



UGS

*Transforming the
process of innovation*

Performance Based Maintenance

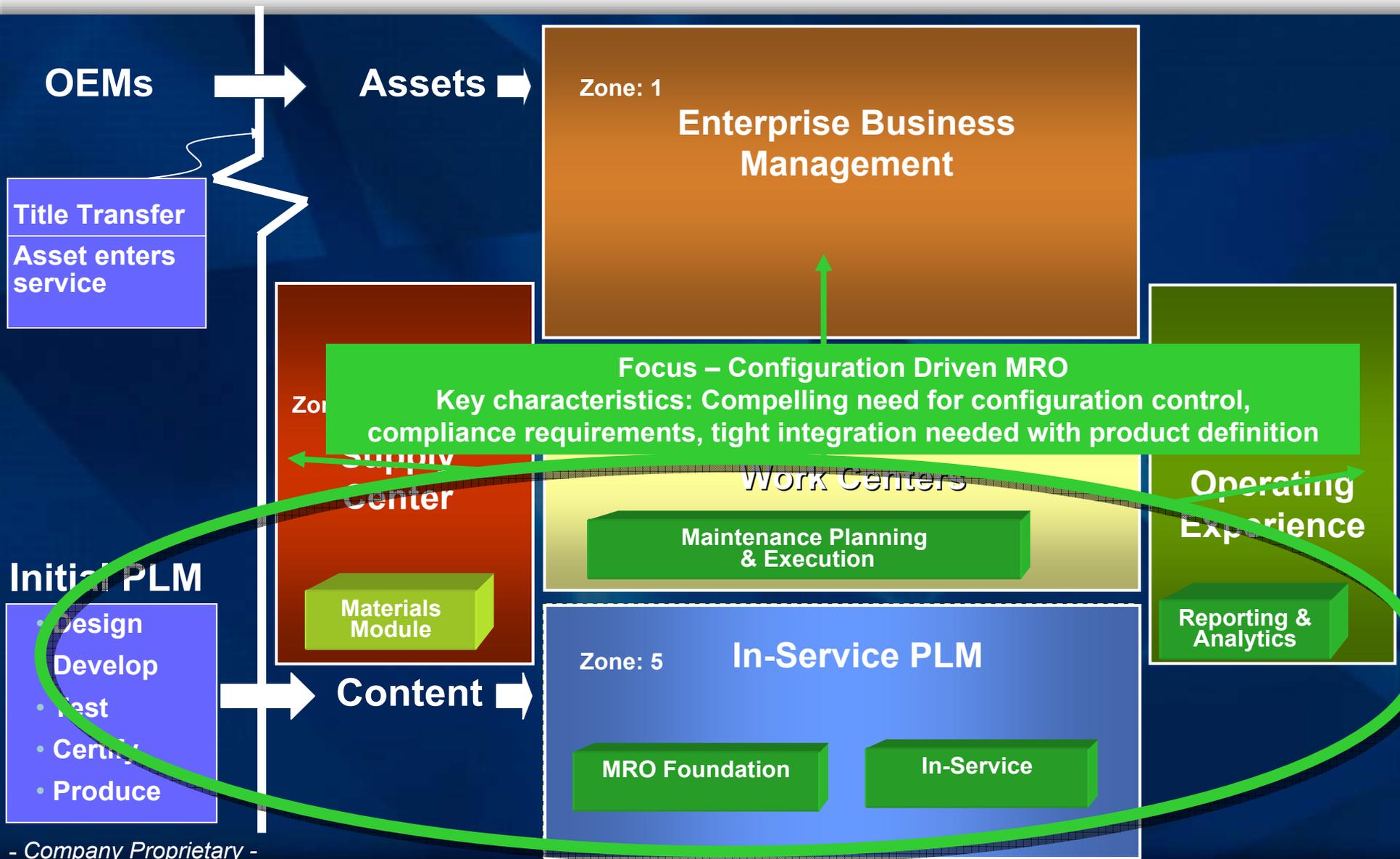
Chris Schrand
Director, MRO Business Management
PLM World 2006

TEAMCENTER



What is the UGS MRO Solutions Set ?

Teamcenter MRO Landscape





Why Configuration Driven MRO ?



Our Value Proposition for Performance based Maintenance

1. MRO Cycle Time Reductions

- Removing tasks from critical path
- Reducing times of tasks on critical path

2. Improved Asset Availability

- Reduced MRO Cycle Times
- Improved Predictive Maintenance

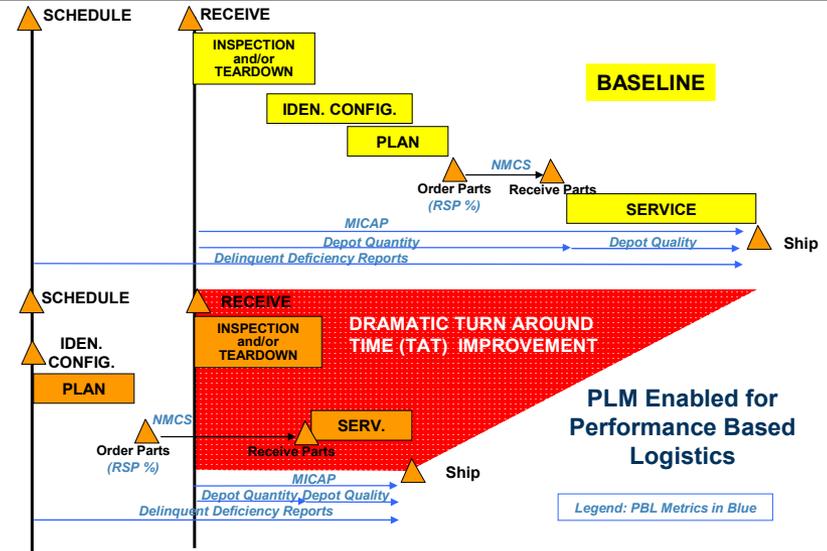
3. Improved Productivity

- Planning & Execution resources
- Reduced compliance costs

4. Improved use of Working Capital

- Turns Increase
- Better Tracking of what's available and lifing information
- Better usage of existing inventory
- Decrease costs by eliminating excess or obsolete inventory
- Better knowledge of available substitutes and alternates in the right context

PLM Value in MRO Cycle Time



Configuration Driven MRO



Why Configuration Driven MRO ?



Our Value Proposition for Performance based Maintenance

5. Improved Configuration Management and speed of Change

- Rapid, targeted incorporations of modifications and upgrades

6. More proactive & less reactive maintenance – learning organization

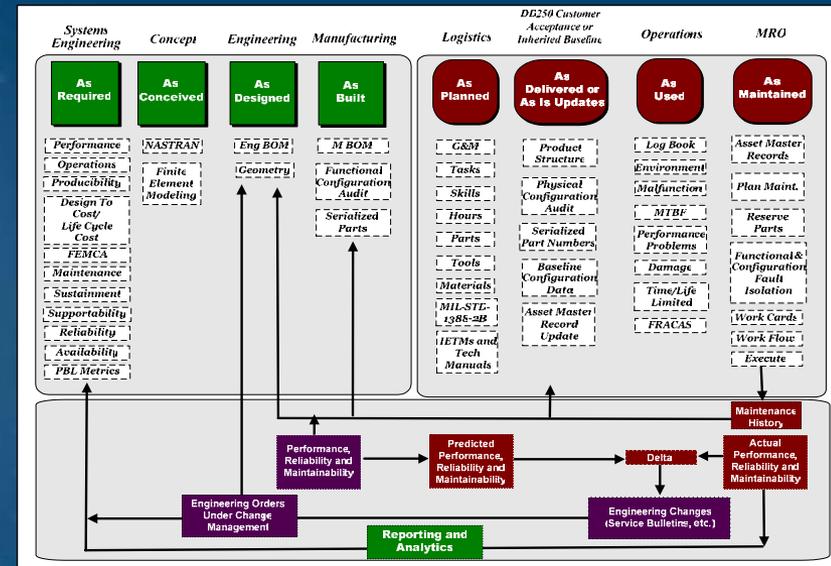
- Ability to analyze what is really effective/necessary
- Improved forecasting

7. Improved Quality of next generation product (DFM)

- Feedback loop, joining Engineering, Manufacturing, Logistics & Sustainment

8. Enables Service and Performance Based Contracts

- Demonstrate achievement of contractual metrics (component uptime, reliability, useful life)
- Ability to adjust maintenance and materials management based on analytics and contract
- Improved information on operational performance of components & equipment



Configuration Driven MRO



Configuration Driven MRO



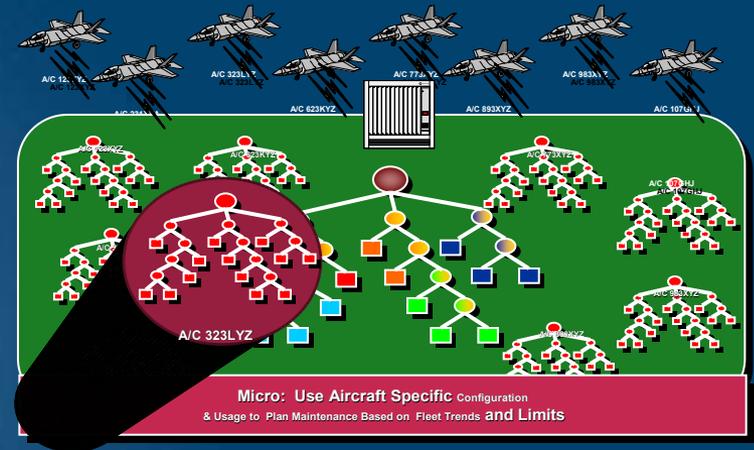
In-Service

Maintenance Execution

Maintenance Planning

Reliability Analysis

Materials Ordering

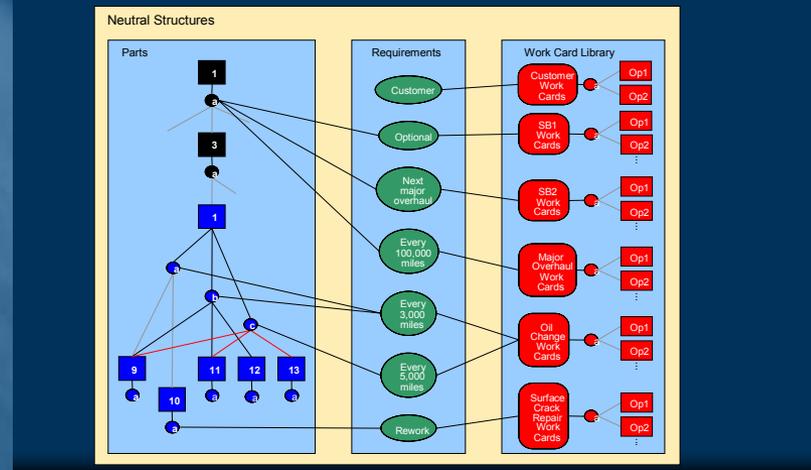


Capability

- ▶ Creates and maintains maintenance requirements
- ▶ Use asset specific configuration & usage to plan maintenance based on fleet trends
- ▶ Creates and maintains work cards, expected configuration impact, resources & materials needed etc.
- ▶ Forecasts and plans maintenance activities and dues



Maintenance Planning





Maintenance Planning



► Maintenance Requirements

- Scheduled - Frequency Driven (Life Characteristic/ Date)
- On Condition - Fault Code Driven
- Driven by Part Position
- Work Instructions to Satisfy Requirement (Work Cards)

Item Information - Microsoft Internet Explorer

Address: http://chrissvr:7001/tcmro/controller/home

TEAMCENTER

Check In History Item Reports Bookmark Subscribe More Actions...

SB3995-293,B,1,2

Summary Assignment Properties Files Related Items Reviewers Security

Properties

[Edit](#)

Object Class: Maintenance Requirement
 Description: Power Takeoff Rework
 Name: SB3995-293,B,1,2
 Creator: chris
 Last Update:

[More Properties ...](#)

Assignment

Assignment: Update properties
 Required Actions: [Update properties](#)
 Optional Actions: [Assign reviewers](#)

Details

Files

Frequencies (1)

[Create and Add](#) [Remove](#)

Name	Relationship	Creator	Last Update
<input type="checkbox"/> AT1900LIFlightHours	Frequency belongs to Requirement	chris	10/18/2005 18:29:22:000

Maintenance Requirements

Positions (1)

Name	Relationship	Creator	Last Update	Occurrence Name
<input checked="" type="checkbox"/> 603T72G12_C34 TurboFan.A.1.1	Requirements In Position	chris	10/18/2005 16:10:44:984	603T72G12

Workcards (5)

[Create and Add](#) [Search And Add](#) [Remove](#)

Name	Relationship	Creator	Last Update
<input type="checkbox"/> <input checked="" type="checkbox"/> WC2345345-SB.A.1.1	Maintenance Process for Requirement	chris	10/18/2005 18:02:52:703
<input type="checkbox"/> <input checked="" type="checkbox"/> WC566234556.A.1.1	Maintenance Process for Requirement	super user	02/10/2006 13:00:08:078
<input type="checkbox"/> <input checked="" type="checkbox"/> WC8653467.A.1.1	Maintenance Process for Requirement	super user	02/10/2006 13:00:14:000
<input type="checkbox"/> <input checked="" type="checkbox"/> WC8922346.A.1.1	Maintenance Process for Requirement	super user	02/10/2006 13:00:18:484
<input type="checkbox"/> <input checked="" type="checkbox"/> WC345788.A.1.1	Maintenance Process for Requirement	super user	02/10/2006 13:00:23:109

Applet com.sdrc._metaphase.wcc.sharedlogin.SharedLoginApplet started



Maintenance Planning



▶ Work Cards

- ▶ Operations to Satisfy Requirements
- ▶ Time and Cost Estimate to Complete Work
- ▶ Sign off authority (Inspection Required)
- ▶ Tasks Breakdown
- ▶ Resource
 - ▶ Skills
 - ▶ Equipment
 - ▶ Tools
 - ▶ Indirect Materials

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Applet.com.sdrc:_metaphase.wcc.sharedlogin.SharedLoginApplet started



Maintenance Planning



▶ Maintenance Actions

- ▶ Requirements Due Based on Utilization of Asset and Frequency of Requirements
- ▶ Unscheduled (Discrepancies)
- ▶ Deferred Maintenance
- ▶ Forecasting
- ▶ Work Scope Definition
- ▶ Scheduling

Due Maintenance Actions - Microsoft Internet Explorer

Address: http://chrissvr:7001/tcmro/controller/home

Links: UGS, personal, TCMRO50, ASBuilt, MXPME, InAir, BarCode, ENT, ENT31, eQube, Google

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Due Maintenance Actions

Name	Req No./Title	Type/Status	Last	Next	Remaining	PN / SN
<input type="checkbox"/>	E3944-2334 Engine 1000 Overhaul	Due / Scheduled	()	1000 F (975) F	50 F	603T72G12 807005
<input type="checkbox"/>	R499523 Landing Gear X-Ray Inspection	Due / Scheduled	()	50 L (50) L	6 L	459234R-50 R1005
<input type="checkbox"/>	SB3995-293 Power Takeoff Rework	Due / Scheduled	()	1000 F (975) F	50 F	603T72G12 807005

Show Dues - Microsoft Internet Explorer

Address: http://chrissvr:7001/tcmro/controller/home

Links: UGS, personal, TCMRO50, ASBuilt, MXPME, InAir, BarCode, ENT, ENT31, eQube, Google

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Show Dues

	Last Actual Value	Estimated Rate	Calculated Total	Projected Utilization
Date	2005/12/16	3 months	3 months	2006/03/16
FlightHours	925	30	90	1015
Landing	44	6	18	62



Configuration Driven MRO



In-Service

Maintenance Execution

Maintenance Planning

Reliability Analysis

Materials Ordering

Capability

- ▶ Maintenance supervisors can assign work orders to technicians
- ▶ Technicians can see job cards, list bills of materials, request parts, add discrepancy reports for unscheduled work, check for warranty parts.
- ▶ Capturing of modification, maintenance & repair data
- ▶ Maintaining accurate configuration & usage data
- ▶ Repair order submittal & material disposition
- ▶ External Execution Activities Management





External Maintenance Activities



- ▶ Capture of Historical Service Events
- ▶ Classification of Events
- ▶ Record Service Event Actions
 - ▶ Who, What, When, Where, Why
- ▶ Configuration Incorporation
 - ▶ Managing AS-Maintained Configuration
- ▶ Maintenance Record
 - ▶ Reporting

The screenshot displays the TEAMCENTER software interface for configuring maintenance activities. The main window shows a table of work orders for part WO339614. Two work orders are listed: a 'Group' for 'Scheduled maintenance for C55G-177294 mid July 2005' and a 'Discrepancy' for 'Burned out light bulb' located in 'Galley1-left' with part number 'GE10Cw'.

Two dialog boxes are open over the interface:

- Define Removes and Installs:** This dialog is used to define the action for a work order. It includes fields for Direction (set to 'Instal'), Position ('Galley 1'), Part Number ('Phillips-20Cw'), Quantity ('2'), Reason ('Replace'), and the user 'Mark Bradley'.
- Define Service Activity:** This dialog is used to define the service activity details. It includes fields for Category, Work Group, Number, Position, Part Number, and Serial Number. The Title is 'Replace all light bulbs in Galley 1'. The Type is 'Program Depot Maintenance'. Other fields include Start Time, Completed Time, Completed By, Approved By, Work Location, Zone, Elapsed Time, Cost, and Notes.

At the bottom of the 'Define Service Activity' dialog, there is a 'Part Movement' table:

Direction	Position	Part #	Serial #	Qty	Reason
Remove	Galley 1	GE10Cw		2	Replace
Instal	Galley 1	Phillips-100w		2	Replace
Instal	Galley 1	Phillips-20Cw		2	Replace



Internal Maintenance Activities



- ▶ Work Scope Definition
- ▶ Resource Allocation
 - ▶ Tool, Equipment, Spares, Consumables, People
- ▶ Maintenance Scheduling/Tracking
- ▶ Costing
 - ▶ Estimate/Actual
- ▶ Compliance Tracking
- ▶ Configuration Incorporation
 - ▶ Managing AS-Maintained Configuration
- ▶ Maintenance Record
 - ▶ Reporting

The screenshot displays the TEAMCENTER software interface for a work order. The main window shows the 'Properties' tab for Job Card Number 26-23-01-900-801, with a description of 'Replace Portable Fire Extinguisher'. A dialog box titled 'Allocate Labor Resources - Work Order WO2006000875; Job Card 26-23-01-900-801' is open, listing technicians and their estimated hours.

Name	Skill	Estimated Hour
<input type="checkbox"/> John Hammer	Aircraft Maintenance Technician	0.0
<input type="checkbox"/> Howard Gordon	Aircraft Maintenance Technician	0.0
<input type="checkbox"/> Phil Willard	Aircraft Maintenance Technician	0.0
<input checked="" type="checkbox"/> Tommy Bruton	Aircraft Maintenance Technician	0.5
<input type="checkbox"/> Steve Cannon	Aircraft Maintenance Technician	0.0

Below the dialog box, the main interface shows a table for 'Physical Aircraft' with columns for Name (Model, Serial Number), Reg Number, Tail Number, Owner, Last Actuals, and Last Actual Date. One entry is visible: CL-604, 5533, 144617, Department of National Defense, 1578.3 Aircraft Hours, 1013.0 Landings, 02/16/2006.

At the bottom, there is a table for 'Required Labor Resources' with columns for Name, Hours, Job Card Number, Position, Position, Techs, and Allocated. One entry is visible: Aircraft Maintenance Technician, 0.5, 26-23-01-900-801, Broken Gauge on Portable Fire Extinguisher, No. 3 Cabin Fire Extinguisher, 1, No.



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Demo

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Questions and Answer

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