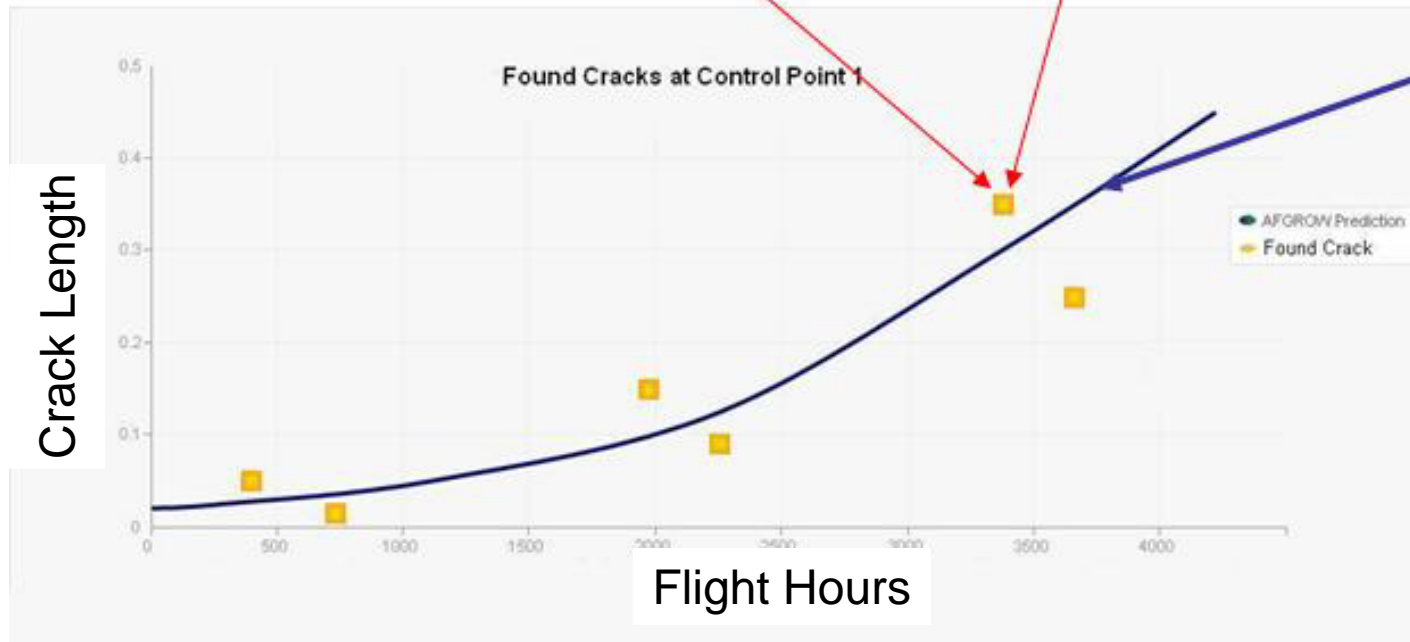
Principle Data Requirements

- Crack Lengths at Fatigue Critical Locations
- Location and severity of corrosion and other damages (material removal)
- Frequency of damage occurrence and repairs employed

Putting Data to Work

A-10 SMIMS

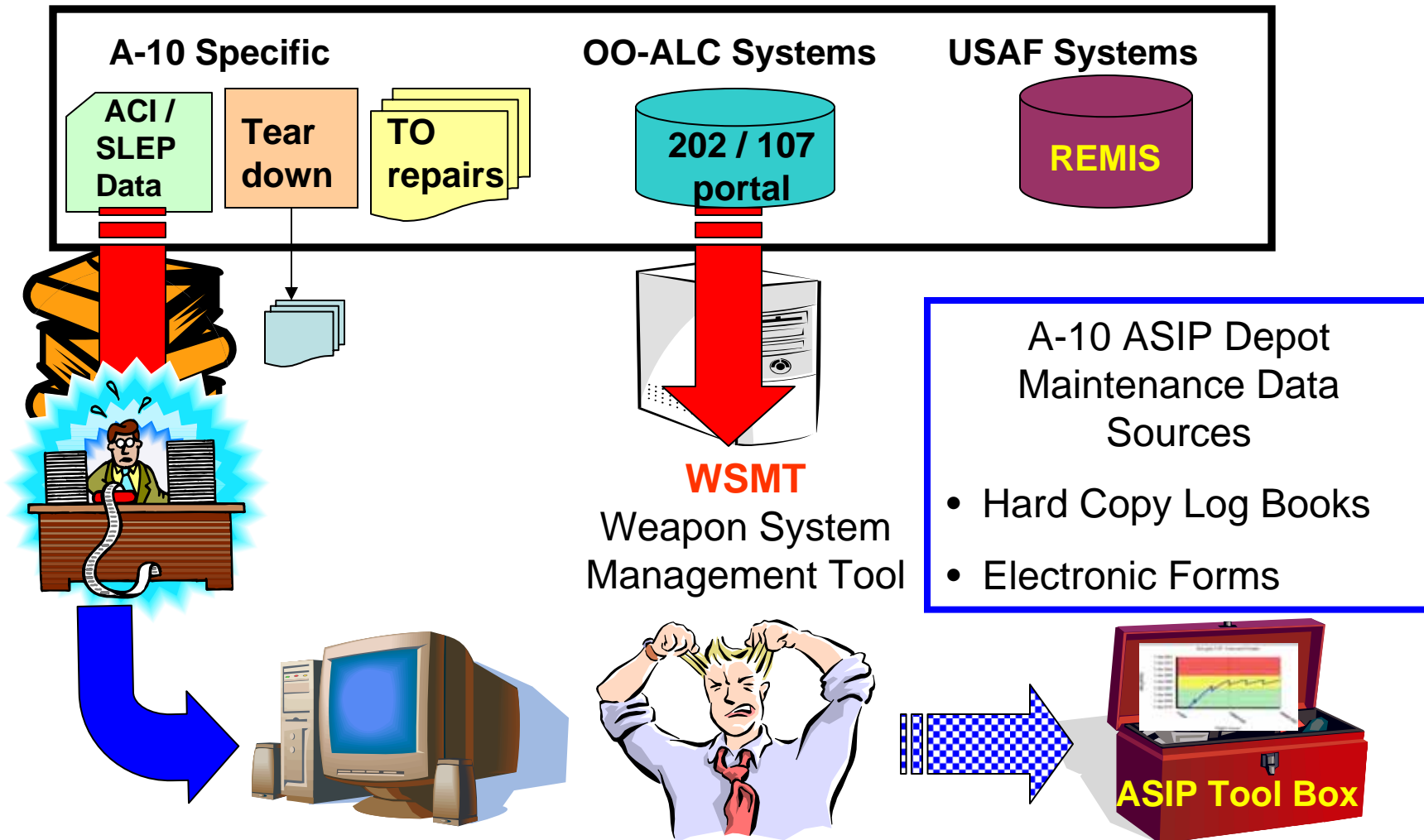
Tail	Flight Hours	Control Point	Type	Crack Size
78XXXXXXXX	3400	1	Hole Crack	0.335
78XXXXXXXX	3750	1	Hole Crack	0.256
78XXXXXXXX	2333	1	Hole Crack	0.147
78XXXXXXXX	1950	1	Hole Crack	0.097



AFGROW

A-10 ASIP MX Depot Maintenance Data Source Review

As-Is State

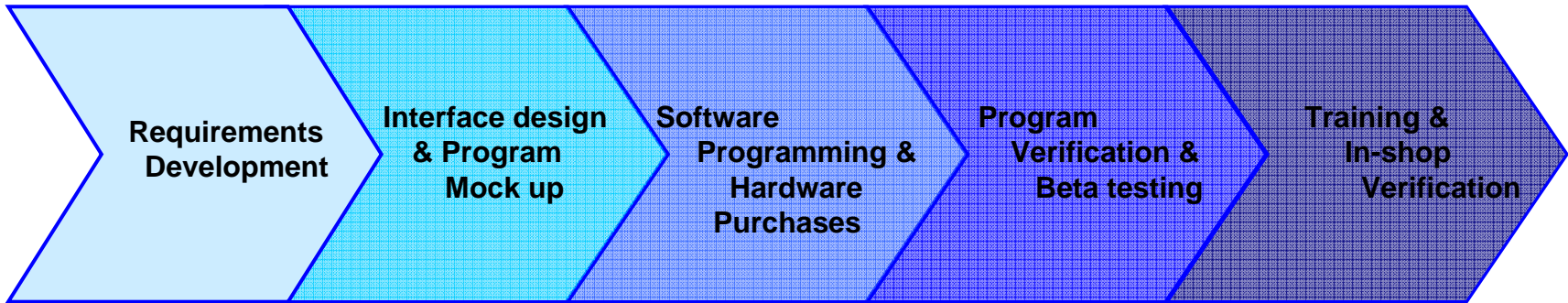


MX Data Collection

Leverage Successful Processes to Minimize Risk



Project Structure/Strategy:



<p>Identification of stakeholders</p> <p>Definitions of current and new processes</p> <p>Data to be collected</p> <p>Database requirements</p> <p>Hardware requirements</p>	<p>Design mock-up interface and share with users</p> <p>Design & layout program structure</p> <p>Identify changes to current process and procedures</p> <p>Start change documentation</p>	<p>Program software</p> <p>Research requirements, obtain concurrence from stakeholders and order computers or other hardware</p> <p>Internal program verification</p>	<p>Install software & hardware in test environment</p> <p>Conduct Beta test of the system and document problems</p> <p>Correct any system problems</p> <p>Verify software and hardware are operating correctly</p>	<p>Generate training material & perform training</p> <p>Install software and hardware in production environment</p> <p>Air Force validation & testing of system</p>
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Software Development Strategy



- Make life easy on engineers and maintenance:
 - user friendly GUIs
 - flexible reporting
 - graphing of data
- Where possible design new software so that it can interact with either SQL or Oracle
- Make sure all new software is sustainable
- Software will be property of government and must be well documented
- Standardized data entry to facilitate data searches
 - Dropdown menus instead of text entry

SMIMS – Product Concepts

202/107 Supplemental Form

Data Input: SPO & Liaison Engineers

Data Retrieval: Analysis Engineers

Need:

202/107 structural damage and maintenance data inconsistently and incompletely captured to be of direct and optimal use to analysis engineers

Query & Report Tool

Data Retrieval: Analysis Engineers

Need:

Analysis engineers do not have a consolidated, user-friendly query tool for data extraction, manipulation, trending, and reporting

Electronic SLEP/SSI

Data Input: NDI & MX Personnel

Data Retrieval: NDI, MX, & Analysis Engineers

Need:

Timely, consistent, and complete SLEP/SSI inspection, damage, and repair data is unavailable for analysis engineer use

Depot -3 Data Collection

Data Input: MX Personnel

Data Retrieval: MX Personnel & Analysis Engineers

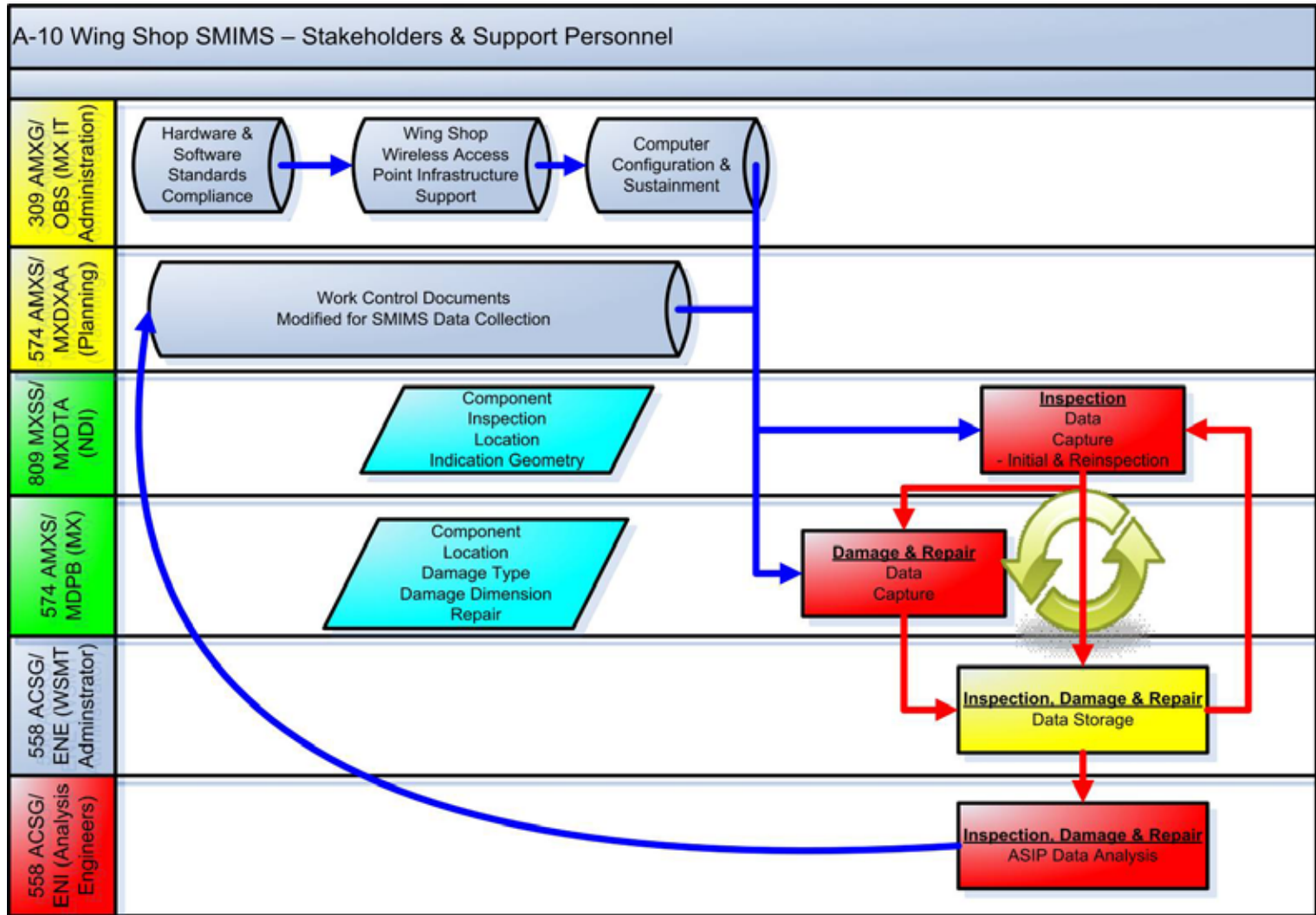
Need:

Analysis engineers have no visibility of Depot -3 structural damage and repair data (i.e. repair frequency, damage type, damage extent, etc...)

A-10 Wing Shop SMIMS Implementation & Support



S&K Technologies
Key Integrator



Electronic SLEP/SSI Data Collection



A-10 Need:

Timely, consistent, and complete Service Life Extension Program (SLEP)/Scheduled Structural Inspection (SSI), damage, and repair data is unavailable for direct and optimal use by analysis engineers.

FY07 Product Benefits:

- Provides a means for capturing timely, consistent and complete SLEP inspection, damage, and repair data in a standardized and searchable format for simple retrieval by analysis engineers
- Eliminates the transcription work engineering performs to place paper SLEP log data into useful electronic form
- E-SLEP screens identify and provide a means for capturing additional key structural data required by analysis engineers
- Identifies the data source (method of measure) to assess the data quality

Electronic Depot -3 Structural Data Capture



A-10 Need:

Analysis engineers have no visibility of Depot -3 structural damage and repair data (i.e. repair frequency, damage type, damage extent, etc...) for use in individual aircraft and fleet wide structural health assessments.

FY07 Product Benefits:

- Provides a means for capturing timely, consistent and complete Depot -3 damage and repair data in a standardized and searchable format for simple retrieval by analysis engineers which would otherwise be unavailable
- Data provides more complete visibility of individual aircraft and fleet wide structural health in the full context of Form 202 and ACI SLEP inspections, damage and repairs
- Near “real time” visibility of aircraft condition allows for faster engineering dispositions and improved maintenance planning which will permit faster and more consistent throughput of aircraft, wings and other commodities

Work Control Document Mods




- 143 WCD require addition of one or more SMIMS data collection statements
 - Submitted to A-10 Wing Shop Planning supervisor
 - Modifications on a “best effort” basis
 - 105 WCD identified as higher priority for modification

Typical Work Flow



- Most WCDs require 2 or more SMIMS instruction statements
 - Inspection Function
 - Document inspection findings on SLEP 1 (SMIMS) inspection data form
 - Repair Function – Prior to Repair
 - Measure and document initial size data of holes on SLEP 1 (SMIMS) Inspection data form prior to repair
 - Repair Function – Post Repair
 - Measure and document final size data of holes and method of repair on SLEP 1(SMIMS) inspection data form after accomplishing repair


TO Repair Damage Input Screen





SMIMS

[Home](#) [Projects](#) [-3 Projects](#) [Reports](#) [Configuration](#)




-3 Repair Log

General Data
Today's Date:  Component:  Work Control Document Number: ITN:

Discrepancy Location
Serial Number: Discrepancy Location: 
  [No response provided yet]

Discrepancy
Discrepancy Type: 

Damage Description

Attachments
 Description:
 Description:
 Description:

TO Repair Damage Input Screen



-3 Repair Log

General Data

Today's Date: <input type="text" value="10/10/2007"/>	Component: <input type="text" value="LH Wing Outer Panel"/>	Work Control Document Number: <input type="text" value="121212"/>	ITN: <input type="text" value="121212"/>
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Discrepancy Location

Serial Number: <input type="text" value="00B6201212L"/>	Discrepancy Location: <input type="text" value="Skin"/> <input type="text" value="Upper Skin"/>	WS: <input type="text" value="120"/> to <input type="text" value="122"/> Distance from: <input type="text" value="Aft Spar"/> in the <input type="text" value="Please Select"/> direction (in) <input type="text" value="4.5"/> Hole Affected (if applicable) Common to: <input type="text" value="Please Select"/> Annotate Damage Location: <input type="text" value="lower surface of upp"/>
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Discrepancy

Discrepancy Type: <input type="text" value="Corrosion"/>	Corrosion Data Length (inches): <input type="text" value="1.0"/> Width (inches): <input type="text" value=".75"/>
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Damage Description

Attachments

	<input type="text"/>	<input type="button" value="Browse..."/>
Description: <input type="text"/>		
	<input type="text"/>	<input type="button" value="Browse..."/>
Description: <input type="text"/>		
	<input type="text"/>	<input type="button" value="Browse..."/>
Description: <input type="text"/>		

TO Repair Data Input Screen

Discrepancy

Discrepancy Type:
Crack

Crack Data

Crack Type: **Surface Crack**
Crack Size: **0.33**
Orientation:

Damage Description

Repair Data

202 Generated **Work Completed**

Doubler Replace Fastener
 Grind Out Replace Part
 Oversize Fastener Other
 Bushing

TO Number: Repair Figure Number:

Repair Description

Installed two 8.0" long, .071 thick 7075-T6 angle doublers with 3/16" hi-loks IAW -3-1 TO.]

Attachments

Description:

Description:

Description:

Hurdles - Cleared

- If reliable data collection was easy, SMIMS would have implemented long ago



Misconceptions
& Established
Business
Practice
Monuments



IT NDAA &
Security
Protocol
Compliance



Stakeholder
Acceptance,
Integration &
Arbitration



A-10 Wing
Shop IT
Infrastructure
Preparation

Impact to the A-10 SPO and AF



- ASIP managers and analysts will have visibility to critical repairs and can track damage trends
- Maintenance personnel and planners can anticipate workload on incoming aircraft or commodities
- Uniform capture of detailed repair data will enable AF to anticipate fleet problems in time to mitigate risk through increased inspections and structural modifications.

Migration to other Weapon Systems

- Any data collection system cannot be built as 'one size fits all' application
- Each weapon system is unique and any data collection system must dovetail into existing processes and infrastructure
- Buy-in by all stake holders is paramount
- Data quality and relevance to ASIP analysis is the key
- SMIMS in part or in whole can be tailored to meet the MIL-STD-1530C requirement needs for other aircraft systems

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- Ian Richardson, 574 AMXS/MDPB
- Danny Andersen, 508 ACSS/GFEAF
- Joe Gallagher, ASC/EN (retired)

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