Presented to:

RAM VI Workshop

Aviation System Assessment Program (ASAP)

Approved for public release; distribution unlimited

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

October 2013

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ASAP Lead

U.S. Army Aviation and Missile Research, Development, and Engineering Center

What is ASAP?

ASAP provides *Reliability, Availability and Maintainability (RAM)* performance data for parts, systems, individual aircraft and Aviation fleets.

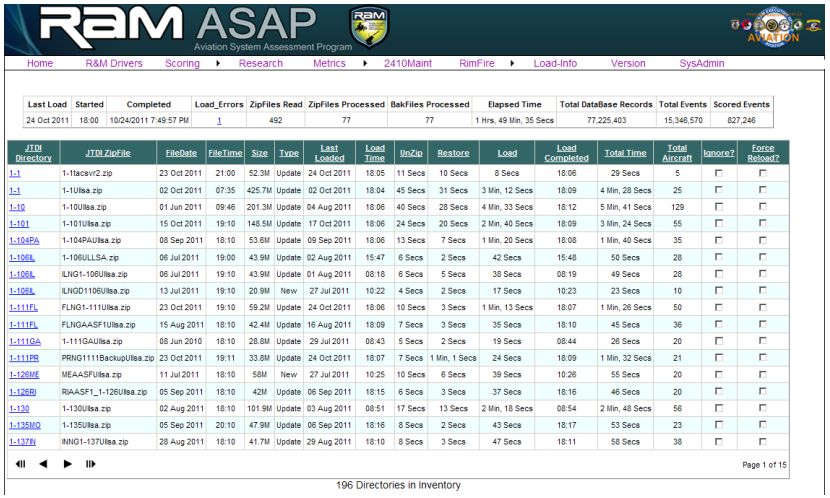
Objectives

- Transform logbook data into Reliability and Maintainability Metrics.
- Quantify fleet/sub-fleet Reliability and Maintenance Performance.
- Identify and Analyze Reliability and Maintenance Drivers.
- Provide customers a central location for RAM Data.

Products

- Readily identifies poor performing components.
- Identifies failure causes and maintenance problems.
- Assesses Mean Time Between Removals (MTBR) and Time-on-Wing.
- Used to assess actual return on investment (ROI).
- Used for inspection analysis and data based review of historical performance

ASAP Database Data Source


RAM ASAP
Aviation System Assessment Program

Home | R&M Drivers | Scoring | Research | Metrics | 2410Maint | RimFire | Load-Info | Version | SysAdmin

Last Load	Started	Completed	Load_Errors	ZipFiles Read	ZipFiles Processed	BakFiles Processed	Elapsed Time	Total DataBase Records	Total Events	Scored Events
24 Oct 2011	18:00	10/24/2011 7:49:57 PM	1	492	77	77	1 Hrs, 49 Min, 35 Secs	77,225,403	15,346,570	827,246

JTDI Directory	JTDI ZipFile	FileDate	FileTime	Size	Type	Last Loaded	Load Time	UnZip	Restore	Load	Load Completed	Total Time	Total Aircraft	Ignore?	Force Reload?
1-1	1-1tacsvr2.zip	23 Oct 2011	21:00	52.3M	Update	24 Oct 2011	18:05	11 Secs	10 Secs	8 Secs	18:06	29 Secs	5	☐	☐
1-1	1-1Ulsa.zip	02 Oct 2011	07:35	425.7M	Update	02 Oct 2011	18:04	45 Secs	31 Secs	3 Min, 12 Secs	18:09	4 Min, 28 Secs	25	☐	☐
1-10	1-10Ulsa.zip	01 Jun 2011	09:46	201.3M	Update	04 Aug 2011	18:06	40 Secs	28 Secs	4 Min, 33 Secs	18:12	5 Min, 41 Secs	129	☐	☐
1-101	1-101Ulsa.zip	15 Oct 2011	19:10	148.5M	Update	17 Oct 2011	18:06	24 Secs	20 Secs	2 Min, 40 Secs	18:09	3 Min, 24 Secs	55	☐	☐
1-104PA	1-104PAUlsa.zip	08 Sep 2011	18:10	53.6M	Update	09 Sep 2011	18:06	13 Secs	7 Secs	1 Min, 20 Secs	18:08	1 Min, 40 Secs	35	☐	☐
1-106L	1-106ULLSA.zip	06 Jul 2011	19:00	43.9M	Update	02 Aug 2011	15:47	6 Secs	2 Secs	42 Secs	15:48	50 Secs	28	☐	☐
1-106L	ILNG1-106Ulsa.zip	06 Jul 2011	19:10	43.9M	Update	01 Aug 2011	08:18	6 Secs	5 Secs	38 Secs	08:19	49 Secs	28	☐	☐
1-106L	ILNGD1106Ulsa.zip	13 Jul 2011	19:10	20.9M	New	27 Jul 2011	10:22	4 Secs	2 Secs	17 Secs	10:23	23 Secs	10	☐	☐
1-111FL	FLNG1-111Ulsa.zip	23 Oct 2011	19:10	59.2M	Update	24 Oct 2011	18:06	10 Secs	3 Secs	1 Min, 13 Secs	18:07	1 Min, 26 Secs	50	☐	☐
1-111FL	FLNGAASF1Ulsa.zip	15 Aug 2011	18:10	42.4M	Update	16 Aug 2011	18:09	7 Secs	3 Secs	35 Secs	18:10	45 Secs	36	☐	☐
1-111GA	1-111GAUlsa.zip	08 Jun 2010	18:10	28.8M	Update	29 Jul 2011	08:43	5 Secs	2 Secs	19 Secs	08:44	26 Secs	20	☐	☐
1-111PR	PRNG1111BackupUlsa.zip	23 Oct 2011	19:11	33.8M	Update	24 Oct 2011	18:07	7 Secs	1 Min, 1 Secs	24 Secs	18:09	1 Min, 32 Secs	21	☐	☐
1-126ME	MEAASFUlsa.zip	11 Jul 2011	18:10	58M	New	27 Jul 2011	10:25	10 Secs	6 Secs	39 Secs	10:26	55 Secs	20	☐	☐
1-126RI	RIAASF1_1-126Ulsa.zip	05 Sep 2011	18:10	42M	Update	06 Sep 2011	18:15	6 Secs	3 Secs	37 Secs	18:16	46 Secs	20	☐	☐
1-130	1-130Ulsa.zip	02 Aug 2011	18:10	101.9M	Update	03 Aug 2011	08:51	17 Secs	13 Secs	2 Min, 18 Secs	08:54	2 Min, 48 Secs	56	☐	☐
1-135MQ	1-135Ulsa.zip	05 Sep 2011	20:10	47.9M	Update	06 Sep 2011	18:16	8 Secs	2 Secs	43 Secs	18:17	53 Secs	23	☐	☐
1-137N	INNG1-137Ulsa.zip	28 Aug 2011	18:10	41.7M	Update	29 Aug 2011	18:10	8 Secs	3 Secs	47 Secs	18:11	58 Secs	38	☐	☐

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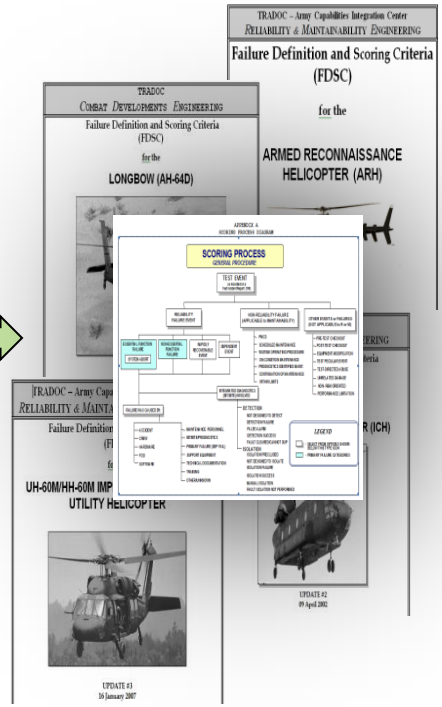
196 Directories in Inventory

- The ASAP Database is updated nightly.
- Supplies a list of JTDI files that have been loaded into the ASAP Database
  - Data from 254 JTDI Directories(Units)
- Provides "FileDate" so the user knows which units have the most up-to-date data available.
- Over 22 Million Maintenance Events available for analysis.

ASAP Information Flow

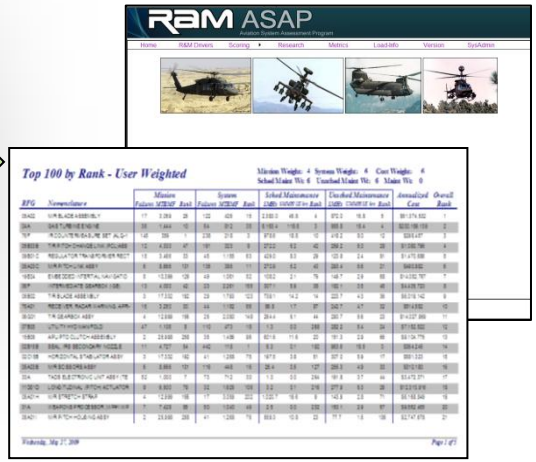
PMs identify the sample required

Logbook data is pulled from the top tier



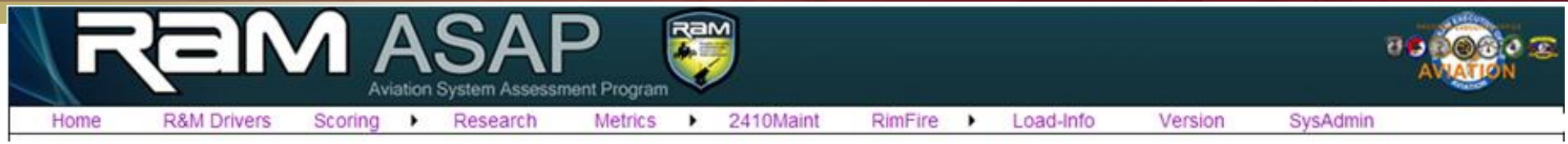
Data is scored against FDSC criteria. WUCs and malfunction effect codes are assigned.

Scored data is stored into a database that generates top drivers



PMs use drivers to help identify candidates for upgrade, monitoring or improvement as well as follow-up post implementation

ASAP Database Capabilities



Analyzed 13-1 Maintenance Events

- R&M Drivers
- R&M Metrics
- Logistics Metrics
- Trend Metrics
- Continuation Metrics

2410 Analysis

- Component Reports
- Part Number Reports
- Removals by Unit Report
- Removals by Model Report
- Reason for Removal Report
- Cleansed Data Listing

Supply Analysis

-Usage data

- Projections

ASAP Database Capabilities

- Analyzed 13-1 Maintenance Events

– R&M Drivers- Estimates Reliability KPPs based on analyzed maintenance records and component listings for each metric.
– R&M Metrics- Query based Reliability KPP estimates for both weapon system and WUC based on analyzed maintenance records
– Scored Data Comparison – Compare different Models, Configurations, Environments, etc.
–Logistics Metrics- Remove vs Replace data for WUC based on analyzed maintenance records.
–Trend Metrics- View the reliability of a WUC code over time by month or by quarter based on analyzed maintenance records.
– Continuation Metrics- View WUC that require follow on maintenance and difficult to troubleshoot WUC.

ASAP Process Flow

Aircraft Data

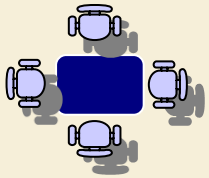
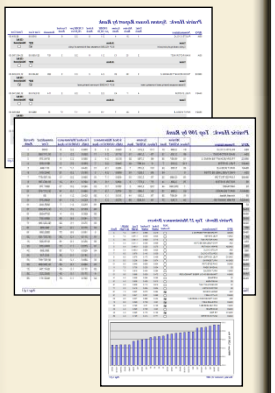
- Maintenance event data
- Aircraft Status
- Corrective Actions

Life Limited / Critical Safety Item Data

Failure Definition and Scoring Criteria

Work Unit Code List

ASAP Analysis

Automated Input	Manual Scoring	Automated Output
ASAP Software • Stores Data • Converts Raw Data to Usable Format • Correct blatant errors	Army Maintainer and RAM Engineer • Attributes Maintenance Action to Hardware • Assign Severity • Correct Mistakes	ASAP Software • Tailored Reports • Top drivers • Comparative Analysis
	Contact field for Clarification (If Needed) Quality Control Peer Review 	

Part / Component RAM Metrics

- Mission Abort Rate
- Mission Affecting Failures
- Maintenance Manhours
- Maintenance Time
- System Failures

Fleet Drivers

- Operational Tempo
- Environmental Factors
- Age Related Failures
- Trending
- Potential Failures

Fact Based Decision Making

- Component Upgrades
- Maintenance Changes
- Resource Allocation
- Business Case Analysis

Reliability Improvement Program

- Where is Improvement Needed?
- Take Advantage of Past Efforts

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Aviation System Assessment Program

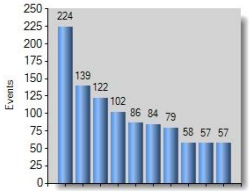
Home | R&M Drivers | Availability | Scoring | Research | Metrics | Load-Info | Version | SysAdmin

---- AsOf: 21 Sep 2010 06:00 ----
Last Scored Event: 01 Nov 2009

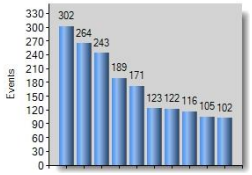
AH-64 Apache Top Reliability-Drivers

FlightHours	MTBMA	MTBMA (w/o AWS&ASE)	MTBMAF	MTBSF	MTBEMA
95031.5	50	55	25	15	10

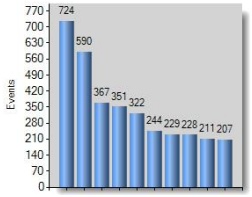
Mission Abort Drivers



Mission Affecting Failure Drivers



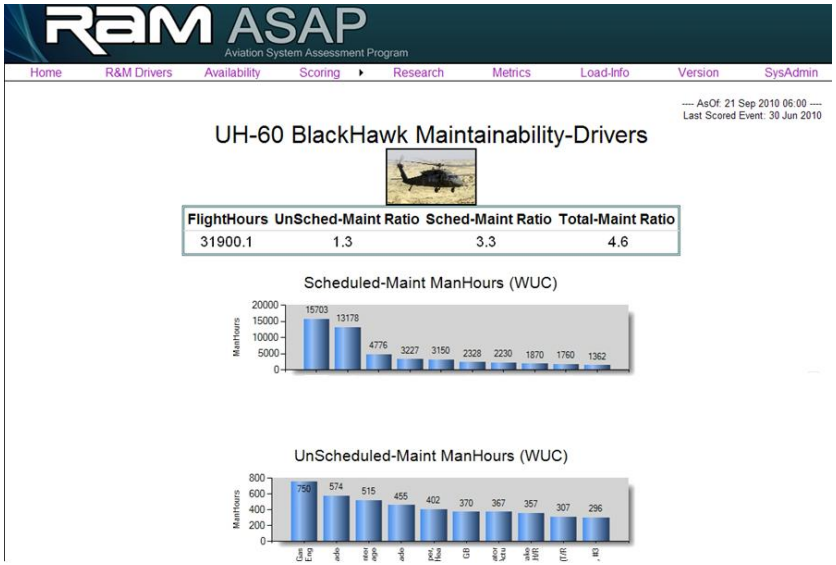
System Failure Drivers



* Results have been modified, for illustration purposes only

- **One stop for fleet wide R&M metrics**
- **Charts showing top Reliability and Maintainability degraders for each metric by Work Unit Code are available**
- **Provides capability to drill down from a bar on the chart to the actual 13-1 Maintenance Event**

Platform	Serial Numbers	Maint Events	Analyzed Hours
Apache	941	6,799,277	154,140
BlackHawk	2048	8,586,262	84,875
Chinook	650	2,501,409	123,383
Kiowa Warrior	577	3,526,799	80,755



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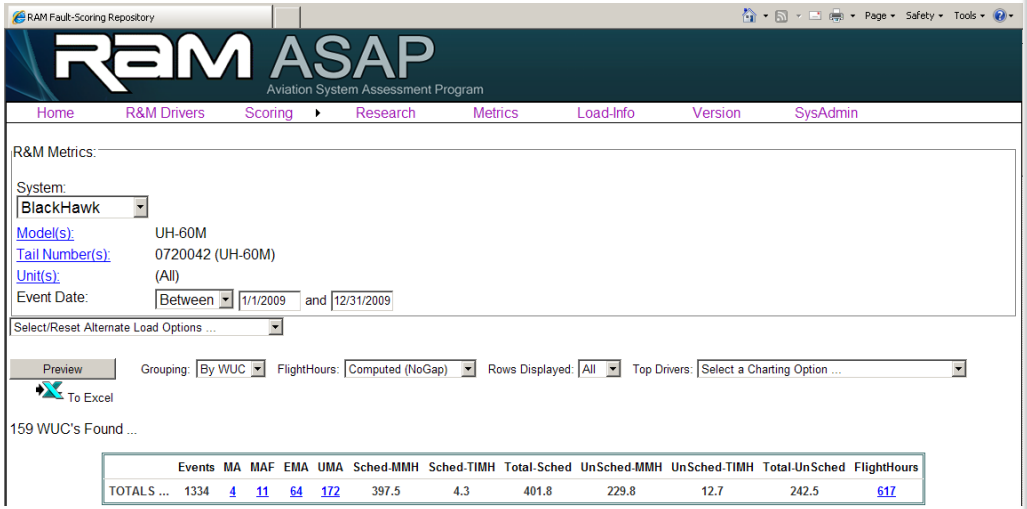
R&M Metrics



- **R&M metrics can be queried by Models, Tail Numbers, Date Ranges, or any combination of those fields.**
- **Provides ability to load multiple TNs with different dates to aid in analyzing Mods.**
- **Top R&M Driver charts can be created from the selected data set.**
- **Provides ability to drill down to the 13-1 maintenance actions that form each metric and export to Excel.**

WUC	WUC Nomen	Quad	Events	MA	MAF	EMA	UMA	Sched Maint		Sched MMH	Sched TIMH	Total Sched		UnSched MMH	UnSched TIMH	Total UnSched
05A03A	Swashplate , M/R Controls	X	2	0	0	0	0	2	----	0.4	0	0.4	----	0	0	0
06E	Input Module	X	1	0	0	0	0	1	----	0.1	0	0.1	----	0	0	0
06F	Intermediate Gearbox (IGB)	X	22	0	0	1	2	19	----	4.7	0	4.7	----	2.6	0.1	2.7
04A	Gas Turbine Engine	X	37	0	0	2	3	17	----	18	0	18	----	9	1.2	10.2
15	Auxiliary Power Plant (APU) ...		1	0	0	0	0	1	----	0.1	0	0.1	----	0	0	0
15A	APU Installation		2	0	0	0	0	2	----	0.2	0	0.2	----	0	0	0
15B06	APU HOUR METER		14	0	0	0	0	14	----	1.3	0.5	1.8	----	0	0	0

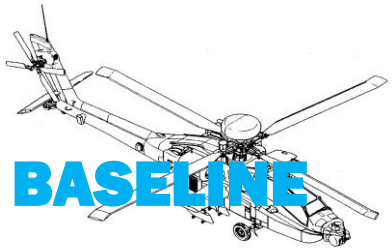
Recapitalization Example

	Mean Time Between Mission Aborts	Mean Time Between Mission Affecting Failures	Mean Time Between Essential Maintenance Actions	Mean Time Between System Failures
Non-Recap	**32.3**	**18.8**	**5.6**	**2.8**
Recap	**53.3**	**[illegible]**	**7.5**	**3.9**
Percent Improvement	**65%**	**[illegible]64%**	**33.9%**	**39.3%**

Total Maintenance			
	Total Maintenance Man Hours	Total Flight Hours	Maintenance Ratio
Non-Recap	12,333	3,782	3.3
Recap	12,987	4,741	2.8
Percent Improvement			**18.2%**

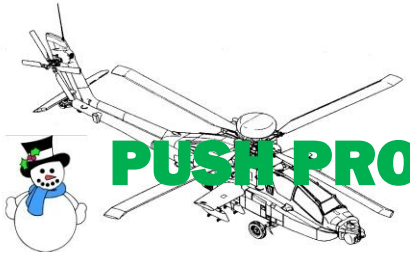
Unscheduled Maintenance			
	Maintenance Man Hours	Total Flight Hours	Maintenance Ratio
Non-Recap	3,516	3,782	0.93
Recap	3,290	4,741	0.69
Percent Improvement			**18.2%**

Push Projection



BASELINE

RAM metrics of current fleet is established in current environment



PUSH PROJECTION

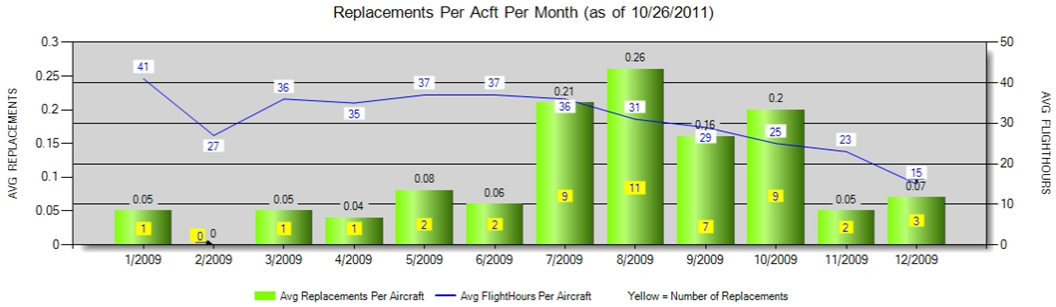
New RAM metrics are projected for the changes to the fleet

- **Model Change**
- **Environmental Changes (Desert, Humidity, Altitude, Gross Weight Changes)**
- **Operational Tempo Changes (higher monthly rate of flying)**

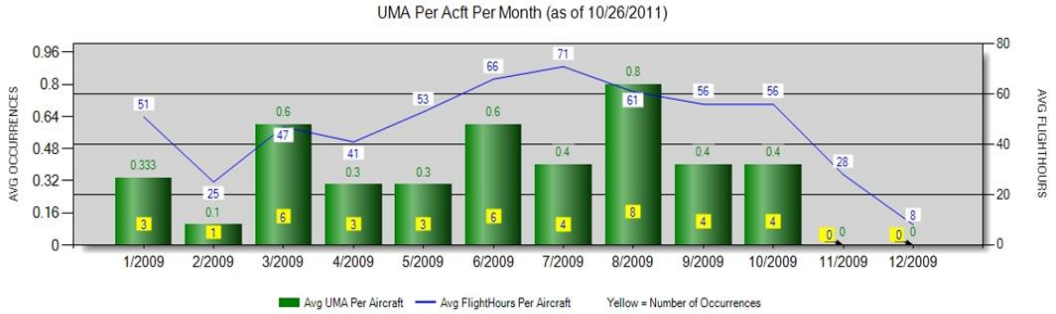
			AMS AH-78							
			AH-78		AH-78		AH-78XU		AH-78X RANGE	
RAM Parameter	AH-78D BASELINE	AH-78D Block 4	CURRENT Environ	NEW Environ	CURRENT ASE	NEW ASE	CURRENT ASE	NEW ASE	MIN	MAX
MTBUMA	1.1	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
MTBEMA	2.4	2.6	2.8	2.8	2.7	2.7	2.8	2.8	2.7	2.8
MTBMAF	7.1	7.7	8.2	8.3	8.1	8.1	8.4	8.2	8.1	8.4
MTBF(S)	3.0	3.2	3.4	3.5	3.4	3.4	3.5	3.5	3.4	3.5
MTBF(M)	17.5	18.8	19.4	19.5	19.1	19.5	20.2	19.7	19.1	20.2
MTTRuma (4)	1.3	1.3	1.3	1.3						
MTTRema (4)	1.9	1.8	1.9	1.8	1.9					
MMH/FH (5)										
Scheduled	4.26	4.26	4.26	4.26	4.26					
Unscheduled	4.14	3.94	3.33	3.25	3.41					
Total MMH/FH	**9.4**	**8.2**	**7.6**	**7.5**	**7.7**					

- Changes are projected from proven methodology used to determine requirements for new aircraft
- Failure rates of ALL components affected by the new environment or optempo are changed to determine an overall RAM Fleet impact.
- Affects Spare Part Considerations

Analyzed 13-1 Maintenance Events



Track Component Replacements per Month or Quarter



Track Component Reliability Metrics per Month or Quarter

910 WUC's Found ...

	Continuations	FlightHours
TOTALS ...	1882	8117.7

WUC	WUC Nomen	Continuations
02B39	APU Inlet Screen	8
19H11	TSEC/KY-100	8
07A41A	Pressure Switch, Collective Boost Actuator	7
11D13	Left Tie Rod, M/R Primary Controls	7
09A01C	AC Generator Current Transformer	6
02B14	Engine Firewall	6
18A02A	VCAS Electronic Unit	6
19E01A	ADF Receiver	6
19O02A	Avionics Control Panels	6

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Rank Components that require the most follow on maintenance and could be difficult to troubleshoot.

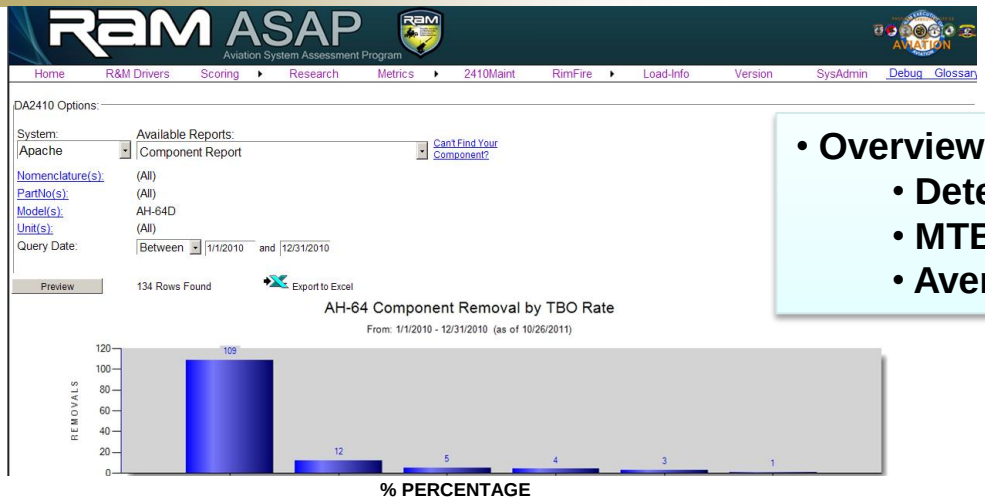
* Results have been modified, for illustration purposes only

ASAP Database Capabilities

- 2410 Analysis

– Component and Part Number Reports - Estimates on Mean Time Between Removal (MTBR), Mean Time Between Chargeable Removal (MTBRC) , Average Time Since New (AVG_TSN), Number of Removals (REMS), Number of Chargeable Removals (REMSC), Percentage of Removals for Time Change Out/Retirement (TBO_RATE), and Cost per Flight Hour by component or part number. Also a breakdown of reasons for removal.
– Removals by Unit Report- Table format of component/part number removals by UIC, Unit, Quantity, and Percent.
– Removals by Model Report – Table format of component/part number removals by Model
– Reason for Removal Report - Query 2410 data to determine which components/part numbers were removed the most for certain Fail Codes
– Cleansed Data Listing- Table format of cleaned DA-2410 data that the queries are based on.

Component/Part Number Report



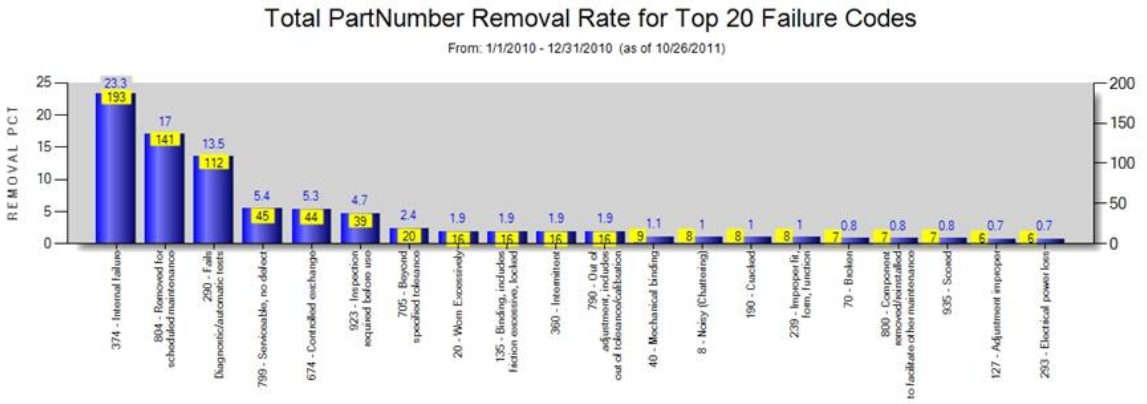
- **Overview for each component/part number**
  - **Determine which components are making TBO.**
  - **MTBR and MTBRc estimates for each part.**
  - **Average Age for each component.**

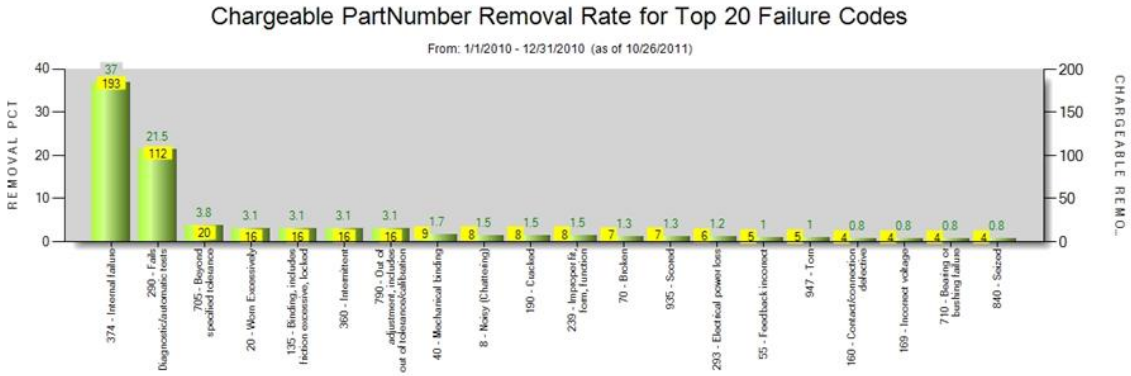
PLATFORM	NOMENCLATURE	WUC	MTBR	MTBRc	AVG_TSN	REMS	REMSc	TBO_RATE	COST_FLT_HR	SCHED_RC_TC
X	ROD END DAMPER	'05A01Z01	593.5	1277	846.3	3,178	1,476	0.01	0.263	13913 HOUR RETIREMENT
X	LEAD LAG LINK ASSY	'05A01I01	383.6	743.1	2291	2,370	1,224	0.008	20.33	10732 HOUR RETIREMENT
X	M/R BLADE PIN	'05A02H	1502	2467	1995	1,454	885	0.009	0.225	6310 HOUR RETIREMENT
X	TRUNNION DAMPER	'05A01W	692.9	2151	985	2,421	780	0.224	0.2	1473 HOUR RETIREMENT
X	LEAD LAG DAMPER	'05A01Z	809	2784	1348	2,430	706	0.149	2.175	2057 HOUR RETIREMENT
X	M/R BLADE	'05A02	646.5	1559	2074	1,676	695	0.011	173.8	4506 HOUR RETIREMENT
X	M/R PITCH LINK ASSY	'05A03C	1134	2200	3533	1,089	561	0	1.513	ON CONDITION
X	CONTROL ARM ASSY	'05A03B01	1039	1253	1954	491	408	0	1.725	ON CONDITION
X	BEARING SUPPORT MIXER	'11D27	1271	1640	1459	456	354	0	1.288	ON CONDITION

* Results have been modified, for illustration purposes only

Component/Part Number Report

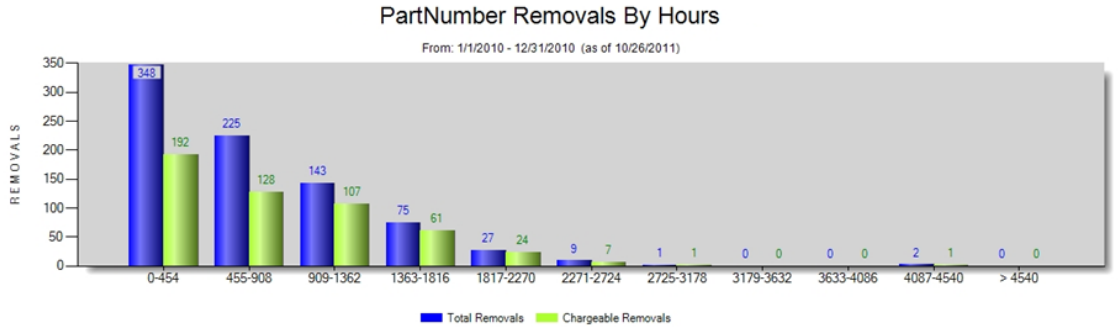
Determine Removal Drivers for each part





Determine Failure Drivers for each part.

Plot Histograms of component lives



Replacements by Unit

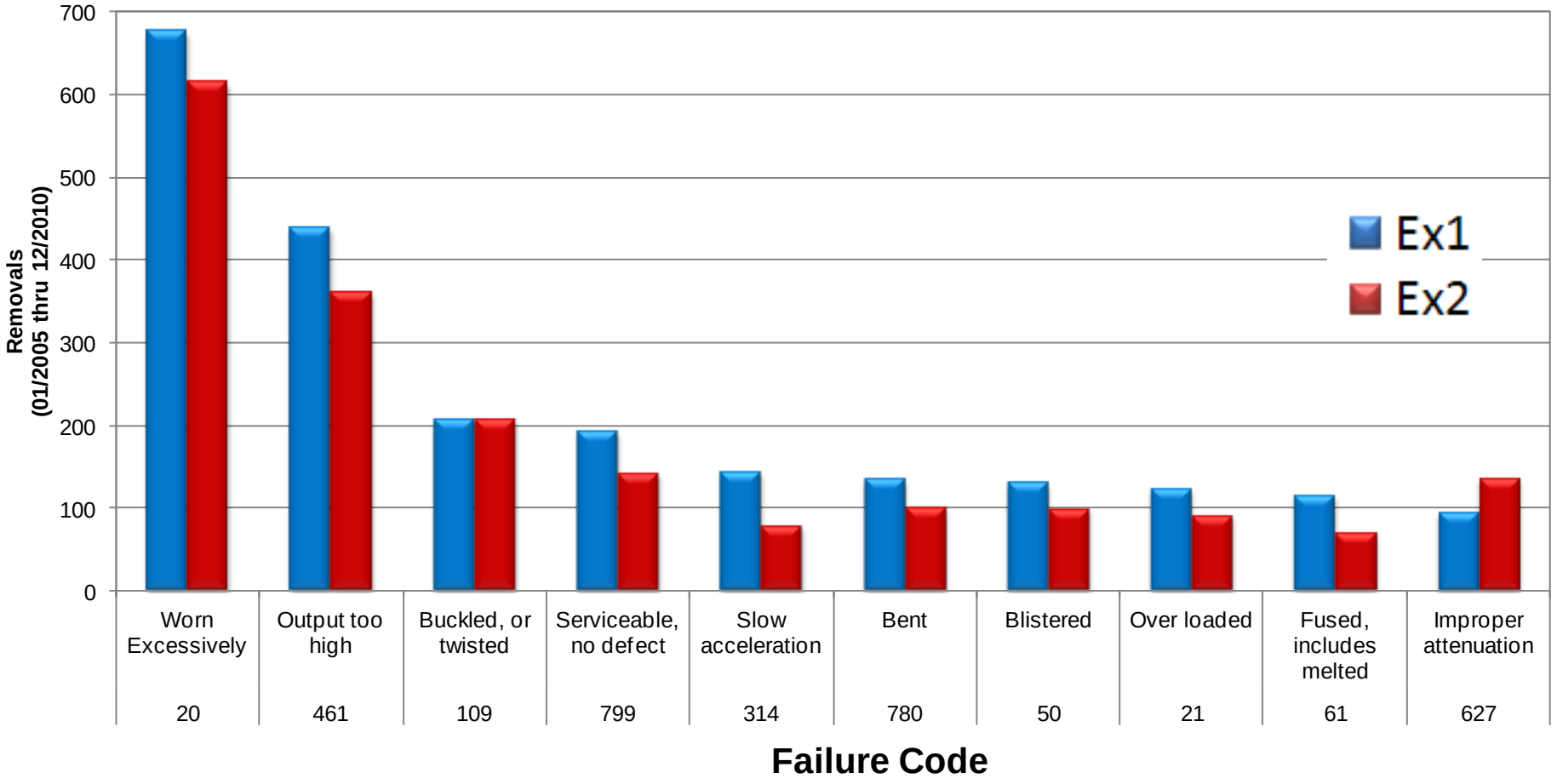
UNIT	QUANTITY	PERCENT
CCAD	1,926	6.9%
AMCOM/OLR EAST	1,488	5.3%
FT DRUM RESET	1,446	5.2%
FT CAMPBELL DOL/ALMD	757	2.7%
TEMPLE OLR RESET	729	2.6%
FT LEWIS OLR	656	2.3%
FT BRAGG OLR	645	2.3%
FT BRAGG DOL	518	1.8%
CCAD	474	1.7%
CT-AVCRAD	458	1.6%
FT HOOD ALMD, DS2	373	1.3%
1107TH AVCRAD	323	1.2%
FT HOOD DOL RESET	208	0.7%
GERMANY OLR	165	0.6%
LSI	163	0.6%
OLR	162	0.6%
CA AVCRAD	156	0.6%

* Results have been modified, for illustration purposes only

DOL (Directorate of Logistics)
ALMD (Aviation Logistics Management Division)
LSI (Logistics Systems Incorporated)

Removals By Model

Top 10 Chargeable Failure Codes



Reason for Removal Report

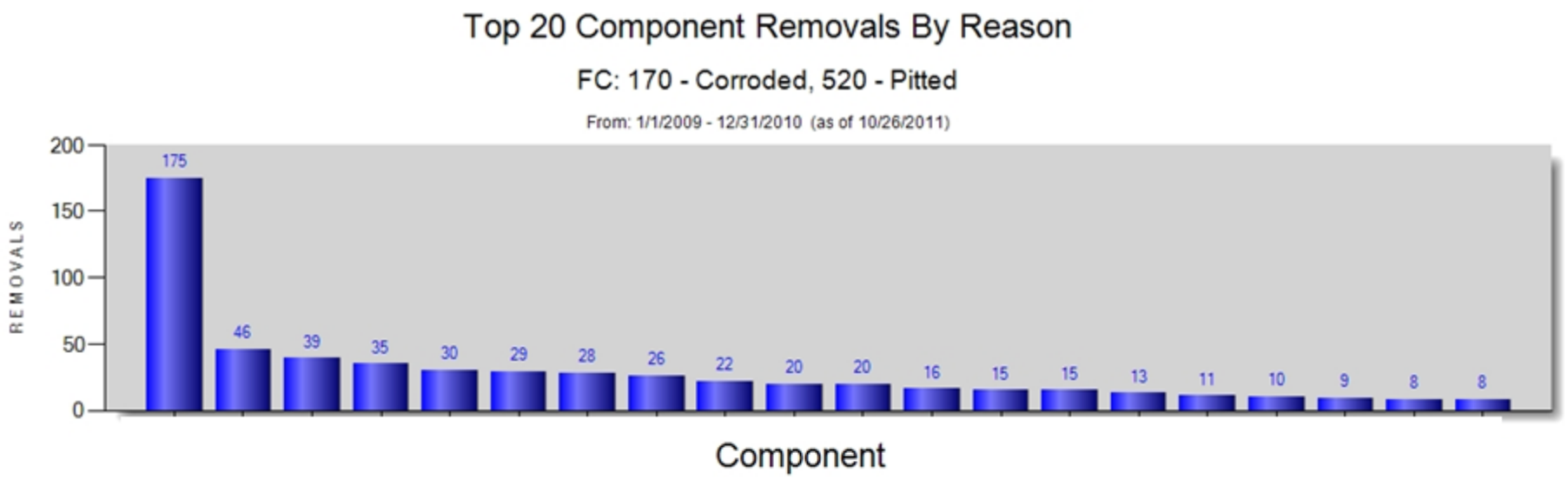
RAM ASAP Aviation System Assessment Program

Home | R&M Drivers | Scoring | Research | Metrics | 2410Maint | RimFire | Load-Info | Version | SysAdmin

DA2410 Options:

System:	Chinook
Available Reports:	Component Reason-For-Removal Report
Failure-Code(s):	170 - Corroded, 520 - Pitted
Nomenclature(s):	(All)
PartNo(s):	(All)
Model(s):	(All)
Unit(s):	(All)
Query Date:	Between 1/1/2009 and 12/31/2010

- **Rank Components/Part Number removals for one or more failure codes**



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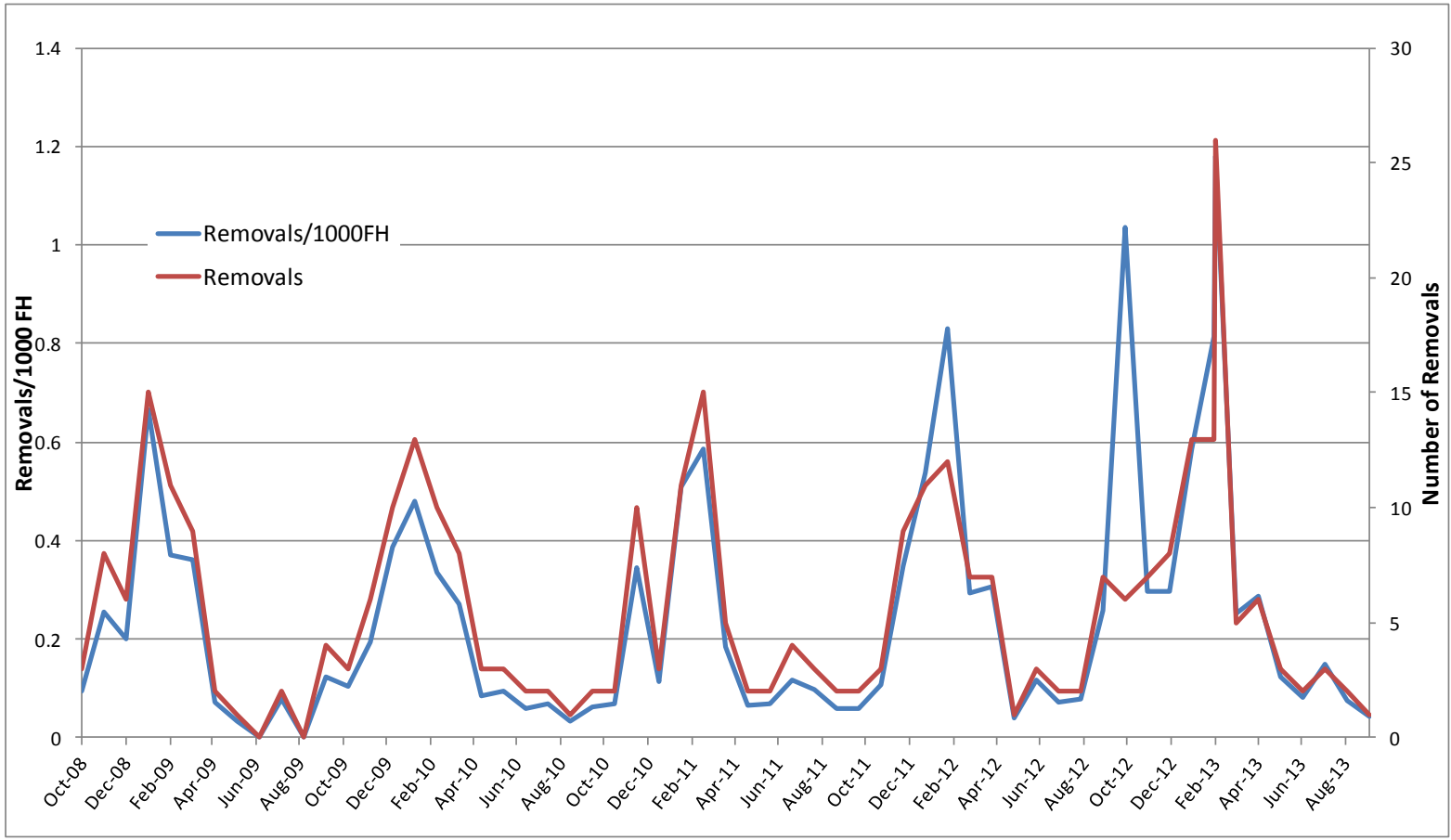
Fail Code Removals by Month

- Displays removals by month for a particular Fail code.
- Highlights “seasonal” removals and Failure modes.



ASAP Database Capabilities

- Supply
  - Order History
  - Order Forecasting

Supply Module Order History

- Overview for each NIIN
- Provide monthly status of Orders, Issues, and Flight hours.
- Look for trends in Issues to enhance future planning.

Available Reports:
Order-History Summary Report

DODAAC(s):	(All)
Unit(s):	(All)
Location(s):	(All)
Description(s):	(All)
Specific NIIN:	
Order Date:	Between 10/1/2012 and 9/30/2013

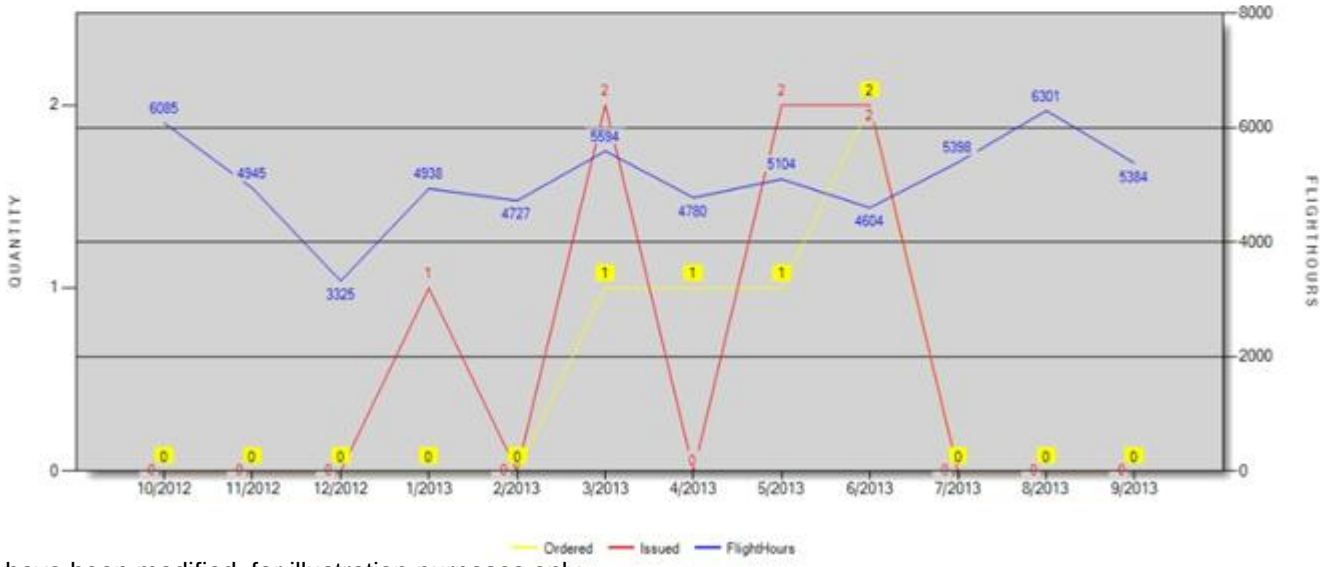
Preview

Export to Excel

FSC = NIIN = **Part Name** PN = CAGE = Price =

AAC = C ARC = X CIIC = U DEMIL = B EC = F MATCAT = H21BE MR = O RC = D RIC = 0 SCMC = 9A SOS = B17 UI = EA UM = EA

MODELS ... [EH-60A, EH-60L, HH-60L, HH-60M, UH-60A, UH-60L, UH-60M]



* Results have been modified, for illustration purposes only

Supply Module Order Forecasting

- Forecast number of Issues for each NIIN based on previous years usage.
- Estimates number of Flight hours per month based on previous years Flight Program.
- Notifies users if a part is over/under planned Issues.

DODAAC(s): (All)
Unit(s): (All)
Location(s): (All)
SoS(s): (All)
Description(s): (All)
Specific NIIN:
Show: Everything

Select/Reset Alternate Load Options ...

Forecast FlightHours:

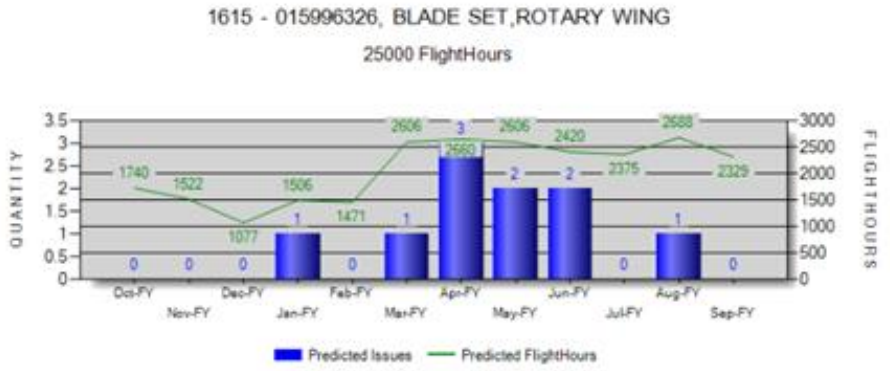
AH-64A,AH-64D	0
CH-47D,CH-47F	0
OH-58A, OH-58C	0
OH-58D	0
UH-60A,UH-60L,UH-60M	25000

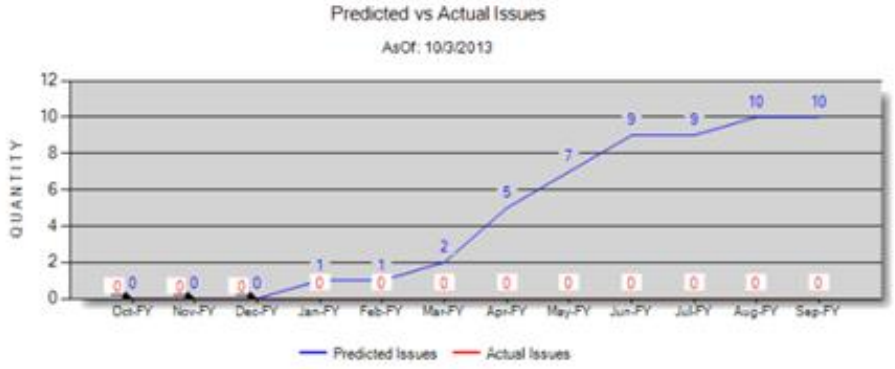
Preview Export to Excel

Assumes distribution of FlightHour
the 'Comparing-FY'. Predicted-Issu
Issues is -1, then # of Issues exce

Rows Found

FSC	NIIN	EST_HRS	SOS	DESCRIPTION	PREDICTED	ISSUED THIS FY	STATUS	PCT
1615		25000	B17	BLADE SET,ROTARY WING	9	0	Nothing Issued	





* Results have been modified, for illustration purposes only

Other ASAP Capabilities

– Export- Download maintenance records over a given period of time, MDS, Tail Number and or Unit.

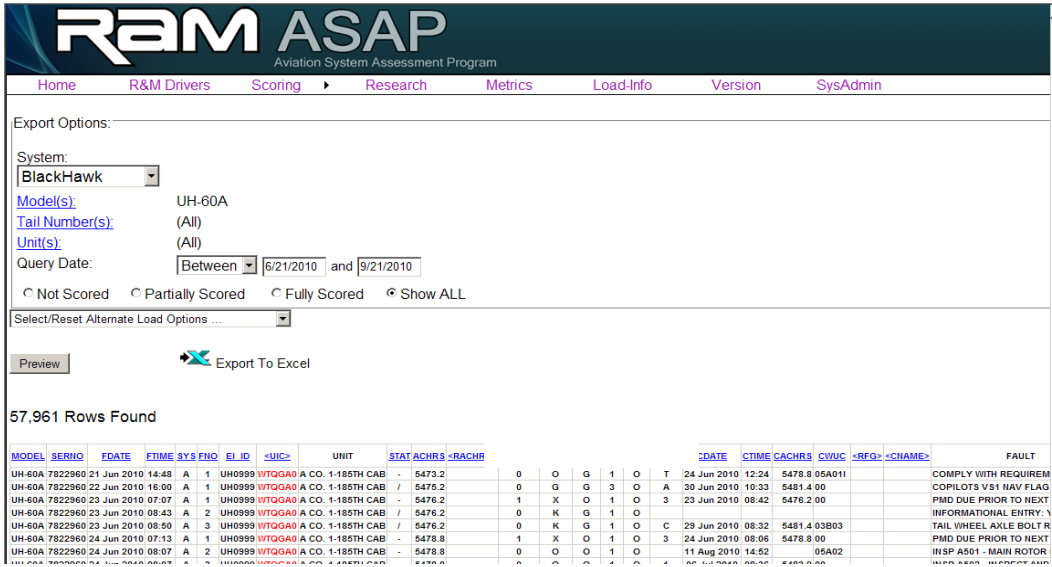
–Fault Action Query- Key word search all maintenance records over a given period of time, MDS, Tail Number and or Unit.

  – Unit Analysis

–Research- Query ULLS-A Data for Flight Events, Flight Hours, 13-2 Data, Aircraft Listing by Unit, Aircraft history, Parts request, Phase Inspection, and MWO listings.

Export 13-1 Maintenance Events

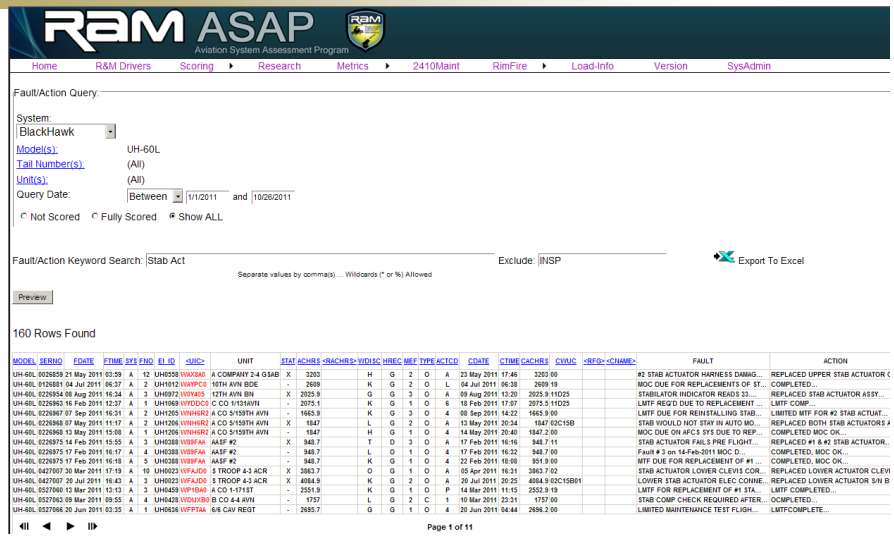
- Export 13-1 maintenance events to Excel
- Specify Model, Tail Numbers, Units and/or Date Range



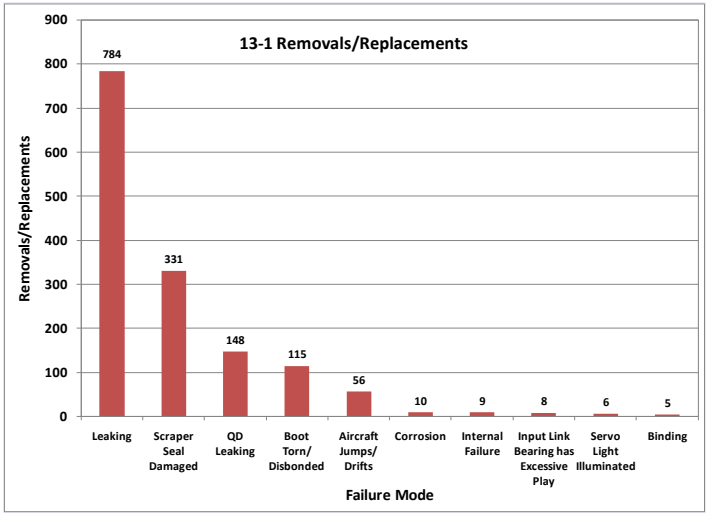
MODEL	SERNO	FDATE	FTIME	SYS	FNO	EI_ID	<UIC>	UNIT	STAT	ACHRS	<RACHR							<DATE	CTIME	CACHRS	CWUC	<RFG>	<CNAME>	FAULT
UH-60A	7822960	21 Jun 2010	14:48	A	1	UH0999	WTQGA0	A CO. 1-185TH CAB	-	5473.2		0	O	G	1	O	T	24 Jun 2010	12:24	5478.8	05A01I			COMPLY WITH REQUIREM
UH-60A	7822960	22 Jun 2010	16:00	A	1	UH0999	WTQGA0	A CO. 1-185TH CAB	/	5475.2		0	G	G	3	O	A	30 Jun 2010	10:33	5481.4	00			COPILOTS VS1 NAV FLAG
UH-60A	7822960	23 Jun 2010	07:07	A	1	UH0999	WTQGA0	A CO. 1-185TH CAB	-	5476.2		1	X	O	1	O	3	23 Jun 2010	08:42	5476.2	00			PMD DUE PRIOR TO NEXT
UH-60A	7822960	23 Jun 2010	08:43	A	2	UH0999	WTQGA0	A CO. 1-185TH CAB	/	5476.2		0	K	G	1	O								INFORMATIONAL ENTRY: Y
UH-60A	7822960	23 Jun 2010	08:50	A	3	UH0999	WTQGA0	A CO. 1-185TH CAB	/	5476.2		0	K	G	1	O	C	29 Jun 2010	08:32	5481.4	03B03			TAIL WHEEL AXLE BOLT R
UH-60A	7822960	24 Jun 2010	07:13	A	1	UH0999	WTQGA0	A CO. 1-185TH CAB	-	5478.8		1	X	O	1	O	3	24 Jun 2010	08:06	5478.8	00			PMD DUE PRIOR TO NEXT
UH-60A	7822960	24 Jun 2010	08:07	A	2	UH0999	WTQGA0	A CO. 1-185TH CAB	-	5478.8		0	O	O	1	O		11 Aug 2010	14:52		05A02			INSP A501 - MAIN ROTOR

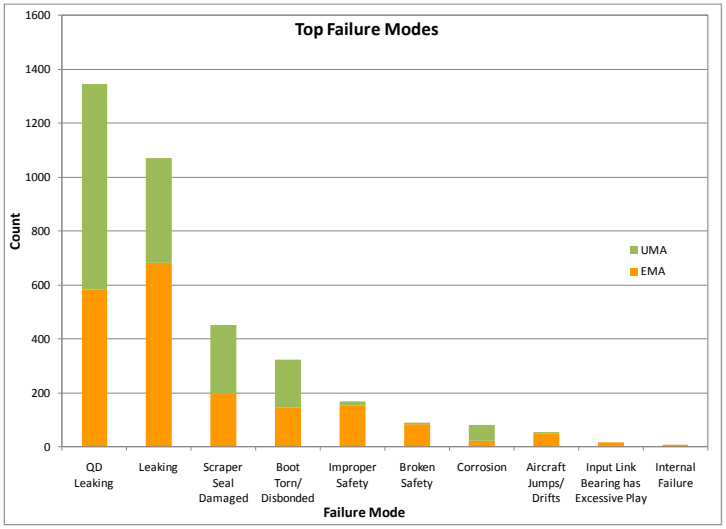
- Correlate maintenance with HUMS data to reduce Mission Aborts and Incorrect Replacements
  - Work toward predicting failures after a flight so that issue does not occur during the next mission
- Verify AMAM implementations.

Fault/Action Query



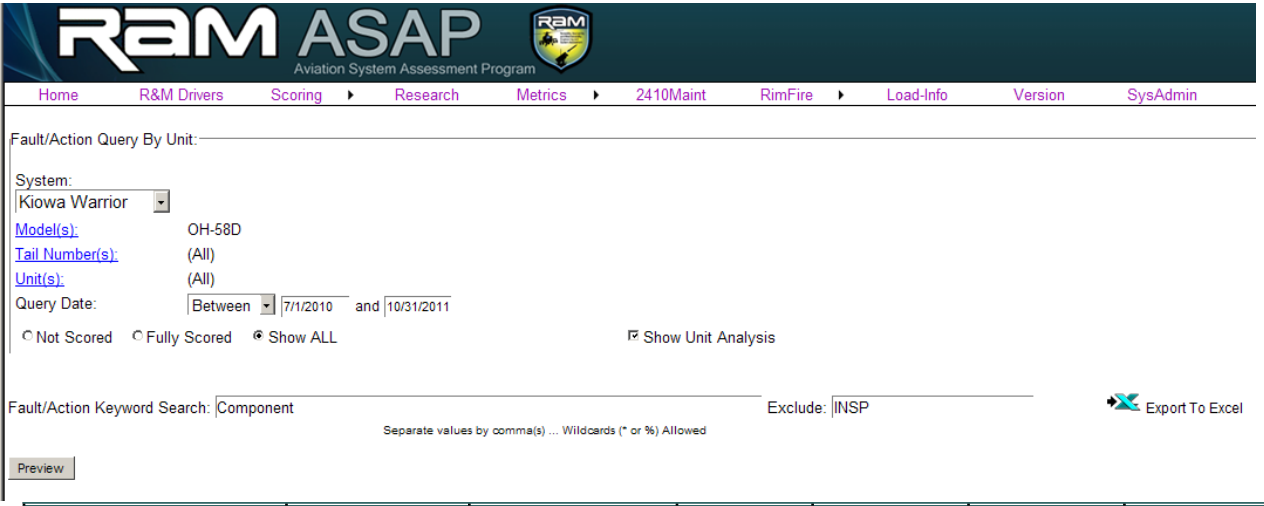
- Key word search all maintenance records over a given period of time, MDS, Tail Number and or Unit.





- RAM Analyst can utilize the all Maintenance events for Component Analysis
  - Provide Top Reasons for Removals as reported by the field
  - Report Top Failure Modes as recorded by the field.
  - Indicate Field Repairs that are most often performed by maintainers.

Fault/Action Query Unit Analysis



UNIT	Master UIC	Occurrences	Aircraft with Occ	Aircraft in Unit	Flight Hours with Occ	Flight Hours In Unit	Occ Per FH	FH Per Occ	Pct Contrib	Cum Pct
A	W0U9	54	33	20	608	669.92	0.0453	12.416	48.75	48.75
B	WFPT	49	24	9	952	2,851	0.0097	58.2	10.4	59.15
C	W0H9	44	23	52	559	8,935	0.0028	203.08	2.98	94.35
D	WAZN	41	21	16	3,516	5,848	0.0039	142.66	4.24	91.37
E	WG2V	35	16	28	2,112	3,160	0.0062	90.285	6.7	81.97
F	WFBG	29	16	15	613	1,911	0.0085	65.911	9.18	68.33
G	WV7P	19	12	31	659	5,012	0.0021	263.79	2.29	96.65
H	WAB0	18	14	31	529	9,226	0.0011	512.58	1.18	99.33
I	WC12	18	13	11	495	1,570	0.0064	87.262	6.94	75.26

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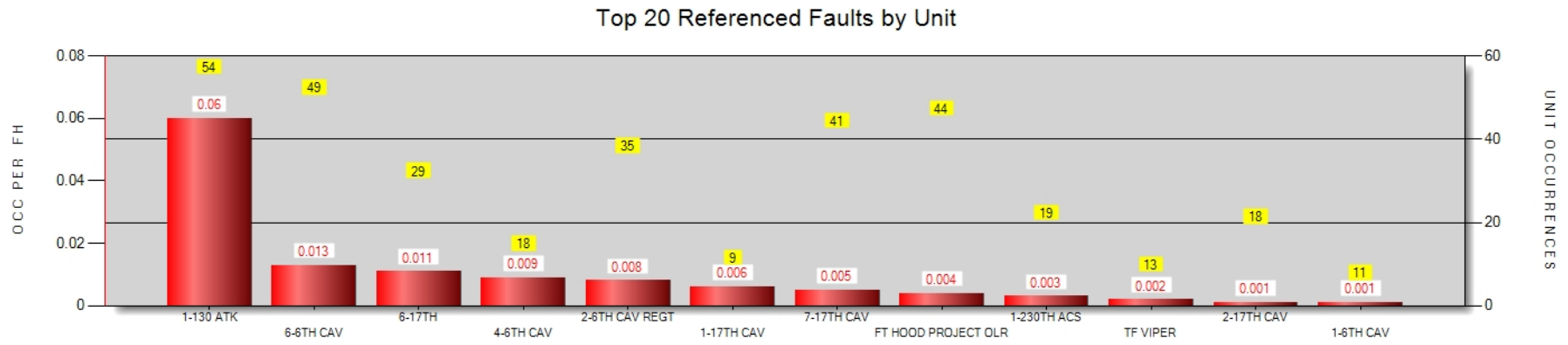
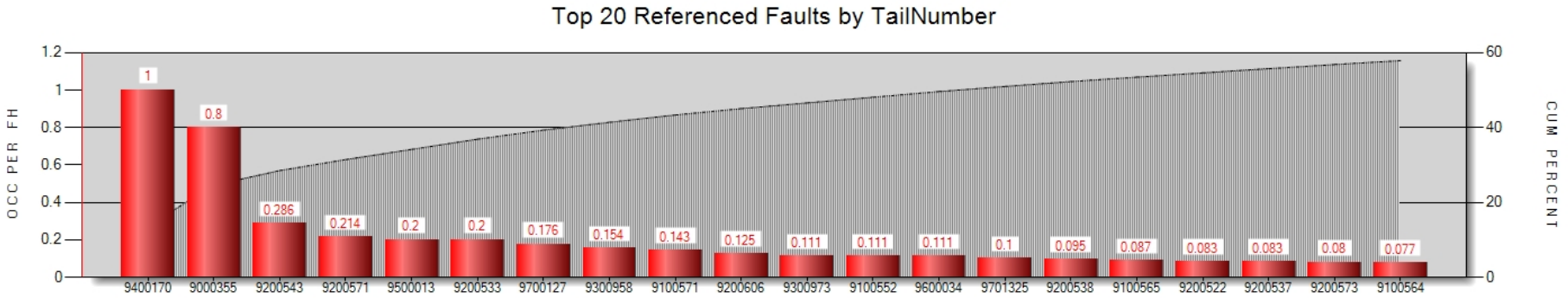
Fault/Action Query
Unit Analysis





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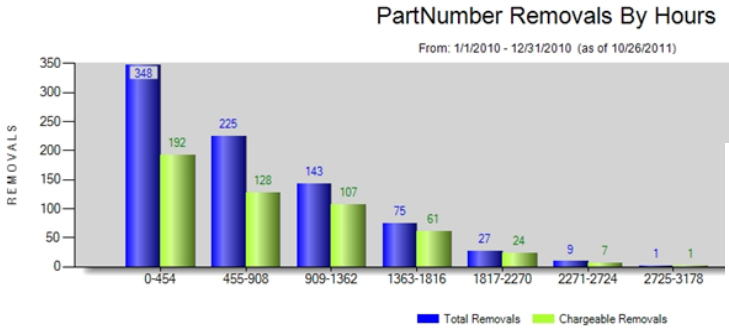
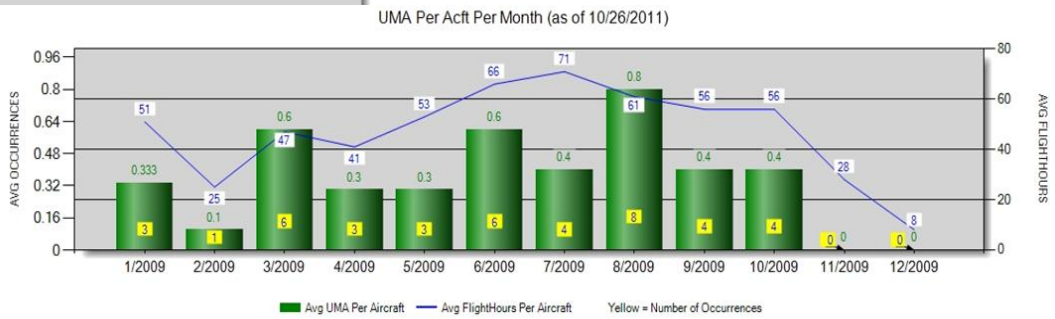
ASAP Benefits

- ASAP Online puts Reliability and Maintainability data at the fingertips of over 350 users
- Used to support the elimination of maintenance tasks which reduce cost.
- Provides capability to make data driven decisions
- Readily identifies poor performing components
- Tracking and Trending of DA-2410 tracked items
- Identifies failure causes and maintenance problems





Questions?