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ORACLE COMPLEX MAINTENANCE, REPAIR & OVERHAUL R12.1

SOLUTION HIGHLIGHTS

Oracle Complex Maintenance, Repair, and Overhaul R12.1 provides the most robust, reliable and effective means through which service providers and operators manage the entire maintenance lifecycle for complex assets. Specifically, Oracle cMRO R12.1 now supports:

- Aircraft induction
- Line maintenance
- Heavy maintenance planning
- Heavy maintenance execution
- Engine and component overhaul
- Marshalling

Today's MROs use a variety of individual applications for each of their critical business processes; none of which are integrated nor provide any insight into combat readiness, asset availability, labor utilization/productivity, and maintenance profitability. As a result, multiple sources of the "truth" exist in various siloes, undermining the integrity of supply chain planning and execution, inventory levels, customer service and satisfaction, aircraft records and billing capabilities.

Only Oracle offers an integrated, standards-based, enterprise solution for MRO designed specifically for aerospace and defense systems, aircraft and engine maintenance operations. Specifically, Oracle cMRO enables companies like Mexicana, Korean Airlines, BAE Systems, Abu Dhabi Aircraft Technologies, OGMA and Boeing to manage their scheduled and unscheduled maintenance visits, monitor components, schedule and route jobs, optimize their supply chains and manage maintenance documents.

Oracle cMRO™ is part of the E-Business Suite and leverages capabilities across supply chain, HR, financials, project costing and billing applications. In addition, cMRO allows MRO service providers and operators to take an iterative approach to implementing an automated complex asset lifecycle management solution.

Aircraft Induction

Oracle cMRO supports the induction process by promoting collaboration between manufacturers, fleet operators and maintenance providers. To ensure accurate creation and management of maintenance requirements, Oracle cMRO provides a comprehensive view of all maintenance requirements; enables maintenance engineers to apply detailed configuration rules and facilitates the automatic notification of updated or associated maintenance requirements. Specifically, Oracle cMRO supports the aircraft induction process by enabling fleet operators to:

- **Receive OEM documentation**

Oracle cMRO manages electronic manuals and updates throughout the build process of new aircraft, weapons systems and engines so they can be easily accessed and referenced for all maintenance purposes

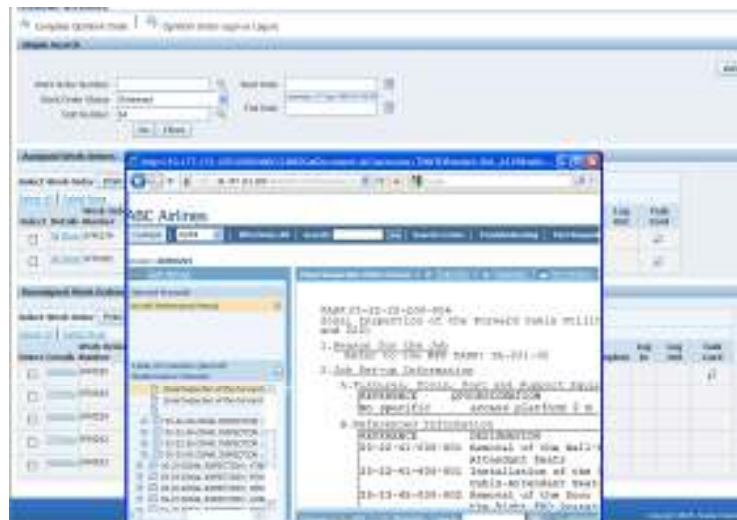
- **Manage and publish content**

Through Oracle cMRO, documents can be received, registered, uploaded and revised electronically and in real-time. Oracle cMRO also provides document indexing, which is used to enable operators and service providers manage, identify and subscribe to maintenance, repair, and overhaul documents.

In addition to indexing, Oracle cMRO also provides status tracking, subscription, version and distribution control

New in cMRO R12.1 is Oracle's integration of Enigma's 3C platform and InService Job Card Generator. This new functionality links cMRO engineering objects such as routes, operations—as well as master- and unit configurations to their source documents published in Enigma's 3C InService MRO product. Specifically, the integration of cMRO and Enigma:

- Creates routes and operations in cMRO automatically based on the Aircraft Maintenance Manual (AMM) or Engine Manual (EM) published in Enigma 3C. A revision of the manual automatically creates a revision of the affected routes and operations in cMRO
- Links master and unit configurations to the Illustrated Parts Catalog in Enigma 3C through the position ATA code
- Enables Engineers and Technicians to navigate manuals in Enigma 3C InService MRO either from a position of the master or unit configuration; the routes in route management or from the work orders on the shop floor, bringing the complete content of the manuals to the point of work, tailored for the job at hand



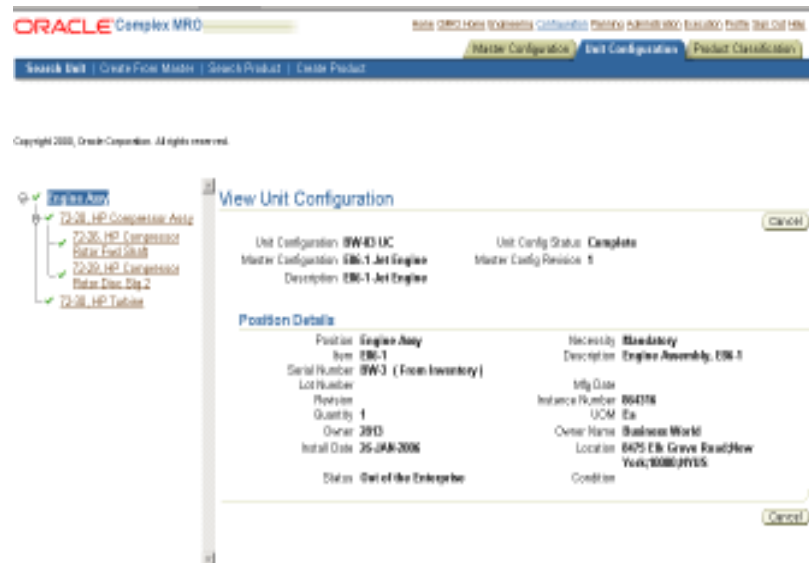
- **Maintain configurations**

Oracle cMRO provides configuration management capabilities at both the

master and unit configuration levels.

An instance of a master configuration describes the allowable configuration and all of its maintenance-significant positions. Specifically, the master configuration enables maintenance providers to:

- Structure assembly models and apply rules for component locations, list with alternate parts per position
- Define and attach reusable sub configurations such as engines attached to airframes
- Apply cross-position configuration rules



Oracle cMRO’s Unit Configuration module enables operators and service providers to easily and effectively:

- Track “as maintained” configurations with part and serial number information, current physical location and ownership
- Monitor asset and component utilization such as hours and cycles

• **Organize fleet classifications**

Oracle cMRO provides detailed support for product classifications, enabling operators to logically structure their fleets. Specifically, product classification is used to associate maintenance requirements on leaf nodes of the fleet structure. For example, an operator may want to structure his fleet on the basis of age; whereby CPCP maintenance requirements would apply to aging airframes. These requirements would have separate branches for engines with configurations.

Determining maintenance requirements and their applicability to specific units are extremely critical, albeit time consuming and error-prone tasks for many MROs. Through its Product Classification module, Oracle cMRO enables maintenance providers to easily and effectively:

- Apply maintenance requirements to individual and associated units
- Provide development of fleet structures across multiple asset classes, operational environments, and utilization forecasts
- Associate maintenance requirements and documents to any level

across multiple assets unique to their operational environments (ETOPS)

- Support primary and supplementary classifications, which allow part and unit grouping from multiple viewpoints

• **Manage maintenance programs**

Integral to the MRO operation is the ability to effectively manage its fleet maintenance program. To this end, Oracle cMRO was designed to enable maintenance operators to quickly, accurately and cost-effectively define the frequency and content of maintenance and repair tasks. Specifically, Oracle cMRO helps operators and service providers to:

- Define maintenance requirements for parts or systems based on letter or phase checks, service bulletins, airworthiness directives, and modification programs
- Apply effectivities of maintenance requirements to specific part numbers and range of serial numbers, configuration positions, product classification nodes
- Create relationships and dependencies between maintenance requirements
- Determine frequencies for tasks based on dates, or utilization counters such as flight hours or cycles

Create initial maintenance forecasts

Oracle cMRO gives maintenance planners enterprise-wide control over forecasts and schedules, as well as enabling operators and service providers to:

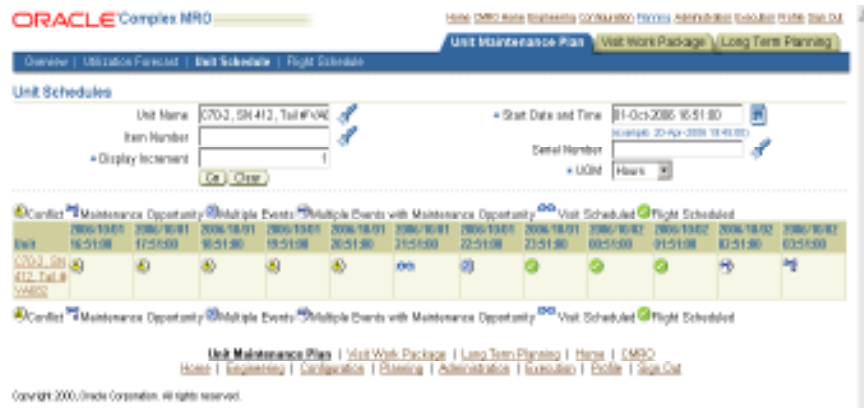
- Define future utilization forecasts based on product classification structures
- Create maintenance forecasts for each individual unit based on maintenance requirement frequencies and utilization forecasts
- Forecast initial spare parts demand and integrate it into the Oracle Demand Planning application
- Provide real-time visibility into a unit's remaining serviceable time
- Calculate due dates for maintenance requirements based on time remaining and utilization forecasts
- Associate maintenance requirements to visits
- List all open maintenance requirements applicable to a unit

Line Maintenance

Oracle cMRO enables fleet operators to optimize their return on asset mission readiness. By providing a public interface into real-time flight schedule information that is then integrated into the CMRO's unit scheduling system, Oracle cMRO enables operators and service providers to quickly, easily and cost effectively:

- Schedule line maintenance visits, pre and post mission checks
- Exploit transit check opportunities
- Reschedule line maintenance activities based on flight schedule changes
- Manage schedule conflicts and respond to maintenance opportunities in real-time
- Update the visit workbench and unit schedule
- Use predefined visit structures based on visit types
- Provide role-based UIs and flows for technicians, transit maintenance technicians (line maintenance) and data entry clerks; reducing training requirements, improving data input accuracy,

and increasing productivity



For non-routine planning, Oracle’s cMRO enables operators and service providers to add maintenance and operations procedures to a production deferral process, match ATA codes to the engineering and configuration definitions, leverage new nonroutine planning and production Uis as well as benefit from minimum equipment list and configuration deviation list (MEL/CDL) nonroutine deferral processes. In fact, since R12, Oracle’s cMRO application enables users to:

- More accurately assess deferrals on non-routine requirements
- Ensure proper maintenance and operations procedures are followed during non-routine minimum equipment and configuration deviation deferrals
- Enhance non-routine planning to simplify developing unit maintenance plans and scheduling maintenance visits
- Introduce ATA Codes to cMRO, providing a standard system for identifying item relationships within a configuration



Heavy Maintenance Planning

Heavy maintenance planning for complex assets forces MROs to respond

immediately to demand requirements while carefully balancing supply constraints. The ability to synchronize maintenance visit requirements with available spare parts, tools, labor skills and space capacities is not an option--it is an imperative.

Oracle cMRO enables MRO operators to effectively plan heavy maintenance visits by providing the ability to quickly and easily:

- Search unit maintenance plans for open maintenance tasks
- Create maintenance visits and define their priorities
- Add planned and un-planned maintenance requirements
- Associate tails to maintenance visits
- Add service requests for non-routine maintenance
- Calculate maintenance visit durations
- Estimate cost and price of maintenance visits to determine P&L
- Determine capacity to accommodate a visit and the capability to perform the required maintenance
- Identify available materials to complete maintenance tasks
- Receive real-time exception alerts when materials are unavailable and identify the next earliest availability
- View all open visits in the primary plan
- Compare resource allocations against capacity to determine visit capability
- Determine optimal allocation of in-house vs. outsourced maintenance tasks to meet delivery deadlines
- Place demand in Oracle Demand Planning™ for materials and spare parts
- Schedule materials to arrive at a particular location and date
- Integrate visit information into project plans for cost collection and billing

While cMRO R12 has the ability to create service orders directly from an inventory location without having to go through the creation of a visit and execution work order, cMRO R12.1 now provides the ability to support the receipt of both the service and the physical part at the same time using the workbench. Specifically, Oracle's cMRO 12.1 provides outside processing receiving capabilities that support:

- Receipt of part
- Receipt of service
- Serial number/part number change
- Planned and unplanned part exchanges
- Staging parts for inspection
- Put-away of part

This new functionality provides default data for pre-defining service orders based on the part to be repaired. Not only does this functionality reduce screen navigation time, but also reduces the time to create a service order and virtually eliminates the risk of errors. Specifically, with R12s new functionality, the cMRO application:

- Automates service order creation for inventory parts based on vendor sourcing rules
- Streamlines the outside processing process with the use of default information and as little user interface navigation as possible
- Provides a one-click approach without sacrificing flexibility for more specialized service orders

In addition to inventory service order management, R12 functionality also delivers reliability planning capabilities within the cMRO application. This functionality helps identify the anticipated failure rates of installed components in a configuration. Based on historic unplanned part changes this functionality takes into consideration items, their current and projected hour and cycle counts and their

positions within a unit.

EY BENEFITS

Oracle cMRO enables MRO service providers and operators to improve performance and reduce costs of managing their maintenance operations. Specifically, cMRO helps MRO providers and operators to:

- Reduce spare parts inventory
- Minimize AOG
- Improve asset availability
- Increase compliance with regulatory requirements
- Optimize workforce utilization
- Tighten cost control

RELATED PRODUCTS AND SERVICES:

Oracle E-Business Suite provides seamless integration across your enterprise and supports the entire MRO lifecycle with applications such as:

- Advanced Supply Chain Planning
- Inventory and Warehouse Management
- Purchasing
- Service
- Costing
- Advanced Pricing
- Projects
- Shipping Execution
- Order Management
- Contracts
- Human Resource Management

- Calculate predicted failure rate of installed components
- Manually identify anticipated failure rates for items without history
- Create material demand for anticipated part changes based on utilization schedule
- Reduce inventory levels at maintenance facilities and transient stations
- Decrease On Ground Time

Heavy Maintenance Execution

Heavy maintenance execution demands immediate access to accurate information regarding scheduled and non-routine maintenance visits, work orders and operations. In order that these events are executed effectively, maintenance information must be accessible in real-time by maintenance planners, shop floor managers, crew chiefs, maintenance technicians and pilots. Oracle cMRO not only provides the access and control for optimizing heavy maintenance execution, but it also enables operators and service providers to:

- View and schedule work orders and operations
- Search for and request available tools, labor and other required resources
- Identify hours or other units of measure for resource availability
- Reschedule operations based on available resources
- Assign required resources to maintenance operations
- Request additional parts for non-routine maintenance
- Update maintenance activities and schedule dates automatically into the supply chain plan
- View work order requirements and hours transacted
- Perform resource transactions
- Record and track material and labor utilization
- View real-time maintenance visit costing status



Maintenance providers and operators must also be able to immediately respond to unscheduled events such as when a tail is inoperable due to a part defect. To this end, Oracle cMRO enables operators to quickly and easily:

- Schedule and perform removal of defective parts and installation of serviceable parts
- Synchronize operations based on resource availability and time

- constraints
- Defer work orders to specific dates or utilization values
- Submit deferrals for approval
- Recalculate due dates in UMPs and automatically create new tasks

Since most repairs require a thorough quality inspection and/or certification, Oracle cMRO simplifies the quality collection process and gives operators the ability to:

- Conduct condition inspections
- Display quality results for specific operations
- Enter flight segment report data
- Define rules for issue classifications
- Create non-routine work orders
- Analyze work orders against similar issue histories and determine repair requirements
- Track part status and conditions

The previous R12 enhancements within cMRO make the ability to restrict access to a unit configuration quick, easy and reliable. Particularly if an asset is involved in an accident, it is imperative that all the data associated with that asset needs to be frozen and access to change anything on this configuration needs to be revoked. Oracle cMRO also offers functionality that can help designate a cMRO super user and request quarantine on a Unit Configuration that prevents any transaction that could affect the current state of the affected Unit. Specifically, cMRO's functionality for configuration management provides:

- Tighter access controls for activating quarantines and preventing data transactions on damaged assets.
- More sophisticated authentication of super-users to prevent unauthorized users from accessing quarantined data, and ensuring affected assets are accurately analyzed and correctly repaired

Oracle's cMRO production including role-based workflows with pre-defined templates provide only the most relevant content for creating and completing workflows. Technicians, transit maintenance techs, and data entry clerks significantly improve their performance and productivity by reducing training time requirements and improving data entry accuracy. Specific functionality provided in cMRO includes:

- Role-based UIs and flows for technicians, transit maintenance technicians (line maintenance) and data entry clerks; reducing training requirements, improving data input accuracy, and increasing productivity
- Work order completion tools including smart defaulting to reduce
- Automated resource transaction functions and APIs to capture and track time card information on employee performance for a particular job

Engine and Component Overhaul

Oracle cMRO provides a robust and automated approach for MRO providers and operators to overhaul engines and their corresponding components. Specifically, Oracle cMRO provides services providers and operators with the ability to:

- Track lifecycles of serialized and non-serialized parts
- Define repairable, consumable and unusable parts

- Determine percentage of replacement vs. rework for each part
- Capture and integrate part dispositions into supply chain plan
- Create “off” and “on” engine logs of part removal and installation
- Assign immediate and secondary part dispositions
- Produce as-maintained configuration reports
- Identify anticipated failure rates for components and items without history

Marshalling

In an engine overhaul shop, once the tear down has been initiated, hundreds and even thousands of parts are liberated from assemblies and sub assemblies that make up one working engine. At this point, some parts need to be replaced with new, some inspected and reused, and others reconditioned and reused. Marshalling is the organizing of these parts and the planning for the reassembly to take place.

New in cMRO 12.1, Oracle now offers a marshalling workbench that enables engine shops to:

- Provide a place and a way to stage materials in a Marshalling area for an upcoming visit
- Provide a view of the Marshalling area to include the unit status, material requirements, staged materials, and the materials not yet available

With R12s enhancements, cMRO now offers serial number reservations, providing the ability to reserve specific item instances against material requirements in a maintenance visit. Reserving items based on condition and/or preferred counter-values promotes the selection of items that are less likely to fail before the next



overhaul or relevant scheduled maintenance. In addition, cMRO now provides a global view of all material requirements in CMRO was critical for the material-planning role. Providing the ability to easily identify material shortfalls prior to

maintenance production will help to avoid costly down times. Using R12s rich functionality, cMRO users are now able to:

- Reserve a specific item to maximize parts availability
- Reduce down times and increase the life expectancy of subcomponents
 - Provide a single view of material requirements across maintenance visits
- Allow planner to identify when required materials will not be available, which items can be secured from alternate sources and which items can have their maintenance rescheduled
- Minimize costly maintenance delays and Asset On Ground times

ORACLE E-BUSINESS SUITE—THE COMPLETE SOLUTION

The Oracle E-Business Suite enables companies to efficiently manage customer processes, manufacture products, ship orders, collect payments, and manage maintenance operations—all from applications that are built within unified information architecture. This information architecture provides a single definition of your customers, suppliers, employees, and products—all aspects of your business. Whether you implement one module or the entire Suite, the Oracle E-Business Suite enables you to share unified information across the enterprise so you can make smarter decisions with better information.

Contact Us

For more information about Oracle's Complex Maintenance and Overhaul R12.1 solution, please visit oracle.com or call +1.800.ORACLE1 to speak to an Oracle representative.



Oracle is committed to developing practices and products that help protect the environment

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