

Application of the Automated Condition Based Maintenance Checking System for Aircrafts [★]

Mahindra IMADABATHUNI ^a, Pradnya JOSHI ^a, David HE ^a,
Mohammed AL-KATEB ^b, Eric BECHHOEFER ^c

^a*Department of Mechanical & Industrial Engineering, The University of Illinois at Chicago, Chicago, IL 60607*

^b*Department of Computer Science, The University of Vermont, Burlington, VT 05405*

^c*Goodrich Sensors and Integrated Systems, Vergennes, VT 0549*

Abstract

Condition Based Maintenance (CBM) systems have evolved as an effective fault detection mechanism in aircrafts by reducing the costs associated with unscheduled maintenance. CBM systems help maintainers to detect and manage the condition of aviation system components and take maintenance actions when there is evidence of need. In this paper we describe the application of a software prototype, which is an automation of the CBM practices, in generating the maintenance reports that are deemed essential for continuous improvement under CBM. We explain the procedure in generating the reports using the software prototype, named the Automated Condition Based Maintenance Checking System (ACBMCS), which is configurable across different platforms and can perform new operations without having to modify the existing source codes. We illustrate the building of the configuration information, required to generate these reports, using XML. We demonstrate that the developed system has the functional capabilities essential to implement CBM on any aircraft. We generate WOW-Status Check reports, Fault BIT reports, Exceedances reports, Vibration Diagnostics reports, Rotor Track and Balance (RTB) reports, Engine Performance reports and Missing Data reports.

Key words: Condition-based Maintenance, XML Schema, Software Configuration Design

1 Introduction

Condition Based Maintenance (CBM) is an important step towards providing Reliability Centered Maintenance (RCM) to avoid failures in aviation equipment. CBM is defined as a set of maintenance processes and capabilities derived primarily from realtime assessment of weapon system condition obtained from embedded sensors and/or external test and measurements using portable equipment [2]. The specific technical and functional requirements of CBM are detailed in [2]. CBM can be highly reliable in allowing maintainers to identify the condition of different components and take corresponding maintenance action only when a need for maintenance is established. The advantages of CBM implementation are evident and are listed as its goals [2] :

[★] This paper was not presented at any other revue. Corresponding author David He. Tel. 312-996-3410.

Email addresses: mimada2@uic.edu (Mahindra IMADABATHUNI), pjoshi5@uic.edu (Pradnya JOSHI), davidhe@uic.edu (David HE), malkateb@cs.uvm.edu (Mohammed AL-KATEB), Eric.Bechhoefer@goodrich.com (Eric BECHHOEFER).