DOT/FAA/AR-xx/xx

DEVELOPMENT OF AN INDUSTRY STANDARDIZED WEB-BASED SURVEILLANCE AND AUDITING TOOL : MINIMIZING MAINTENANCE ERRORS

March 19, 2007

Final Technical Report

U.S. Department of Transportation
Federal Aviation Administration

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Technical Report Documentation Page

1. Report No. DOT/FAA/AR-xx/xx	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle Development of an Industry Standardized Auditing and Surveillance Tool: Minimizing Maintenance Errors		5. Report Date 03/19/2007
		6. Performing Organization Code
7. Author(s) Anand K. Gramopadhye, PhD., Joel Greenstein, PhD., Pallavi Dharwada, , Nikhil Iyengar, Kunal Kapoor		8. Performing Organization Report No.
9. Performing Organization Name and Address Human Computer Systems Laboratory Clemson University 147 Freeman Hall Clemson, SC 29634		10. Work Unit No. (TRAIS)
		11. Contract or Grant No. 2003-G-011
12. Sponsoring Agency Name and Address U.S. Department of Transportation Federal Aviation Administration Office of Aviation Research Washington, DC 20591		13. Type of Report and Period Covered Final Technical Report
		14. Sponsoring Agency Code
15. Supplementary Notes		

16. Abstract

This report outlines the development of a Web-based Surveillance and Auditing Tool (WebSAT), a system that analyzes aircraft maintenance data. Given that there are no systems available in the industry which assist in evaluation of aircraft maintenance data using standardized procedures, four different web applications were designed and developed to achieve effective and efficient information management of aircraft maintenance operations and understand trends in the errors captured through these operations. It is anticipated that using these systems will systematize and standardize the data collection, reduction and analysis of aircraft maintenance data in the aviation industry. Specifically, this research, pursued over three years, with industry partner Airline at Memphis, Tennessee achieved the following objectives: (1) identify an exhaustive list of impact variables that affect aviation safety and transcend various aircraft maintenance organizations; (2) develop data collection/reduction and analysis protocols to analyze errors for the identified set of impact variables; and (3) using the results of the aforementioned activity, develop and implement a web-based application which ensures oversight of aircraft maintenance operations.

17. Key Words	18. Distribution Statement This document is available to the public through the National Technical Information Service (NTIS), Springfield, Virginia 22161.

19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 390	22. Price

Form DOT F1700.7 (8-72)   Reproduction of completed page authorized

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

Inspection and maintenance errors that occur in aircraft maintenance systems have a formidable impact on the safety and reliability of air transportation. Evaluation of the aircraft maintenance system requires an analysis of the maintenance processes in use. Significant efforts have been made to investigate and track inspection and maintenance errors. Although valuable in terms of their contributions to the identification of the performance-shaping factors that lead to maintenance errors, these efforts have not emphasized analyzing the information gathered. The systematic evaluation of data collected on the aviation maintenance process can provide management with feedback on the performance of the airline and consequently provide support of the decision-making process prior to the dispatch of the aircraft. Recognizing that surveillance, auditing and airworthiness directives form a significant portion of the quality assurance function of an airline, it is critical that data be collected on these processes. This research involves the development of a Web-based Surveillance and Auditing Tool (WebSAT), a system that analyzes aircraft maintenance data. Given that there are no systems available in the industry which assist in evaluation of aircraft maintenance data using standardized procedures, four different web-applications were designed and developed to achieve effective and efficient information management of aircraft maintenance operations and understand trends in the errors captured through these operations. It is anticipated that using these systems will systematize and standardize the data collection, reduction and analysis of aircraft maintenance data in the aviation industry.

Specifically, this report, describes the results of this research pursued over three years, with industry partner airline at Memphis, Tennessee which achieved the following objectives: (1) identify an exhaustive list of impact variables that affect aviation safety and transcend various aircraft maintenance organizations; (2) develop data collection/reduction and analysis protocols to analyze errors for the identified set of impact variables; and (3) using the results of the aforementioned activity, develop and implement a web-based application which ensures oversight of aircraft maintenance operations.

1. INTRODUCTION

1.1. BACKGROUND AND NEED FOR RESEARCH

The mission of the Federal Aviation Administration (FAA) is to provide safe and reliable air transportation. It is important to have a sound aircraft inspection and maintenance system (FAA, 1991). This system is a complex one (FAA, 1991) with many interrelated human and machine components. Its linchpin, however, is the human. Recognizing this fact, the FAA, under the auspices of the National Plan for Aviation Human Factors, has pursued human factors research (FAA 1991, 1993) to fulfill the mission of the FAA's Flight Standard Service of promoting "safety of flight of civil aircraft in air commerce by setting certification standards, for air carriers, commercial operators, air agencies and airmen; and by directing, managing and executing certification, inspection and surveillance activities to assure adequacy of flight procedures, operating methods, airman qualifications and proficiency, aircraft maintenance and maintenance aspects of continued airworthiness programs." Given this goal, surveillance of maintenance activity contributes an important function in maintaining and improving aviation safety. One arena where this surveillance activity can have tremendous impact is the implementation of a system that can be used by operators prior to delivery of aircraft to customers to reduce maintenance errors.

A study conducted by Boeing and US ATA (1995) found that maintenance error was a crucial factor in aircraft accidents from 1982 to 1991, contributing to 15% of the commercial hull loss accidents where five or more people were killed. Rankin et al. (2000) documented the most critical causes of those accidents:

- 23% involved incorrect removal or installation of components
- 28% involved a manufacturer or vendor maintenance/inspection error
- 49% involved error due to an airline's maintenance policy
- 49% involved poor design leading to maintenance errors

In addition, Rankin and Allen (1995) established the economic costs of these maintenance errors, estimating that 20 to 30% of in-flight shutdowns are due to maintenance error costing $ 500,000/shut down, 50% of the flight delays are due to engine problems caused by maintenance errors costing $ 10,000/hour of delay and 50% of flight cancellations are due to engine problems caused by maintenance errors costing an average of $ 50,000/cancellation. The message is clear: we need a proactive system, which will help track maintenance errors, identifying both potential problem areas and the factors causing those errors. If such a system is developed, we will be in a position to manage maintenance errors, resulting in an aircraft maintenance system that is more safe and robust. To understand the need to develop such a system, the entire aircraft inspection and maintenance system needs to be understood.

The complexity of the inspection/maintenance system is further complicated by a variety of geographically dispersed entities ranging from large international carriers and repair and maintenance facilities, through regional and commuter airlines to the fixed-based operators associated with general aviation (refer to Figure 1). Inspection is regulated by the

FAA, as is maintenance. However, while the adherence to inspection procedures and protocols are closely monitored, evaluating the efficacy of these procedures is much more difficult.

When an aircraft is brought into service, a process called MSG (Maintenance Service Group) is used to determine how each component failure is to be corrected to maintain a high level of safety. Aircraft for commercial use have their maintenance scheduled initially by a team that includes the FAA, aircraft manufacturers and start-up operators. These schedules are then taken by the carrier and modified so that they suit individual requirements and meet legal approval. Thus, within the carrier's schedule there will be checks at various intervals, often designated as flight line checks, overnight checks, and A, B, C and D, the heaviest, checks. The objective of these checks is to conduct both routine and non-routine maintenance of the aircraft, including scheduling the repair of known problems; replacing items after a certain air time, number of cycles or calendar time; repairing defects discovered previously, for example, from reports logged by pilot and crew, line inspection, or items deferred from previous maintenance; and performing scheduled repairs.
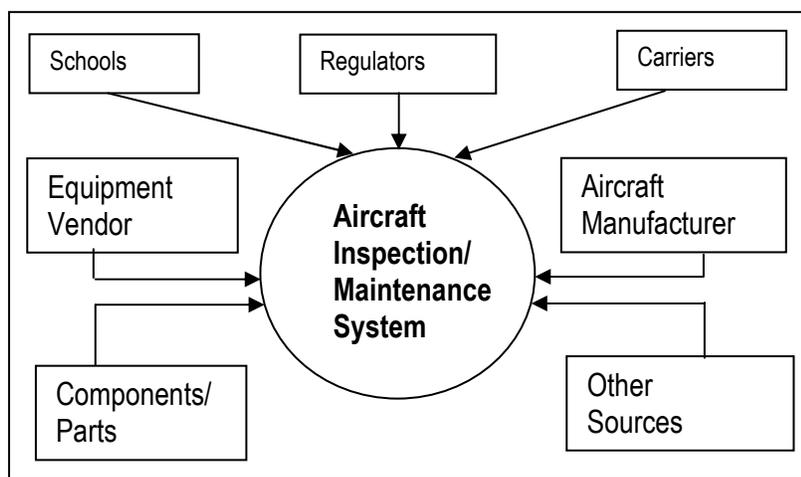

Figure 1. The Aircraft Inspection Maintenance System.

Once maintenance and inspection are scheduled for an aircraft, this timetable is translated into a set of job, or work, cards containing instructions for inspection and maintenance as the aircraft arrives at each maintenance site. Initially, the aircraft is cleaned and access hatches opened so that inspectors can view the different areas. This activity is followed by a heavy inspection check, primarily visual in nature. Since such a large part of the maintenance workload is dependent on the discovery of defects during inspection, it is imperative that the incoming inspection be completed as soon as possible after the aircraft arrives at the inspection maintenance site. In addition, there is pressure on the inspector to discover critical defects necessitating long follow-up maintenance times early in the inspection process. Thus, there is a heavy inspection workload at the commencement of each check. It is only after the discovery of defects that the planning group can estimate the expected maintenance workload, order replacement parts and schedule maintenance items. To meet this demand, maintenance facilities frequently resort to overtime, resulting in an increase in the total number of inspection hours, often leading to prolonged work hours.

Further increasing the pressure, much of the inspection, including routine inspections on the flight line, is carried out during the night shift, between the last flight of one day and the first flight on the next. Once a defect is rectified, it may generate additional inspection, called "buyback" inspections, to ensure that the work meets necessary standards.

Thus, it is seen that initially the inspector's workload is very high at the arrival of an aircraft. As the service on the aircraft progresses, this workload decreases as the maintenance crew works on the repairs. The inspection load again increases towards the end of service. However, the rhythm of the work changes at this time because of frequent interruption as AMT's call in inspectors to conduct buybacks of completed work. All of these factors contribute to place stress on the inspectors and other personnel (Taylor, 1990), stress that is further compounded by the fact that the inspector has to search for multiple defects occurring at varying severity levels and locations (Drury, Prabhu and Gramopadhye, 1990).

The maintenance task is further complicated because of the wide variety of defects being reported in older aircraft. Scheduled repairs account for only 30% of all maintenance in these aircraft compared to 60-80% in the younger fleet, a fact which can be attributed to an increase in the number of age-related defects (FAA, 1991). Consequently, a more intensive inspection program is required for older aircraft, and inspection plays a more vital role. However, the introduction of newer aircraft will not substantially reduce the maintenance workload, as new airframe composites create an additional set of variables. The problem of maintenance is compounded since the more experienced inspectors and mechanics are retiring and are being replaced by a much younger and less experienced work force. Not only do the unseasoned AMT's lack the knowledge and skills of the far more experienced inspectors/AMT's they are replacing, they are also not trained to work on a wide variety of aircraft.

Further, the cost of inspection is rising. As a result, there is increasingly greater competitive pressure to reduce maintenance/inspection costs, for example, by maintaining minimum staffing levels and adhering to the mandated workload, without, of course, jeopardizing safety or disrupting flight schedules. From an airline management perspective, two goals need to be achieved by a maintenance/inspection program: safety and profitability. While safety is of paramount concern, profitability can be realized only when safety is achieved economically. For maintenance, this means that in addition to performing the task, technicians have to be sensitive to efficiency, the speed measure, and effectiveness, the accuracy measure, if they are to optimize their performance. The interrelationship between these performance measures and task factors, among others, is seen in Figure 2.
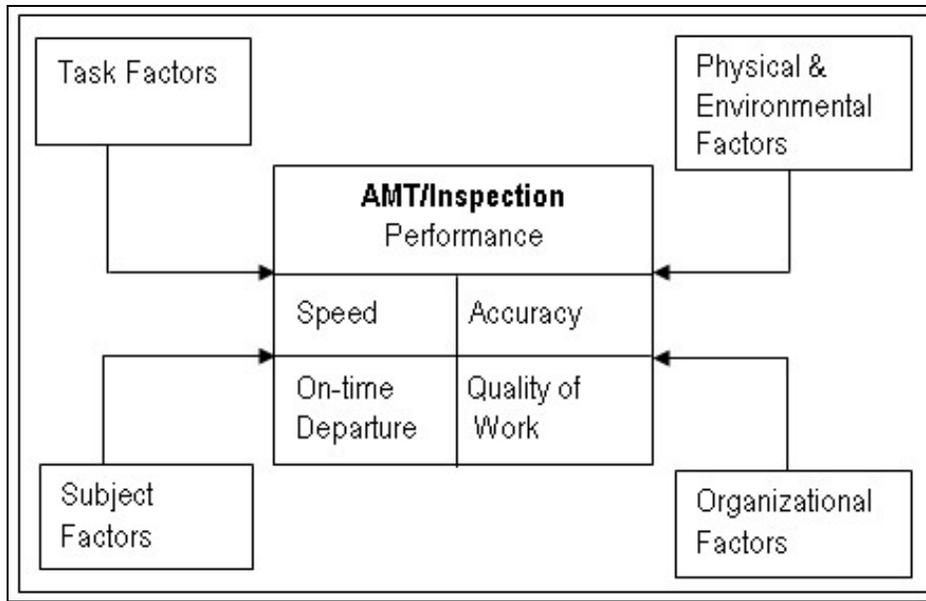
Figure 2. Factors Impacting Aircraft Inspection Performance.

The stress produced by this complicated situation, imposing at times, what appear to be contradictory goals, often results in maintenance errors, a fact that has been confirmed through task analysis of commercial maintenance and inspection activities (Drury, Prabhu and Gramopadhye, 1990) This analysis has revealed aircraft maintenance to be a complex activity requiring above average coordination, communication and cooperation between inspectors, maintenance personnel, supervisors and various other sub-systems (e.g., planning, stores, clean-up crew, shops, quality assurance) to be effective and efficient (FAA, 1991; FAA, 1993). Thus, it is clear that there exists potential for errors, and it is only through devising strategies that identify where they occur that we can eventually determine problem areas and develop interventions minimizing their impact.

For the FAA to provide the public with continuing safe, reliable air transportation, it is important to have a sound aircraft inspection and maintenance system. This system is complex, with many interrelated machine and human components. Recognizing the importance of the human in this process, the FAA has pursued human factors research, placing continuing emphasis on developing interventions to make the inspection/maintenance system more reliable and/or more error-tolerant. A key objective has been to reduce errors and to conduct research that provides the aircraft maintenance community with interventions/tools that will help in the identification of factors resulting in maintenance errors. Knowing which factors contribute to these errors can lead to strategies minimizing their effects. A potential area for the application of such an approach is in the arena of dispatching aircraft following service. In response to this need, this research focuses on developing a web–based surveillance tool to minimize maintenance errors prior to dispatch by airlines. It is anticipated that the use of this tool will facilitate the standardization of data collection on aircraft maintenance activities. To ensure that the tool addresses the needs of the aircraft maintenance community, this research was pursued with an industry partner.

1.2. OBJECTIVES

The general objective of this research is to develop and implement an application tool to perform surveillance activities to ensure that a consistent level of supervision is maintained over maintenance operations. The system will promote a standardized format for data collection, reduction and analysis to identify proactively contributing factors of improper maintenance. The research was pursued over three years employing an integrated task analytic and user-centered software lifecycle development methodology with the following specific objectives: (1) identify an exhaustive list of impact variables that affect aviation safety and transcend across various aircraft maintenance organizations; (2) develop data collection/reduction and analysis protocols to analyze errors for the identified set of impact variables; and (3) using the results of the aforementioned activity, develop and implement a web-based application which ensures oversight of aircraft maintenance operations.

1.3. BENEFITS OF THE RESEARCH

The development of this web-based tool will benefit the FAA and the aviation maintenance industry in the following areas:

- Identification of potential factors causing maintenance errors. Eliminating these factors will help reduce maintenance errors, ultimately improving the safety and reliability of aircraft inspection and maintenance operations.

- Standardization of the data collection process supporting the analysis of maintenance errors prior to aircraft dispatch.

- This web-based tool will be combined with existing data collection programs to support record keeping and to facilitate consistency in oversight of aircraft maintenance performance monitoring.

In addition, this research directly supported AFS requirements and the AAR mandate for reducing maintenance accidents by conducting guidelines-based human factors research through identifying and implementing intervention strategies.

2. METHODOLOGY

2.1. WEBSAT STRUCTURE

WebSAT, developed at the Human Computer Systems Laboratory at Clemson University, is a tool for analyzing aircraft maintenance data and generating reports. The business processes involved in a typical airline's quality assurance department are supported through the four different modules of WebSAT as described below.

1. Audit Management Module for Technical Audits: This module allows an auditor to document an audit conducted on a vendor and record the audit data in WebSAT. The various tasks and goals of different user categories such as auditors, managers and vendors can be accomplished using the WebSAT audit management system. The typical tasks that can be performed by an auditor or a manager or a vendor are described below

a. Start an audit on a particular vendor of a specific audit type.
b. Create/ Modify/ Select a checklist for conducting the audit.
c. Enter audit data in terms of checklist responses, process measures, aircraft level impact categories, organizational categories, and open ended responses such as findings, concerns and observations.
d. Generate audit report and send it to the vendor for corrective actions.
e. Send corrective actions (*Vendor Task).*
f. Approve the corrective actions sent by the vendor.
g. Create vendor assessment reports which show numerical and graphical analysis of the vendor data.
h. Approve checklist modifications and creations *(Manager Task).*
i. Edit information on auditors, vendors and audit types.

The vendor can see the audit report not only through e-mail but also using WebSAT and send his corrective actions through WebSAT. WebSAT automatically closes the audit once all the audit findings are taken care of and the vendor addressed corrective actions are approved by the auditor. Therefore, the entire audit process from starting an audit to closing it can be monitored in WebSAT. WebSAT automatically assigns the audit status without any user intervention based on the phase of the audit. The most significant aspect of WebSAT apart from data collection and data reduction is the analysis capability. Data collected from various audits can be utilized for assessing vendors' performance over a period of time. See Appendix A for the user manual of the WebSAT Technical Audit Management Module.

2. Audit Management Module for Internal Audits: The work flow of this module is very similar to that of the Module for Technical Audits except that the audit is on a department within the airline company rather than a vendor external to the organization. For this reason, the checklists used are different. See Appendix B for a detailed description of the WebSAT Internal Audit Management System.

3. Surveillance Management Module: This module allows a surveillance representative to document every surveillance activity performed by him/ her on the aircraft. The various tasks that can be accomplished by different user categories, such as Quality Assurance Representatives (QARs) or their managers are given below.

a. Access the sampled surveillance activities and mandatory items of a scheduled work order of an aircraft.
b. Access non-routine work cards of a scheduled work order of an aircraft.
c. Enter the surveillance data collected and classify it in terms of a process measure, risk to aircraft, and managerial implications.
d. Identify the target percentage of activities to be achieved for each process measure of a surveillance event per each day.
e. View the percentage of discrepancies in a work order.
f. Generate a weekly/monthly status report.
g. Generate a risk analysis report.
h. Set Goals for QARs (*Manager Task*).
i. Edit Vendor, QAR information *(Manager Task).*

See Appendix C for the user manual of the Surveillance Management Module in WebSAT.

Airworthiness Directives (AD) Tracking Module: This module allows the airworthiness directive representative to track the applicability and status of an AD. The AD representatives use built-in checklists to perform the review of a documented AD and enter data on the findings. These findings can be utilized later to perform analysis based on various criteria. Unlike the other three modules, the AD data analysis does not use a regression model. WebSAT also allows the AD representatives to modify existing checklists or create new checklists and ensures that the manager approves the modifications. See Appendix D for the user manual of the Airworthiness Directives (AD) Tracking Module in WebSAT.

The objectives of these groups are achieved through effective functioning of the representatives who perform surveillance and auditing activities. Their findings will help in the evaluation and assessment of the internal and external organizations associated with the airline which influences the safety and airworthiness of aircraft. The surveillance and auditing activities are of foremost importance in ensuring adherence to the quality requirements and also maintaining a consistent level of supervision over maintenance operations.

2.2. WORK FLOWS

1.1.1   AUDITS

Audit is an activity that addresses specific issues. Auditing may be performed at two levels: Internal and Technical audits. Internal audits are those that are performed within and/or across the airline departments. Oversight of functions relating to aircraft line maintenance, ramp operations and aircraft fueling, whether owned by the airline or contracted, is accomplished by a formal system of technical audits performed by qualified technical auditors. The audit manager assigns an auditor and schedules the audit. The auditor will select the audit standards, perform pre-audit analysis and finally complete the audit. The auditor then reports the findings to the vendor and his/her manager. This approach is used by the Partnering airline technical audit team for their audits. The work flow analysis of the internal audit and technical audit work functions is depicted in Figures 3 and 4, respectively.

Work Flow Diagram
Work Function Internal Audit
User Sr Technical Audit Specialist
Source Trip Reports

Major Findings

All Findings

Department Manager (EMM)
(done at Los Angeles Indianapolis and Memphis)
- Complete corrective actions
- Address new concerns from the audit manager
- Provide internal evaluation information to the audit
manager on the audit process

Records
- Store old audits

Transfer old audit reports

Conduct SAI and EPI

User Auditor
- Identify area to be audited
- Review policies and regulations for modifying checklists
- Modify checklist based on the audit type
- Plan the trips to visit the department
-Conduct Audit
- Generate Audit Report
- Forward Corrective Actions form
to the departments
(For adhoc audits provide feedback
for EMM and FOD audits)
-Follow-up on Corrective Actions if not satisfactory
-Close audit subsequent to corrective actions completion

Internal Evaluations
(ATOS)
- Provide checklist with
attributes

Conduct SAI and EPI

Discuss Status report
regularly

Corrective
Actions

Audit Report
Contents Audit #
Department detail Date
Cc Sr Manager MD & VF

Internal Audit Manager
- Receive report
- Provide feedback to the department(s)
the audit includes
- Generate Audit Scores
- Approve audit checklists
- Approve trip expenses
- Send Audit Report
- Communicate Senior Manager
concerns (if any) to the department
- Add new questions for audits

Department Manager (FOD)
- Complete corrective actions
- Address new concerns from the audit manager
- Provide internal evaluation information to the
audit manager on the audit process

Comments

Senior Manager
- Review Audit Report summary
- Provide comments on the audits (if any
and copy to auditor MD & VF)

Glossary:
ATOS – Air Transport Oversight System
EMM – Engineering Material And Maintenance
EP – Element Performance Inspection
FOD – Flight Operations Department
Mx – Maintenance
PCS - Production Control System
QA – Quality Assurance
WC – Work Card
SA – Safety Attribute Inspection
MD – Managing Director
VF – Vice Preseident

Figure 3: Work Flow of Internal Audits

Work Flow Diagram
Work Function: Technical Audits
User: Manager
Source: Trip Report I, II, V

Mainframe System

Supplier Evaluation System

Request for an audit
(also could be through e-mail)

Request to perform an audit

Surveillance

Fuel Vendor
Surveillance Report

User: Manager
1. Perceive notification for a supplier audit from an external department or SCORE system
2. Schedule the audit
3. Assign an auditor based on vendor zip code
4. Forward the request to the assigned auditor
5. Approve FMR, and other supplier type vendors
6. Verify the various audit checklists and fuel surveillance checklist
7. Schedule FMR audits
8. Score the ramp audits

Schedule an appointment with
Mx. Personnel or Inspector

Final Audit Report includes findings, concerns on compliance issues, other comments, corrective actions

Prior to Corrective Actions Phase: Audit Findings Report

Vendor

Corrective Actions

All Findings

Major Findings

Auditor
-Select Audit Standards
-Perform pre-audit analysis
- Complete the audit at vendor location
- Formulate Audit report
-Follow up on Corrective Actions
Close Audit

Glossary:
FMR – Fuel, Maintenance and Ramp

Figure 4: Work Flow Analysis of Technical Audits

1.1.2   _SURVEILLANCE_

Surveillance is the day-to-day oversight and evaluation of the work contracted to an airframe substantial maintenance vendor to determine the level of compliance with the airline's Maintenance Program and Maintenance Manual. The primary objective of surveillance is to provide the airline, through the accomplishment of a variety of specific surveillance activities on a planned and random sampling basis, an accurate, real-time, and comprehensive evaluation of how well each substantial maintenance vendor is complying with the airline's and FAA requirements. For example, the partnering airline has a Quality Assurance Representative (QAR), stationed at the vendor location who schedules surveillance of an incoming aircraft. The specific task to be performed on an aircraft at a vendor location is available on a work card. The representative performs surveillance on different work cards according to the surveillance schedule. The results are documented and used to analyze the risk factors associated with the concerned vendor and aircraft. A high-level work flow analysis of the surveillance work function is depicted in the Figure 5.

Work Flow Diagram
Work Function Surveillance
User Quality Assurance Representative
Source Trip Report I II III

Reliability
Mx Planning & Engineering
-Look at historical data to add value to surveillance activities
- Add New ADs to PCS
- Update PCS with work cards for a W/O #

Technical Audits Dept

Share data on "rejects" with trends in N/R and routine activities ("give rise to New Checklists")

Office

Collect W/C hardcopy

User 1
1 Use PCS to refer to planning chart to identify which A/C is coming to the facility (make a note of the tail # on a post it)
2 Review surveillance schedule in PCS (pay attention to operational maintenance work cards in schedule)
3 Select the work cards to perform surveillance from PCS
4 Use MJCS and PCS to print ADs
5 Perform surveillance activities
6 Categorize surveillance activities
7 Prepare weekly reports (use ETIC to conclude if on schedule)
8 Status meeting with manager
9 Feed information into the report using PCS & Mainframe system

Major Findings

Airline
A/C representatives

Weekly Status Report
Contents Work Order #, A/C Tail #, Date

All Findings

Schedule an appointment with Mx Personnel or Inspector

Major Findings

- Discuss Weekly Status
- Discuss A/C Status using ETIC (Triggers off drop-in)
- Discuss QA reps performance- # of surveillance activities performed

Monthly Progress Report

Vendor

Manager
- Conducts analysis of some data
(monthly progress report)
-

Glossary:
A/C – Aircraft
AD – Airworthiness Directive
ETIC – Estimated Time In Commission
MJCS - Master Job Control Sheet
Mx – Maintenance
N/R – Non routine
PCS - Production Control System
QA – Quality Assurance
W/C – Work Card
W/C – Work Order

Figure 5. Work Flow of Surveillance

1.1.3 *AIRWORTHINESS DIRECTIVES*

The Airworthiness Directives Control Group (ADCG) is responsible for the implementation of new, revised or corrected Airworthiness Directives (AD) appearing in the Federal Register. If the "applicability statement" of an AD refers to an aircraft model and series or engine model and series operated by the airline, or if the AD addresses an appliance or component that could be installed on an aircraft operated by the airline company, the ADCG considers the AD to be initially applicable. A Work Instruction Card (WIC) generated by the ADCG is used by the maintenance personnel to check for compliance with the AD. There are checklists to review the compliance of a WIC. These checklists can be used as a process measurement tool to review each WIC and identify any discrepancies. The findings obtained from these reviews can be used to identify risk factors. A high-level work flow analysis of the AD work function is depicted in Figure 6 below.

Work Flow Diagram
Work Function Airworthiness Directive
User Airworthiness liaison
Source Trip Reports

ATA – Information Portal where member airlines can place comments on ADs
- coordinator for compliance documents with ATA #s

Make AD recommendations

FAA
- Issue ADs

Issue ADs in the FR

Engineering
- Issue EOCN during A/C acquisition or AD termination (NPRM)
- Assign an engineer for the AD
- Complete ADNT
- Send completed ADNT to ADCG
- Decide if the compliance document should be an EO EA or FCD
- Complete AD compliance document
- Incorporate ADCG edits on AD compliance document

EOCN

- ADNT AC #, AD detai Date (UPPER PORTION)
- Forward ADNT copy to aircraft records and update MCS

ADCG (Airworthiness liaison)
(AD from Federal Register)
- Review FR
- Decide AD Applicability
- Import applicable ADs into EAS
- Complete upper portion of ADNT
- Send ADNT to Engineering
- Initiate ADMT form
- Review AD compliance document including WIC(if any)
- Forward comments to Engineering on AD compliance document
- Copy to ADCG Manger on the AD process for approval
- Verify MCS loading and complete ADMT
- Send Status Report to Senior Manager for Records
- Collect/ Review EOCN from Engineering

EAS Intranet System

ADNT AC # AC detail Date (LOWER PORTION)

Glossary:
ACO – Aircraft Certification Office
ADCG – Airworthiness directive control group
ADNT - Airworthiness directive Notification transmittal
ADMT – Airworthiness directive Management tracking
AMOC – Alternate Methods of Compliance
ATA – Air Transportation Association
EA – Engineering Authorization
EAD – Emergency Airworthiness Directive
EAS - Engineering Authorization
EO – Engineering Order
EOCN - Engineering Order Change Notice
FCD – Fleet Campaign Directive
FR – Federal Register
MCS – Modification control System
NPRM – Notice of Proposed Rule Making
QA – Quality Assurance
WIC – Work Instruction Card

Discuss Status report regularly

Senior Manager
- Review Status Report from ADCG

Figure 6. Work Flow of AD

2.3. <u>DATA ARCHIVE AND MODIFICATION</u>

The auditors, surveillance and AD representatives can store, update and retrieve information in real time from WebSAT. Over time, the tool will become a repository of audits, surveillance activities and AD tracking information. The auditors and surveillance and AD

representatives will be able to use these records as evidence to analyze aircraft maintenance data, rather than managers depending on scattered and largely un-documented data to validate trends. The airline's information technology department maintains WebSAT and ensures the integrity of the data stored in it.

Please refer to Appendix J for the exhaustive list of process measures generated for the departments of Technical audits, Internal audits, Surveillance, and Airworthiness Directives.

3.   WEBSAT TECHNOLOGY DESCRIPTION

The WebSAT tool can be accessed by geographically dispersed entities of an airline to feed data into the system and share it across different facilities. This web based tool consists of a front-end and a back-end to allow data to be shared. The front-end is the web interface an auditor or surveillance representative will interact with. The front-end comprises the design files which display the web elements such as images, buttons and textboxes. These files are loaded in a web server to launch WebSAT. The files in the web server thus provide the auditors and surveillance representatives with access to the tool. The WebSAT design files have been developed using the Microsoft Visual Studio .NET development environment.

The back-end is a database server where data is stored, updated, and retrieved. WebSAT's database can reside on a SQL or Oracle server. A database server is a device capable of storing large amounts of data while allowing concurrent real-time data sharing. Consequently, the back-end cannot reside on one's personal machine and has to reside on a common database server which takes requests from users at various locations.

A database contains several tables each containing different kinds of data. For example, in the WebSAT database, there is an employee table which stores all employee information such as employee ID, phone number, address and designation. Similarly, there is a supplier table which stores all supplier information such as supplier ID, contact information and supplier name. All these tables are related to one another and these tables and their relationships are stored in a database schema.

3.1.   WEBSAT SYSTEM REQUIREMENTS

Table 1. WebSAT System Requirements

Web Browser	Internet Explorer version 5.0 or higher and Firefox version 1.5
Web Server	Internet Information Services 5.1 or above
Server Operating System	Windows Server 2003 (Preferred) Windows XP Professional
Framework	.NET Framework 1.1 or above
Database	SQL Server 2005/SQL Server 2003 or Oracle Server 2005
Editing and Debugging Software	Visual Studio.NET 2003 and above (with Crystal Reports 9.0 or above).

3.2. WEBSAT INSTALLATION INFORMATION

The primary users of WebSAT are the surveillance representatives, internal and technical auditors, AD representatives and managers of the four work functions. These primary users will be referred to as end users in this report. A system administrator is also required to perform the one-time task of WebSAT installation.

In information technology parlance, WebSAT is a client-server application (see Figure 7). The client side refers to the personal computers that the end users use. The client side, using web browsers, allows the end users to view, update and enter data into WebSAT. The server side refers to the web server which contains the design files and the database server used to store data entered by the end users. The web server handles the requests from a number of geographically dispersed end users simultaneously.
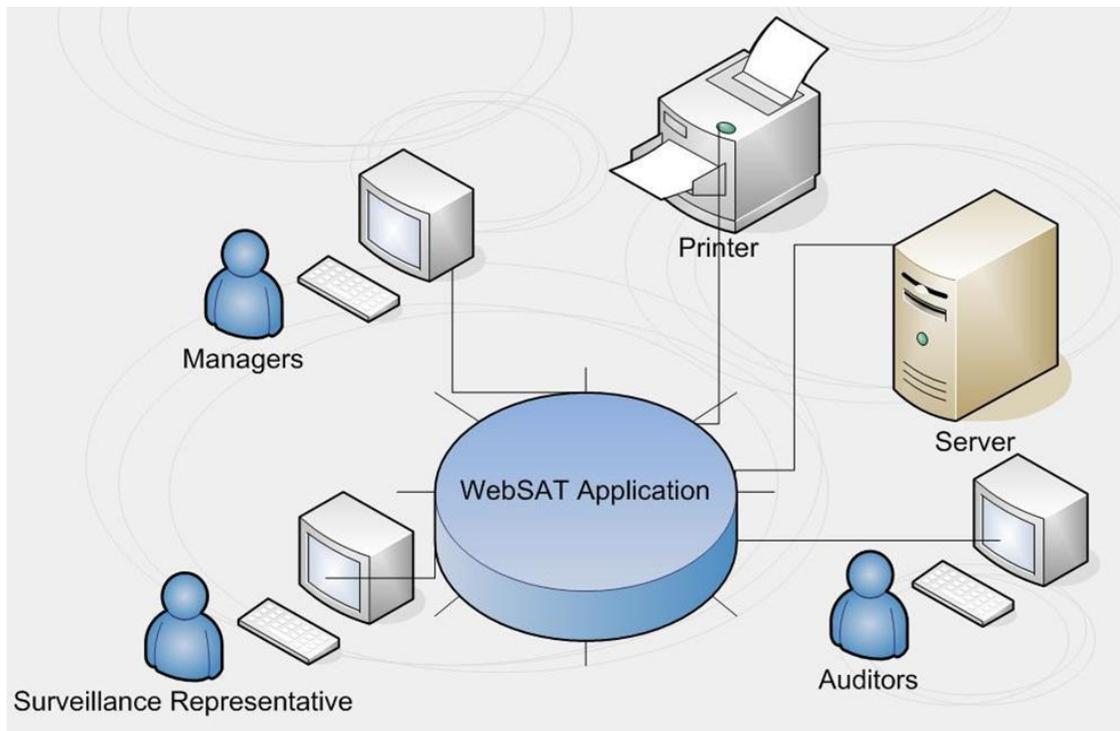
Figure 7. Client-Server Application

The WebSAT application installation package consists primarily of the database file with a ".bak" extension, the application files with an ".msi" extension, user manuals and installation/technical reference manual. The details on WebSAT installation are available in the installation/technical reference manual (see Appendix E). The user manual in the application package which is also described in Appendices A, B, C and D gives detailed information on how to use the tool.

4. SYSTEM DESIGN AND EVALUATION

A user-centric design methodology was adopted to design and develop the tool. Various ethnographic techniques, such as interviews, observation sessions and surveys were conducted to identify the needs of the various user categories of WebSAT. The available documents at the airline company were also studied users were shadowed at their work environment to analyze the work flows of different work functions at the quality assurance department of the partnering airline. The work flow analysis (see section 2) helped in understanding the users' current practices at work, the work environment, motivations and frustrations at work. This information was utilized in identifying user needs, creating personas and establishing target specifications for the systems developed. The needs were prioritized based on the importance ratings gathered from the users and the designers. In the next phase concepts generated by the designers were prototyped and tested with end users to finalize the information architecture of the product. Subsequently, the detailed design of the tool was accomplished and in-house evaluation of the designs was performed before conducting user testing of a functional prototype with end users at the client location. See sections 4.1 and 4.2 for details on the methods and results of the user testing sessions conducted at the partnering airline.

4.1. USER TESTING METHODS

The user testing sessions were conducted at the partnering airline with the end users of the Internal and Technical Audit Management systems, the Surveillance Management system, and the Airworthiness Directives Tracking system. The participants recruited for this study were real time users of the web-based surveillance and auditing tool and represent the general user population. The participants were asked to participate in user testing through e-mails. The content of the e-mail provided information about the testing, and the potential risks and benefits involved in participating in the study. After acquiring the users' consent to participate, testing was done at the participant's location, not in a laboratory setting. Eight auditors, 7 QARs and 5 managers participated. WebSAT functional prototypes were presented to the users and they were asked to perform specified tasks using a 19" Dell color monitor, a standard Dell keypad and an optical mouse. The application was run under the Windows XP operating system on a Dell Inspiron 700 m Celeron 2.6 GHz processor using Internet Explorer browser 6.0.

4.1.1. AUDIT TASKS

Both managers and auditors performed the same tasks in the order shown below (See Appendix E for the scenario descriptions presented to the participants):

1. Retrieve vendor X's past audit findings
2. Start a new audit on vendor X
3. Select a checklist for the new audit started
4. Print the checklist selected for vendor X to use for conducting the audit
5. Enter findings for the new audit started
6. Identify the regulation standard for the question given on the specified checklist
7. Categorize the audit findings in terms of Aircraft Level Impact (ALI) and Organizational Categories (OC).

8. Generate audit report based on the audit conducted and send it to vendor X
9. Approve corrective actions
10. Find vendor X contact information
11. Find the different audit types in WebSAT
12. Find the status of audit # xyz
13. Find help information on given topic
14. Create a new checklist for the given new audit type
15. Modify the checklist given and submit it to a manager for approval
16. Perform data analysis

4.1.2. SURVEILLANCE TASKS

1. Classify the data collected in terms of a process measure and risk to aircraft, and indicate managerial implications
2. Access an AD
3. Access the sampled surveillance activities
4. View the percentage of discrepancies
5. Generate a risk analysis report
6. Access information on non-routine work cards
7. Access information on non-routine work cards generated by vendor
8. Generate a weekly status report
9. Access help information
10. Identify the percentage of activities to be carried out for each process measure of a surveillance event.

4.1.3. AD MODULE TESTING

The AD module was only tested with the AD manager and one AD representative because the AD work flow implemented in WebSAT is not a part of the existing job domain of the AD representatives. The users needed familiarization and training with the process to be able to perform the tasks using WebSAT. Hence only the two users who were aware of the proposed work flow performed tasks and gave qualitative feedback on the system.

4.1.4. DATA COLLECTION

Performance measures determining the efficiency and effectiveness of user performance were measured in this study. Specifically, the time taken to complete each task was obtained. If the user was unable to complete a particular task after initial attempts, it was counted as unsuccessful. At the end of each task, the subject was given an After-Scenario Questionnaire (ASQ) and asked to give a rating on a scale of 1 to 7 with 1 being highly satisfied and 7 being highly dissatisfied with: the ease of use of the interface in performing that particular task, satisfaction with the amount of time it took to perform the task; and the online help information provided in accomplishing the task (Kirakowski and Corbett, 1993). In addition, qualitative feedback was acquired through the think-aloud technique. A summative evaluation of the tool was conducted by administering a Software Usability Measurement Inventory (SUMI) questionnaire at the end of each session (Lewis, 1990).

4.2. USER TESTING RESULTS

The data gathered for each module was analyzed separately to assess the individual performance of each module. The user testing sessions conducted at the partnering airline with the end users of the Internal and Technical Audit Management systems, the Surveillance Management system, and the Airworthiness Directives Tracking system revealed that WebSAT is usable. This can be inferred from qualitative feedback obtained in the form of user comments such as

- "This (WebSAT) looks far superior to the current automated audit management system we are using."
- "Very easy to use" (While Creating a New Checklist)
- "It is very easy to find information" (While Generating an Audit Report)

The quantitative data gathered in terms of time taken to complete the task was utilized in verifying the system met the target specifications (see Appendix F for details on the user testing data gathered).

4.2.1. TECHNICAL AND INTERNAL AUDIT MODULES - PERFORMANCE SPECIFICATIONS

For both audit modules, the system met with its performance specifications for all metrics except Metric 2. As can be seen in Appendix F-1, only approximately 40% of the users were able to complete this scenario. In addition, it can be observed from Appendix F-2 that the average after-scenario questionnaire rating for 12 out of 16 tasks ranged between 1 and 2, indicating that the users were very highly satisfied with the ease-of-use and the amount of time needed to perform each of these tasks. Except for Metric 2, which requires the user to identify vendor contact information, the tasks received an ASQ rating ranging between 1 and 3. These results suggest that even though the users were not familiarized with the tool prior to the testing, it is usable and enables the users to accomplish their goals. With increased use, the users will become more comfortable and adept with the tool. New screen designs were not proposed for tasks with low completion rates because the team felt that with familiarity with the software the users will not have a problem.

4.2.2. SUMI EVALUATION – AUDIT MODULES

Subsequent to completing all the scenarios, each user completed the SUMI questionnaire, the purpose of which is to collect data on user satisfaction, one of the most important variables determining the success of a product. The 50 questions on this inventory are answered as agree, undecided, disagree, represented by a 1, 2, or 3, respectively. The subsequent analysis measures the software product on five specific SUMI scales – Efficiency, Affect, Helpfulness, Control and Learnability—in addition to the sixth, the Global Usability scale, which is a general satisfaction measure (see Appendix G-1). These scales measure the degree to which the user can meet the demands of the tasks or the computer system, given his or her ability and level of knowledge. The higher the SUMI value, the better the product is, with scores over 50 indicating the product is competitive with state-of-the-art technology. Given the similarity between the internal and

technical audit systems, work flows and users, the combined scores of the technical and internal audits were evaluated. These totaled higher than 60 on five of the scales and 58 on the efficiency scale (see Appendix G-1 for the specific scores), indicating the high quality of the WebSAT auditing modules.

4.2.3. SURVEILLANCE MODULE - PERFORMANCE SPECIFICATIONS

For the surveillance module, the system met its performance specifications for all metrics other than metrics 32 and 17 which were assessed by scenarios 4 and 10 respectively. Scenario 4 was to access the sampled surveillance activities of a given work order. Scenario 10 was to use the online help feature provided to the user. Metric 32 is the time taken to access the sampled surveillance activities and metric 17 is time taken to access help information. As can be seen in Appendix H-1, only approximately 30% of the users were able to complete these scenarios. In addition, it can be observed from Appendix H-2 that the average ASQ rating for 8 of the 10 tasks ranged between 1 and 2. This shows that the users were very highly satisfied with the ease of use and the amount of time it took to perform each of these tasks. Excluding metrics 32 and 17, the metrics had an ASQ rating ranging between 1 and 3. The users did not have any familiarization session with this tool before they used it and faced it for the first time during this testing. This suggests that the tool is very usable and enables the users to accomplish their goals. The system exceeded the ideal target specifications in all cases except for metrics 32 and 17. New screen designs were not proposed for tasks with low completion rates since the team felt that with familiarity with the software the users will be able to perform the task successfully.

4.2.4. SUMI EVALUATION – SURVEILLANCE MODULE

The WebSAT surveillance system scored 60 on five scales and 56 on the efficiency scale (see Appendix G-2 for the specific scores), indicating the high quality of the WebSAT surveillance module.

5. MODEL DETAILS

A hierarchical logistical regression technique was used to analyze the historical data provided by the partnering airline. Around 18000 data points for technical audit, 4000 for internal audit and 85000 data points for surveillance were analyzed. One model each for the technical audit, internal audit and surveillance modules was generated. These models have been embedded in the tool for predicting vendor/ department performance. They are being used in the vendor, department and risk assessment sections for the technical audit, internal audit and surveillance modules, respectively and in the audit impact and surveillance planning sections of each module.

For example, the model for technical audit is as follows:

Logit (response code) = β_1 Auditor Experience + $\beta_{2\,(1\,to\,3)}$Audit Type(1 to 3) + β_3Audit Duration + $\beta_{4(1\,to\,2)}$Continent (1 to 2) + $\beta_{5(1\,to\,3)}$Auditor Experience * Audit Type (1 to 3) + β_6Auditor Experience * Audit Duration + $\beta_{7(1\,to\,2)}$Auditor Experience * Continent (1 to 2) + $\beta_{8(1\,to\,6)}$Auditor Experience * Process Measure (1 to 6) + $\beta_{9(1\,to\,3)}$Audit Duration * Audit Type (1 to 3) + $\beta_{10(1\,to\,2)}$Audit Duration * Continent (1 to 2) + β_0

β_1 and $\beta_{2\,(1\,to\,4)}$ refer to the coefficients of the model, with 1 to 4 representing the four different values for each audit type level. β_0 refers to the intercept. Auditor Experience and Audit

Type are the independent variables, with 1 to 4 representing the four levels of Audit Type. Logit refers to the logistic probability unit.

The interaction effects were analyzed for the significant interactions. Figure 8 displays the two way interaction of auditor experience with continent (pvalue = 0.0003). To understand the interaction between two variables, A*B, the response variable is measured at one level of one variable, say A, for various levels of the other variable, B. If variable A is a continuous variable such as auditor experience, the levels it is set at are decided using the variable's mean and standard deviation (say SD_A). Thus, if B is a categorical variable, the interaction between the two variables, A*B, will be measured by calculating the response variable value at the mean of variable A for the various categorical levels of B. Similarly, the response variable value at one standard deviation above the mean of variable A (A + SD_A) and one standard deviation below the mean of variable A (A - SD_A) for the various categorical levels of B shows the interaction of A* B at two other levels of A.

To evaluate the two way interaction of auditor experience with continent, the response variable was measured at one level of the auditor experience for various levels of continent. The auditor experience mean from the historical data is 6.993 years with a standard deviation of 2.5. Observing the chart we can conclude that for the same auditor experience there is a difference in the response rate for the American, Asian and European continents where response rate refers to the percentage of "Yes" responses in the audit. The auditor experience particularly affected the response rate for vendors located on the American continent.
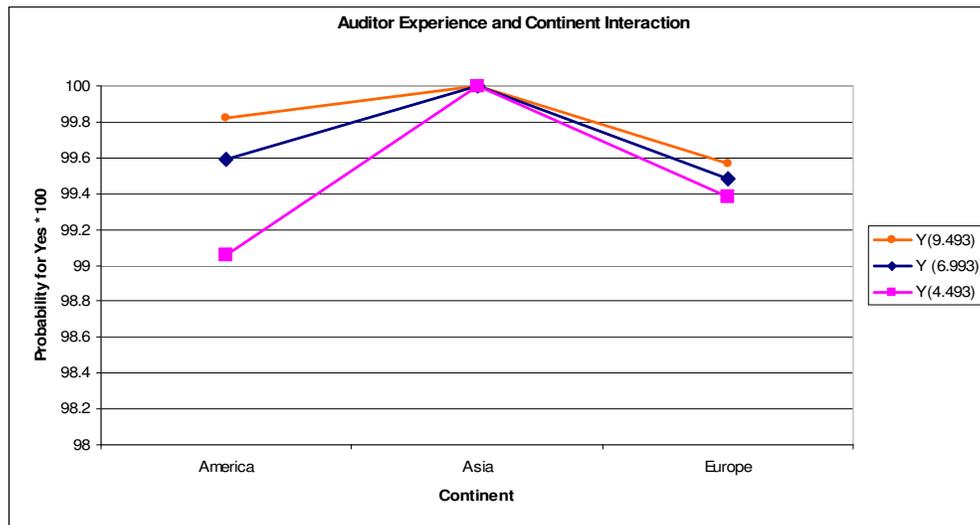
Figure 8. Auditor Experience and Continent Interaction Effect

Similar graphs and explanations have been provided for the other two way interactions of audit duration with audit type (pvalue = 0.0005) and audit duration with continent (pvalue < 0.0001) in the tool.

The modeling results obtained are promising for Technical Audit and Surveillance. The results obtained for Internal Audit are insufficient. This can be attributed to the insufficiency of data for the variables. Due to confidentiality reasons, the data on variables such as auditor characteristics (e.g., auditor age and experience) and department characteristics (e.g., department size and department location) were not provided. In other cases, inaccessibility of data on variables proved to be a difficulty. For example, vendor characteristics, such as number of

service orders and period of vendor service existed in disparate systems from which data retrieval was virtually impossible. Since logistical regression models thrive on variability in group characteristics, lack of variables for a group level and inadequate data limit the accuracy of the model.

The technical audit model revealed that the vendor performance of the Asian continent seemed to be virtually perfect. This result should be further evaluated to understand the characteristics that cause this. For example, it could be that the auditors, who conducted the audits on this continent were not as objective in conducting their audits as were the auditors on other continents. Conversely, it may also be that the vendors from this continent pay more attention to their business process and its associated regulations to achieve outstanding response rates of 100%. The data on continents could be further broken down to individual countries to provide more specific discussion. Further observation also reveals that the response rate deteriorates if the audit duration increases, independent of the audit type and continent, except for the Asian continent. This is particularly prominent in Suppliers audits and on the American continent. This result may be especially useful for managers, who would now have a reason to believe that audit durations should be short and swift especially if they are Supplier audits on the American continent.

Similarly, the surveillance model revealed that the rejection rate increases for non-technical process measures such as facility surveillance, particularly for the Asian continent. Rejection rate refers to the percentage of "Rejects" during a substantial maintenance. The surveillance model also revealed a higher rejection rate for older aircraft.

An example of the use of the Surveillance Planning section in the Surveillance module is illustrated. This section is used by the surveillance representative to predict a rejection rate and review the impact of the predictor variables on the rejection rate. It allows the representative to view information on the method adopted to generate the model and a graphical presentation of the impact of the various predictor variables such as aircraft age, aircraft model and vendor location on rejection rate.

Figure 9. Surveillance Planning section in Surveillance Module

As shown in the Figure 9, the representative specifies the values for each step and clicks on the Calculate Predicted Rejection Rate button. The representative is given the choice to review the details of the model or to proceed directly to the predicted rejection rate based on the parameters. Figures 10, 11, 12 and 13 present the Model Review section.
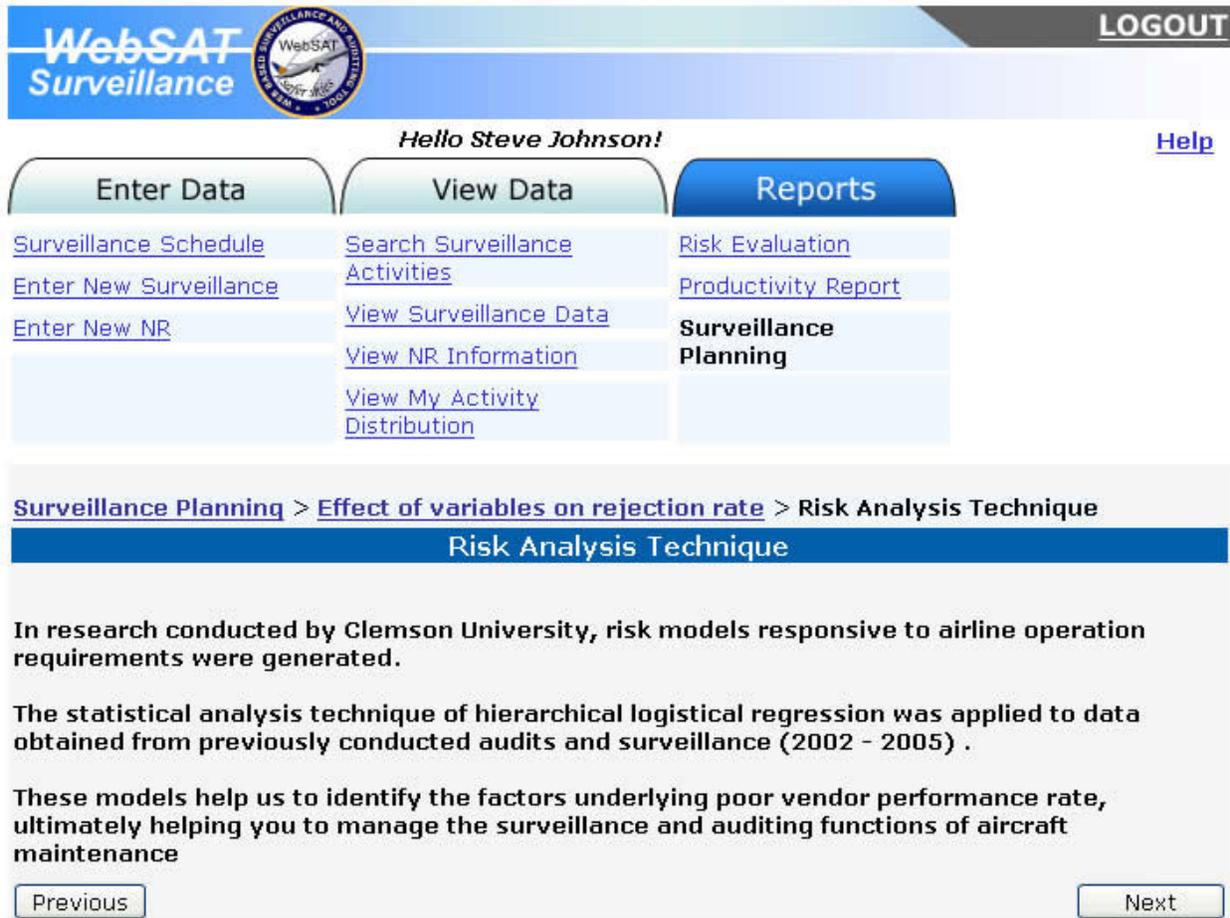
Figure 10. Model Review in Surveillance Planning section

As shown in Figure 11, the General Model Details page illustrates the model, including its variables and its intercepts. The model is presented in a general and detailed form. The detailed form can be viewed using the View Detailed Model link and presents the entire model with the variables and their interactions at different levels. The Understanding Variable Interaction page (Figure 12) describes the predictor variables which were found to significantly affect the rejection rate.

Figure 11. Model Details in Surveillance Planning section

Figure 12. Variable interactions in Model Review section

Figure 13 displays the page which describes the impact of the predictor variables on the rejection rate. This page shows the interaction of the predictor variable Process Measure with predictor variable Vendor Location and its effect on the predicted rejection rate. This section allows the representative to review the graphical presentation of the impact of the various predictor variables such as aircraft age, aircraft model and vendor location.
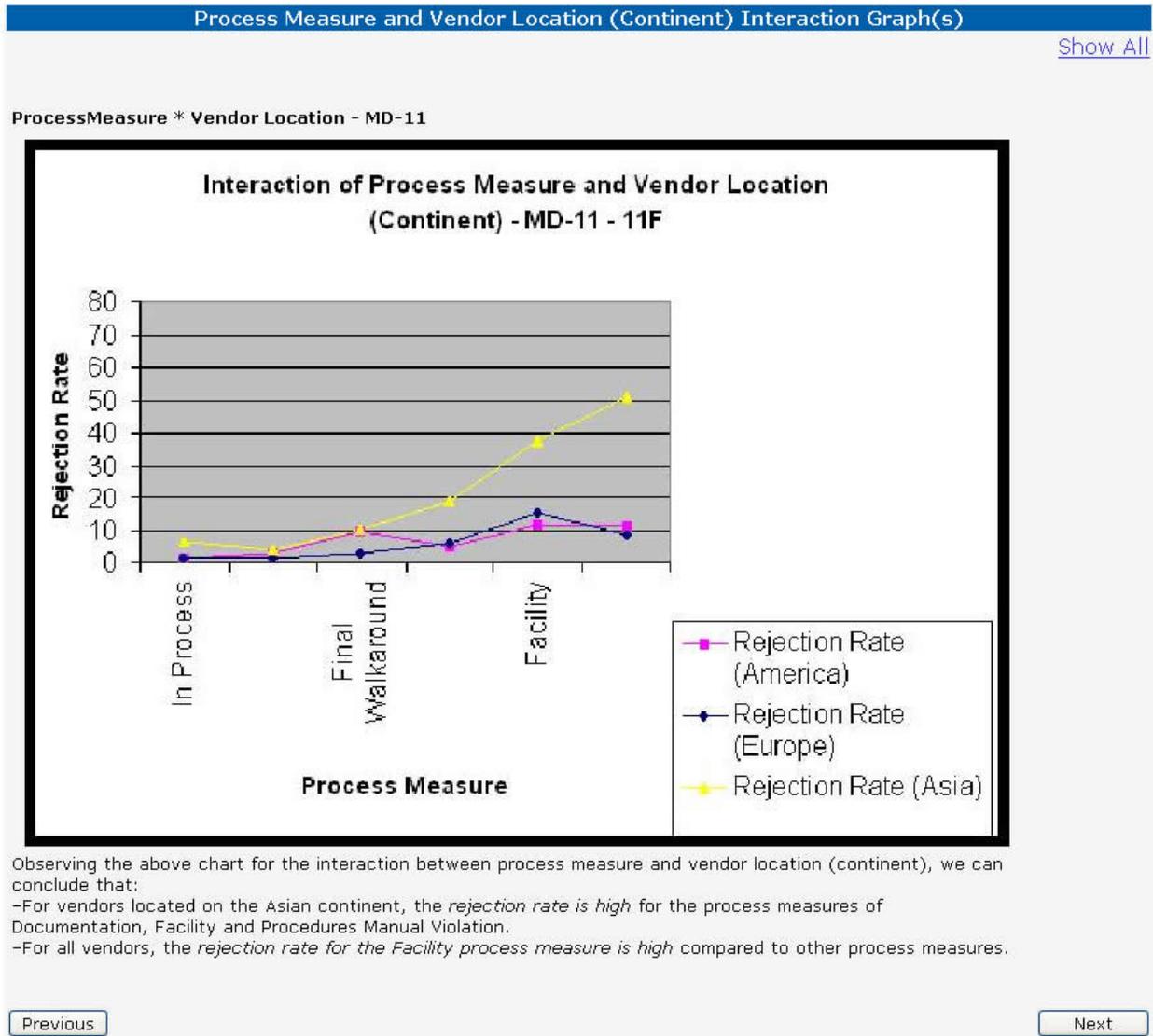
Figure 13. Variable Impact in Model Review section

As shown in Figure 14, the Predicted Rejection Rate page displays the predicted rejection rate and the values of the various parameters selected on Surveillance Planning page. The Back button allows the representative to return to the Surveillance Planning page.
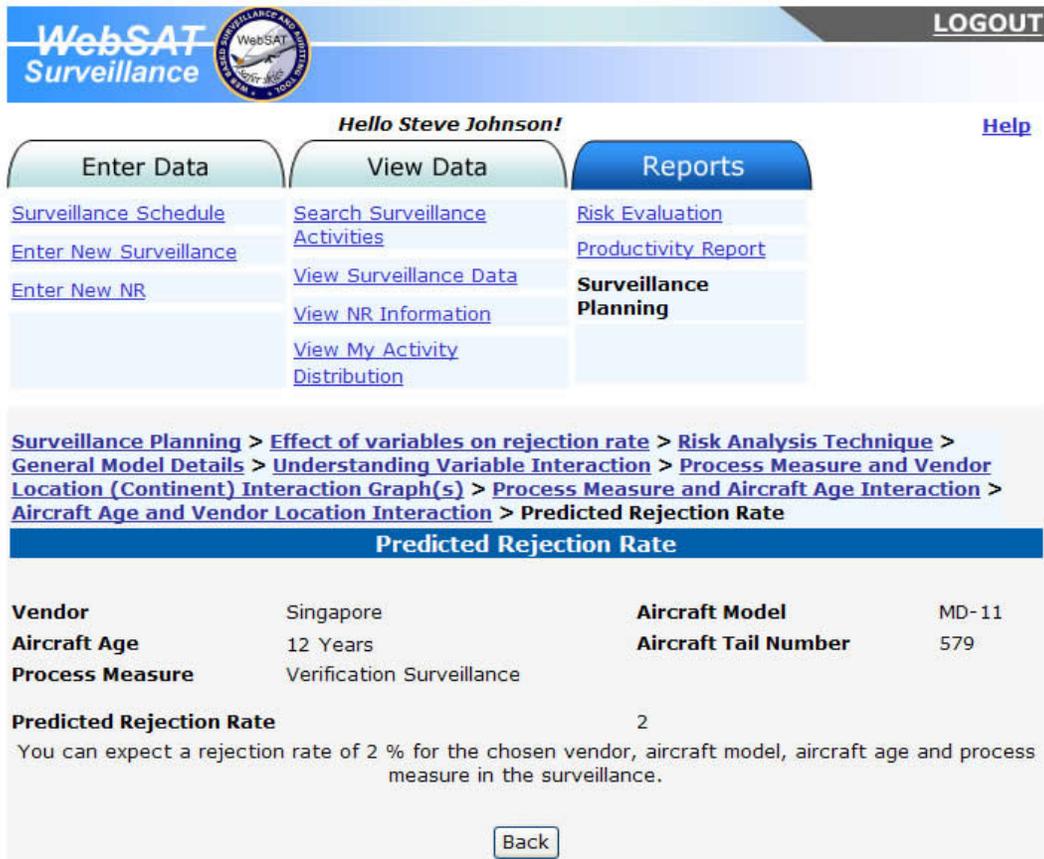
Figure 14. Predicted Rejection Rate in Model Review section

In conclusion, the surveillance planning, audit impact and audit allocation sections allow the auditing and surveillance personnel to use the model in understanding the predicted response/ rejection rate and the effect of the predictor variables and assist the managers in allocating resources.

6. <u>INSTRUCTIONS FOR OTHER AIRLINES</u>

Airlines may install WebSAT by following the instructions as provided in the installation manual. However, since WebSAT was designed primarily using information from the partnering airline, our industry partner, there are certain aspects of the tool, stated below, which must be kept in mind.

(a) Audit and Surveillance Process: Since WebSAT uses a generic auditing and surveillance process, it can be used by any airline. The tool can be used to start an audit, create and modify checklists, enter findings for a work card, and to generate reports that can be sent to a vendor or a department.

(b) Replenishing the WebSAT Tables: Data needs to be entered in some WebSAT tables to customize WebSAT for an airline. Employees and Suppliers are two such tables. It is important to fill WebSAT's Employees and Suppliers tables with the airline's employees and supplier

information. Refer to Appendix I for more details on the different fields in the WebSAT tables and their specifications.

(c) Permanent Connection of WebSAT with Airline Database Tables: There are some tables in the surveillance module which require permanent connection to specific airline tables. For example, for the surveillance module to function with real time data, the WebSAT work card table must be connected with the airline's work card table to enable the surveillance representative to see the current work cards.

(d) Data Model Utility: The logistical regression models used in WebSAT were developed using statistical packages and historical data. Since the partnering airline historical data was used, the results of the models cannot be applied to any other airline. However, the following steps can be taken to generate a similar model for another airline:

a. Collect data on audits, surveillance activities, aircraft, vendor and department characteristics, and auditor and surveillance representative characteristics.
b. Run logistical regression analysis using a statistical package such as SAS to generate the model.
Please note that steps a. and b. are complex and require consultation with a statistical expert.

(e) ALI and OC: These categories were developed with the help of the partnering airline managers, auditors, and surveillance representatives. Since the categories are generic in nature, they may be utilized by other airlines.

(f) SQL and Oracle Databases: Please refer to the sections below.

(g) Microsoft Visual Studio .NET program: Since the WebSAT design files have been developed using the Microsoft Visual Studio .NET development environment, the files must be edited and compiled on the web server using this application.

7. DEVELOPMENTAL CHALLENGES

WebSAT is a complex tool in that it involves web pages which can collect data and it can specify various parameters for data retrieval. These capabilities necessitate the requirement for a web server and a database application. The different developmental challenges encountered in WebSAT development were:

(a) Geographically Different Locations of End Users: This challenge required that WebSAT be web based to allow the users, who are constantly traveling from location to location, to use WebSAT through the internet. To address this challenge, WebSAT design files were installed on a web server. This allows the end users to access WebSAT regardless of their geographical location.

(b) Data Storage and Retrieval: Any audit or surveillance event involves documenting observations and storing them in WebSAT. It will also involve storing checklists and reports. Airworthiness Directives must also be tracked. To address this challenge, the WebSAT database

was developed in Microsoft SQL and in Oracle. Two versions of WebSAT were created to suit both of these database products.

(c) .NET Framework: The .NET framework provides a development environment through Microsoft Visual Studio .NET. The .NET framework eases installation of applications on a server. Consequently, the design files must be stored on a web server having the .NET framework.

8. FUTURE IMPOVEMENTS TO WEBSAT

Listed below are some of the features which may be implemented in future versions of WebSAT. These features are listed by module:

1. Technical and Internal Audit Modules:
   - Follow up audits
   - Redesign user interface to accommodate more vendors
   - Include vendor suspension
   - Provide past-due notification
   - Vendor's and Auditor's personal space

2. Surveillance Module:
   - Include vendor suspension
   - Quality Assurance Representative's and Vendor's personal space
   - Scheduling of aircraft maintenance

3. Airworthiness Directives Module:
   - Information flow on accepted airworthiness directives to surveillance module

9. RESEARCH CONTRIBUTIONS AND DISSEMINATIONS

Scientific research projects were conducted in this project. Their abstracts are presented below.

9.1. RESEARCH CONTRIBUTIONS

9.1.1. A MULTIDIMENSIONAL SCALING AND PARTICIPATORY DESIGN APPROACH TO CLASSIFY OPEN ENDED AIRCRAFT MAINTENANCE DATA

The quality assurance data to be analyzed by the web-based surveillance and auditing tool (WebSAT) is both qualitative and quantitative. The forced responses to checklist questions provide a definitive outcome identifying the effectiveness of the four quality assurance work functions. On the other hand, open-ended responses, the second type of response for capturing maintenance errors, are qualitative in nature since they reflect what the auditors and quality assurance representatives observe during their interactions at vendor locations. This research applied the statistical technique of multidimensional scaling and the user centered design method

of participatory design to categorize open-ended responses into suitable performance metrics of aircraft safety and organizational cost.

Given the importance of the open-ended comments made in the quality assurance process, it is critical to capture all open-ended response data in addition to the attribute data acquired from forced responses. While WebSAT proposes to capture both types of information, the open-ended responses require interpretation to ensure their appropriate application in the maintenance/inspection process; that is, this data must be associated with appropriate measures of the maintenance process. This research establishes performance measures implying the impact of audit and surveillance findings on aircraft safety and establishes another list of performance measures categorizing the impact of audit and surveillance findings on the organization. These performance measures are referred to as ALI and OC, respectively.

9.1.2. PERSONAS FOR INTERACTION DESIGN OF WEB-APPLICATIONS TO DISPLAY TRENDS IN AVIATION MAINTENANCE DATA

WebSAT is required to be used by users of different categories such as auditors, managers and senior managers. The different categories of users have varied goals with respect to their interaction with WebSAT. It is essential in this regard to understand the goals of these user categories, their tasks, their abilities, characteristics and frustrations towards computer applications in general and understand their mental models with respect to their job domain. A Persona is a fictitious person which represents a user category and allows the design team to use it as a reference to the user's perspective in making design decisions. This methodology allowed the research team to establish user categories and understand their specific characteristics to cater to their individual differences or group differences through WebSAT designs. This allowed interfaces to be tailor-made for specific user categories.

9.1.3. DEVELOPMENT OF RISK ASSESSMENT MODELS TO MEASURE VENDOR PERFORMANCE IN SURVEILLANCE AND AUDITING OF AIRCRAFT MAINTENANCE

Elimination of aviation accidents is one of the primary goals of the Federal Aviation Administration and the airline industry. A leading cause of aviation accidents is lack of oversight of various organizational aspects, in particular, the organization's maintenance operation performance. The technologies used in the industry generate multiple risks, mostly from three domains: systems, hardware and people (Zimolong, 1992). Maintenance performance analyses identify the inherent risk in distributed, large-scale systems. Analysis of existing aviation maintenance data is a crucial step in meeting the aviation industry's need to improve aviation safety. Presently, we lack suitable tools to analyze large bodies of maintenance data. In this study, we generated risk models responsive to airline operation requirements using hierarchical logistical regression analysis based on historical auditing and surveillance data. These models help to determine the organizational factors underlying aviation maintenance errors, ultimately helping airline personnel to better manage the surveillance and auditing functions of aircraft maintenance.

9.2. DISSEMINATION

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11. APPENDICES

APPENDIX A

WebSAT User Manual for Technical Audits Management Module

Web-based Surveillance and Auditing Tool

User Manual - Technical Audits

Contents

1 Introduction

This is a user guide for the Web-based Surveillance and Auditing Tool (WebSAT) Technical Audits module. It is organized according to the functions that can be performed using this tool. Detailed instructions are provided for the various tasks for conducting audits and documenting audit data and storing it in WebSAT. It is intended to be a straightforward introduction to how this tool works and assumes that the reader has a basic level of familiarity with computer and internet applications and with the business processes involved in a typical airline's Quality Assurance Department.

To view ONLY one particular topic, click the appropriate section in the Table of Contents. To print instructions for that topic, click on the Print button on your browser.

1.1 WebSAT Description

The research team at the Human Computer Systems Laboratory has developed WebSAT. It is a tool for analyzing aircraft maintenance data using results from statistical techniques such as logistical regression, to determine risk trends. It is intended to collect, reduce, and analyze surveillance, auditing and airworthiness directives operations data in a standardized way to reflect the impact of maintenance error on the safety of an aircraft. This will allow users at various hierarchical levels in a work function to collect and analyze data on.

Over time the WebSAT tool will become a repository of surveillance and audits. This will mean that auditors will be able to use verified records as evidence to analyze aircraft maintenance data, rather than managers depending on scattered and largely un-documented data to validate trends. The airline information and technology department will help maintain WebSAT and ensure the integrity of the data stored in it.

2 Introduction to WebSAT Terms

This section provides a brief explanation of the terms used in the different screens and forms of WebSAT, which may be unfamiliar to the auditor.

2.1 Aircraft Level Impact

Each time a NO is documented during an audit, an aircraft level impact (ALI) will be associated with each open-ended response indicating a possible risk to the aircraft.

2.2 Organizational Categories

Management is interested in the cost implications of discrepancies observed by the auditors. The set of categories addressing this concern are the Organizational Categories.

2.3 Audit ID

Audit ID refers to the audit identification number corresponding to an audit. This is generated by WebSAT.

2.4 Audit Type

Audit Type refers to the different types of audits typically performed, including the fuel audit, line maintenance audit, ramp operations audit, and supplier audit.

2.5 Vendor

A vendor is a company providing its services to the airline.

2.6 Primary Auditor

Primary Auditor is the auditor primarily in charge of entering the audit data into the system. Each audit has one primary auditor assigned to it.

2.7 Secondary Auditor

Secondary Auditor is the auditor associated with an audit, but will only take primary responsibility of entering audit information in case of absence of the primary auditor.

2.8 Audit Status

An audit status indicates the phase of each audit. WebSAT changes the status without user intervention. The four statuses used in WebSAT are described below:

- **Opened**: As soon as an audit has been created in WebSAT, it is in the Opened status. It remains in this status until the auditor begins entering responses.
- **Findings**: The audit status changes to Findings automatically by WebSAT when the auditor begins entering audit responses. The audit continues to remain in this status until an audit report is sent to the vendor.
- **Corrective Actions**: The Corrective Actions status indicates that a report for the audit has been sent to the vendor and a response is awaited on the audit findings stated in the audit report.
- **Closed**: WebSAT moves the audit from Corrective Actions to the Closed status when all the corrective actions received from the vendor are found satisfactory and have been approved by the auditor. This status indicates that all tasks associated with this audit have been completed. Although an auditor cannot make any changes to an audit once it has reached Closed status, he/she can view a closed audit.

2.9 Checklist

Checklist consists of a series of audit questions used by the auditor to assess if regulatory requirements are satisfied by the vendor. A checklist can be printed from the View Checklist and Checklist Data Entry pages in WebSAT.

2.10 Template Checklist

A template is a standard set of questions approved by the manager for a vendor and an audit type.

2.11 Checklist Revision

Checklist revision refers to a revision of a chosen checklist for an audit type and a vendor. Checklist revisions can be created from a template or from another revision. Thus, a revision number identifies every unique creation of various checklists. The revision number is generated by the system.

2.12 Checklist ID

Checklist ID refers to the checklist identification number generated by the system.

2.13 Process Measures for Technical Audits

The data collected from technical audit checklists will be grouped into categories to facilitate further analysis and comment on the effectiveness of the technical audit process. These categories are defined as process measures. Please refer to FAR 121 and CASE 1A and 3A standards for detailed descriptions of the items listed for all the process measures. The process measures identified for technical audits are defined below.

2.13.1 Compliance/Documentation

This process measure verifies documentation system, the authorization of the personnel and administration requirements of vendors and sub-contractors. Listed below are some of the items evaluated by this process measure:

a. Quality programs
b. Certificate forms
c. Manuals and forms control
d. Paper work control

2.13.2 Inspection

This process measure verifies the certification of the inspector, the sampling procedures of parts, the compliance of parts to specifications, and the validity of the inspection stamps at the vendor location. Listed below are some of the items evaluated by this process measure:

a. Fuel truck inspection
b. Fuel farm inspection
c. Hydrant inspection
d. Inspection programs

2.13.3 Facility Control

This process measure verifies that the vendor follows the regulations on viability of parts and materials, well-maintained facilities and storage, and on damage protection programs. Listed below are some of the items evaluated by this process measure:

a. Housing and facilities
b. Material control and storage
c. Segregation of parts
d. Packaging
e. List of shelf items
f. Shelf life control and material storage

2.13.4 Training and Personnel

This process measure verifies that the vendor employees are adequately trained and have the required certification to perform operations such as technical data control and calibration. Listed below are some of the items evaluated by this process measure:

a. Employee training
b. Verification of personnel
c. List of authorized personnel

2.13.5 Procedures

This process measure verifies that the vendor adheres to regulatory guidelines for programs such as shipping procedures, testing evaluations, and de-icing programs. Listed below are some of the items evaluated by this process measure:

a. Shipping procedures
b. Tool and test equipment (calibration and measurement) and procurement
c. Scrapped parts
d. Work processing
e. NDT evaluation
f. Precision tool control
g. Aircraft anti-tipping and tether maintenance
h. Aircraft de-icing program
i. Weight and balance
j. Ramp operation *

* Note The findings of ramp activities related to administration requirements, employee training, and dangerous goods are not included in this process measure.

2.13.6 Data Control

This process measure verifies the availability of up-to-date technical data concerning parts at a vendor facility. It also verifies the identification of parts in relation to their testing records and validates the fuel audit records. Listed below are some of the items evaluated by this process measure:

a. Technical data control
b. Record keeping
c. Fuel facility records
d. Fuel vehicle records

  e. Pipeline fuel receipts
  f. Transport truck fuel receipts

2.13.7 Safety

  This process measure verifies the safety of the vendor facility. Listed below are some of the items evaluated by this process measure:

  a. Safety
  b. Fire protection
  c. Flammable material protection
  d. Aircraft maintenance procedures
  e. Dangerous goods

3 Login

Figure 1. WebSAT Login Page

You can accomplish three tasks using the Login page:

1. Log into WebSAT: To login, type in your Username and Password (see Figure 1) and click on the Login button. If the information provided is correct, you will be taken to either the Start New Audit page or the Resume Audit page. You will arrive at the Start New Audit page if you do not have any audits in opened, findings or corrective actions status. You will arrive at Resume Audit page if you have audits in the opened, findings or corrective actions status.

2. Change Password: Click on the Change Password link, to change your password (see Section 4 for details).

3. Request for Existing Password: Click on the Forgot Password link on the WebSAT Login page, if you have forgotten your password and are unable to login (see Section 5 for details).

4 Change Password

Clicking on the Change Password link on the WebSAT Login page takes you to the Change Password page shown in Figure 2. If you wish to exit the Change Password page, click on the Cancel button to return to the WebSAT Login page.

Figure 2. Change Password Page

To enter the information required to change your password:

1. Type your username, old password and new password.

2. Verify new password by re-typing it in the Confirm New Password text box.

3. Select your identity question from the drop-down menu shown in the Figure 3 below. The Identity Question field helps you access your password in case you forget it. For example, you could select "What is your pet's name?"

Figure 3. Identity Question drop-down menu

4. Type in the answer to the identity question you selected in the Identity Answer textbox. For example, you could type in "Rover" as the answer to your pet's name.

5. Click on the Submit button to submit the information you have entered into WebSAT and go to Login page.

5 Forgot Password

If you forget your password, click on the Forgot Password link on the WebSAT Login page to access the page seen in Figure 4. If you wish to exit the Forgot Password page, click on the Cancel button to return to the WebSAT Login page.

Figure 4. Forgot Password Page

To request for your existing password:

1. Enter your first name, last name and email address in the text boxes provided.

2. Click on the Submit button to provide your information to WebSAT. If the email address provided matches with the one that exists in WebSAT then your password will be sent to the email address provided.

6 Global Navigation Tabs

Once you login, one of the two pages will appear: (a) Start New Audit (b) Resume Audit. You will arrive at the Start New Audit page if you do not have any audits in opened, findings or corrective actions status. You will arrive at Resume Audit page if you have audits in the opened, findings or corrective actions status.

Figure 5. Global Navigation Tabs

This page includes three global navigation tabs at the top: Audit Tasks, Checklists and Reports. A fourth tab, Administration, exists exclusively for the manager. A description of the four tabs is provided below:

1. Audit Tasks: This tab includes audit related tasks. The four tasks that can be accomplished using this tab are:

a. Start New Audit: Click on the Start New Audit link to start an audit. See Section 7 for details.

b. Resume Audit: Click on the Resume Audit link to continue working on an audit where you left off. See Section 9 for details.

c. Corrective Actions Approval: Click on the Corrective Actions link to approve the corrective actions provided by the vendor. See Section 12 for details.

d. Search Audits: Click on the Search Audits link to look for audits in any status. See Section 13 for details.

e. Delete Audits: Click on the Delete Audits link to delete audits. See Section 14 for details.

2. Checklists: Using this tab, you can perform the four checklist-related tasks listed below.

a. View Checklist: Click on the View Checklist link to view and print a checklist. See Section 15 for details.

b. Modify Checklist: Click on this link to modify a checklist. See Section 17 for details.

c. New Audit Type Checklist: Click on this link to begin creating a checklist for a newly created audit type. See Section 19 for details.

d. Approve Checklist: This link is visible only to a manager. Click on this link to approve modified checklists sent by auditors for approval. See Section 23 for details.

3. Reports: This tab includes the four reports that can be generated by WebSAT.

a. Audit Report: Click on this link to generate a report on an audit. See Section 24 for details.

b. Vendor Assessment Report: Click on this link to generate a report on a vendor. See Section 25 for details.

c. Audit Planning Tool: Click on this link to plan a future audit. See Section 31 for details.

4. Administration: This tab includes the four administrative tasks that managers can perform.

a. Edit Auditors: Click on this link to add, modify or delete an auditor. See Section 32.1 for details on Edit Auditors.

b. Edit Vendors: Click on this link to add, modify or delete a vendor. See Section 32.2 for details on Edit Vendors.

c. Edit Audit Type: Click on this link to add, modify or delete an audit type. See Section 32.3 for details on Edit Audit Type.

d. Reassign Auditors: Click on this link to reassign an auditor for an audit. This link can be used when an auditor in charge of an ongoing audit is unwell and needs to be replaced. See Section 32.4 for details.

7 Start New Audit

7.1 *Purpose*

Click on Start New Audit link on the global navigation tab to access the Start New Audit page (see Figure 6) which allows you to start an audit on a vendor. Note that an auditor cannot start two audits on the same vendor for the same audit type.

Figure 6. Start New Audit Page

7.2   Task Details

To Start New Audit on this page (see Figure 6):

1. Audit Type Drop-Down Menu: Click on the Audit Type drop-down menu and choose the type of audit. The red star (*) next to this field indicates it is required in order to start a new audit.

2. Vendor Name Drop-Down Menu: Choose the vendor name from the drop-down menu provided. The red star (*) next to this field indicates it is required in order to start a new audit. The menu selection lists the vendors currently providing services for the airline for the audit type selection.

3. Auditor Name: This is a label showing the name of the auditor who has logged into WebSAT.

4. Start Date: Click on the calendar icon next to the Start Date textbox to choose the audit start date. A pop up calendar (see Figure 7) will display dates of the current month. The back and forward arrow can be used to navigate from one month to another. The date can also be specified in the text box provided in the mm/dd/yyyy format.

Figure 7. Calendar Pop-up

5. Choose Auditor Type: Click on the Primary Auditor or Secondary Auditor radio buttons to start an audit as a Primary or Secondary Auditor respectively.

6. Submit: Click on the Submit button after all the required information has been provided to go to the Checklist Association page.

8 Checklist Association

8.1 Purpose

When a new audit is started in WebSAT, you will be taken to the Checklist Association page containing a table listing the checklist revisions for a particular audit type. This list contains only the revisions approved in last 18 months, including the date of approval and name of the modifier. If no revisions have occurred in that time period, then only the latest checklist will be shown in this table.

This list will always display the template checklist for the chosen audit type. It will also include the revisions made by the primary and secondary auditors and those revisions made for the vendor being audited. At the most one revision from each auditor, primary or secondary, will be shown.

The three fields, Audit ID, Audit Type, Vendor and Auditor Name generated by WebSAT, provide information related to an audit. In Figure 8 below, for example, the audit ID is 439, the audit type is Fuel, the vendor name is Togo and the name of the auditor in charge is Thomas Wilson.

In the Checklist Revision table, the Checklist Description column specifies the checklist revision number and the Approved Date.

Figure 8. Checklist Association Page

8.2 Task Details

The four tasks that can be completed on this page are:

1. Postpone Checklist Association: Click on the Later button, if you do not want to select a checklist for the audit at this point. You will then be taken to the Audit Details page (see Section 11). You can select a checklist revision for this audit the next time you access it or when you retrieve it through the Resume Audit page.

2. Submit Checklist Association: Click on the radio button next to the Checklist Description column in the table to select a checklist. Click on the Submit button to associate this checklist with the new audit. This action will take you to the Audit Details page (see Section 11).

3. Preview Checklist: Click on the radio button next to the Checklist Description column in the table to select a checklist. Click on the Preview Checklist button to open a Microsoft Word window to view this version of the checklist.

4. Modify Checklist: Click on the radio button next to the Checklist Description column in the table to select a checklist revision. Click on the Modify Checklist button to modify the checklist using the Checklist Questions page (see Section 18).

9 Resume Audit

9.1 Purpose

After you login, you will arrive at the Resume Audit page which lists all audits currently in opened, findings or corrective actions status.

Figure 9. Resume Audit Page

9.2   Task Details

The two tasks that can be completed on this page are:

1. Checklist Data Entry page for an audit: Click on the Audit ID link to proceed to Checklist Data Entry page.

2. Audit Details page for an audit: Click on the Audit Details tab to view an audit table with a list of audits identical to those in the Checklist Data Entry tab. Click on the Audit ID link to proceed to the Audit Details page to view that particular audit's vendor information.

The different fields in the audits table, as seen in Figure 9, are:

- *Audit ID*: In Figure 9, for example, there is an audit with audit ID 427.
- *Vendor Name*: In Figure 9, audit 427 belongs to the vendor DELTA based in Georgia, USA.
- *Audit Type*: In Figure 9, the audit type of audit 427 is suppliers.

- *Status Name*: In Figure 9, the status name field for audit ID 427 is Opened (see Section 2.8 for Audit Statuses).
- *Start Date*: In Figure 9, the Audit Start Date field shows the date for audit ID 427 as 10 July 2006.

10 Checklist Data Entry

10.1 Purpose

Click on the Audit ID link on the Checklist Data Entry tab on Resume Audit page to access the Checklist Data Entry page (see Figure 10). This page allows you to enter audit information.

As seen in Figure 10, information related to an audit is provided at the top below the global navigation tabs. Specifically, for Audit ID 426 Bob Cristo is listed as the primary auditor and no answers have been entered for the 137 questions for this audit. This audit of vendor BIZDEN began on 14 July 2006.

Below this general audit description is a list of all the questions from the checklist chosen from the Checklist Association page (see Section 8). Each Checklist Data Entry page has at most ten questions, each belonging to a checklist category having a corresponding process measure. The example in Figure 10 shows questions from the Administration category and Compliance/Documentation process measures.

Figure 10. Checklist Data Entry Page

10.2 Task Details

The six tasks that can be completed on this page are:

1. Enter Answers: Click on one of the radio buttons provided below each question. If a YES radio button is selected, you can enter findings for the question by clicking on the Add Findings, Comments and Concerns link provided below each question as shown in Figure 10. This action will transform the link to Hide Findings, Comments and Concerns link and will display text fields for entering Findings, Comments and Concerns. Click on this link to hide all the text fields and entered information.

If the NO radio button is selected then fill the following fields (see Figure 11):

Figure 11. Checklist Data Entry page after NO is selected

a. ALI: Use the ALI drop-down menu to choose the possible impact on the aircraft of this NO.

Figure 12. Risk Matrix

b. OC Link: Click on the OC link to access a risk matrix to select the risk level for this NO as seen in Figure 12.

c. "What is this Link?": Click on the "What is this?" link that appears next to the ALI drop-down menu or OC link to open a pop-up window with information pertaining to ALI or OC as shown in Figure 13.

Figure 13. "What is this?" link pop up for ALI

d. Add Findings, Comments and Concerns: Enter information in the Findings, Comments and Concerns textboxes as seen in Figure 11. The Findings or Concerns text field must be completed when "No" response if provided.

2. Upload files: Click on the Browse button and use the Choose File dialogue box to locate the file you want to upload. Click on the Cancel button to close the dialogue box. Click on the Open button to select the file. Click on the Upload button to upload the file. You can upload only one file at a time. However, for a finding you may upload as many files you feel necessary.

3. Show All Findings: Click on the Show All Findings link to view a pop-up window with all findings entered for this audit.

4. Navigation Through the Checklist Data Entry Pages: The Checklist Data Entry page navigation options are available at the top and bottom of the page. This page can be navigated in the following two ways:

a. Navigation Drop-Down Menu and Go Button: Use the drop-down menu to navigate from one page to another as shown in Figure 10. For example, in Figure 10, to go to question 17, select 11-20 from the drop-down menu and click on the Go button.

b. Next and Previous Buttons: Click on the Previous or Next button to access the previous or next Checklist Data Entry page.

5. Save Information: Click on the Save and Return to Audit Details button to save the data entered for all questions on each page and to proceed to the Audit Details page.

6. Generate Report: Click on the Generate Report button at the top and bottom of each Checklist Data Entry page to begin the report generation for the audit. You will only be able to send a report to the vendor only if all the questions have been responded to and all findings have been entered for each NO response. This action takes you to the Reports page to email the report to the vendor (see Section 24).

If you omit a question or fail to enter a finding, the dialogue box shown in Figure 14 will pop up; click on the OK button to return to the Checklist Data Entry page.
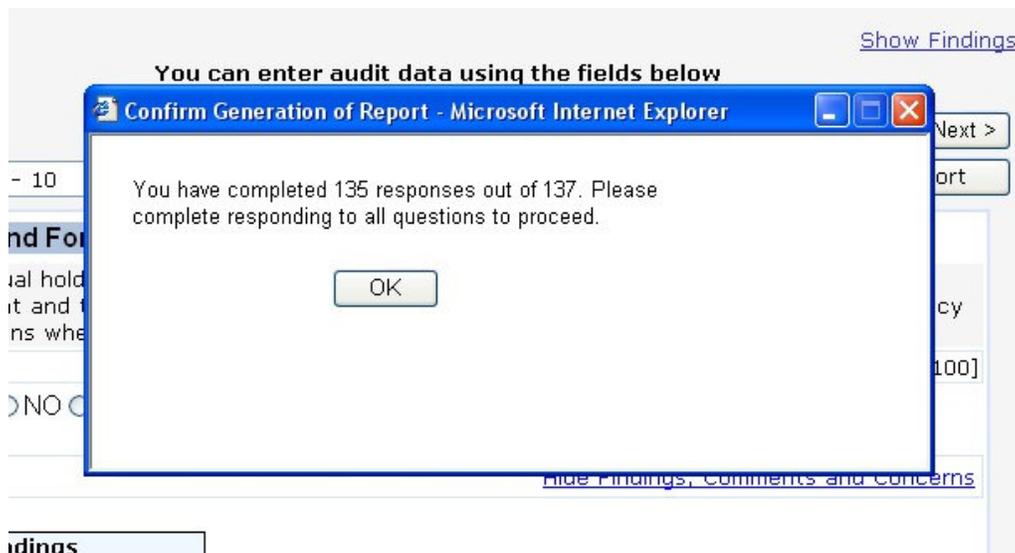
Figure 14. Generate Report confirmation pop-up dialogue box

11 Audit Details

11.1 Purpose

Audit Details page presents information pertaining to an audit selected in the Resume Audit page. This includes vendor information as well the audit relevant information as shown in Figure 15.

There are two ways in which you could arrive at the Audit Details page:
- From Checklist Association page using the Later or Submit button.
- From Resume Audit page, using the Audit Details tab link to click an audit ID.

1. Vendor Information: The vendor information column has vendor's name, ID, address, contact person name and title, contact phone number, fax number and e-mail

address.

2. Audit Information: The audit information fields have the primary auditor name and ID, the name of the secondary auditor responsible for this audit, the audit ID, type of the audit, checklist revision associated with this audit, the current status of the audit, the start date and the end date of this audit. The End Date field will be automatically decided by the system and displayed when the audit reaches closed status. Click on the Preview link in the Checklist Revision field to view a printer friendly version of the checklist that is currently associated with this audit.

Figure 15. Audit Details Page

11.2 Task Details

The four tasks that can be completed in this page, as seen in Figure 15, are described below:

1. Select a Different Checklist for the Audit: Click on the Select a Different Checklist to this Audit button to change the checklist associated with the audit on the Checklist Association page (see Section 8).

2. Proceed to Checklist Data Entry Page: Click on the Enter Checklist Answers button to proceed to the Checklist Data Entry page to enter responses and audit findings (see Section 10).

3. Preview Checklist: Click on the revision number link in the Preview Checklist field to open a Microsoft Word window to view this version of the checklist.

4. Edit Vendor and Audit Information: Click on the Edit button to display the Edit Audit Details page and to modify the information provided in the Audit Details page as shown in Figure 16. Click on the Save button at the bottom of the Edit Audit Details page to save the modified information. Here you can change all the vendor fields occurring under Vendor Information except for the Vendor Name field. Click on the Add Another Contact link, at the lower left portion of the screen, to add an additional vendor contact information. You can have at most two contacts.

The only two fields that can be modified under Auditor Information are Secondary Auditor drop-down menu and Start Date. Select a secondary auditor from the drop-down menu to be designated as the secondary auditor for this audit. Information cannot be modified once the audit is in a closed status.

Figure 16. Edit Audit Details Page

12 Corrective Actions Approval

12.1 Purpose

Click on the Corrective Actions link on the global navigation tab to access the Corrective Actions page where all corrective actions status audits, for which you are a primary or secondary auditor, are presented in a table (see Figure 17). Once the vendor addresses the findings documented in the audit report in the corrective actions form, use the Corrective Actions Approval page to record if the vendor's corrective actions are acceptable. In Figure 17, the audit 422 started on 13 July 2006 for SISCO of audit type fuel is awaiting corrective action approval.

Figure 17. Corrective Actions Page

Click on the audit ID link corresponding to the audit you intend to work on to access the Corrective Actions Approval page as shown in Figure 18.

	Corrective Actions Approval				
AuditID #	Auditor Name	Audit Report Sent on	Vendor Name	Corrective Actio Received On
422	Bob Cristo	7/13/2006	SISCO	7/13/2006

Enter vendor manager name

Expected date of corrective action return 7/29/2006

Audit Findings # 1
Category Name Fuel Farm Inspection
Process Measure Inspection

Finding the nut and bolt assembly was loose.

View Corrective Action Form

Audit Findings # 2
Category Name Fuel Farm Inspection
Process Measure Inspection

Finding tanks were rusted.

View Corrective Action Form

Audit Findings # 3
Category Name Fuel Farm Inspection
Process Measure Inspection

Finding filters were damaged.

View Corrective Action Form

Audit Findings # 4
Category Name Fuel Farm Inspection
Process Measure Inspection

Finding there was debri found in this area.
View Corrective Action Form

Audit Findings # 5
Category Name Fuel facility records
Process Measure Data Control

Finding All kinds of checks are improperly done. Daily checks are not done. Monthly checks are not regulatory compliant.

View Corrective Action Form

Back   Next >>

Figure 18. Corrective Actions Approval Page.

12.2 Task Details

The corrective action approval in this page can be completed as follows:

1. Enter Vendor Manager Name: Enter the vendor manager name who is responsible for the corrective actions in the Enter Vendor Manager Name field.

2. Expected Date of Corrective Action Return: This field displays the date that was specified in the audit report. If the corrective actions were not acceptable and if the vendor has been asked to rework them, the revised due date must be entered in this text field.

3. Audit Findings: Each audit finding from the audit report is presented. Below each audit finding, a View Corrective Action Form link is provided. Click on this link to view the corrective actions addressed by the vendor and subsequently, indicate if they are satisfactory or not.

View Corrective Action Plan: Click on the View Corrective Action Plan link to open the Corrective Action Plan (see Figure 19) where you can view the corrective actions addressed by the vendor for that finding and indicate if it is approved or not. You may enter your comments for each corrective action form using the textbox provided. Click on the Cancel button to return to the corrective actions without saving the data entered.

Click on the YES or NO radio button at the lower right portion of the page to approve or disapprove the corrective action, respectively. Click on the Return to Corrective Action Approval button to save the data entered on corrective actions plan page and to return to the Corrective Actions Approval page. Click on the Print button to view a printer friendly PDF version of this corrective action plan. Use the browser print option to print this page.

Figure 19. Corrective Action Plan.

5. Email Corrective Action Approval: Click on the Email Corrective Action Approval button to send the Corrective Action back to the vendor. An email will be sent to the vendor notifying him of the review you have performed and this will also change the message link in the Corrective Action Approval column to Corrective Action Sent. You can still view the Corrective Action Plan and the decisions made by you from the Corrective Actions page.

6. Previous and Next Button: The Previous button appears on subsequent pages where more than five findings. Click on this button to navigate to previous pages. At the most 5 findings will be displayed in the Corrective Actions Approval page. If there are more than 5 findings for an audit then use the Next button to navigate.

13 Search Audits

13.1 Purpose

Click on the Search Audits link on the global navigation tab to access the Search Audits page which allows you to search audits by specifying the appropriate criteria as shown in Figure 20. Enter the search criteria and click on the Search button to view a list of audits matching the search criteria. Select a particular audit by clicking on the audit ID and view the audit data for that particular audit.

Figure 20. Search Audits Page

13.2 Task Details

To search for an audit, fill any one of the fields listed below:

1. Audit Type Drop-Down Menu: Click on the Audit Type drop-down menu to select an audit type.

2. Auditor Name Drop-Down Menu: Click on the Auditor Name drop-down menu to select an auditor.

3. Vendor Site Name Drop-Down Menu: Click on the Vendor Site Name drop-down menu to select a vendor site.

4. Auditor Status Drop-Down Menu: Click on the audit status drop-down menu to select an audit status.

4. Date Fields: This feature helps you to specify a particular date range to search for audits. You may enter the From and To date fields by typing in the date in the

mm/dd/yyyy format OR you could click on the calendar icon next to the From and To text field to select a date from the Calendar Pop up. The pop up calendar will display dates of the current month. Select the month using the drop-down menu. The back and forward arrow can be used to navigate from one year to another as shown in Figure 21.

Figure 21. Calendar Pop up

14 Delete Audits

14.1 Purpose

      Click on the Delete Audits link on the global navigation tab to access the Delete Audits page which allows you to delete audits by specifying the appropriate criteria as shown in Figure 22. Enter the search criteria and click on the Delete button to view a list of audits matching the search criteria. Select a particular audit by clicking on the audit ID and view the audit data for that particular audit.

Figure 22. Delete Audits Page

14.2 Task Details

To delete an audit, you need to complete the following tasks:

1. Provide Search Criteria: To locate the audits you want to delete, fill any one of the fields listed below:

a. Audit Type Drop-Down Menu: Click on the Audit Type drop-down menu to select an audit type.

b. Auditor Name Drop-Down Menu: Click on the Auditor Name drop-down menu to select an auditor.

c. Vendor Site Name Drop-Down Menu: Click on the Vendor Site Name drop-down menu to select a vendor site.

d. Auditor Status Drop-Down Menu: Click on the audit status drop-down menu to select an audit status. If you logged in as a manager, you can see all the audit statuses except for closed, which allows you to delete audits that are in any status except for closed. However, if you logged in as an auditor, you can only see Opened and Findings statuses.

e. Date Fields: This feature helps you to specify a particular date range to search for audits. You may enter the From and To date fields by typing in the date in the mm/dd/yyyy format OR you could click on the calendar icon next to the From and To text field to select a date from the Calendar Pop up. The pop up calendar will display dates of the current month. Select the month using the drop-down menu. The back and forward arrow can be used to navigate from one year to another.

Figure 23. Audit Deletion Page

2. Search Audits: Click on the Search button to locate audits based on the criteria specified.

3. Delete Audits: To delete audits, you must complete the following tasks (see Figure 23):

a. Audit Selection: Click on checkboxes under the Select column to choose audits you would like to include for this analysis. For faster selection, click on the Select All button to choose all the audits listed in the Audits table. The Select All button changes to Uncheck All. Click on Uncheck All to uncheck all the selected items.

b. Audit Deletion: Click on the Delete button to delete the chosen audits. You will see a feedback message on the page confirming the deletion.

15 View Checklist

15.1 Purpose

Click on the View Checklist link on the global navigation tab to access the View Checklist page (See Figure 24) which allows you to view the checklist revisions for the audits you are currently working with.

Figure 24. View Checklist Page

15.2 Task Details

The tasks that can be completed on this page are:

1. View Checklist of an Ongoing Audit: Click on the Revision ID in the Revision column of the Checklist Revisions table on the top half of the page to view the checklist for a current audit. In Figure 24, the Revision 1 checklist is used for audit ID 422 of audit type fuel and vendor name Sisco. The audit start date and status for this is 13 July 2006 and Corrective Action, respectively.

2. View Other Checklist Revisions: To view all the checklist revisions associated with an audit type, fill the following fields on the lower half of the page:

a. Audit Type Drop-Down Menu: Select an audit type using the Audit Type drop-down menu. The red star (*) next to this field indicates it is required in order to view a checklist.

b. Vendor Name Drop-Down Menu: Use the Vendor Name drop-down menu to select a vendor whose checklists you would like to view.

c. View Checklist Button: Click the View Checklist button to access the Checklist Results page where you can choose the checklist to access the Checklist Details page.

16 Checklist Details

16.1 Purpose

The Checklist Details page can be accessed only from the View Checklist page, as shown in Figure 25. At the top of the page below the global navigation tabs, as seen in Figure 25, the Audit Type and Revision fields are provided. The body of the checklist primarily consists of the checklist questions and the associated answer types as shown in Figure 25. The questions will be displayed categorically. The categories will be displayed to the left and the corresponding process measures will be displayed at the right, in the row before the questions.

In Figure 25, the checklist displayed belongs to audit type fuel and revision number 1. The 10 questions belong to category Administration and process measure Compliance/Documentation.

View Checklist > Checklist Details

Checklist Details

Printer Friendly

Audit Type   Fuel
Version   1

Administration

Compliance/Documentation

1   Is the FedEx Fueling Manual current and has the latest revision inserted?

     ○ YES   ○ NO   ○ N/A

2   Is a procedure in place to notify FedEx when new, additional, replacement or modified equipment is placed into service?

     ○ YES   ○ NO   ○ N/A

3   Does the vendor have the proper equipment to perform the required quality control checks? Items include white bucket, glass jar, stainless bucket, free water test, Millipore test kit.

     ○ YES   ○ NO   ○ N/A

4   Is a procedure in place for handling contaminated / off specification fuel?

     ○ YES   ○ NO   ○ N/A

5   Is a procedure in place to defuel aircraft? If defueled into a hydrant system, do all airlines approve?

     ○ YES   ○ NO   ○ N/A

6   If any waivers are on file, is the vendor complying with them?

     ○ YES   ○ NO   ○ N/A

7   Are employee training records available for inspection?

     ○ YES   ○ NO   ○ N/A

8   Is FedEx training video available for aircraft type?

     ○ YES   ○ NO   ○ N/A

9   Does vendor have a designated trainer, designated by FedEx? Review designation letter for type of aircraft.

     ○ YES   ○ NO   ○ N/A

10 Are employees trained on FedEx type of aircraft?

     ○ YES   ○ NO   ○ N/A

[View Another checklist]   [Next Page >>]

Figure 25. Checklist Details Page

16.2 Task Details

The three tasks that can be accomplished in this page are:

1. View Printer Friendly Page: Click on the Printer Friendly link, to view a dialogue box as shown in Figure 26. This box provides you with an option to save or open the checklist. Click the Save button to save the checklist as a Microsoft Word file. Click the Open button to open the checklist as a Microsoft Word file.
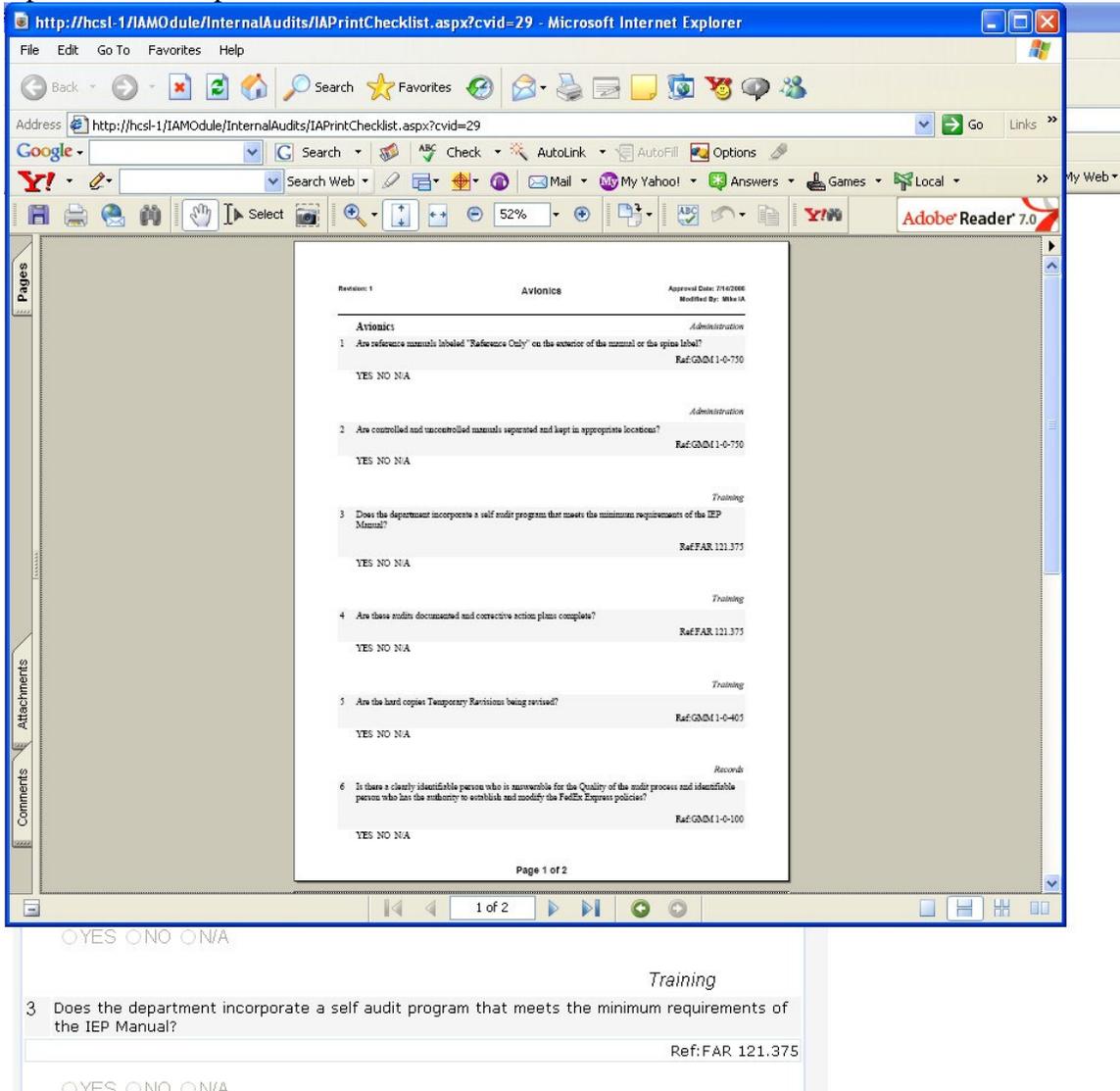
Figure 26. Print and Save options

2. View Another Checklist: Click on the View Another Checklist button to go back to the View Checklist page to choose and view a different checklist.

3. Navigate Between Checklist Pages: Click on the Next button to view the 10 questions in the next page. Click on the Previous button to view the 10 questions in the previous page.

17 Modify Checklist

17.1 Purpose

Click on the Modify Checklist link on the global navigation tab to access the Modify Checklist page which allows you to modify a checklist (see Figure 27).

Figure 27. Modify Checklist Page

17.2 Task Details

The three tasks that can be completed on this page, as shown in Figure 27, are:

1. Continue Working on Checklist Modification: Click on the Select link in the leftmost column of the table on the top half of the page to view the checklist(s) you are currently modifying. This allows you to continue the modification process of the

checklist from where you had left off. In Figure 27, the template of audit type Line_Mx is currently being modified.

2. Modify Other Checklists: To begin a checklist modification, fill the fields in the Select a Checklist to Modify section at the middle of the page. Use this section to create a revision based on the template.

a. Audit Type Drop-Down Menu: Select an audit type using the Audit Type drop-down menu. The red star (*) next to this field indicates that it is a required in order to modify a checklist. The audit type already chosen for an ongoing modification by you will not be displayed again in this audit type drop-down menu.

b. Vendor Name Drop-Down Menu: Select a vendor using the Vendor Name drop-down menu. The red star (*) next to this field indicates that it is a required in order to modify a checklist. The vendor for whom a checklist is already being modified by you will not be displayed again in this audit type drop-down menu.

c. Go Button: This button will lead you to Checklist Questions page where the entire checklist will be displayed.

3. Template Modification: The Template Modification section will be available only to those auditors who have been given the privilege to modify the template. Select an audit type from the drop-down menu and click Go to access the Checklist Questions page where the entire checklist will be displayed

18 Checklist Questions

18.1 Purpose

The Checklist Questions page allows you to modify the checklist selected in the Modify Checklist page. This page can be accessed from both the Modify Checklist and the Checklist Association pages. The auditors accessing checklists from Template Modification section in the Modify Checklist page can add, delete and modify questions. However, those accessing this page from the Modify Other Checklist section can only add questions to the revision they created.

Figure 28 shows the template modification process. The top of the page shows that the checklist currently being created is based on revision 1, last modified by Judy on 16 April 2006. The category Administration and process measures Compliance/Documentation are displayed immediately above the group of questions (see Section 2.13 for Process Measure details).

Figure 28. Checklist Questions Page

18.2 Task Details

The four tasks that can be completed on this page are:

1. Modify, Insert or Delete a Question: To modify, add or delete questions, click on the Modify, Insert or Delete link below each question (see Figure 28).

A. Modify a Question: Click on the Modify link to open the Modify Question pop-up window (see Figure 29) where you can modify a question, its reference or its answer type. Click the Cancel button to return to the Checklist Questions page without saving the changes currently made.

Figure 29. Modify Question Page

The four tasks that can be completed using this window are (see Figure 29):

a. Question Reference Textbox Field: Use this field to change the question reference, which are standards an audit question addresses.

b. Question Textbox Field: Use this field to rephrase the audit question in the checklist.

c. Answer Type: To collect a response to an audit question, you must click on either the radio button Yes No Not Applicable (N/A) or Yes No Not Applicable (N/A) Not Observed (N/O).

In addition you can check the Sub-Question answer type to collect information on different groups and items. By filling in the following fields to enter Group and Item level information:

- Group Title and Item Name: Enter a group name in the Group Title textbox. Enter the item name in the textbox below the Group Title.

- Item Answer Type: Choose if each item should be displayed as a Yes/No or open-ended response.
- Add Groups and Items: Click the Add Item or Add Group link to add an additional item or a new group respectively.

- Deletion of Groups and Items: Click the check boxes next to the appropriate Group Title or the items and click on the Delete Checked Groups or the Delete Checked Items buttons.

e. Submit Button: Click on the Submit button to save the changes made on the Modify Questions window and to return to the Checklist Questions page.

B. Insert a Question: Click on the Insert link to open an Insert New Question pop-up window (see Figure 30). This page contains the same fields as the Modify Questions page. To review the various tasks that can be completed, please see Modify a Question Section 18.2.1.

Figure 30. Insert New Question Page

C. Delete a Question: Click on the Delete link to delete a question. Click on the OK button in the warning pop-up message (see Figure 31) to confirm question deletion. Click Cancel button to avoid deletion.

Figure 31. Confirm Deletion

2. Navigation Options: The Checklist Question pages can be navigated in the following ways:

a. Navigation Drop-Down Menu and Go Button: Use the drop-down menu to navigate from one page to another below the global navigation tabs. As seen in Figure 28, to go to question 17, select 11-20 from the drop-down menu and click on the Go button.

b. Modify Another Checklist: Click on the Modify Another Checklist link on the top left of the page to go back to the Modify Checklist page.

c. Next and Previous Buttons: Click on the Next and Previous buttons at the bottom of the page to navigate between the Checklist Questions pages.

3. Change Categories Order: Click on the Change Categories Order link to reorder the generic groups under which the questions are organized (see Section 2.13). The page seen in Figure 32 displays all the categories for the checklists currently being modified. Click the Cancel button to avoid saving any changes and to go back to the Checklist Questions page.

Use the drop-down menus provided next to each category to decide the order in which they should be listed. Click the Submit button to save this change and to go back to the Checklist Questions page.
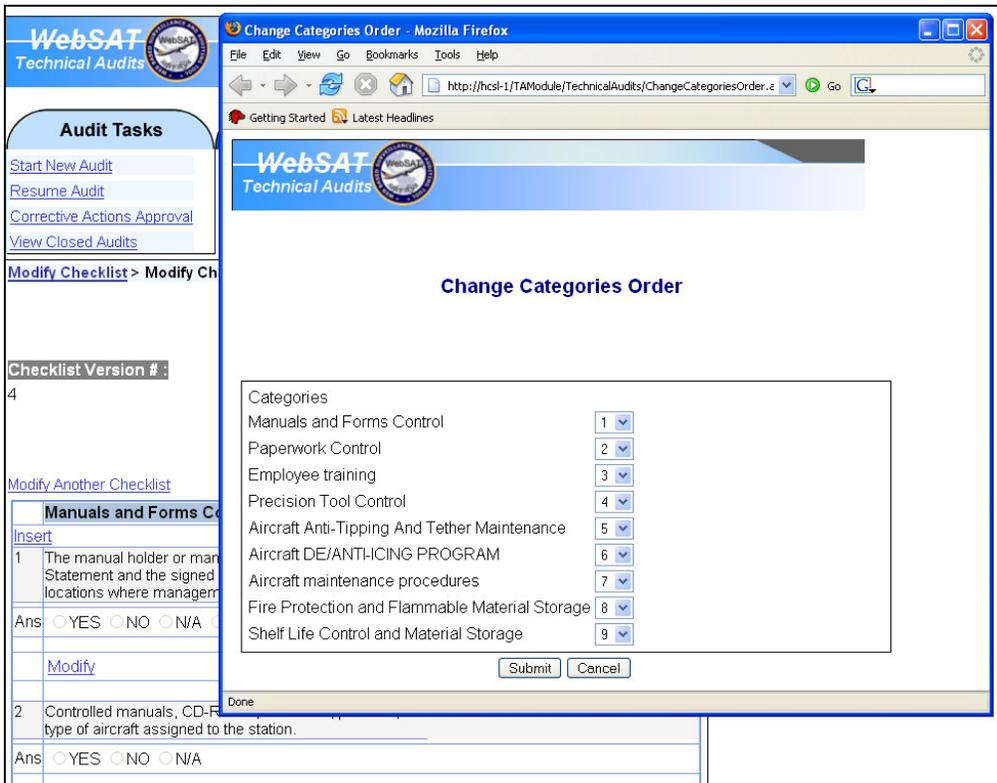
Figure 32. Change Categories Order

4. Submit to Manager Button: Click on the Submit to Manager button to send the modified checklist for manager approval. The checklist will be available in WebSAT for audits only after the manager has approved it.

19 New Audit Type Checklist

Click on the New Audit Type Checklist link on the global navigation tab to access the New Audit Type Checklist page. This page (see Figure 33) helps you to create a new checklist for a newly created audit type.

Figure 33. New Audit Type Checklist Page

Figure 33 shows that checklist creation process can begin for the newly created audit type Suppliers created on 17 April 2006. The Action field in the table displays either Create Checklist. The Create Checklist link is shown when the process of checklist creation hasn't begun. A Continue Creation link is shown when the process of checklist creation is to be resumed.

To begin creating a new checklist on this page (see Figure 33), click on the link in the Action field to go to the Choose Category Name page.

Note that this page can be used only for newly created audit types. Only the manager has the privilege to create new audit types. For modification of existing checklist, use Modify Checklist on the Checklist tab (see Section 17). Also note that once you begin working on checklist creation for a new audit type, no other auditor will see the new audit type displayed in this table. Thus, checklist creation process for an audit type will only be associated to you.

20 Choose Category Name

20.1 Purpose

The Choose Category Name page allows you to choose an existing or a new category as shown in Figure 34. The Choose Category Name page can be accessed only while creating a new checklist. You can access this page from the New Audit Type Checklist page (see Section 19) or from the Checklist Summary page (see Section 21).

Click on the Cancel button to return to the Checklist Summary page without saving the changes.

Note that this page can be used only for choosing one category at a time. As seen in Figure 34, the checklist creation process is for audit type Suppliers.

Figure 34. Choose Category Name Page

20.2 Task Details

To choose a category in this page, fill in the fields below as shown in Figure 34:

1. From Existing Category Radio Button and Drop-Down Menu: Click on the Existing Category radio button to view a drop-down menu containing all the categories created to-date. Use the drop-down menu to select a category. WebSAT automatically identifies a process measure associated with the selected category (see Section 2.13 for process measures and categories).

2. Enter Category Name Radio Button and Text Box: Click on the Enter Category Name radio button and use the text box field to enter a new category unavailable in the Existing Categories drop-down menu. Since this is a new category, you must associate a process measure from the Process Measure for New Category drop-down menu (see Section 2.13 for process measures and categories).

3. Enter Number of Questions Textbox: Enter the number questions required for the selected category.

4. Save and Proceed to Checklist Summary Button: Click on the Save and Proceed to Checklist Summary button to save the selected category and the number of questions entered and to return to the Checklist Summary page.

21 Checklist Summary

21.1 Purpose

The Checklist Summary page, as shown in Figure 35, is useful in displaying the different categories and the numbers of questions in each category of the checklist. This page can be accessed from the Choose Category Name page only. As seen in Figure 35, the checklist creation process is for audit type Suppliers.

Figure 35. Checklist Summary Page

21.2 Task Details

The five tasks that can be completed in this page, as shown in Figure 35, are:

1. Edit Questions in a Category: Click on the link in the Category Name field to proceed to the Complete Category page to add or remove questions. The field displays the categories created so far. It also displays in parenthesis the number of questions existing in the category next to each Category Name.

2. Delete a Category and its Questions: Check the checkbox next to the Category link in the Delete column and click on the Delete button at the bottom of the page, to delete the category. Deleting a category will also lead to the deletion of all the questions in the category.

3. Add a Category: Click on the Add Category button to access to the Choose Category Name page for adding a category.

4. Preview a Checklist: Click on the Preview Checklist button to preview the checklist currently being created. Clicking this button will display a pop up showing the checklist with the categories, questions with the chosen answer type and references.

5. Submit to Manager Approval Button: Click on the Submit to Manager button to send the checklist to the manager for approval. Note that the checklist will be used by WebSAT for audits only after the manager has approved the checklist.

22 Question Details

22.1 Purpose

The Question Details page displays the questions for the current category and allows you to add and delete questions. You can access this page from the Checklist Summary page only. As seen in Figure 36, the checklist creation process is for audit type Suppliers for category Administration and process measure Compliance/Documentation (see Section 2.13 for process measures and categories).

Figure 36. Question Details Page

22.2 Task Details

The four tasks that can be completed in this page, as shown in Figure 36:

1. Editing Questions: To edit questions, fill the following fields:

a. Question Reference Textbox Field: Use this field to change the question reference, which are standards an audit question addresses.

b. Question Textbox Field: Use this field to rephrase the audit question in the checklist.

c. Choose Answer Type: The steps in this task are identical to Section 18.2.1-A.

2. Delete a Question: Check on the checkboxes next to Question number field and click on the Delete Checked Questions button to delete the selected questions.

3. Save and Add New Question: Click on the Save and Add New Question button to save current changes and add a new question to the current list of questions.

4. Save and Proceed to Summary Page: Click on the Save and Proceed to Summary Page button to save current changes and return to the Checklist Summary page.

23 Approve Checklist

Click on the Approve Checklist link on the global navigation tab to access the Approve Checklist page which allows you to view, modify or approve a checklist awaiting approval. You can only view this page if you log in as a manager. The Approve Checklist link will not be visible to an auditor.

The Approve/Deny/Modify Checklist table, on the Approve Checklist page (Figure 37), lists all checklists awaiting the manager's approval. These checklists have been modified by other auditors based on their requirements. In Figure 37, the table contains a checklist of audit type Ramp_ops created by Pallavi Dharwada awaiting manager approval.

Figure 37. Approve Checklist

23.1 Task Details

The four tasks that can be completed in this page are:

1. Approve Checklist: Click on the Approve button in the row you would like to approve the checklist for. This will open an Approval Comments textbox where you can type in your comments on the approval of the checklist.

2. Deny Checklist: Click on the Deny button in the row you would like to deny the checklist for. This will open a Deny Checklist Comments textbox where you can type in your comments on the denial of the checklist.

3. Preview the Checklist: Click on Preview button in the appropriate row to open the checklist version in a new window.

4. Modify the Checklist: Click on Modify button in the appropriate row to go to the Checklist Questions page for checklist modification.

24 Audit Report

24.1 Purpose

Click on the Audit Report link in the global navigation tab to access the Audit Report page (see Figure 38) which allows you to generate audit reports. Audit Report is a summary of an audit. It displays the findings, comments, concerns and additional findings entered for the audit.

In order to generate a report for an audit, all the responses must have been entered into and findings for each NO must have been entered. In addition to report generation, this page allows you to either send the report to the vendor or any other individual.

Figure 38. Audit Report Page

24.2 Task Details

To choose an audit for generating an audit report, fill the following fields:

1. Auditor Name Drop-Down Menu: Click on the Auditor Name drop-down menu to select an auditor. You can select the name of any technical auditor to access audits performed by him/her for generating a report. Note for audits where you are not the primary or secondary auditor, you will be able to generate reports only if they are in

closed status.

2. Audit ID Textbox: Enter audit ID to identify a specific audit for generating an audit report.

3. Audit Type Drop-Down Menu: Click on the Audit Type drop-down menu to select the audit type of the audit you intend to generate a report.

4. Vendor Name Drop-Down Menu: Click on the Vendor Name drop-down menu to select a vendor name to identify the audit you intend to generate a report.

5. Search Button: Click on the Search button to access the Search Results page which allows you to view the search results on the Search Results table depending on the criteria specified in the Audit Report page.

Figure 39. Search Results Page

Click on the Audit ID link to generate audit reports for specified audit (see Figure 39). This action will take you to the Generate Report step of Reports page or you will see a dialogue box showing you the status of answered responses on the audit (See Figure 40).

You will only be able to send a report to a vendor if all the questions have been responded to and all findings have been entered for each NO response, else a dialogue box is shown (see Figure 19). If you omit a question or fail to enter a finding, the dialogue box shown in Figure 40 will pop-up; click on the OK button to return to the Checklist Data Entry page. The purpose of the dialogue box is to let you know how many questions have been attempted for the chosen audit.

If you have entered all the audit responses for the audit and then click on the Audit ID link in the Search Results table, you will see the Generate Report step of Reports page. Note if you are attempting to generate a report on an audit completed by another auditor you will be shown only those audits in the closed status.
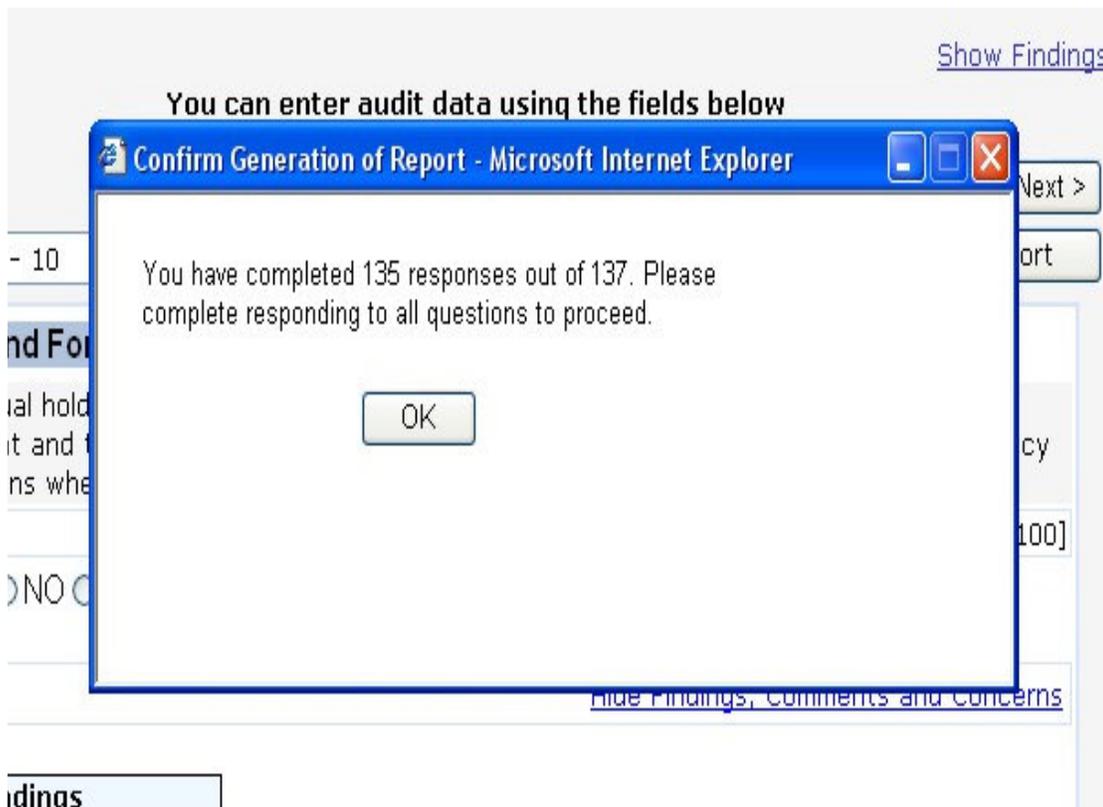
Figure 40. Confirmation Dialogue Box

The fields displayed in the Generate Report step of Reports page depends on if any information from the audit exist in the fields stated below. To complete the Generate Report step of Reports page (see Figure 41), you may fill the following fields:

1. Email Message (Letter with Discrepancies) Checkbox: Check the Email Message (Letter with Discrepancies) checkbox to include email message in the report to be sent to

the vendor where the email draft would assume the case where discrepancies exist in the audit.

2. Email Message (Letter with no Discrepancies) Checkbox: Check the Email Message (Letter with no Discrepancies) checkbox to include email message in the report to be sent to the vendor where the email draft would assume the case where no discrepancies exist in the audit.

3. Findings Checkbox: Check the Findings checkbox to include audit findings with the audit report.

4. Comments Checkbox: Check the Comments checkbox to include audit comments with the audit report.

5. Concerns Checkbox: Check the Concerns checkbox to include audit concerns with the audit report.

6. Additional Findings Checkbox: Check the Additional Findings checkbox to include audit's additional findings with the audit report.

7. Submit Button: Click on the Submit button to go to the Email Report Step of the Reports page.

Figure 41. Generate Report – an example

The Email Report step of the Reports page is accessed from the Generate Report step of Reports page. This page (see Figure 42) displays the email content, Findings, Comments, Concerns, Additional Findings and attachments. Click on the Cancel button to return back to the Audit Report page. The tasks that can be completed in this page are:

Figure 42. Screenshot 1 for e-mail information

1. Insert Email Addresses: This task can be completed in two ways.

a. Using the Insert Addresses Link: Click on the Insert Addresses link, immediately above the To field, to insert e-mail addresses of individuals to email the audit report. Click on the Cancel button to get back to the Email Report page. Click on the Insert Addresses link to display a pop-up (see Figure 43) where you can choose an email address to be inserted by checking the checkboxes and clicking on Insert Checked Contacts.

Figure 43. Option to insert e-mail addresses

b. To and CC Text Boxes: Use these two textboxes to enter email IDs.

2. Subject Textbox: Use the Subject textbox to enter a subject title for the audit report.

3. Message Draft Message: This draft message can be edited to suit the audit requirements (see Figure 42 and 52). As seen in Figure 42, the audit report dated 16 June 2006 states that the auditor John B conducted an audit of vendor FASSCOP.

Figure 44. Screenshot 2 for e-mail information

3. Print Button: Click on the Print button to either open the report or save it on the work terminal (see Figure 45).
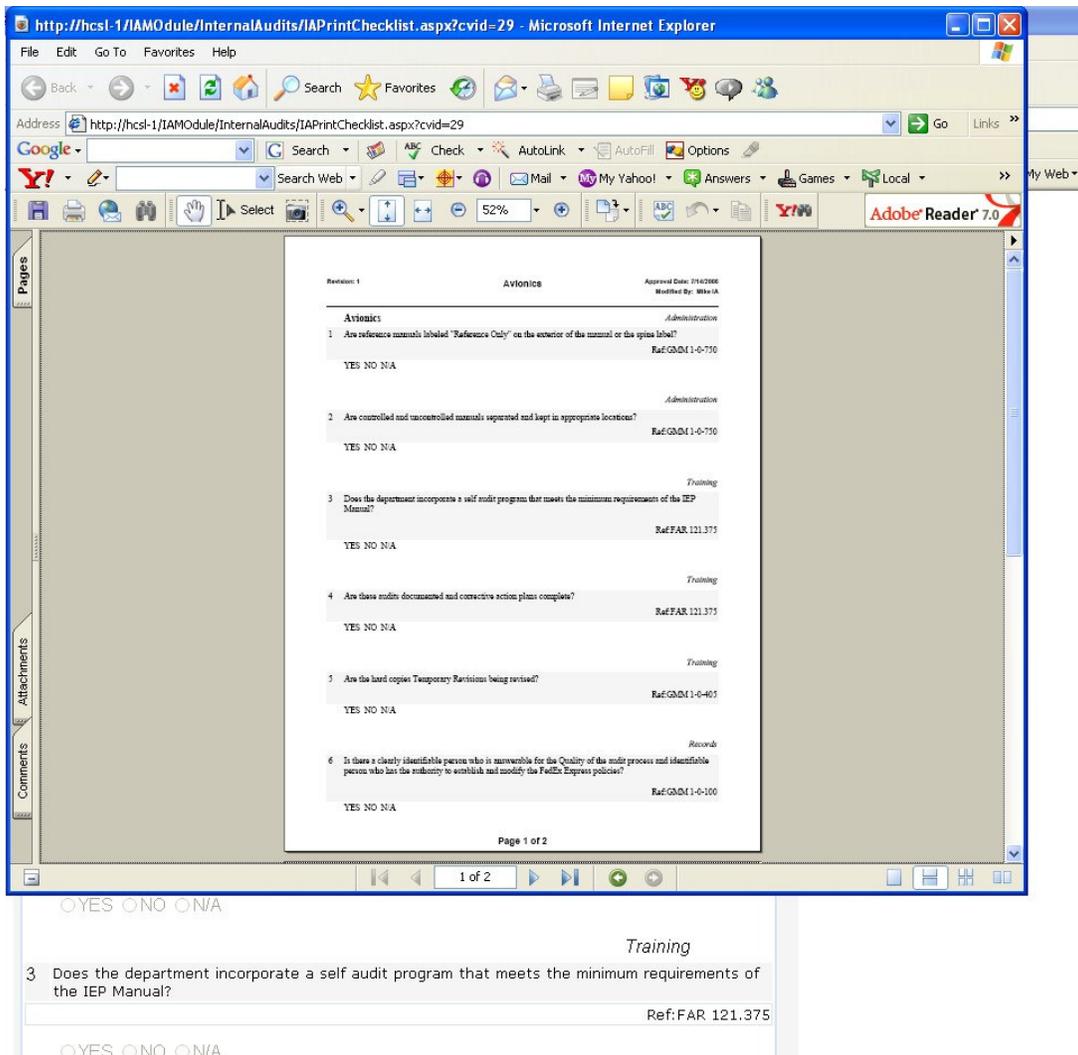
Figure 45. Opening or saving an audit report

4. Email Report Button: Click on the Email Report button to email the report to the vendor. A message will be displayed saying that the audit report has been successfully sent to the vendor.

25 Vendor Assessment Report

25.1 Purpose

Click on the Vendor Assessment Report link on the global navigation tabs to access the Vendor Assessment Report page seen in Figure 46. The Vendor Assessment Report page evaluates the performance of a vendor for a specific audit, or for several audits over a period of time.

Figure 46. Vendor Assessment Report Page

25.2 Task Details

To identify the audits and choose the contents of the Vendor Assessment Report, fill the following fields:

1. Vendor Name Drop-Down Menu: Choose the vendor name from the drop-down menu. The red star (*) next to this field indicates that this is required. The menu lists the vendors currently providing services for the airline.

2. Audit Type Drop-Down Menu: Click on the Audit Type drop-down menu and choose the type of audit. This drop-down menu will display the audit types associated with the vendor. Choose All Applicable in the drop-down menu to include all the audit types the vendor may be associated with.

3. Audit Date: This feature helps you to specify a particular date range to search for audits. You may enter the From and To date fields by typing in the date in the mm/dd/yyyy format OR you could click on the calendar icon next to the From and To

text field to select a date from the pop-up calendar. The pop-up calendar will display dates of the current month. Select the month using the drop-down menu. The back and forward arrow can be used to navigate from one year to another as shown in Figure 47. Note that if the audit dates are not chosen, WebSAT will default the search to audits in the last five years.

Figure 47. Calendar Pop up

4. Report Analysis Choices: The Report Analysis Choices field includes the following checkboxes as shown in Figure 46:

- *Vendor Analysis by Audit Checkbox*: Check the Vendor Analysis by Audit checkbox to view vendor analysis for each audit.

- *Audit Duration Distribution Checkbox*: Check the Audit Duration Distribution checkbox to view duration of the various audits conducted on the vendor.

- *Vendor Analysis for all audits Checkbox*: Check the Vendor Analysis for all audits checkbox to view vendor analysis for all audits for each audit type.

- *Response Rate Line Graph Checkbox*: Check the Response Rate Line Graph checkbox to view line graph comparing the current audit response rates with predicted response rate.

- *Process Measure Distribution (Aggregated) Checkbox*: Check the Process Measure Distribution (Aggregated) checkbox to view a pie chart of the aggregated process measure distribution.

- *Process Measure Distribution (Individual) Checkbox*: Check the Process Measure Distribution (Individual) checkbox to view pie charts for process measure distribution of each individual process measure.

- *Aircraft Level Impact Checkbox*: Check the Aircraft Level Impact checkbox to view the aircraft level impact distribution.

- *Organizational Categories Checkbox*: Check the Organizational Categories checkbox to view the organizational categories distribution.

5. Submit: Click on the Submit button after all the required information has been provided to go to the Audit Selection page.

26 Audit Selection

26.1 Purpose

The Audit Selection page, as shown in Figure 48, displays the different audits matching the criteria specified in the Vendor Assessment Report page. You can access this page only from the Vendor Assessment Report page.

The page begins by identifying the criteria chosen in the Vendor Assessment Report page. As seen in Figure 48, the Audit Selection page is displaying audits of vendor ZICO from 14 July 2001 to 14 July 2006 for fuel audit type. The process measures applicable for this analysis are shown in the Process Measures field.

Figure 48. Audit Selection Page

26.2 Task Details

The two tasks that can be completed from this page, as shown in Figure 48, are:

1. Audit Selection for Analysis: Click on checkboxes under the Select column to choose audits you would like to include for this analysis. For faster selection, click on the Select All button to choose all the audits listed in the Audits table. The Select All button changes to Uncheck All. Click on Uncheck All to uncheck all the selected items. Click on the Perform Analysis button to go to the next page depending on your choices in the Reports Analysis field in the Vendor Assessment Report page (see Section 25).

2. Back to Vendor Assessment Report page: Click on the Back button to go back to the Vendor Assessment Report page.

27 Vendor Analysis by Audits

27.1 Purpose

The Vendor Analysis by Audits page, as shown in Figure 49, displays the vendor analysis for each audit chosen in the Audit Selection page. You can access this page only if the Vendor Analysis by Audits checkbox in the Report Analysis Choices field in the Vendor Assessment Report page is checked.

The page begins by identifying the criteria chosen in the Vendor Assessment Report page. As seen in Figure 49, the Vendor Analysis by Audits page is displaying audits of vendor ZICO from 14 July 2001 to 14 July 2006 for fuel audit type. The process measures applicable for this analysis are shown in the Process Measures field. The number of audits selected for this analysis is 3.

Figure 49. Vendor Analysis by Audits Page

27.2 Field Description

The various fields in the Vendor Analysis by Audits page, as shown in Figure 49, are:

1. Summary Information of Each Audit table: The Summary Information of Each Audit table includes the various audits selected in the Audit Selection page. Each row in this table contains analysis of an audit.

As seen in Figure 49, for Audit 277 with primary auditor Judy and audit duration of 33 days, the response rate for this audit is 78.74 percent. This means that if there were

100 questions in this audit, there were approximately 78 YES responses. The Model's Predicted Outcome for this Audit is the percentage YES predicted using a Multi Level Logistic Regression model embedded in WebSAT which performs analysis based on historical data. The model's predicted outcome for this audit is 62.34 percent. This means that based on historical evidence and considering all the various parameters in the model, it predicts an audit response rate of approximately 62 YES for every 100 questions.

2. View Distribution of Process Measures, Aircraft Level Impact and Organizational Categories Link: Click on the View Distribution of Process Measures, Aircraft Level Impact and Organizational Categories link to view the pie chart distribution of process measures, aircraft level impact and organizational categories (see Figure 50).
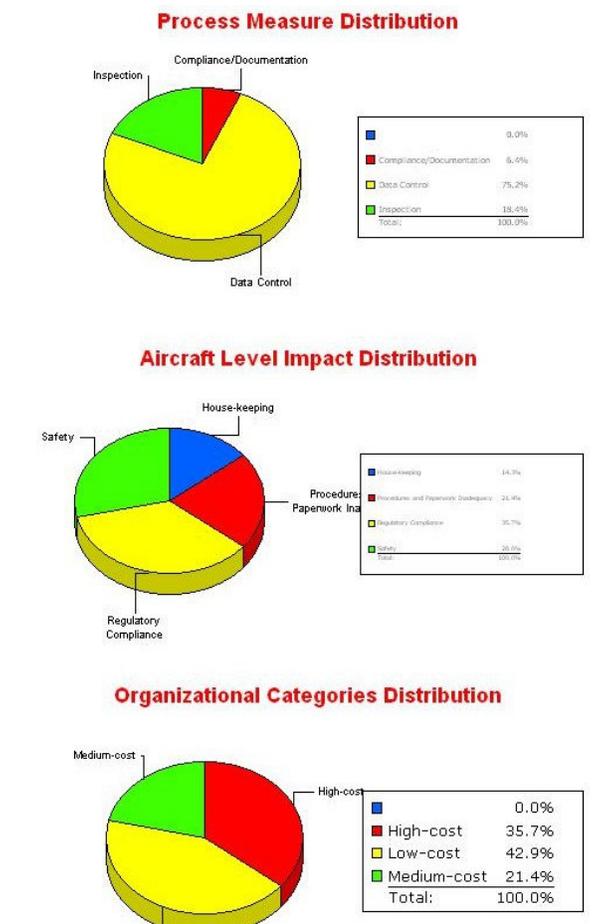
Figure 50. Distribution of Process Measures, Aircraft Level Impact and Organizational Categories for an audit

3. Previous and Next Button: Click on the Previous and Next button to navigate to the other pages.

28 Audit Duration Distribution

The Audit Duration page, as shown in Figure 51, displays the time taken to complete each audit chosen in the Audit Selection page. You can access this page only if the Audit Duration checkbox in the Report Analysis Choices field in the Vendor Assessment Report page is checked.

The page begins by identifying the criteria chosen in the Vendor Assessment Report page. As seen in Figure 51, the Audit Duration page is displaying audits of vendor SISCO from 16 June 2001 to 16 June 2006 for fuel audit type. The process measures applicable for this analysis are shown in the Process Measures field. The number of audits selected for this analysis is 4.

Figure 51. Audit Duration Distribution Page

In Figure 51, the Audit Duration Distribution section begins by identifying the audit type of the audits selected in the Audit Selection page as fuel. The number of audits used from the Audit Selection page is 4 of which 3 are in closed status. The mean audit duration for 3 audits in closed status is 19.33 days which indicates that on an average the audits took approximately 19 days to complete. This section also displays a bar chart with

the audit durations as the Y axis and the different audits in the X Axis. Click on the Previous and Next button to navigate to the other pages.

29 Vendor Analysis for all Audits

The Vendor Analysis for all Audits page, as shown in Figure 52, displays the vendor analysis for all audits chosen in the Audit Selection page. You can access this page only if the Vendor Analysis for all Audits checkbox in the Report Analysis Choices field in the Vendor Assessment Report page is checked.

The page begins by identifying the criteria chosen in the Vendor Assessment Report page. As seen in Figure 52, the Vendor Analysis for all Audits page is displaying audits of vendor SISCO from 16 June 2001 to 16 June 2006 for fuel audit type. The process measures applicable for this analysis are shown in the Process Measures field. The number of audits selected for this analysis is 3.

Figure 52. Aggregated Audit Information Page

In Figure 52, the Summary Information per Audit Type section shows that the number of fuel audits is 3. For the audit type fuel, the Aggregated Audit Response Rate is 83.03 percent. This means that for the three audits, the average response rate is approximately 83 YES responses for every 100 questions in an audit.

The Aggregated Model Response Rate using the Multilevel Logistical Regression model is 50.96 percent. The Aggregated Model Response Rate is the percentage Yes

predicted for all the audits of a particular audit type using a Multi Logistic Regression model embedded in the system which performs analysis based on historical data. Standard Deviation is a measure of the average distance of the audit response rate from the aggregated audit response rate. Click on the Previous and Next button to navigate to the other pages.

30 Vendor Assessment Graphs

The different graphs displaying trends and distribution of the vendor data are explained below:

30.1 Response Rate Graph

The Response Rate Graph page, as shown in Figure 53, displays the trend on vendor's performance in terms of audit response rate. You can access this page only if the Response Rate Graph checkbox in the Report Analysis Choices field in the Vendor Assessment Report page is checked.

 The page begins by identifying the criteria chosen in the Vendor Assessment Report page. As seen in Figure 53, the Response Rate Graph page is displaying audits of vendor SISCO from 16 June 2001 to 16 June 2006 for fuel audit type. The process measures applicable for this analysis are shown in the Process Measures field. The number of audits selected for this analysis is 3.

The red line in the graph is the response rate of the audits chosen in the Audit Selection page while the blue line is the Model's predicted response rate generated from the different parameters of each audit.
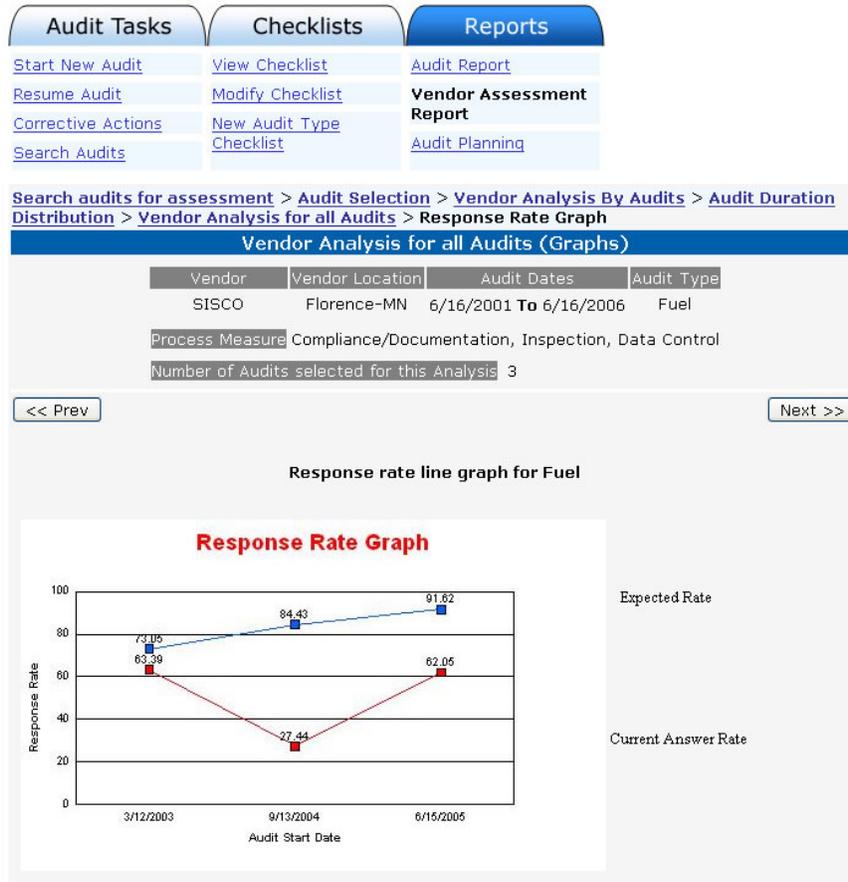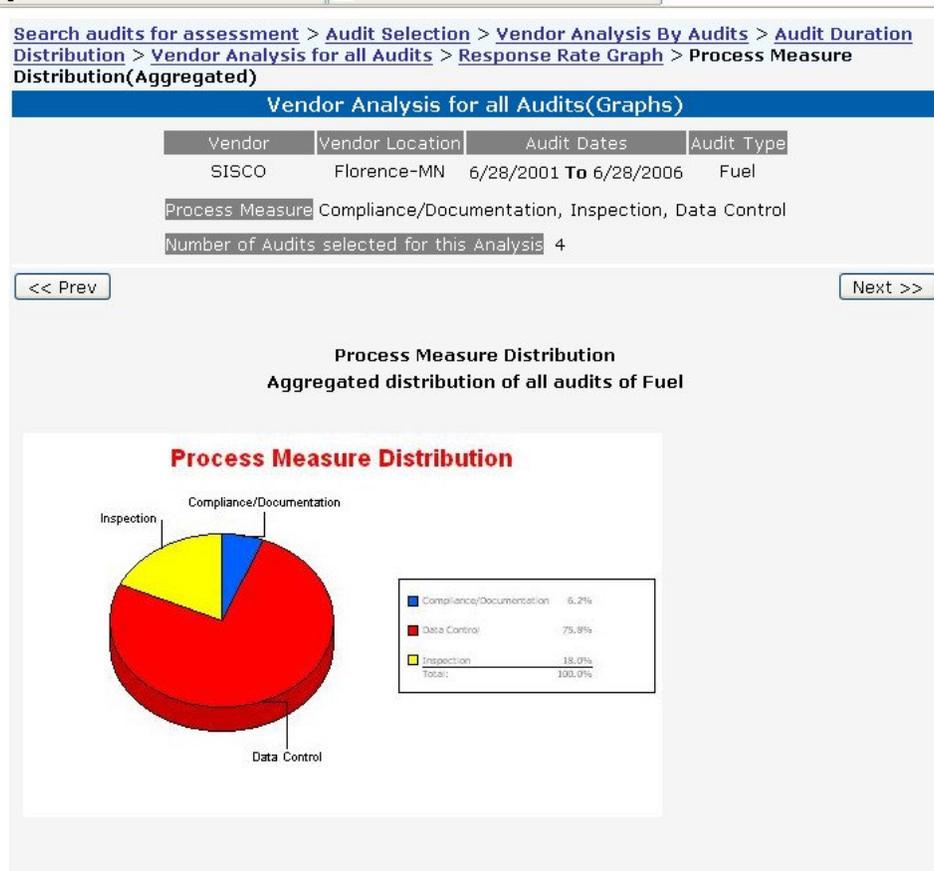
Figure 53. Response Rate Graph Page

30.2 Process Measure Distribution (Aggregated)

The Process Measure Distribution (Aggregated) page, as shown in Figure 54, displays the aggregated process measure distribution using a pie chart.

As seen in Figure 54, the Process Measure Distribution (Aggregated) page is displaying audits of vendor SISCO from 16 June 2001 to 16 June 2006 for fuel audit type. The process measures applicable for this analysis are shown in the Process Measures field. The number of audits selected for this analysis is 3.

Figure 54. Process Measure Distribution (Aggregated) Page

30.3 *Process Measure Distribution (Individual)*

The Process Measure Distribution (Individual) page, as shown in Figure 55, displays the aggregated distribution of each individual process measure using a pie chart.

As seen in Figure 55, the Process Measure Distribution (Aggregated) page is displaying audits of vendor SISCO from 16 June 2001 to 16 June 2006 for fuel audit type. The process measures applicable for this analysis are shown in the Process Measures field. The number of audits selected for this analysis is 3.

Click on the Choose Process Measure drop-down menu to select a process measure and to view its distribution for all the chosen audits.
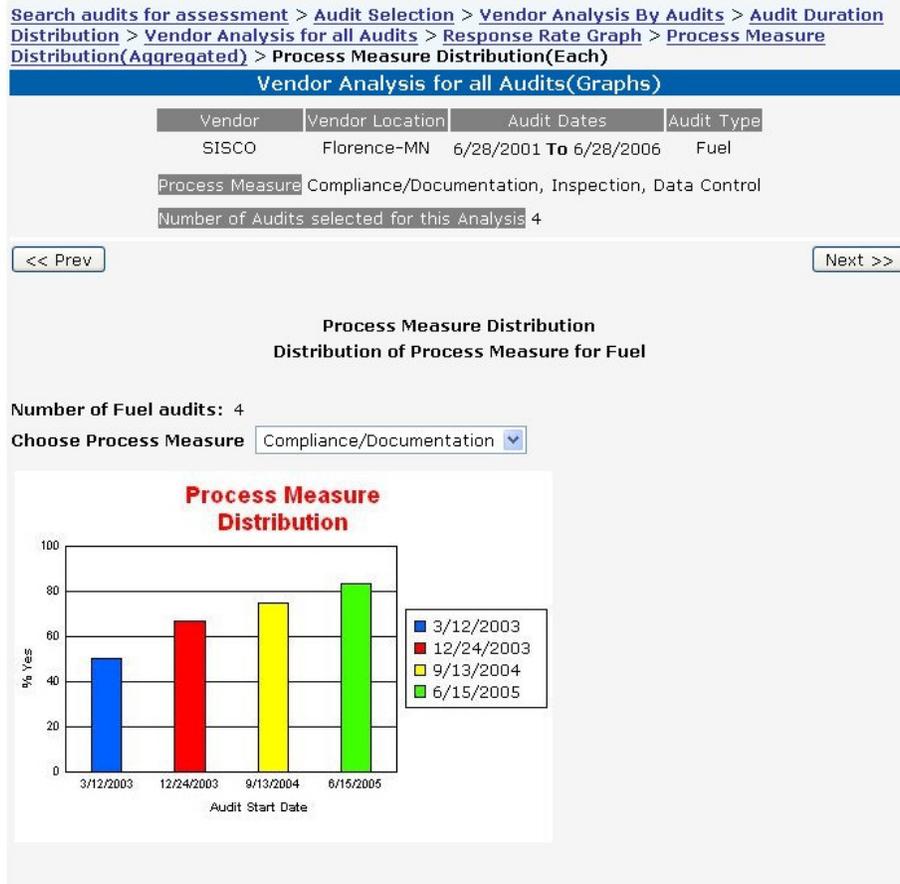
Figure 55. Process Measure Distribution (Individual) Page

30.4 Aircraft Level Impact Distribution

The Aircraft Level Impact Distribution page, as shown in Figure 56, displays the aircraft level impact distribution using a pie chart.

As seen in Figure 56, the Aircraft Level Impact Distribution page is displaying audits of vendor SISCO from 16 June 2001 to 16 June 2006 for fuel audit type. The process measures applicable for this analysis are shown in the Process Measures field. The number of audits selected for this analysis is 4.

The distribution will be shown for each audit type. The various fields in the Aircraft Level Impact Distribution section are Total Number of Audits, Total number of Findings in these audits and Findings for each Aircraft Level Impact category.
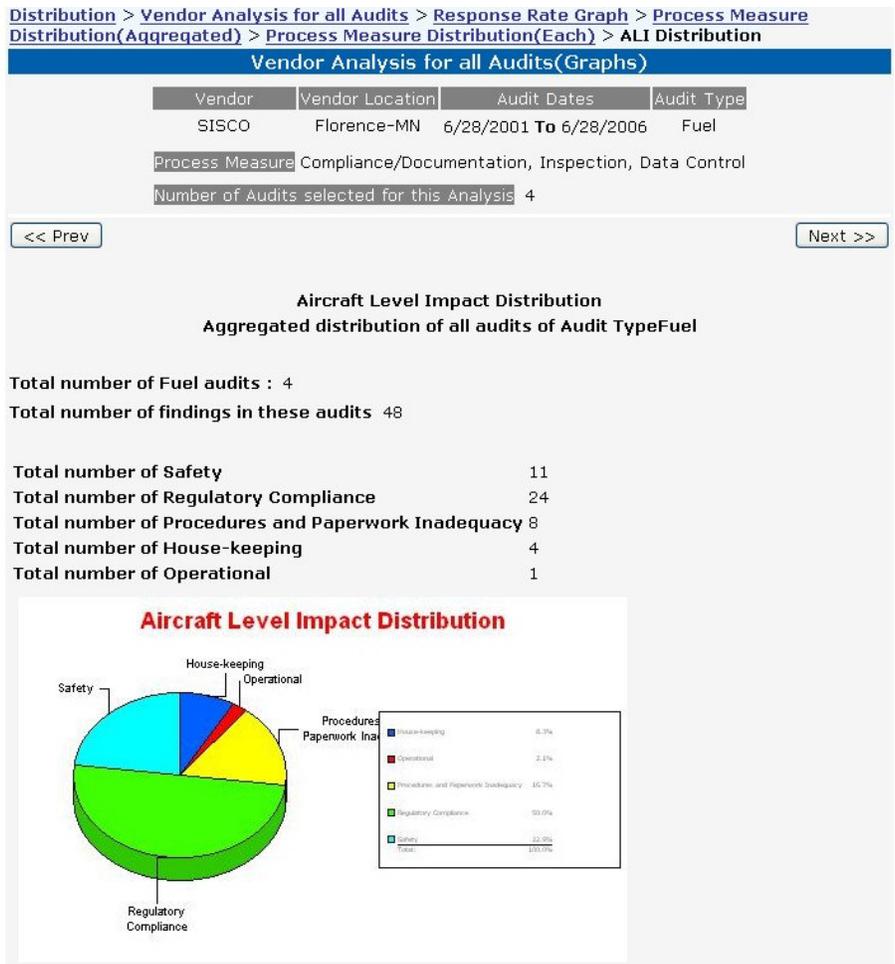
Figure 56. Aircraft Level Impact Distribution Page

30.5 Organizational Categories Distribution

The Organizational Categories Distribution page, as shown in Figure 57, displays the organizational categories distribution using a pie chart.

As seen in Figure 57, the Aircraft Level Impact Distribution page is displaying audits of vendor SISCO from 16 June 2001 to 16 June 2006 for fuel audit type. The process measures applicable for this analysis are shown in the Process Measures field. The number of audits selected for this analysis is 4.

The distribution will be shown for each audit type. The various fields in the Organizational Categories Distribution section are Total Number of Audits, Total number of findings in these audits and Findings for each Organizational Categories category.

Figure 57. Organizational Categories Distribution Page

31 Audit Allocation/Impact

31.1 Purpose

Click on the Audit Allocation/Impact link in the global navigation tab to access the Audit Allocation/Impact page, as shown in Figure 58, which displays the fields required to conduct audit allocation.

In the global navigation tab, for the auditor this link is displayed as Audit Impact while for the manager this page is displayed as Audit Allocation. The Audit Impact and Audit Allocation page vary in the number of predictions that can be made. The audit impact can provide predictions for only one specified set of data for the parameters provided. The Audit Allocation page allows the manager, to predict the response for an audit by specifying at the most three sets of values to the various parameters.

Figure 58. Audit Allocation Page

31.2 Task Details

To conduct audit allocation, fill the following fields below:

1. Vendor Name Drop-Down Menu: Choose the vendor name from the drop-down menu. This menu selection lists the vendors currently providing services for the airline for the audit type selection.

2. Audit Type Drop-Down Menu: Click on the Audit Type drop-down menu and choose the type of audit.

3. Auditor Name: Click on the Auditor Name drop-down menu and choose an auditor.

4. Audit Duration: Enter the number of days required to complete the audit.

5. Calculate Predicted Response Rate Button: Click on the Calculate Predicted Response Rate button to go to the Predicted Response Rate page.

Figure 59. Predicted Response Rate Page

The Predicted Response Rate page, as shown in Figure 59, displays the expected response rate for the criteria specified in the Audit Allocation page. The manager can use this page to estimate the audit response if an audit was to be conducted on the specified vendor using the other criteria.

As seen in Figure 59, the audit planning was conducted using vendor TELCO and auditor Bob for a Line Maintenance audit type. The duration for the audit was set at 31 days. Using the parameters, the model predicts a response rate of approximately 91 percent. This means that based on historical evidence and considering all the various parameters, the model predicts an audit response rate of approximately 91 YES for every 100 audit questions.

32 Administration Tasks (Manager Only)

The Administration tab is available exclusively for managers. The manager can edit auditors, suppliers and audit type using this global navigation tab. He can also re-assign auditors using this tab.

32.1 Edit Auditors

Click on the Edit Auditors link on the global navigational tab to access the Add Auditors page which allows you, as the manager, to edit information associated with the

auditors. The manager can add a new auditor, remove an assigned auditor, or modify the current information associated with an auditor.

Figure 60. Add Auditors Page

32.1.1 Add New Auditor/Manager

Use this page in Figure 60 to enter information on a new auditor/manager. The red star (*) indicates required fields. Click on the Submit button to save this information and to go to the Edit Auditor Information page shown in Figure 61. An email will be sent to the auditor providing him with the new WebSAT userid and password. It is recommended to use the Modify tab and verify if the auditor, about to be added, already exists in the system.

Figure 61. Information added for a new auditor

32.1.2 Add Auditor – Edit Information

To edit the submitted information, click on the Edit Above Information button on the lower left of the screen. To add the next auditor, click on the Add New Auditor button on the lower right of the screen.

32.1.3 Remove Auditor

Click on the Remove link, to remove an auditor from the system. Use the drop-down menu to select the auditor to be removed and then click on the Delete button, as shown in Figure 62. If the auditor you would like to remove from the system has some ongoing audits, the system will give you the option of either deleting the audits or re-assign the audits to another auditor.
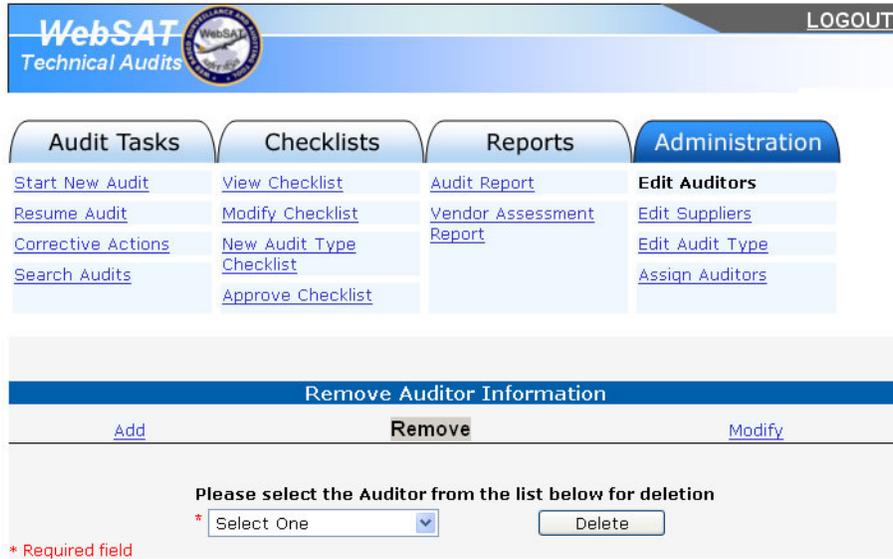
Figure 62. Remove Auditor Page

The dialogue box in Figure 63 pops up asking if you want to remove the auditor from the system. Click on the OK button in the dialogue box.
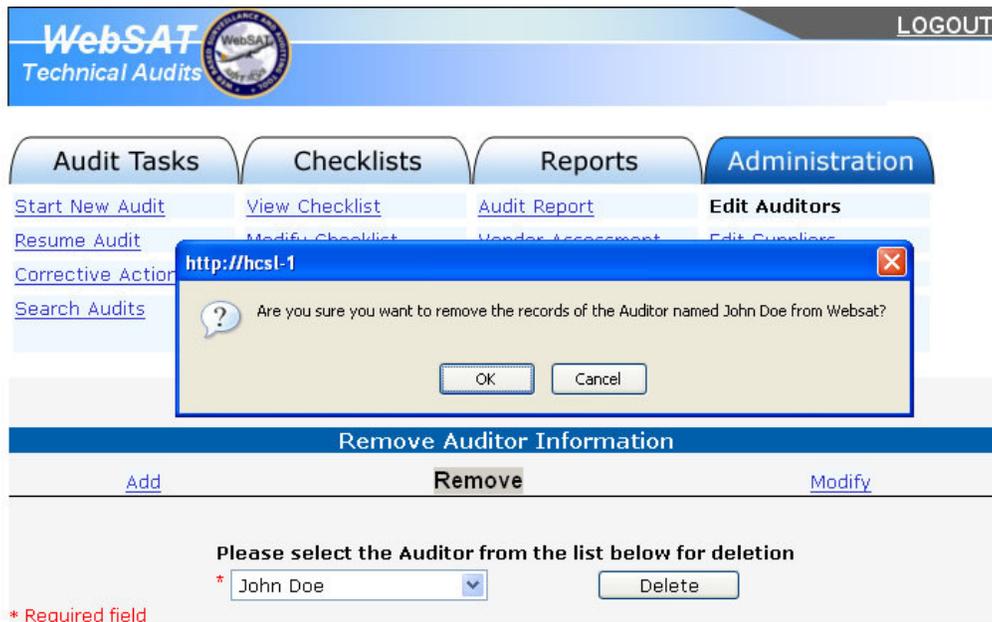
Figure 63. Dialogue Box Inquiry

Feedback indicates that the auditor has been successfully removed as shown in Figure 64.

Figure 64. Feedback Page

Click on the Cancel button in the dialogue box to avoid auditor deletion and to return to the screen shown in Figure 62.

32.1.4 Modify Auditor

To modify existing auditor information, click on the Modify link in the Edit Auditors page to access the screen seen in Figure 65.

Figure 65. Modify Auditor Page

Select the auditor in the drop-down menu shown in the figure and click on the Modify button to access to the Modify Auditor Information page in Figure 66.

Figure 66. Modify Auditor Information

Use the Modify Auditor Information page to edit information on an auditor. The red star (*) indicates required fields. Click on the Submit button to save this information. Clicking the Submit button will give feedback message on successful modification.

32.2 Edit Vendors

Click on the Edit Vendors link on the global navigational tab to access the Add Vendors page to edit vendor information. The manager can add a new vendor, remove a vendor or modify the current information associated with a vendor.

32.2.1 Add Vendor

Use the Add New Vendor page in Figure 67 to enter information on a new vendor. The red star (*) indicates that it is a required field. Click on the Submit button to save this information and to go to the Edit Vendor Information page shown in Figure 68. An email will be sent to the vendor providing him with the new WebSAT userid and password. Use the View Approved Vendor List link to view the approved vendor list, their respective userids and passwords in a separate window.

Figure 67. Adding a New Vendor Page

32.2.2 Add Vendor– Edit Information with Feedback

To edit the submitted information, click on the Edit Above Information button on the lower left of the screen as shown in Figure 68. To add the next vendor, click on the Add New Vendor button on the lower right of the screen.

Figure 68. Information feedback indicating a vendor has been added

32.2.3 Remove Vendor

Click on the Remove link, to remove a vendor from the system. Use the drop-down menu to select the vendor to be removed and then click on the Delete button as shown in Figure 69. This process is similar to the Edit Auditors - Remove section (see Section 32.1.3). If there are ongoing audits on the vendor, the system will give the option of deleting the audits right away and removing the

vendor from the system or waiting for the audits to be completed to delete the vendor.

Figure 69. Remove Vendor Page

32.2.4 Modify Vendor

To modify existing vendor information, click on the Modify link in the Edit Vendor page to access the screen seen in Figure 70. Select the vendor in the drop-down menu shown in the figure and click on the Modify button to access the Modify Vendor Information page. The process is similar to the Edit Auditors - Modify section (see Section 32.1.4). The fields displayed are identical to Edit Vendors- Add section (see Section 32.2.2).

Figure 70. Modify Vendor Information

32.2.5 Reactivate Vendor

To reactivate a vendor who has been deleted from WebSAT, click on the Reactivate link in the Edit Vendor page to access the screen seen in Figure 71. Select the vendor in the drop-down menu shown in the figure and click on the Reactivate button to access the Reactivate Vendor Information page. This process is similar to the Edit Auditors - Remove section (see Section 32.1.3).

Figure 71. Reactivate Vendor

32.3 Edit Audit Type

Click on the Edit Audit Type link on the global navigational tab to access the Add New Audit Type page which allows you to edit information regarding existing and new audit types for technical audits. The manager can add, remove, or modify an audit type.

32.3.1 Add New Audit Type

To add an audit type, click on Add link in the Edit Audit Type page and fill in the Audit Type Name field shown in Figure 72. Click on the Submit button to save the new audit type.

Figure 72. Add New Audit Type Page

32.3.2 Audit Type Removal

Click on the Remove link to delete an existing audit type as shown in Figure 73. The process is similar to the Edit Auditors - Remove section (see Section 32.1.3).

Figure 73. Select an audit type to be removed from the system

32.3.3 Modify Audit Type

Click on the Modify link in the Edit Audit Type page to modify existing audit type information. The manager sees the Modify Audit type Information page (see Figure 74). Select an audit type using the drop-down menu. The process is similar to the Edit Auditors - Modify section (see Section 32.1.4). The fields displayed are identical to Edit Audit Type- Add Audit Type section (see Section 32.3.1).

Figure 74. Modify Audit Type Page

32.4 Re-Assign Auditors

Click on the Re-Assign Auditors link in the global navigation tab to access the Re-Assign Auditors page as shown in Figure 75. You may choose to use this feature when one of the auditors fell sick while conducting the audit and would like to be replaced. Further, this feature may come in handy when both the primary and secondary auditors are unavailable.

Figure 75. Re-Assign Auditors Page

Use the Auditor Name drop-down menu, a required field, to select an auditor.

Figure 76. Assign new auditors to existing records

Based on the criteria, the audits are listed in the table in Re-Assign Auditors page as shown in Figure 76. The table in Figure 76 also indicates the current auditor type, and the new auditor drop-down menu allows the manager to make new assignments for the associated audit. Click on the Back button to go back to the Re-Assign Auditors page.

Select an auditor from the drop-down menu and click on the Submit button to reassign the auditor. Clicking the Submit button takes the manager to the Re-Assign Auditors page with a feedback indicating that the new auditors have been successfully assigned.

33 Help

Click on the Help link at the top right portion of the screen to access the Help page which allows you to view the WebSAT Technical Audits User Manual and the process measure definition document (see Figure 77).

Figure 77. Help Page

APPENDIX B

WebSAT User Manual for Internal Audits Management Module

Web-based Surveillance and Auditing Tool

Developed by
Human Computer Systems Laboratory
Department of Industrial Engineering
Clemson University, Clemson, SC 29634
Information contained in this report/ manual is proprietary to Clemson University
and intended for use only by Fedex Express and FAA to whom it is addressed.

Contents

1 Introduction

This is a user guide for the Web-based Surveillance and Auditing Tool (WebSAT) Internal Audits module. It is organized according to the functions that can be performed using this tool. Detailed instructions are provided for the various tasks for conducting audits and documenting audit data and storing it in WebSAT. It is intended to be a straightforward introduction to how this tool works and assumes that the reader has a basic level of familiarity with computer and internet applications and with the business processes involved in a typical airline's Quality Assurance Department.

To view ONLY one particular topic, click the appropriate section in the Table of Contents. To print instructions for that topic, click on the Print button on your browser.

1.1 WebSAT Description

The research team at the Human Computer Systems Laboratory has developed WebSAT. It is a tool for analyzing aircraft maintenance data using results from statistical techniques such as logistical regression, to determine risk trends. It is intended to collect, reduce, and analyze surveillance, auditing and airworthiness directives operations data in a standardized way to reflect the impact of maintenance error on the safety of an aircraft. This will allow users at various hierarchical levels in a work function to collect and analyze data on.

Over time the WebSAT tool will become a repository of surveillance and audits. This will mean that auditors will be able to use verified records as evidence to analyze aircraft maintenance data, rather than managers depending on scattered and largely un-documented data to validate trends. The airline information and technology department will help maintain WebSAT and ensure the integrity of the data stored in it.

2 Introduction to WebSAT Terms

This section provides a brief explanation of the terms used in the different screens and forms of WebSAT, which may be unfamiliar to the auditor.

2.1 Aircraft Level Impact

Each time a NO is documented during an audit, an aircraft level impact (ALI) will be associated with each open-ended response indicating a possible risk to the aircraft.

2.2 Organizational Categories

Management is interested in the cost and risk implications of discrepancies observed by the auditors. The set of categories addressing this concern are the Organizational Categories (OC).

2.3   Audit ID

Audit ID refers to the audit identification number corresponding to an audit. This is generated by WebSAT.

2.4   Audit Type

Audit Type refers to the different types of audits typically performed. Engineering Machine and Maintenance (EMM) and Flight Operations (Flight Ops) are currently, the two audit types in WebSAT.

2.5   Department

A department is a specialized division of the airline.

2.6   Primary Auditor

Primary Auditor is the auditor primarily in charge of entering the audit data into the system. Each audit has one primary auditor assigned to it.

2.7   Secondary Auditor

Secondary Auditor is the auditor associated with an audit, but will only take primary responsibility of entering audit information in case of absence of the primary auditor.

2.8   Audit Status

An audit status indicates the phase of each audit. WebSAT changes the status without user intervention. The four statuses used in WebSAT are described below:

- **Opened**: As soon as an audit has been created in WebSAT, it is in the Opened status. It remains in this status until the auditor begins entering responses.
- **Findings**: The audit status changes to Findings automatically by WebSAT when the auditor begins entering audit responses. The audit continues to remain in this status until an audit report is sent to the department.
- **Corrective Actions**: The Corrective Actions status indicates that a report for the audit has been sent to the department and a response is awaited on the audit findings stated in the audit report.
- **Closed**: WebSAT moves the audit from Corrective Actions to the Closed status when all the corrective actions received from the department are found satisfactory and have been approved by the auditor. This status indicates that all tasks associated with this audit have been completed. Although an auditor cannot make any changes to an audit once it has reached Closed status, he/she can view a closed audit.

2.9   Checklist

Checklist consists of a series of audit questions used by the auditor to assess if regulatory requirements are satisfied by the department. A checklist can be printed from the View Checklist and Checklist Data Entry pages in WebSAT.

2.10 Template Checklist

A template is a standard set of questions approved by the manager for a department and an audit type.

2.11 Checklist Revision

Checklist revision refers to a revision of a chosen checklist for an audit type and a department. Checklist revisions can be created from a template or from another revision. Thus, a revision number identifies every unique creation of various checklists. The revision number is generated by the system.

2.12 Checklist ID

Checklist ID refers to the checklist identification number generated by the system.

2.13 Process Measures for Internal Audits

The data collected from internal audit checklists will be grouped into categories to facilitate further analysis and explain the effectiveness of the internal audit process. These categories are defined as process measures. Please refer to CASE standards for detailed descriptions of the items listed for all the process measures. The process measures identified for internal audits are defined below.

2.13.1 Administration

This process measure ensures the departments' ability to manage up-to-date documented systems and ensure the adequacy of various programs followed in-house.

2.13.2 Training

This process measure ensures that the employees of the departments within the organization are trained properly, and have the required certification to perform operations.

2.13.3 Records

This process measure ensures that the required records are made available for review by the departments within an organization.

2.13.4 Safety

This process measure ensures the overall safety aspect of the departments within an organization.

2.13.5 Manuals

This process measure verifies the technical data, manuals, and forms provided by the departments within an organization.

2.13.6 Procedures

This process measure ensures that the maintenance and flight operations departments adhere to federal aviation regulatory guidelines and company departmental policies while executing various operations within each program.

3 Login

Figure 1. WebSAT Login Page

You can accomplish three tasks using the Login page:

1. Log into WebSAT: To login, type in your Username and Password (see Figure 1) and click on the Login button. If the information provided is correct, you will be taken to either the Start New Audit page or the Resume Audit page. You will arrive at the Start New Audit page if you do not have any audits in opened, findings or corrective actions status. You will arrive at Resume Audit page if you have audits in the opened, findings or corrective actions status.

2. Change Password: Click on the Change Password link, to change your password (see Section 4 for details).

3. Request for Existing Password: Click on the Forgot Password link on the WebSAT Login page, if you have forgotten your password and are unable to login (see Section 5 for details).

4 Change Password

Clicking on the Change Password link on the WebSAT Login page takes you to the Change Password page shown in Figure 2. If you wish to exit the Change Password page, click on the Cancel button to return to the WebSAT Login page.

Internal Audits

Change Password Screen

User Name

Old Password

New Password

Confirm New Password

Identity Question

Select One

Identity Answer

* All fields are required

Submit   Cancel

Figure 2. Change Password Page

To enter the information required to change your password:

1. Type your username, old password and new password.

2. Verify new password by re-typing it in the Confirm New Password text box.

3. Select your identity question from the drop-down menu shown in the Figure 3 below. The Identity Question field helps you access your password in case you forget it. For example, you could select "What is your pet's name?"

Figure 3. Identity Question drop-down menu

4. Type in the answer to the identity question you selected in the Identity Answer textbox. For example, you could type in "Rover" as the answer to your pet's name.

5. Click on the Submit button to submit the information you have entered into WebSAT and go to Login page.

5 Forgot Password

If you forget your password, click on the Forgot Password link on the WebSAT Login page to access the page seen in Figure 4. If you wish to exit the Forgot Password page, click on the Cancel button to return to the WebSAT Login page.

Figure 4. Forgot Password Page

To request for your existing password:

1. Enter your first name, last name and email address in the text boxes provided.

2. Click on the Submit button to provide your information to WebSAT. If the email address provided matches with the one that exists in WebSAT then your password will be sent to the email address provided.

6 Global Navigation Tabs

Once you login, one of the two pages will appear: (a) Start New Audit (b) Resume Audit. You will arrive at the Start New Audit page if you do not have any audits in opened, findings or corrective actions status. You will arrive at Resume Audit page if you have audits in the opened, findings or corrective actions status.

Figure 5. Global Navigation Tabs

This page includes three global navigation tabs at the top: Audit Tasks, Checklists and Reports. A fourth tab, Administration, exists exclusively for the manager. A description of the four tabs is provided below:

1. Audit Tasks: This tab includes audit related tasks. The four tasks that can be accomplished using this tab are:

a. Start New Audit: Click on the Start New Audit link to start an audit. See Section 7 for details.

b. Resume Audit: Click on the Resume Audit link to continue working on an audit where you left off. See Section 9 for details.

c. Corrective Actions Approval: Click on the Corrective Actions link to approve the corrective actions provided by the department. See Section 12 for details.

d. Search Audits: Click on the Search Audits link to look for audits in any status. See Section 13 for details.

e. Delete Audits: Click on the Delete Audits link to delete audits. See Section 14 for details.

2. Checklists: Using this tab, you can perform the four checklist-related tasks listed below.

a. View Checklist: Click on the View Checklist link to view and print a checklist. See Section 15 for details.

b. Modify Checklist: Click on this link to modify a checklist. See Section 17 for details.

c. New Department Checklist: Click on this link to begin creating a checklist for a newly created department. See Section 19 for details.

d. Approve Checklist: This link is visible only to a manager. Click on this link to approve modified checklists sent by auditors for approval. See Section 23 for details.

3. Reports: This tab includes the four reports that can be generated by WebSAT.

a. Audit Report: Click on this link to generate a report on an audit. See Section 24 for details.

b. Department Assessment Report: Click on this link to generate a report on a department. See Section 25 for details.

c. Audit Planning Tool: Click on this link to plan a future audit. See Section 31 for details.

4. Administration: This tab includes the four administrative tasks that managers can perform.

a. Edit Auditors: Click on this link to add, modify or delete an auditor. See Section 32.1 for details on Edit Auditors.

b. Edit Departments: Click on this link to add, modify or delete a department. See Section 32.2 for details on Edit Departments.

c. Edit Audit Type: Click on this link to add, modify or delete an audit type. See Section 32.3 for details on Edit Audit Type.

d. Reassign Auditors: Click on this link to reassign an auditor for an audit. This link can be used when an auditor in charge of an ongoing audit is unwell and needs to be replaced. See Section 32.4 for details.

7 Start New Audit

7.1 Purpose

Click on Start New Audit link on the global navigation tab to access the Start New Audit page (see Figure 6) which allows you to start an audit on a department. Note that an auditor cannot start two audits on the same department.

Figure 6. Start New Audit Page

7.2 Task Details

To Start New Audit on this page (See Figure 6):

1. Audit Type Drop-Down Menu: Click on the Audit Type drop-down menu and choose the type of audit. The red star (*) next to this field indicates it is required in order to start a new audit.

2. Department Name Drop-Down Menu: Choose the department name from the drop-down menu provided. The red star (*) next to this field indicates it is required in order to start a new audit. The menu selection lists the departments currently providing services for the airline for the audit type selection.

3. Auditor Name: This is a label showing the name of the auditor who has logged into WebSAT.

4. Start Date: Click on the calendar icon next to the Start Date textbox to choose the audit start date. A pop up calendar (see Figure 7) will display dates of the current month. The back and forward arrow can be used to navigate from one month to another. The date can also be specified in the text box provided in the mm/dd/yyyy format.

Figure 7. Calendar Pop-up

5. Choose Auditor Type: Click on the Primary Auditor or Secondary Auditor radio buttons to start an audit as a Primary or Secondary Auditor respectively.

6. Submit: Click on the Submit button after all the required information has been provided to go to the Checklist Association page.

8   Checklist Association

8.1   Purpose

When a new audit is started in WebSAT, you will be taken to the Checklist Association page containing a table listing the template and the checklist revision used on the last audit performed on the department. It will also include those revisions made by the primary and secondary auditors and those revisions made for the department being audited. At the most one revision from each auditor, primary or secondary, will be shown.

The three fields, Audit ID, Audit Type and Auditor Name generated by WebSAT, provide information related to an audit. In Figure 8 below, for example, the audit ID is 38, the audit type is EMM, the department is Avionics and the name of the auditor in charge is Robin Steven.

In the Checklist Revision table, the Checklist Description column specifies the checklist revision number and the Approved Date.

Figure 8. Checklist Association Page

8.2   Task Details

The four tasks that can be completed on this page are:

1. Postpone Checklist Association: Click on the Later button, if you do not want to select a checklist for the audit at this point. You will then be taken to the Audit Details page (see Section 11). You can select a checklist revision for this audit the next time you access it or when you retrieve it through the Resume Audit page.

2. Submit Checklist Association: Click on the radio button next to the Revision column in the table to select a checklist revision. Click on the Submit button to associate this checklist with the new audit. This action will take you to the Audit Details page (see Section 11).

3. Preview Checklist: Click on the Preview Checklist link in the appropriate row to open a Microsoft Word window to view this version of the checklist.

4. Modify Checklist: Click on the Modify Checklist link in the appropriate row to modify the checklist using the Checklist Questions page (see Section 18). The auditors with the privilege from the manager can use this link to create a revision of either the template or the other checklists listed and can add, delete and modify questions to the revision. However, those auditors who do not have this privilege can only use this link to create a revision where they can only add question.

9   Resume Audit

9.1   Purpose

After you login, you will arrive at the Resume Audit page which lists all audits currently in opened, findings or corrective actions status.

Figure 9. Resume Audit Page

9.2 Task Details

The two tasks that can be completed on this page are:

1. Checklist Data Entry page for an audit: Click on the Audit ID link to proceed to Checklist Data Entry page.

2. Audit Details page for an audit: Click on the Audit Details tab to view an audit table with a list of audits identical to those in the Checklist Data Entry tab. Click on the Audit ID link to proceed to the Audit Details page to view that particular audit's department information.

The different fields in the audits table, as seen in Figure 9, are:

- *Audit ID*: In Figure 9, for example, there is one audit with audit IDs 38.
- *Department Name*: In Figure 9, audit 38 belongs to the department Avionics.
- *Status Name*: In Figure 9, the status name field for audit ID 38 is Opened (see Section 2.8 for Audit Statuses).
- *Start Date*: In Figure 9, the Start Date field shows the audit start date for audit ID 38 as 5 July 2006.

10 Checklist Data Entry

10.1 Purpose

Click on the Audit ID link on the Checklist Data Entry tab on Resume Audit page to access the Checklist Data Entry page (see Figure 10). This page allows you to enter audit information.

As seen in Figure 10, information related to an audit is provided at the top below the global navigation tabs. Specifically, for Audit ID 38 Robin Steven is listed as the primary auditor and no answers have been entered for the 11 questions for this audit. This audit of department Avionics began on 5 July 2006.

Below this general audit description is a list of all the questions from the checklist chosen from the Checklist Association page (see Section 8). Each Checklist Data Entry page has at most ten questions, each belonging to a process measure. The example in Figure 10 shows questions from the Administration process measures.

Figure 10. Checklist Data Entry Page

10.2 Task Details

The four tasks that can be completed on this page are:

1. Enter Answers: Click on one of the radio buttons provided below each question. If a YES radio button is selected, you can enter findings for the question by clicking on the Add Findings, Comments and Concerns link provided below each question as shown in Figure 10. This action will transform the link to Hide Findings, Comments and Concerns link and will display text fields for entering Findings, Comments and Concerns. Click on this link to hide all the text fields and entered information.

If the NO radio button is selected then fill the following fields (see Figure 11):

Figure 11. Checklist Data Entry page after NO is selected

a. ALI: Use the ALI drop-down menu to choose the possible impact on the aircraft of this NO.

Figure 12. Risk Matrix

b. OC Link: Click on the OC link to access a risk matrix to select the risk level for this NO as seen in Figure 12.

c. "What is this Link?": Click on the "What is this?" link that appears next to the ALI drop-down menu or OC link to open a pop-up window with information pertaining to ALI or OC as shown in Figure 13.

Figure 13. "What is this?" link pop up for ALI

d. Add Findings, Comments and Concerns: Enter information in the Findings, Comments and Concerns textboxes as seen in Figure 11. The Findings or Concerns text field must be completed when "No" response if provided.

2. Upload files: Click on the Browse button and use the Choose File dialogue box to locate the file you want to upload. Click on the Cancel button to close the dialogue box. Click on the Open button to select the file. Click on the Upload button to upload the file. You can upload only one file at a time. However, for a finding you may upload as many files you feel necessary.

3. Show All Findings: Click on the Show All Findings link to view a pop-up window with all findings entered for this audit.

4. Navigation Through the Checklist Data Entry Pages: The Checklist Data Entry page navigation options are available at the top and bottom of the page. This page can be navigated in the following two ways:

a. Navigation Drop-Down Menu and Go Button: Use the drop-down menu to navigate from one page to another as shown in Figure 10. For example, in Figure 10, to go to question 17, select 11-20 from the drop-down menu and click on the Go button.

b. Next and Previous Buttons: Click on the Previous or Next button to access the previous or next Checklist Data Entry page.

5. Save Information: Click on the Save and Return to Audit Details button to save the data entered for all questions on each page and to proceed to the Audit Details page.

6. Generate Report: Click on the Generate Report button at the top and bottom of each Checklist Data Entry page to begin the report generation for the audit. You will only be

able to send a report to the department only if all the questions have been responded to and all findings have been entered for each NO response. This action takes you to the Reports page to email the report to the department (see Section 24).

If you omit a question or fail to enter a finding, the dialogue box shown in Figure 14 will pop up; click on the OK button to return to the Checklist Data Entry page.
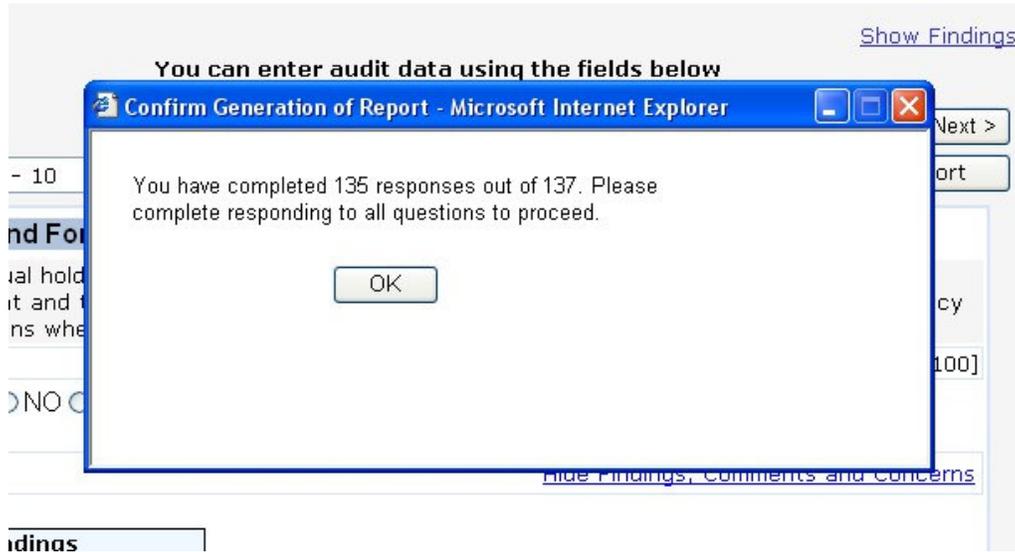
Figure 14. Generate Report confirmation pop-up dialogue box

11 Audit Details

11.1 Purpose

Audit Details page presents information pertaining to an audit selected in the Resume Audit page. This includes department information as well the audit relevant information as shown in Figure 15.

There are two ways in which you could arrive at the Audit Details page:
- From Checklist Association page using the Later or Submit button.
- From Resume Audit page, using the Audit Details tab link to click an audit ID.

1. Department Information: The department information column has department's name, ID, address, contact person name and title, contact phone number, fax number and e-mail address.

2. Audit Information: The audit information fields have the primary auditor name and ID, the name of the secondary auditor responsible for this audit, the audit ID, type of the audit, checklist revision associated with this audit, the current status of the audit, the start date and the end date of this audit. The End Date field will be automatically decided by the system and displayed when the audit reaches closed status. Click on the Preview link in the Checklist Revision field to view a printer friendly revision of the checklist that is

currently associated with this audit.

Figure 15. Audit Details Page

11.2 Task Details

The four tasks that can be completed in this page, as seen in Figure 15, are described below:

1. Select a Different Checklist for the Audit: Click on the Select a Different Checklist to this Audit button to change the checklist associated with the audit on the Checklist Association page (see Section 8).

2. Proceed to Checklist Data Entry Page: Click on the Enter Checklist Answers button to proceed to the Checklist Data Entry page to enter responses and audit findings (see Section 10).

3. Preview Checklist: Click on the revision number link in the Preview Checklist field to open a Microsoft Word window to view this version of the checklist.

4. Edit Department and Audit Information: Click on the Edit button to display the Edit Audit Details page and to modify the information provided in the Audit Details page as shown in Figure 16. Click on the Save button at the bottom of the Edit Audit Details page to save the modified information. Here you can change all the department fields occurring under Department Information except for the Department Name field. Click on the Add Another Contact link, at the lower left portion of the screen, to add an additional department contact information. You can have at most two contacts.

The only two fields that can be modified under Auditor Information are Secondary Auditor drop-down menu and Start Date. Select a secondary auditor from the drop-down menu to be designated as the secondary auditor for this audit. Information cannot be modified once the audit is in a closed status.

Figure 16. Edit Audit Details Page

12 Corrective Actions Approval

12.1 Purpose

Click on the Corrective Actions link on the global navigation tab to access the Corrective Actions page where all corrective actions status audits, for which you are a primary or secondary auditor, are presented in a table (see Figure 17). Once the department addresses the findings documented in the audit report in the corrective actions form, use the Corrective Actions Approval page to record if the department's corrective actions are acceptable. In Figure 17, the audit 38 started on 5 July 2006 for Avionics of audit type EMM is awaiting corrective action approval.

Click on the Audit ID link corresponding to the audit you intend to work on to access the Corrective Actions Approval page as shown in Figure 18.

Figure 17. Corrective Actions Page

Figure 18. Corrective Actions Approval Page.

12.2 Task Details

The corrective action approval in this page can be completed as follows:

1. Enter Department Manager Name: Enter the department manager name who is responsible for the corrective actions in the Enter Department Manager Name field.

2. Expected Date of Corrective Action Return: This field displays the date that was specified in the audit report. If the corrective actions were not acceptable and if the department has been asked to rework them, the revised due date must be entered in this text field.

3. Audit Findings: Each audit finding from the audit report is presented. Below each audit finding, a View Corrective Action Form link is provided. Click on this link to view the corrective actions addressed by the department and subsequently, indicate if they are satisfactory or not.

View Corrective Action Plan: Click on the View Corrective Action Plan link to open the Corrective Action Plan (see Figure 19) where you can view the corrective actions addressed by the department for that finding and indicate if it is approved or not. You may enter your comments for each corrective action form using the textbox provided. Click on the Cancel button to return to the corrective actions without saving the data entered.

Click on the YES or NO radio button at the lower right portion of the page to approve or disapprove the corrective action, respectively. Click on the Save and Return to Corrective Action Approval button to save the data entered on corrective actions plan page and to return to the Corrective Actions Approval page. Click on the Print button to view a printer friendly PDF version of this corrective action plan. Use the browser print option to print this page.

Figure 19. Corrective Action Plan.

5. Email Corrective Action Approval: Click on the Email Corrective Actions button to send the Corrective Action back to the department. An email will be sent to the department notifying him of the review you have performed and this will also change the message link in the Corrective Action Approval column to Corrective Action Sent. You can still view the Corrective Action Plan and the decisions made by you from the Corrective Actions page.

6. Previous and Next Buttons: The Previous button appears on subsequent pages where more than five findings. Click on this button to navigate to previous pages. At the most 5 findings will be displayed in the Corrective Actions Approval page. If there are more than 5 findings for an audit then use the Next button to navigate.

13 Search Audits

13.1 Purpose

Click on the Search Audits link on the global navigation tab to access the Search Audits page which allows you to search audits by specifying the appropriate criteria as shown in Figure 20. Enter the search criteria and click on the Search button to view a list of audits matching the search criteria. Select a particular audit by clicking on the audit ID and view the audit data for that particular audit.

Figure 20. Search Audits Page

13.2 Task Details

To search for an audit, fill any one of the fields listed below:

1. Audit Type Drop-Down Menu: Click on the Audit Type drop-down menu to select an audit type.

2. Auditor Name Drop-Down Menu: Click on the Auditor Name drop-down menu to select an auditor.

3. Department Name Drop-Down Menu: Click on the Department Name drop-down menu to select a department.

4. Auditor Status Drop-Down Menu: Click on the audit status drop-down menu to select an audit status.

4. Date Fields: This feature helps you to specify a particular date range to search for audits. You may enter the From and To date fields by typing in the date in the mm/dd/yyyy format OR you could click on the calendar icon next to the From and To text field to select a date from the Calendar Pop up. The pop up calendar will display dates of the current month. Select the month using the drop-down menu. The back and forward arrow can be used to navigate from one year to another as shown in Figure 21.

Figure 21. Calendar Pop up

14 Delete Audits

14.1 Purpose

Click on the Delete Audits link on the global navigation tab to access the Delete Audits page which allows you to delete audits by specifying the appropriate criteria as shown in Figure 22. Enter the search criteria and click on the Delete button to view a list of audits matching the search criteria. Select a particular audit by clicking on the audit ID and view the audit data for that particular audit.

Figure 22. Delete Audits Page

14.2 Task Details

To delete an audit, you need to complete the following tasks:

1. Provide Search Criteria: To locate the audits you want to delete, fill any one of the fields listed below:

a. Audit Type Drop-Down Menu: Click on the Audit Type drop-down menu to select an audit type.

b. Auditor Name Drop-Down Menu: Click on the Auditor Name drop-down menu to select an auditor.

c. Department Name Drop-Down Menu: Click on the Department Name drop-down menu to select a department.

d. Auditor Status Drop-Down Menu: Click on the audit status drop-down menu to select an audit status. If you logged in as a manager, you can see all the audit statuses except for closed, which allows you to delete audits that are in any status except for closed. However, if you logged in as an auditor, you can only see Opened and Findings statuses.

e. Date Fields: This feature helps you to specify a particular date range to search for audits. You may enter the From and To date fields by typing in the date in the

mm/dd/yyyy format OR you could click on the calendar icon next to the From and To text field to select a date from the Calendar Pop up. The pop up calendar will display dates of the current month. Select the month using the drop-down menu. The back and forward arrow can be used to navigate from one year to another.

Figure 23. Audit Deletion Page

2. Search Audits: Click on the Search button to locate audits based on the criteria specified.

3. Delete Audits: To delete audits, you must complete the following tasks (see Figure 23):

a. Audit Selection: Click on checkboxes under the Select column to choose audits you would like to include for this analysis. For faster selection, click on the Select All button to choose all the audits listed in the Audits table. The Select All button changes to Uncheck All. Click on Uncheck All to uncheck all the selected items.

b. Audit Deletion: Click on the Delete button to delete the chosen audits. You will see a feedback message on the page confirming the deletion.

15 View Checklist

15.1 Purpose

Click on the View Checklist link on the global navigation tab to access the View Checklist page (see Figure 24) which allows you to view the checklist revisions for the audits you are currently working with.

Figure 24. View Checklist Page

15.2 Task Details

The tasks that can be completed on this page are:

1. View Checklist of an Ongoing Audit: Click on the Revision ID in the Revision column of the Checklist Revisions table on the top half of the page to view the checklist for a current audit. In Figure 24, the Revision 1 checklist is used for audit ID 38 of department name Avionics. The audit start date and status for this is 5 July 2006 and Opened, respectively.

2. View Other Checklist Revisions: To view all the checklist revisions associated with an audit type, fill the following fields on the lower half of the page:

a. Audit Type Drop-Down Menu: Select an audit type using the Audit Type drop-down menu. The red star (*) next to this field indicates it is required in order to view a

checklist.

b. Department Name Drop-Down Menu: Use the Department Name drop-down menu to select a department whose checklists you would like to view.

c. View Checklist Button: Click the View Checklist button to access the Checklist Results page where you can choose the checklist to access the Checklist Details page.

16 Checklist Details

16.1 Purpose

The Checklist Details page can be accessed only from the View Checklist page, as shown in Figure 25. At the top of the page below the global navigation tabs the Audit Type and Revision fields are provided. The body of the checklist primarily consists of the checklist questions and the associated answer types. The questions will be displayed categorically. The categories will be displayed to the left and the corresponding process measures will be displayed at the right, in the row before the questions.

In Figure 25, the checklist displayed belongs to department avionics and revision number 1. The 10 questions belong to process measure Administration.

Figure 25. Checklist Details Page

16.2 Task Details

The three tasks that can be accomplished in this page are:

1. View Printer Friendly Page: Click on the Printer Friendly link, to view the checklist as a PDF file.

Figure 26. Print Preview

2. View Another Checklist: Click on the View Another Checklist button to go back to the View Checklist page to choose and view a different checklist.

3. Navigate Between Checklist Pages: Click on the Next button to view the 10 questions in the next page. Click on the Previous button to view the 10 questions in the previous page.

17 Modify Checklist

17.1 Purpose

Click on the Modify Checklist link on the global navigation tab to access the Modify Checklist page which allows you to modify a checklist (see Figure 27).

Figure 27. Modify Checklist Page

17.2 Task Details

The three tasks that can be completed on this page, as shown in Figure 27, are:

1. Continue Working on Checklist Modification: Click on the Select link in the leftmost column of the table on the top half of the page to view the checklist(s) you are currently modifying. This allows you to continue the modification process of the checklist from where you had left off. In Figure 27, the template for department Acquisitions from Syracuse, NY of audit type EMM is currently being modified.

2. Modify Other Checklists: To begin a checklist modification, fill the fields in the Select a Checklist to Modify section at the middle of the page. Use this section to create a revision based on the template.

a. Audit Type Drop-Down Menu: Select an audit type using the Audit Type drop-down menu. The red star (*) next to this field indicates that it is a required in order to modify a checklist. The audit type already chosen for an ongoing modification by you will not be displayed again in this audit type drop-down menu.

b. Department Name Drop-Down Menu: Select a department using the Department Name drop-down menu. The red star (*) next to this field indicates that it is a required in order to modify a checklist. The department who is already being modified by you will not be displayed again in this audit type drop-down menu.

c. Go Button: This button will lead you to Checklist Questions page where the entire checklist will be displayed.

3. Template Modification: The Template Modification section will be available only to those auditors who have been given the privilege to modify the template. Select an audit type from the drop-down menu and click Go to access the Checklist Questions page where the entire checklist will be displayed

18 Checklist Questions

18.1 Purpose

The Checklist Questions page allows you to modify the checklist selected in the Modify Checklist page. This page can be accessed from both the Modify Checklist and the Checklist Association pages. The auditors accessing checklists from Template Modification section in the Modify Checklist page can add, delete and modify questions. However, those accessing this page from the Modify Other Checklist section can add, delete and modify questions to the checklist only if they have been provided the privilege by the manager. Those auditors who do not have the privilege can only add questions to the revision they created.

Figure 28 shows the template modification process. The top of the page shows that the checklist currently being created is based on revision 1, last modified by Robin on 17 May 2006. The process measure Administration is displayed immediately above the group of questions.

Figure 28. Checklist Questions Page

18.2 Task Details

The four tasks that can be completed on this page are:

1. Modify, Insert or Delete a Question: To modify, add or delete questions, click on the Modify, Insert or Delete link below each question (see Figure 28).

A. Modify a Question: If you have the modification privileges, you will be able to alter the contents on the checklist directly (see Figure 29) where you can modify a question or its reference. Click the Cancel button to return to the Checklist Questions page without saving the changes currently made.

Figure 29. Checklist Questions Page -Modify Question

The four tasks that can be completed using this window are (see Figure 29):

a. Question Reference Textbox Field: Use this field to change the question reference, which are standards an audit question addresses.

b. Question Textbox Field: Use this field to rephrase the audit question in the checklist.

c. Save Button: Click on the Save button to save the changes made on the Checklist Questions page.

B. Insert a Question: Click on the Insert link to insert a new question below the link (see Figure 30). Click on the Save button to save the changes made on the Checklist Questions page.

Figure 30. Checklist Questions Page- Insert New Question

C. Delete a Question: Click on the checkbox next to the question number and click on the Delete button at the bottom of the page to delete a question.

2. Navigation Options: The Checklist Question pages can be navigated in the following ways:

a. *Modify Another Checklist*: Click on the Modify Another Checklist link on the top left of the page to go back to the Modify Checklist page.

b. *Next and Previous Buttons*: Click on the Next and Previous buttons at the bottom of the page to navigate between the Checklist Questions pages.

4. Submit to Manager Button: Click on the Submit to Manager button to send the modified checklist for manager approval. The checklist will be available in WebSAT for audits only after the manager has approved it.

19 New Department Checklist

Click on the New Department Checklist link on the global navigation tab to access the New Department Checklist page. This page (see Figure 31) helps you to create a new checklist for a newly created department.

Figure 31. New Department Checklist Page

Figure 31 shows that checklist creation process can begin for the newly created department Crew Safety. The Action field in the table displays either Create Checklist. The Create Checklist link is shown when the process of checklist creation hasn't begun. A Continue Creation link is shown when the process of checklist creation is to be resumed.

To begin creating a new checklist on this page (see Figure 31), click on the link in the Action field to go to the Choose Section page.

Note that this page can be used only for newly created departments. Only the manager has the privilege to create new departments. For modification of existing checklist, use Modify Checklist on the Checklist tab (see Section 17). Also note that once you begin working on checklist creation for a new department, no other auditor will see the new department displayed in this table. Thus, checklist creation process for a department will only be associated with you.

20 Choose Section

20.1 Purpose

The Choose Section page allows you to choose an existing section. The Choose Section page seen in Figure 32 can be accessed only while creating a new checklist. You can access this page only the first time you begin checklist creation from the New Department Checklist page (see Section 19). Click on the Cancel button to return to the page to you came from without saving the changes.

Note that this page can be used only for choosing one section at a time. As seen in Figure 32, the checklist creation process is for department Crew Safety.

Figure 32. Choose Section Page

20.2 Task Details

To choose a section in this page can be done in two ways as shown in Figure 32:

1. Single Section Checklist: Click on the One Section radio button if the checklist will contain only one section. Click on the Proceed to Checklist Summary button to access the Checklist Summary page where by default 10 blank questions will be in the section.

2. Multiple Section Checklist: Click on the Multiple Section radio button and use the drop-down menu to choose a section. Click on the Proceed to Checklist Summary button to access the Checklist Summary page where by default 10 blank questions will be in the section.

21 Checklist Summary

21.1 Purpose

The Checklist Summary page, as shown in Figure 33, is useful in displaying the different section and the numbers of questions in each section of the checklist. This page can be accessed from the Choose Section page and Question Details page only. As seen in Figure 33, the checklist creation process is for department Crew Safety.

Figure 33. Checklist Summary Page

21.2 Task Details

The five tasks that can be completed in this page, as shown in Figure 33, are:

1. Edit Questions to a Section: Click on the link in the Section field to proceed to the Question Details page to add or remove questions. The field displays the sections created so far. It also displays in parenthesis the number of questions existing in each section

2. Delete a Category and its Questions: Check the checkbox next to the Section link in the Delete column and click on the Delete button at the bottom of the page, to delete the section. Deleting a section will also lead to the deletion of all the questions in the section.

3. Add a Section: Click on the Add Section button to access to the Section page for adding a section.

4. Preview a Checklist: Click on the Preview Checklist button to preview the checklist currently being created. Clicking this button will display a pop up showing the checklist with the sections, questions and references.

5. Submit to Manager Approval Button: Click on the Submit to Manager button to send the checklist to the manager for approval. Note that the checklist will be used by WebSAT for audits only after the manager has approved the checklist.

22 Question Details

22.1 Purpose

The Question Details page displays the questions for the current section and allows you to add and delete questions. You can access this page from the Checklist Summary page only. As seen in Figure 34, the checklist creation process is for department Crew Safety.

Figure 34. Question Details Page

22.2 Task Details

The four tasks that can be completed in this page, as shown in Figure 34:

1. Editing Questions: The tasks in this section are similar to those in Modify Checklist page. See Section 18.1.1 (Modify a Question).

2. Delete a Question: Check on the checkboxes next to Question number field and click on the Delete button to delete the selected questions.

3. Save and Add New Question: Click on the Save and Add New Question button to save current changes and add a new question to the current list of questions.

4. Save and Proceed to Summary Page: Click on the Save and Proceed to Summary Page button to save current changes and return to the Checklist Summary page.

23 Approve Checklist

Click on the Approve Checklist link on the global navigation tab to access the Approve Checklist page which allows you to view, modify or approve a checklist awaiting approval. You can only view this page if you log in as a manager. The Approve Checklist link will not be visible to an auditor.

The Approve/Deny/Modify Checklist table, on the Approve Checklist page (Figure 35), lists all checklists awaiting the manager's approval. These checklists have been modified by other auditors based on their requirements. In Figure 35, the table contains a checklist of department Warehouse created by Robin Steven awaiting manager approval.

Figure 35. Approve Checklist

23.1 Task Details

The four tasks that can be completed in this page are:

1. Approve Checklist: Click on the Approve button in the row of department you would like to approve the checklist for. This will open an Approval Comments textbox where you can type in your comments on the approval of the checklist.

2. Deny Checklist: Click on the Deny button in the row of department you would like to deny the checklist for. This will open a Deny Checklist Comments textbox where you can type in your comments on the denial of the checklist.

3. Preview the Checklist: Click on Preview button in the appropriate row to open the checklist version in a new window.

4. Modify the Checklist: Click on Modify button in the appropriate row to go to the Checklist Questions page for checklist modification.

24 Audit Report

24.1 Purpose

Click on the Audit Report link in the global navigation tab to access the Audit Report page (see Figure 36) which allows you to generate audit reports. Audit Report is a summary of an audit. It displays the findings, comments, concerns and additional findings entered for the audit.

In order to generate a report for an audit, all the responses must have been entered into and findings for each NO must have been entered. In addition to report generation, this page allows you to either send the report to the department or any other individual.

Figure 36. Audit Report Page

24.2 Task Details

To choose an audit for generating an audit report, fill the following fields:

1. Auditor Name Drop-Down Menu: Click on the Auditor Name drop-down menu to select an auditor. You can select the name of any internal auditor to access audits performed by him/her for generating a report. Note for audits where you are not the primary or secondary auditor, you will be able to generate reports only if they are in closed status.

2. Audit ID Textbox: Enter audit ID to identify a specific audit for generating an audit report.

3. Audit Type Drop-Down Menu: Click on the Audit Type drop-down menu to select the audit type of the audit you intend to generate a report.

4. Department Name Drop-Down Menu: Click on the Department Name drop-down menu to select a department name to identify the audit you intend to generate a report.

5. Search Button: Click on the Search button to access the Search Results page which allows you to view the search results on the Search Results table depending on the criteria specified in the Audit Report page.

Figure 37. Search Results Page

      Click on the Audit ID link to generate audit reports for specified audit (see Figure 37). This action will take you to the Generate Report step of Reports page or you will see a dialogue box showing you the status of answered responses on the audit (See Figure 38).

      You will only be able to send a report to a department if all the questions have been responded to and all findings have been entered for each NO response, else a dialogue box is shown (see Figure 19). If you omit a question or fail to enter a finding, the dialogue box shown in Figure 38 will pop-up; click on the OK button to return to the Checklist Data Entry page. The purpose of the dialogue box is to let you know how many questions have been attempted for the chosen audit.

If you have entered all the audit responses for the audit and then click on the Audit ID link in the Search Results table, you will see the Generate Report step of Reports page. Note if you are attempting to generate a report on an audit completed by another auditor you will be shown only those audits in the closed status.
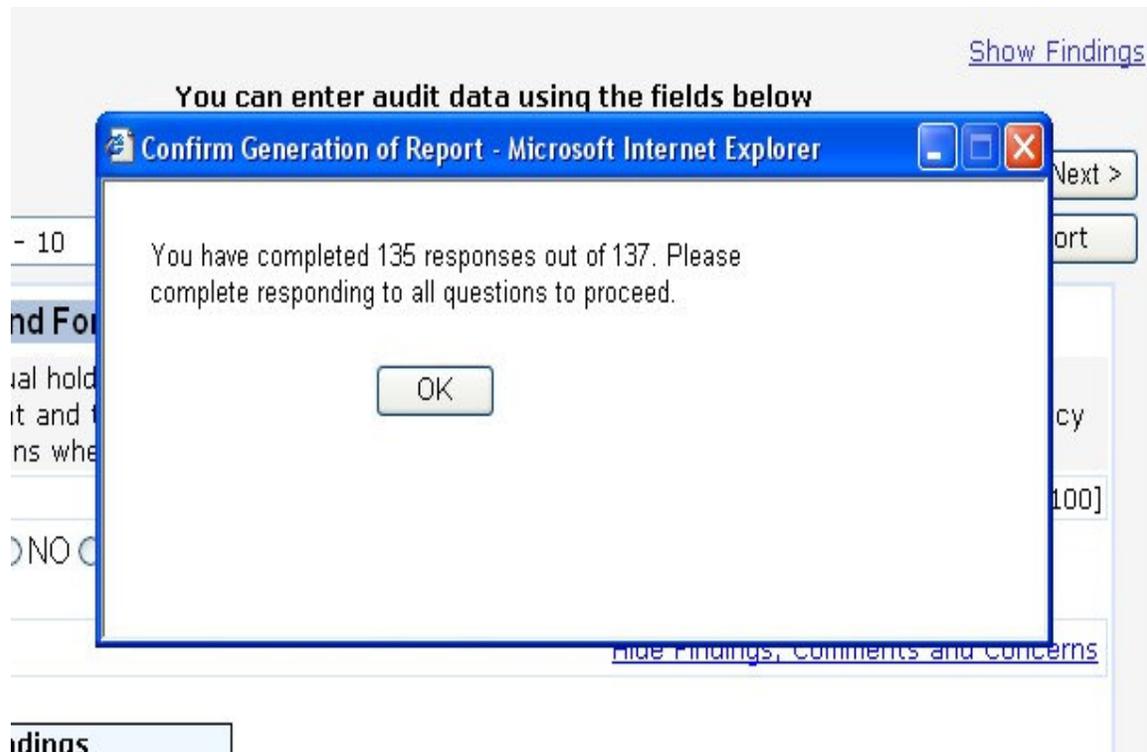
Figure 38. Confirmation Dialogue Box

The fields displayed in the Generate Report step of Reports page depends on if any information from the audit exist in the fields stated below. To complete the Generate Report step of Reports page (see Figure 39), you may fill the following fields:

1. Email Message (Letter with Discrepancies) Checkbox: Check the Email Message (Letter with Discrepancies) checkbox to include email message in the report to be sent to the department where the email draft would assume the case where discrepancies exist in the audit.

2. Email Message (Letter with no Discrepancies) Checkbox: Check the Email Message (Letter with no Discrepancies) checkbox to include email message in the report to be sent to the department where the email draft would assume the case where no discrepancies exist in the audit.

3. Findings Checkbox: Check the Findings checkbox to include audit findings with the audit report.

4. Comments Checkbox: Check the Comments checkbox to include audit comments with the audit report.

5. Concerns Checkbox: Check the Concerns checkbox to include audit concerns with the audit report.

6. Additional Findings Checkbox: Check the Additional Findings checkbox to include audit's additional findings with the audit report.

7. Submit Button: Click on the Submit button to go to the Email Report Step of the Reports page.

Figure 39. Generate Report – an example

The Email Report step of the Reports page is accessed from the Generate Report step of Reports page. This page (see Figure 40) displays the email content, Findings, Comments, Concerns, Additional Findings and attachments. Click on the Cancel button to return back to the Audit Report page. The tasks that can be completed in this page are:

Figure 40. Screenshot 1 for e-mail information

1. Insert Email Addresses: This task can be completed in two ways.

a. Using the Insert Addresses Link: Click on the Insert Addresses link, immediately above the To field, to insert e-mail addresses of individuals to email the audit report. Click on the Cancel button to get back to the Email Report page. Click on the Insert Addresses link to display a pop-up (see Figure 41) where you can choose an email address to be inserted by checking the checkboxes and clicking on Insert Checked Contacts.

Figure 41. Option to insert e-mail addresses

b. To and CC Text Boxes: Use these two textboxes to enter email IDs.

2. Subject Textbox: Use the Subject textbox to enter a subject title for the audit report.

3. Message Draft Message: This draft message can be edited to suit the audit requirements (see Figure 40 and 52).
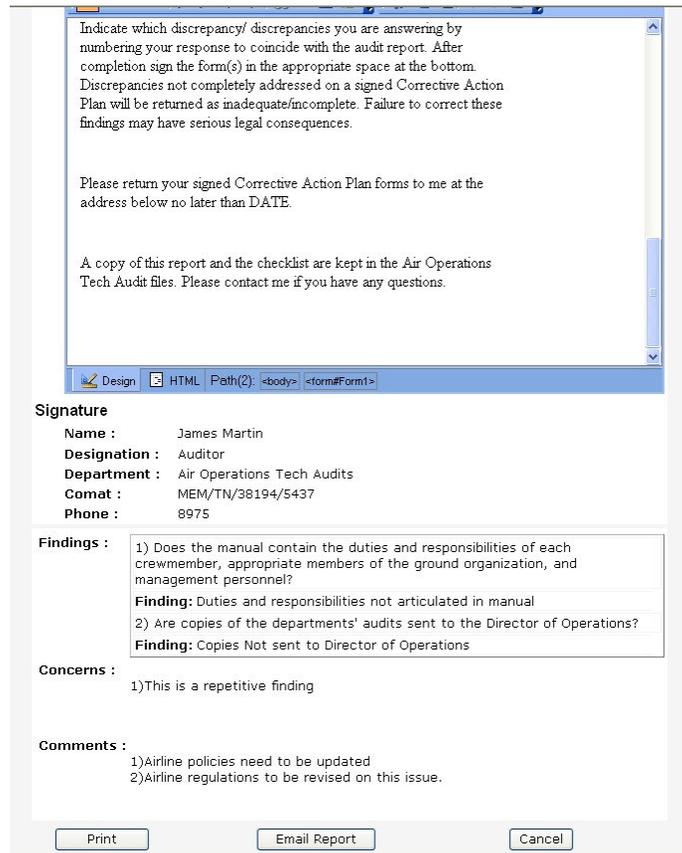
Figure 42. Screenshot 2 for e-mail information

3. Print Button: Click on the Print button to either open the report or save it on the work terminal (see Figure 43).
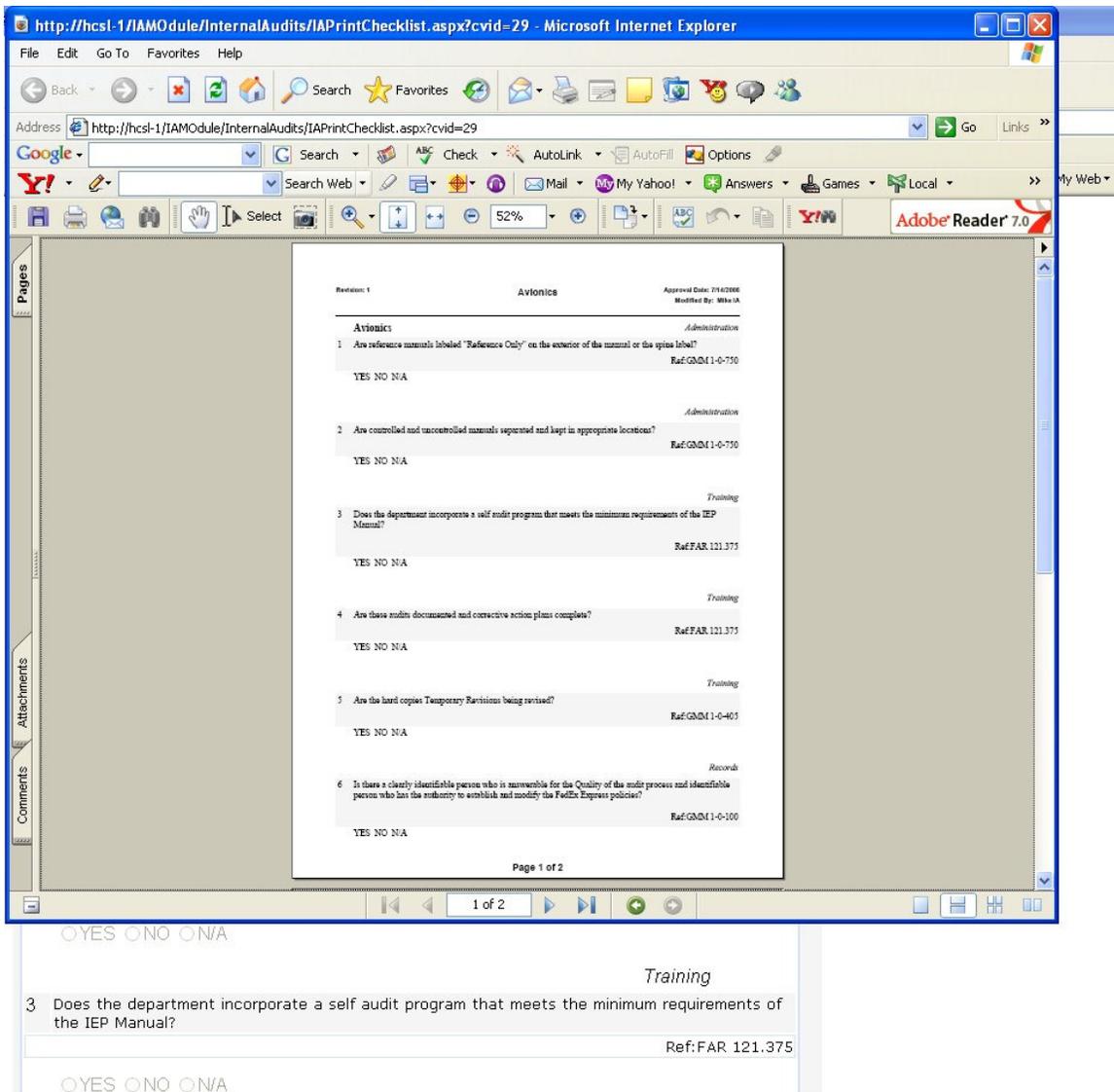
Figure 43. Opening or Saving an audit report

4. Email Report Button: Click on the Email Report button to email the report to the department. A message will be displayed saying that the audit report has been successfully sent to the department.

25 Department Assessment Report

25.1 Purpose

Click on the Department Assessment Report link on the global navigation tabs to access the Department Assessment Report page seen in Figure 44. The Department Assessment Report page evaluates the performance of a department for a specific audit, or for several audits over a period of time.

Figure 44. Department Assessment Report Page

25.2 Task Details

To identify the audits and choose the contents of the Department Assessment Report, fill the following fields:

1. Audit Type Drop-Down Menu: Choose the Audit Type from the drop-down menu. The red star (*) next to this field indicates that this is required. The menu lists the departments currently providing services for the airline.

2. Department Name Drop-Down Menu: Click on the Department Name drop-down menu and choose the department. This drop-down menu will display the associated departments. Choose All Applicable in the drop-down menu to include all the audit types the department may be associated with.

3. Audit Date: This feature helps you to specify a particular date range to search for audits. You may enter the From and To date fields by typing in the date in the mm/dd/yyyy format OR you could click on the calendar icon next to the From and To text field to select a date from the pop-up calendar. The pop-up calendar will display

dates of the current month. Select the month using the drop-down menu. The back and forward arrow can be used to navigate from one year to another as shown in Figure 45. Note that if the audit dates are not chosen, WebSAT will default the search to audits in the last five years.

Figure 45. Calendar Pop-up

4. Report Analysis Choices: The Report Analysis Choices field includes the following checkboxes as shown in Figure 44:

- *Department Analysis by Audit Checkbox*: Check the Department Analysis by Audit checkbox to view department analysis for each audit.

- *Audit Duration Distribution Checkbox*: Check the Audit Duration Distribution checkbox to view duration of the various audits conducted on the department.

- *Department Analysis for all audits Checkbox*: Check the Department Analysis for all audits checkbox to view department analysis for all audits for each audit type.

- *Response Rate Line Graph Checkbox*: Check the Response Rate Line Graph checkbox to view line graph comparing the current audit response rates with predicted response rate.

- *Process Measure Distribution (Aggregated) Checkbox*: Check the Process Measure Distribution (Aggregated) checkbox to view a pie chart of the aggregated process measure distribution.

- *Process Measure Distribution (Individual) Checkbox*: Check the Process Measure Distribution (Individual) checkbox to view pie charts for process measure distribution of each individual process measure.

- *Aircraft Level Impact Checkbox*: Check the Aircraft Level Impact checkbox to view the aircraft level impact distribution.

- *Organizational Categories Checkbox*: Check the Organizational Categories checkbox to view the organizational categories distribution.

5. Submit: Click on the Submit button after all the required information has been provided to go to the Audit Selection page.

26 Audit Selection

26.1 Purpose

The Audit Selection page, as shown in Figure 46, displays the different audits matching the criteria specified in the Department Assessment Report page. You can access this page only from the Department Assessment Report page.

The page begins by identifying the criteria chosen in the Department Assessment Report page. As seen in Figure 46, the Audit Selection page is displaying audits of department GOCC from 15 July 2001 to 15 July 2006. The process measures applicable for this analysis are shown in the Process Measures field.

Figure 46. Audit Selection Page

26.2 Task Details

The two tasks that can be completed from this page, as shown in Figure 46, are:

1. Audit Selection for Analysis: Click on checkboxes under the Select column to choose audits you would like to include for this analysis. For faster selection, click on the Select All button to choose all the audits listed in the Audits table. The Select All button

changes to Uncheck All. Click on Uncheck All to uncheck all the selected items. Click on the Perform Analysis button to go to the next page depending on your choices in the Reports Analysis field in the Department Assessment Report page (see Section 25).

2. Back to Department Assessment Report page: Click on the Back button to go back to the Department Assessment Report page.

27 Department Analysis by Audits

27.1 Purpose

The Department Analysis by Audits page, as shown in Figure 47, displays the department analysis for each audit chosen in the Audit Selection page. You can access this page only if the Department Analysis by Audits checkbox in the Report Analysis Choices field in the Department Assessment Report page is checked.

The page begins by identifying the criteria chosen in the Department Assessment Report page. As seen in Figure 47, the Department Analysis by Audits page is displaying audits of department GOCC from 15 July 2001 to 15 July 2006. The process measures applicable for this analysis are shown in the Process Measures field. The number of audits selected for this analysis is 3.
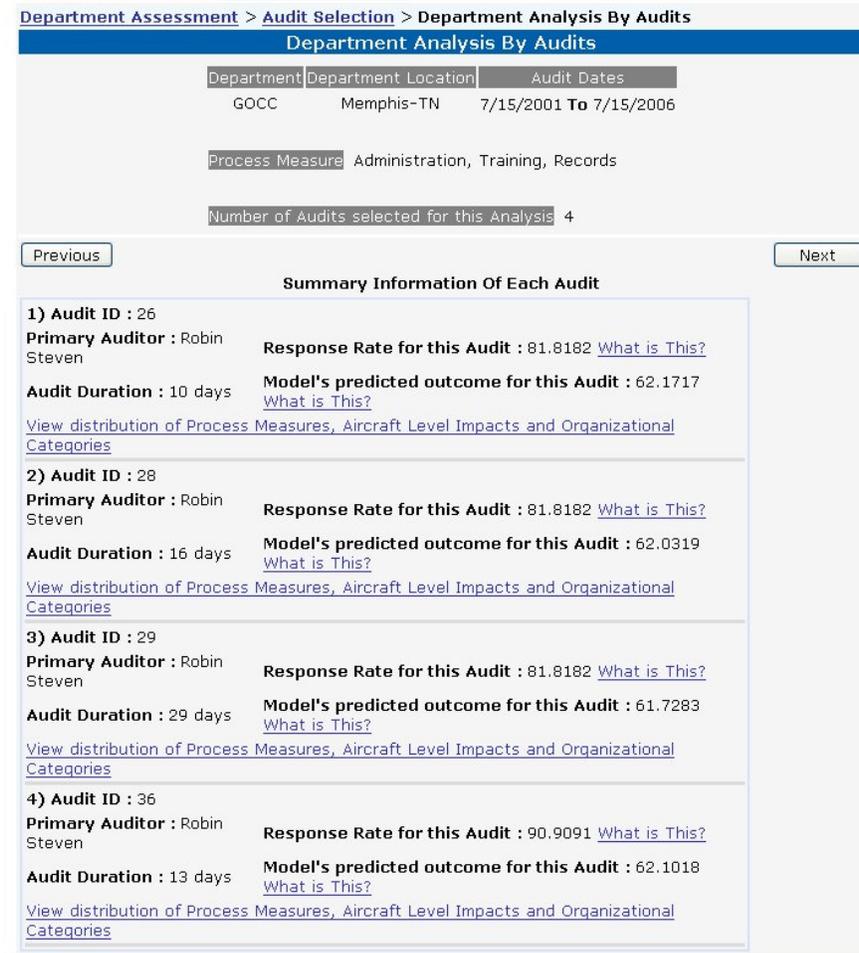
Figure 47. Department Analysis by Audits Page

27.2 Field Description

The various fields in the Department Analysis by Audits page, as shown in Figure 47, are:

1. Summary Information of Each Audit table: The Summary Information of Each Audit table includes the various audits selected in the Audit Selection page. Each row in this table contains analysis of an audit.

As seen in Figure 47, for Audit 26 with primary auditor Robin and audit duration of 10 days, the response rate for this audit is 81.81 percent. This means that if there were 100 questions in this audit, there were approximately 81 YES responses. The Model's Predicted Outcome for this Audit is the percentage YES predicted using a Multi Level Logistic Regression model embedded in WebSAT which performs analysis based on historical data. The model's predicted outcome for this audit is 62.17 percent. This means that based on historical evidence and considering all the various parameters in the model, it predicts an audit response rate of approximately 62 YES for every 100 questions.

2. View Distribution of Process Measures, Aircraft Level Impact and Organizational Categories Link: Click on the View Distribution of Process Measures, Aircraft Level Impact and Organizational Categories link to view the pie chart distribution of process measures, aircraft level impact and organizational categories (see Figure 48).
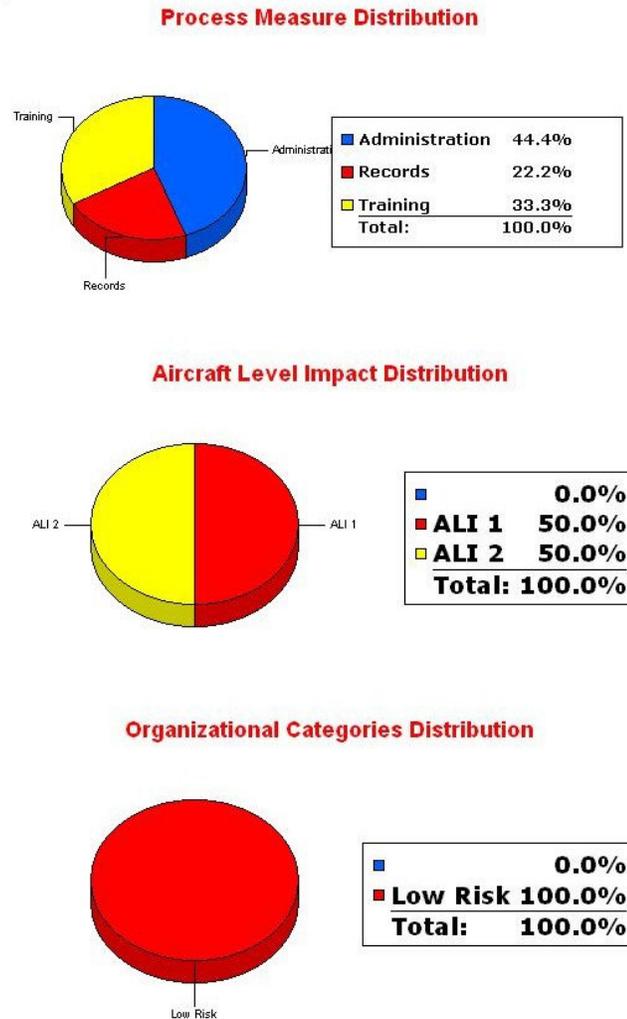
Figure 48. Distribution of Process Measures, Aircraft Level Impact and Organizational Categories for an audit

3. Previous and Next Button: Click on the Previous and Next button to navigate to the other pages.

28 Audit Duration Distribution

The Audit Duration page, as shown in Figure 49, displays the time taken to complete each audit chosen in the Audit Selection page. You can access this page only if the Audit Duration checkbox in the Report Analysis Choices field in the Department Assessment Report page is checked.

The page begins by identifying the criteria chosen in the Department Assessment Report page. As seen in Figure 49, the Audit Duration page is displaying audits of department GOCC from 15 July 2001 to 15 July 2006. The process measures applicable for this analysis are shown in the Process Measures field. The number of audits selected for this analysis is 4.
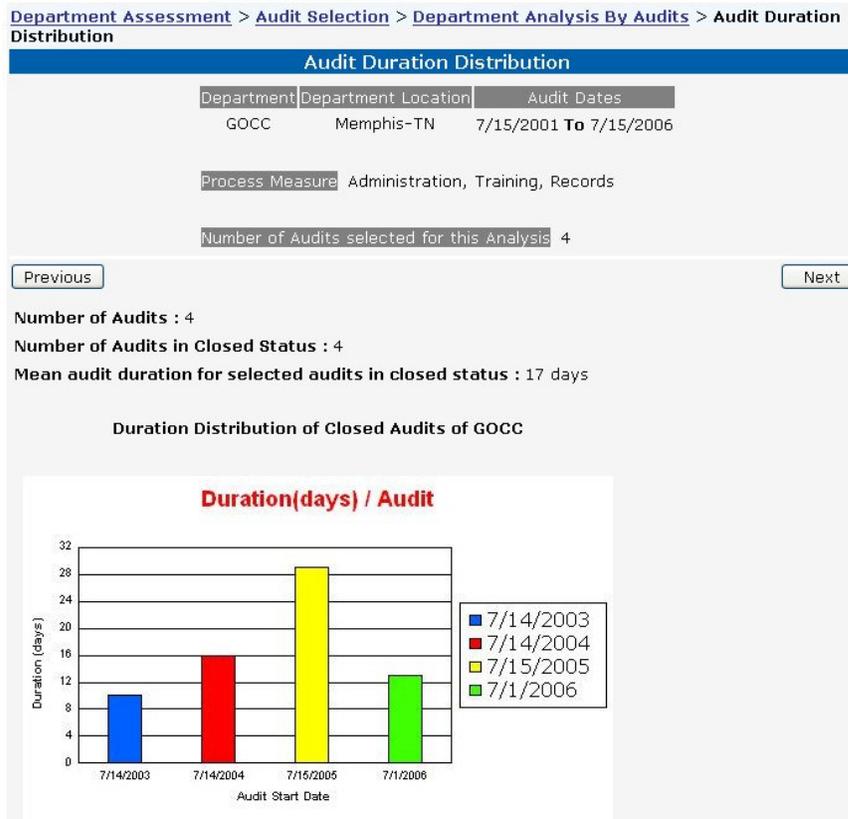
Figure 49. Audit Duration Distribution Page

In Figure 49, the Audit Duration Distribution section begins by identifying the number of audits used from the Audit Selection page as 4 of which all are in closed status. The mean audit duration for 3 audits in closed status is 17 days which indicates that on an average the audits took approximately 17 days to complete. This section also displays a bar chart with the audit durations as the Y axis and the different audits in the X Axis. Click on the Previous and Next button to navigate to the other pages.

29 Department Analysis for all Audits

The Department Analysis for all Audits page, as shown in Figure 50, displays the department analysis for all audits chosen in the Audit Selection page. You can access this page only if the Department Analysis for all Audits checkbox in the Report Analysis Choices field in the Department Assessment Report page is checked.

The page begins by identifying the criteria chosen in the Department Assessment Report page. As seen in Figure 50, the Department Analysis for all Audits page is

displaying audits of department GOCC from 15 July 2001 to 15 July 2006. The process measures applicable for this analysis are shown in the Process Measures field. The number of audits selected for this analysis is 4.
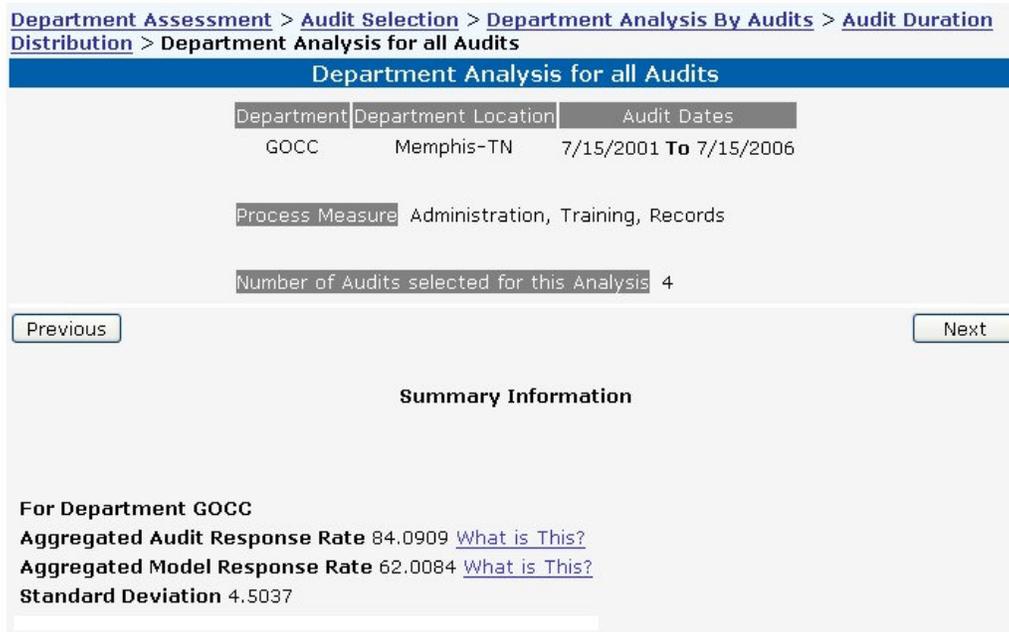
Figure 50. Aggregated Audit Information Page

In Figure 50, the Summary Information section that for the department fuel, the Aggregated Audit Response Rate is 84.09 percent. This means that the average response rate is approximately 84 YES responses for every 100 questions in an audit.

The Aggregated Model Response Rate using the Multilevel Logistical Regression model is 62 percent. The Aggregated Model Response Rate is the percentage Yes predicted for all the audits of a particular department using a Multi Logistic Regression model embedded in the system which performs analysis based on historical data. Standard Deviation is a measure of the average distance of the audit response rate from the aggregated audit response rate. Click on the Previous and Next button to navigate to the other pages.

30 Department Assessment Graphs

The different graphs displaying trends and distribution of the department data are explained below:

30.1 Response Rate Graph

The Response Rate Graph page, as shown in Figure 51, displays the trend on department's performance in terms of audit response rate. You can access this page only if the Response Rate Graph checkbox in the Report Analysis Choices field in the

Department Assessment Report page is checked.

The page begins by identifying the criteria chosen in the Department Assessment Report page. As seen in Figure 51, the Response Rate Graph page is displaying audits of department GOCC from 15 July 2001 to 15 July 2006. The process measures applicable for this analysis are shown in the Process Measures field. The number of audits selected for this analysis is 4.

The red line in the graph is the response rate of the audits chosen in the Audit Selection page while the blue line is the Model's predicted response rate generated from the different parameters of each audit.
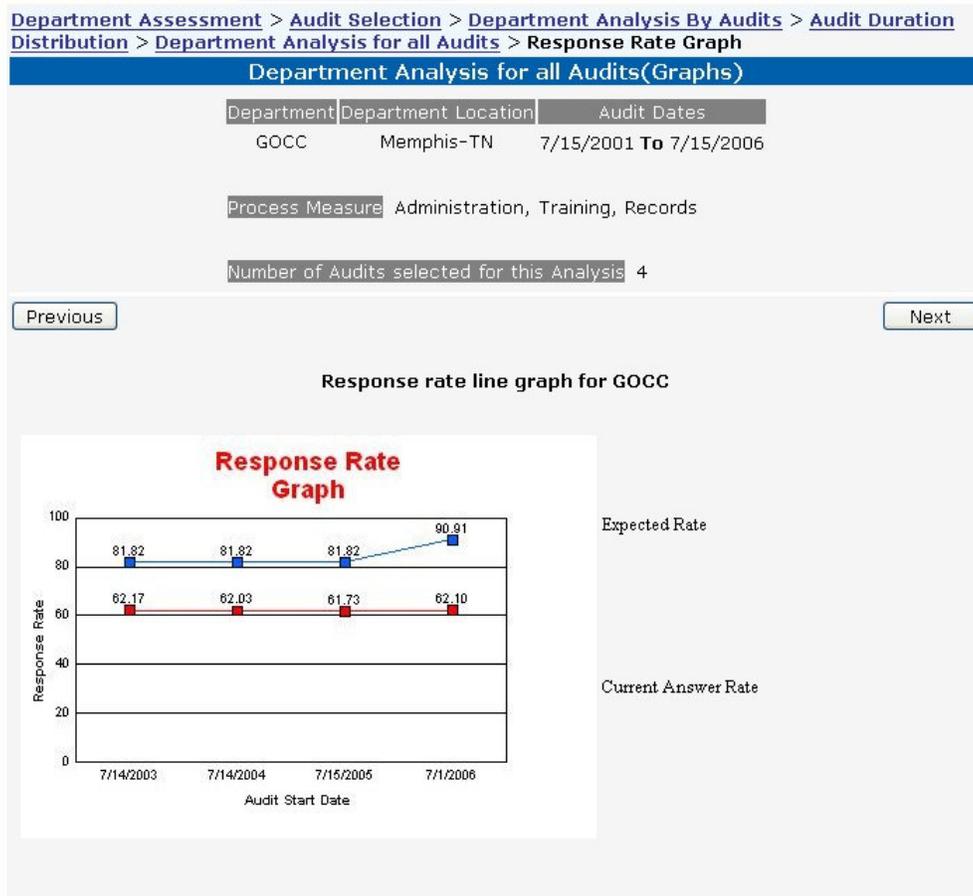
Figure 51. Response Rate Graph Page

30.2 Process Measure Distribution (Aggregated)

The Process Measure Distribution (Aggregated) page, as shown in Figure 52, displays the aggregated process measure distribution using a pie chart.

As seen in Figure 52, the Process Measure Distribution (Aggregated) page is displaying audits of department GOCC from 15 July 2001 to 15 July 2006. The process

measures applicable for this analysis are shown in the Process Measures field. The number of audits selected for this analysis is 4.
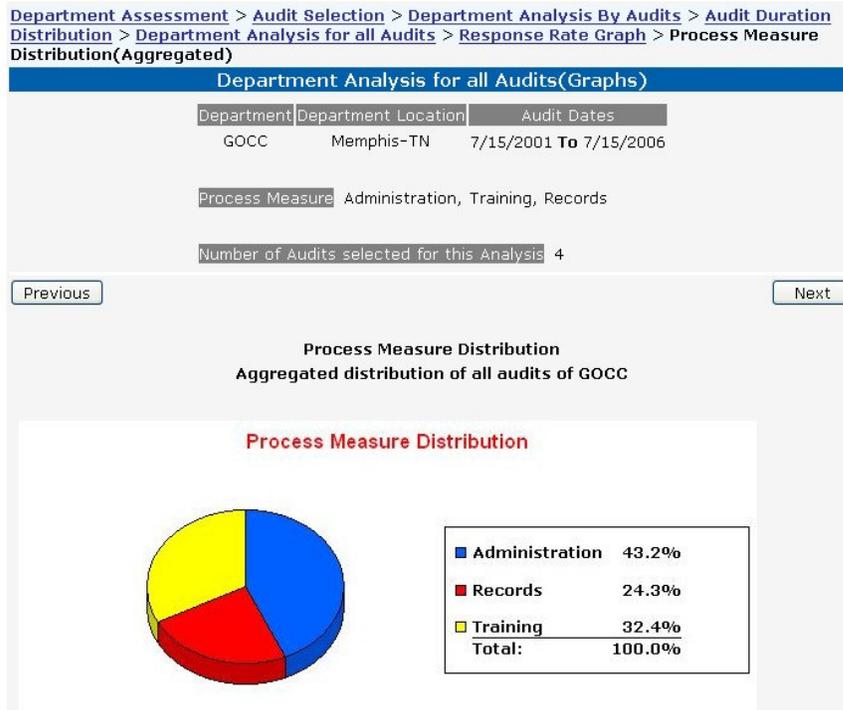
Figure 52. Process Measure Distribution (Aggregated) Page

30.3 Process Measure Distribution (Individual)

The Process Measure Distribution (Individual) page, as shown in Figure 53, displays the aggregated distribution of each individual process measure using a pie chart.

As seen in Figure 53, the Process Measure Distribution (Aggregated) page is displaying audits of department GOCC from 15 July 2001 to 15 July 2006. The process measures applicable for this analysis are shown in the Process Measures field. The number of audits selected for this analysis is 4.

Click on the Choose Process Measure drop-down menu to select a process measure and to view its distribution for all the chosen audits.
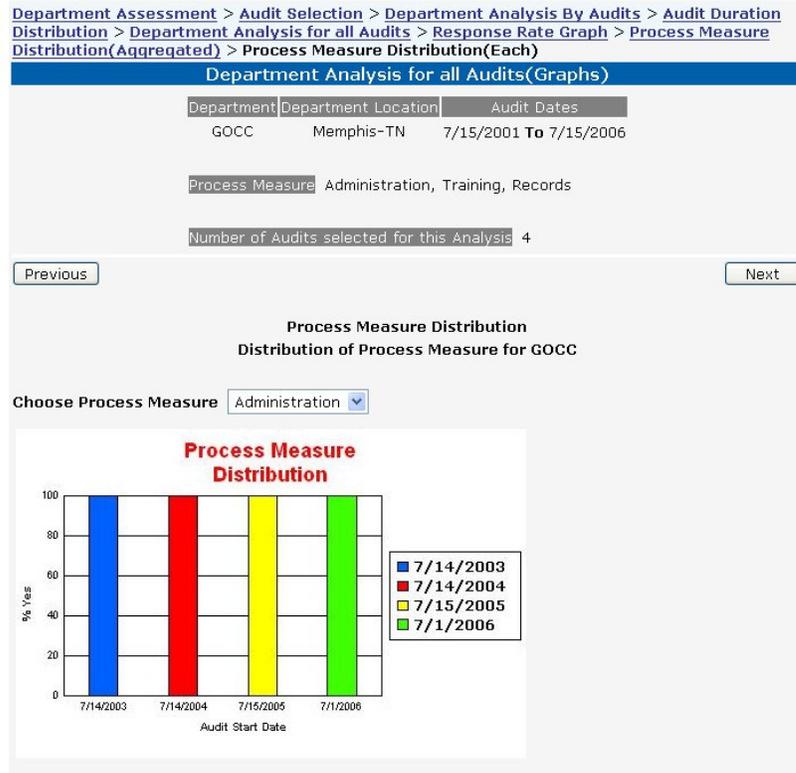
Figure 53. Process Measure Distribution (Individual) Page

30.4 Aircraft Level Impact Distribution

The Aircraft Level Impact Distribution page, as shown in Figure 54, displays the aircraft level impact distribution using a pie chart.

As seen in Figure 54, the Aircraft Level Impact Distribution page is displaying audits of department GOCC from 15 July 2001 to 15 July 2006. The process measures applicable for this analysis are shown in the Process Measures field. The number of audits selected for this analysis is 4.

The various fields in the Aircraft Level Impact Distribution section are Total Number of Audits, Total number of Findings in these audits and Findings for each Aircraft Level Impact category.
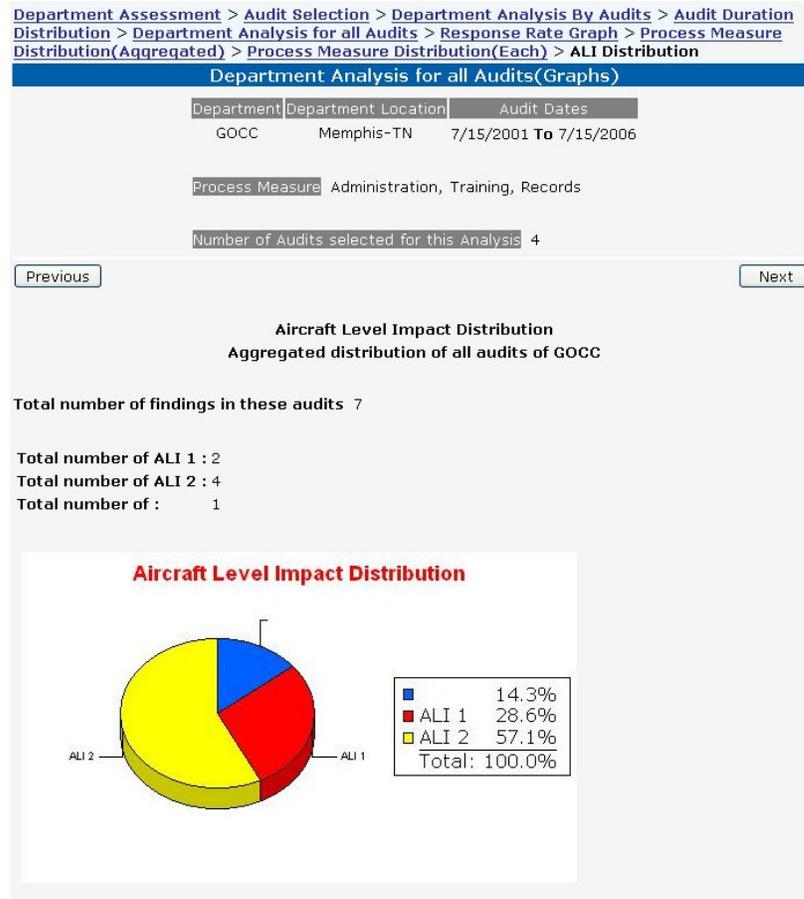
Figure 54. Aircraft Level Impact Distribution Page

30.5 Organizational Categories Distribution

The Organizational Categories Distribution page, as shown in Figure 55, displays the organizational categories distribution using a pie chart.

As seen in Figure 55, the Aircraft Level Impact Distribution page is displaying audits of department GOCC from 15 July 2001 to 15 July 2006. The process measures applicable for this analysis are shown in the Process Measures field. The number of audits selected for this analysis is 4.

The various fields in the Organizational Categories Distribution section are Total Number of Audits, Total number of findings in these audits and Findings for each Organizational Categories category.
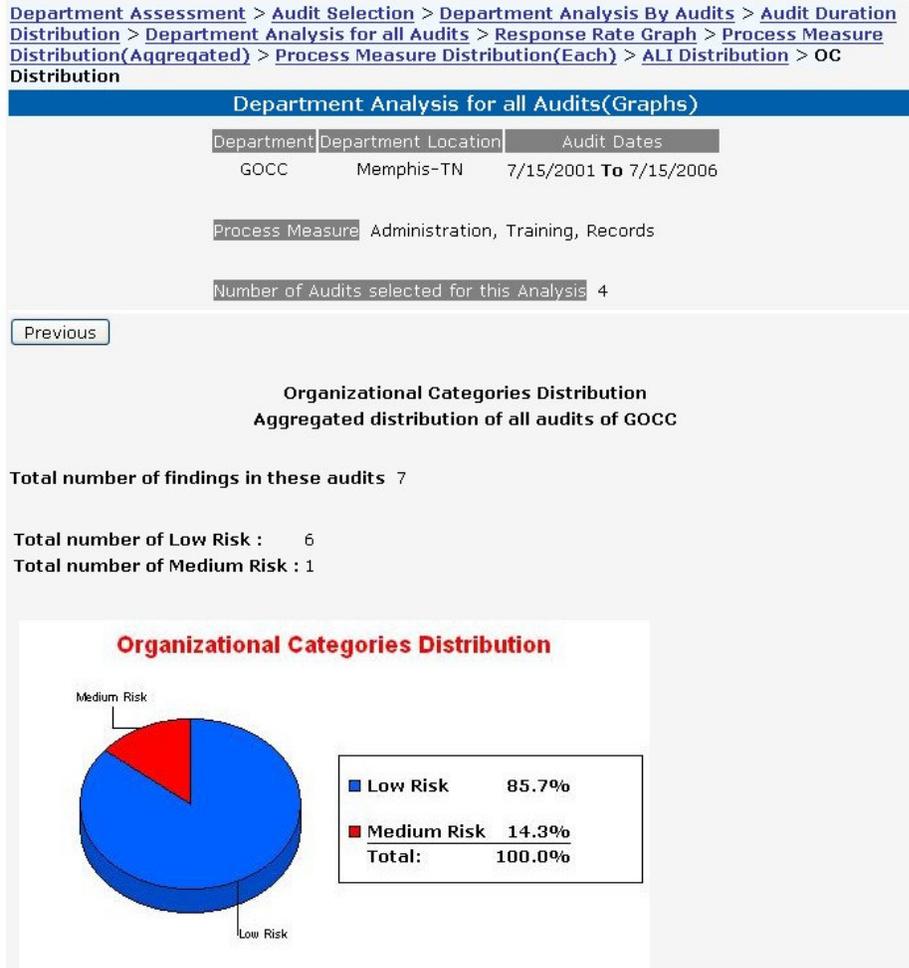
Figure 55. Organizational Categories Distribution Page

31 Audit Impact / Allocation

31.1 Purpose

Click on the Audit Allocation/Impact link in the global navigation tab to access the Audit Allocation/Impact page, as shown in Figure 56, which displays the fields required to conduct audit allocation.

In the global navigation tab, for the auditor this link is displayed as Audit Impact while for the manager this page is displayed as Audit Allocation. The Audit Impact and Audit Allocation page vary in the number of predictions that can be made. The audit impact can provide predictions for only one specified set of data for the parameters provided. The Audit Allocation page allows the manager, to predict the response for an audit by specifying at the most three sets of values to the various parameters.

Figure 56. Audit Allocation Page

31.2 Task Details

To conduct audit planning, fill the following fields below:

1. Audit Type Drop-Down Menu: Click on the Audit Type drop-down menu and choose the type of audit.

2. Department Name Drop-Down Menu: Choose the department name from the drop-down menu. This menu selection lists the departments currently providing services for the airline for the audit type selection.

3. Audit Duration: Enter the number of days required to complete the audit.

4. Calculate Predicted Response Rate Button: Click on the Calculate Predicted Response Rate button to go to the Predicted Response Rate page.

Figure 57. Predicted Response Rate Page

The Predicted Response Rate page, as shown in Figure 57, displays the expected response rate for the criteria specified in the Audit Planning page. The manager can use this page to estimate the audit response if an audit was to be conducted on the specified department using the specified criteria.

As seen in Figure 57, the audit allocation was conducted using department GOCC and duration for the audit as 10 days for Training process measure. Using the parameters, the model predicts a response rate of approximately 89 percent. This means that based on historical evidence and considering all the various parameters, the model predicts an audit response rate of approximately 89 YES for every 100 audit questions.

32 Administration Tasks (Manager Only)

The Administration tab is available exclusively for managers. The manager can edit auditors, suppliers and audit type using this global navigation tab. He can also re-assign auditors using this tab.

32.1 Edit Auditors

Click on the Edit Auditors link on the global navigational tab to access the Add Auditors page which allows you, as the manager, to edit information associated with the auditors. The manager can add a new auditor, remove an assigned auditor, or modify the current information associated with an auditor.

Figure 58. Add Auditors Page

32.1.1 Add New Auditor/ Manager

Use this page in Figure 58 to enter information on a new auditor/ manager. The red star (*) indicates required fields. Click on the Submit button to save this information and to go to the Edit Auditor Information page shown in Figure 59. An email will be sent to the auditor providing him with the new WebSAT userid and password. It is recommended to use the Modify tab and verify if the auditor, about to be added, already exists in the system.

Figure 59. Information added for a new auditor

32.1.2 Add Auditor – Edit Information

To edit the submitted information, click on the Edit Above Information button on the lower left of the screen. To add the next auditor, click on the Add New Auditor button on the lower right of the screen.

32.1.3 Remove Auditor

Click on the Remove link, to remove an auditor from the system. Use the drop-down menu to select the auditor to be removed and then click on the Delete button, as shown in Figure 60. If the auditor you would like to remove from the system has some ongoing audits, the system will give you the option of either deleting the audits or re-assign the audits to another auditor.

Figure 60. Remove Auditor Page

The dialogue box in Figure 61 pops up asking if you want to remove the auditor from the system. Click on the OK button in the dialogue box.

Figure 61. Dialogue Box Inquiry

Feedback indicates that the auditor has been successfully removed as shown in Figure 62.

Figure 62. Feedback Page

Click on the Cancel button in the dialogue box to avoid auditor deletion and to return to the screen shown in Figure 60.

32.1.4 Modify Auditor

To modify existing auditor information, click on the Modify link in the Edit Auditors page to access the screen seen in Figure 63.

Figure 63. Modify Auditor Page

Select the auditor in the drop-down menu shown in the figure and click on the Modify button to access to the Modify Auditor Information page in Figure 64.

Figure 64. Modify Auditor Information

Use the Modify Auditor Information page to edit information on an auditor. The red star (*) indicates required fields. Click on the Submit button to save this information. Clicking the Submit button will give feedback message on successful modification.

32.2 Edit Departments

Click on the Edit Departments link on the global navigational tab to access the Add Departments page to edit department information. The manager can add a new department, remove a department or modify the current information associated with a department. Use the View Approved Department List link to view the approved department list, their respective userids and passwords in a separate window.

32.2.1 Add Department

Use the Add New Department page in Figure 65 to enter information on a new Department. The red star (*) indicates that it is a required field. Click on the Submit button to save this information and to go to the Edit Department

Information page shown in Figure 66. An email will be sent to the vendor providing him with the new WebSAT userid and password.

Figure 65. Adding a New Department Page

32.2.2 Add Department– Edit Information with Feedback

To edit the submitted information, click on the Edit Above Information button on the lower left of the screen as shown in Figure 66. To add the next department, click on the Add New Department button on the lower right of the screen.

Hello Mike IA!   **Help**

Audit Tasks	Checklists	Reports	Administration
Start New Audit	View Checklist	Audit Report	Edit Auditors
Resume Audit	Modify Checklist	Department Assessment Report	**Edit Departments**
Corrective Actions	New Department Checklist	Audit Allocation	Edit Audit Type
Search Audits	Approve Checklist		Re-Assign Auditors
Delete Audits			

Add New Department

Add   Remove   Modify   Reactivate

View Approved Department List

The Department has been added to Websat.An email has been sent with the userID and password

Enter Department Information below

* Department Name	Crew Projects
* Checklist Type	**Flight Ops**
* Street Address	1112 Flog street
* City	Valdosta
* State	Fl
* Country	United States
* Zip Code	56894

* Department Contact Name	Bridgette Collins
* Department Contact Title	Manager
* User Name	cproject
* Password	cproject
* Email Address	cproject@ops.com
Work Telephone	__-__-__
Fax Number	__-__-__

*Required Field

[Edit above Information]   [Add another Department]

Figure 66. Information feedback indicating a department has been added

32.2.3 Remove Department

Click on the Remove link, to remove a department from the system. Use the drop-down menu to select the department to be removed and then click on the Delete button as shown in Figure 67. This process is similar to the Edit Auditors - Remove section (see Section 32.1.3). If there are ongoing audits on the department, the system will give the option of deleting the audits right away and removing the department from the system or waiting for the audits to be completed to delete the department.

Figure 67. Remove Department Page

32.2.4 Modify Department

To modify existing department information, click on the Modify link in the Edit Department page to access the screen seen in Figure 68. Select the department in the drop-down menu shown in the figure and click on the Modify button to access the Modify Department Information page. The process is similar to the Edit Auditors - Modify section (see Section 32.1.4). The fields displayed are identical to Edit Departments- Add section (see Section 32.2.2).

Figure 68. Modify Department Information

32.2.5 Reactivate Department

To modify existing department information, click on the Modify link in the Edit Department page to access the screen seen in Figure 69. Select the department in the drop-down menu shown in the figure and click on the Reactivate button to access the Reactivate Department Information page. This process is similar to the Edit Auditors - Remove section (see Section 32.1.3).

Figure 69. Reactivate Departments

32.3 Edit Audit Type

Click on the Edit Audit Type link on the global navigational tab to access the Add New Audit Type page which allows you to edit information regarding existing and new audit types for internal audits. The manager can add, remove, or modify an audit type.

32.3.1 Add New Audit Type

To add an audit type, click on Add link in the Edit Audit Type page and fill in the Audit Type Name field shown in Figure 70. Click on the Submit button to save the new audit type.

Figure 70. Add New Audit Type Page

32.3.2 Audit Type Removal

Click on the Remove link to delete an existing audit type as shown in Figure 71. The process is similar to the Edit Auditors - Remove section (see Section 32.1.3).

Figure 71. Select an audit type to be removed from the system

32.3.3 Modify Audit Type

Click on the Modify link in the Edit Audit Type page to modify existing audit type information. The manager sees the Modify Audit type Information page (see Figure 72). Select an audit type using the drop-down menu. The process is similar to the Edit Auditors - Modify section (see Section 32.1.4). The fields displayed are identical to Edit Audit Type- Add Audit Type section (see Section 32.3.1).

Figure 72. Modify Audit Type Page

32.4 Re-Assign Auditors

Click on the Re-Assign Auditors link in the Administration tab to access the Re-Assign Auditors page as shown in Figure 73. You may choose to use this feature when one of the auditors fell sick while conducting the audit and would like to be replaced. Further, this feature may come in handy when both primary and secondary auditors are unavailable.

Figure 73. Re-Assign Auditors Page

Use the Auditor Name drop-down menu, a required field, to select an auditor.

Figure 74. Assign new auditors to existing records

Based on the criteria, the audits are listed in the table in Re-Assign Auditors page as shown in Figure 74. The table in Figure 74 shows the new auditor drop-down menu which allows the manager to make new assignments for the associated audit. Click on the Back button to go back to the Re-Assign Auditors page.

Select an auditor from the drop-down menu and click on the Submit button to reassign the auditor. Clicking the Submit button takes the manager to the Re-Assign Auditors page with a feedback indicating that the new auditors have been successfully assigned.

33 Help

Click on the Help link at the top right portion of the screen to access the Help page which allows you to view the WebSAT Technical Audits User Manual and the process measure definition document (see Figure 75).

Figure 75. Help Page

APPENDIX C

WebSAT User Manual for Surveillance Management Module

Web-based Surveillance and Auditing Tool

User Manual - Surveillance

Contents

Human Computer Systems Laboratory
Department of Industrial Engineering
Clemson University
www.ces.clemson.edu/ie/research/hcsl/websat

Creation Date: 08/03/04

1 Introduction

This is a user guide for the Web-based Surveillance and Auditing Tool (WebSAT) Surveillance module. It is organized according to the functions that can be performed using this tool. Detailed instructions are provided for the various tasks for conducting surveillance and documenting surveillance data and storing it in WebSAT. It is intended to be a straightforward introduction to how this tool works and assumes that the reader has a basic level of familiarity with computer and internet applications and with the business processes involved in a typical airline's Quality Assurance Department.

To view ONLY one particular topic, click the appropriate section in the Table of Contents. To print instructions for that topic, click on the Print button on your browser.

1.1 WebSAT Description

The research team at the Human Computer Systems Laboratory has developed WebSAT. It is a tool for analyzing aircraft maintenance data using results from statistical techniques such as logistical regression, to determine risk trends. It is intended to collect, reduce, and analyze surveillance, auditing and airworthiness directives operations data in a standardized way to reflect the impact of maintenance error on the safety of an aircraft. This will allow users at various hierarchical levels in a work function to collect and analyze data on.

Over time the WebSAT tool will become a repository of surveillance and audits. This will mean that the Quality Assurance representatives (QARs) and the auditors will be able to use verified records as evidence to analyze aircraft maintenance data, rather than managers depending on scattered and largely un-documented data to validate trends. The airline information and technology department will help maintain WebSAT and ensure the integrity of the data stored in it.

2 Introduction to WebSAT Terms

This section provides a brief explanation of the terms used in the different screens and forms of WebSAT, which may be unfamiliar to the QAR.

2.1 Aircraft Level Impact

Each time a discrepancy is documented for a surveillance activity, an aircraft level impact (ALI) will be associated with each open-ended response indicating a possible risk to the aircraft.

2.2   Organizational Categories

Management is interested in the cost implications of discrepancies observed by the quality assurance representatives. The set of categories addressing this concern are the Organizational Categories.

2.3   Aircraft Tail Number

Aircraft Tail Number refers to the aircraft identification number corresponding to an aircraft.

2.4   Work Order

Work Order # refers to the work order identification number corresponding to a work order of a particular aircraft tail number.

2.5   Work Card

Work Card # refers to the work card identification number corresponding to a work card.

2.6   AD

AD # refers to the airworthiness directive (AD) identification number corresponding to an AD.

2.7   NR

NR # refers to the Non Routine (NR) identification number corresponding to a NR.

2.8   Site

Site refers to the name of the vendor location providing its services to the airline.

2.9   Process Measures for Surveillance

The data obtained from surveillance process will be grouped into categories to facilitate further data analysis and comment on the effectiveness of the surveillance process. These categories are defined as process measures.

Technical Process Measures (T): Process measures which include surveillance involving scheduled maintenance activities performed on an aircraft during a maintenance event are referred to as Technical Process Measures. These process measures include technical activities that are hands-on and performed directly on the aircraft. Technical activity also includes maintenance that is performed in a back shop setting on a removed aircraft part. Example would be a panel removed and routed to a composites back shop for repair, then reinstalled on the aircraft.

Non-Technical Process Measures (NT): The surveillance activities involving verification of standardized procedures, referenced manuals, equipment, and facility maintenance requirements are referred to as Non-Technical Process measures.

2.9.1 In-process Surveillance (T):

It is the act of observing a maintenance task that is currently in work. The on-site surveillance representatives will select certain work cards, AD driven work cards, EOs, EAs, non-routines and observe the task being accomplished by the vendor mechanic or inspector to ensure competency, correctness and adequacy of the customer's paper work to complete the task. This surveillance should be performed progressively throughout the maintenance event. Preparation before a job, torquing of an item, the use of tooling and such items, are typical examples of in-process surveillance activities.

2.9.2 Verification Surveillance (T):

It is the re-inspection/re-accomplishing of completed work cards, AD driven work cards, EOs, EAs and non-routines that are signed off by the vendor personnel as "Complete." No additional reopening of access panels that have been closed or disassembly of the aircraft or assistance from vendor personnel will be required unless poor workmanship or other conditions are evident during the surveillance. This surveillance activity is to ensure that the intent of the task has been complied with, the workmanship meets acceptable standards and that the customer's paper work is adequate to complete the task. This surveillance should be performed progressively throughout the maintenance event as the tasks are completed.

2.9.3 Final Walk Around (T):

It is a surveillance of the aircraft at the end of the scheduled maintenance event that checks the general condition of the aircraft usually after the vendor has completed the work scope assigned. For example: obvious safety, legal fitness, airworthiness items, general condition, cleanliness and completeness of the aircraft's cockpit, lavatory, courier area and cargo compartments, landing gear wheel wells, all access panels properly installed and no indication of fuel, oil or hydraulic leaks. Proper completion of the aircraft logbook should also be included in this activity.

2.9.4 Documentation Surveillance (NT):

This surveillance is performed on the vendor's documented system to validate the quality control, technical data control, inspection, and work-processing programs, as presented in C.A.S.E. standard 1-A (Revision 45-1/7/2004). The vendor should be able to provide the required documents and certificates upon request.

    a. Certifications: This surveillance ensures that the certification program includes certificates, operations specifications, licenses, repairman

certificates, antidrug and alcohol misuse program certificates, registrations and capabilities listing required by the Code of Federal Regulations for any individual, equipment or facility. These documents are required to be kept current and made readily available for inspection and verification. For detailed instructions and description refer to C.A.S.E. standard 1-A section 2.

b. **Quality Control:** This surveillance ensures that the quality control program includes procedures and operation which must be described in a quality control manual or other appropriate document. These documents are required to be kept current and made readily available to the surveillance representatives. For detailed instructions and description refer to C.A.S.E. standard 1-A section 3.

c. **Inspection:** This surveillance ensures that the inspection program includes procedures to maintain an up-to-date roster of supervisory and inspection personnel who are appropriately certified and are familiar with the inspection methods, techniques and equipment that they use. For detailed instructions and description refer to C.A.S.E. standard 1-A section 4.

d. **Technical Data Program:** This surveillance ensures that the technical data program requires all the maintenance operations to be accomplished in accordance with customer's manuals. It also ascertains that the vendor has a documented system to maintain current technical data and a master copy of each manual. For detailed instructions and description refer to C.A.S.E. standard 1-A section 6.

e. **Tool/Test Equipment:** This surveillance ensures that the tools and the test equipment used by the vendor for maintenance are frequently calibrated to the required standards. It also ensures that the tools and the test equipment program includes identification of tools and test equipment, identification of individuals responsible for the calibration, accomplishment of periodic calibrations, and applicable tolerance or specification. For detailed instructions and description refer to C.A.S.E. standard 1-A section 8.

2.9.5 Facility Surveillance (NT):

This surveillance is performed on the vendor's facility to validate the shelf life control, housing and facilities, storage and safety/security/fire protection programs, as presented in C.A.S.E. standard 1-A (Revision 45- 1/7/2004). The vendor should implement programs to maintain the facility and prevent damage, material deterioration, and hazards.

a. **Shelf Life Control:** This surveillance ensures that the vendor describes in their manual a shelf life program, procedure, and a detailed listing of parts and materials which are subjected to shelf life. It also identifies the expiration date of each shelf life item. For detailed instructions and description refer to C.A.S.E. standard 1-A section 7.

b. **Storage:** This surveillance ensures that the vendor identifies, maintains and protects parts and raw material during a maintenance event. For detailed instructions and description refer to C.A.S.E. standard 1-A section 12.

c. **Housing and Facilities:** This surveillance ensures that the vendor houses adequate equipment and material, properly stores supplies, protects parts and sub-assemblies, and ensures that the facility has adequate space for work. For detailed instructions and description refer to C.A.S.E. standard 1-A section 10.

d. **Safety/Security/Fire Protection:** This surveillance ensures that the vendor provides adequate safety, security and fire protection at the maintenance facility. It also ensures that the fire protection devices and systems are inspected periodically, and maintained in serviceable conditions. For detailed instructions and description refer to C.A.S.E. standard 1-A section 11.

2.9.6 Procedures Manual Violation (NT):

This surveillance ensures that the vendor is complying with the requirements set forth in the customer maintenance manual, and compliance requirements presented in the vendor Inspection Procedures Manual (IPM) or Repair Station Manual (RSM).

a. **Customer Maintenance Manual Compliance:** This surveillance requires the vendor to comply with programs, documented procedures, and standards described in the customer maintenance manual.

b. **Vendor Inspection Procedures Manual Compliance:** This surveillance ensures that the vendor complies with programs, documented procedures, and standards described in the vendor IPM or RSM. It also ensures if the vendor IPM is adequate to meet with the customer maintenance manual requirements.

c. **Work Processing:** This surveillance ensures that there exists a documented system for all the programs and procedures that the vendor adopts for training, identification of parts, and use of appropriate tools and equipment in good condition to perform a maintenance task. For detailed instructions and description refer to C.A.S.E. standard 1-A section 13.

2.9.7 Additional Findings Module for Surveillance

This module documents additional information pertaining to surveillance work domain. However, the categories in this module listed below do not hold the vendor responsible for the findings obtained. This module helps the surveillance representatives to document any information both technical and non-technical, beyond the work scope of the scheduled maintenance event. The customer maintenance program could be updated with this information to help in the future. **Note:** Although these categories are not process measures, the findings obtained from this module are documented and reported through WebSAT.

1 Information: It includes the surveillance activities and data that the on-site surveillance representative needs to document for informational purposes. This surveillance activity is always non-technical and should not penalize the vendor for findings beyond the scope of a particular maintenance event.

2 Aircraft Walk Around: This surveillance category is to be used only for those technical findings that cannot be traced to a scheduled maintenance task and are beyond the current work scope of the scheduled maintenance event. Every attempt should be made to ensure that the finding is not part of the scheduled event prior to using this category.

3 Login

Figure 1. WebSAT Login Page

You can accomplish three tasks using the Login page:

1. Log into WebSAT: To login, type in your Username and Password (see Figure 1) and click on the Login button. If the information provided is correct, you will be taken to either the Start New Surveillance page.

2. Change Password: Click on the Change Password link, to change your password (see Section 4 for details).

3. Request for Existing Password: Click on the Forgot Password link on the WebSAT Login page, if you have forgotten your password and are unable to login (see Section 5 for details).

4 Change Password

Clicking on the Change Password link on the WebSAT Login page takes you to the Change Password page shown in Figure 2. If you wish to exit the Change Password page, click on the Cancel button to return to the WebSAT Login page.

Figure 2. Change Password Page

Enter the information required to change your password:

1. Type your username, old password and new password.

2. Verify new password by re-typing it in the Confirm New Password text box.

3. Select your identity question from the drop-down menu shown in the Figure 3 below. The Identity Question field helps you access your password in case you forget it. For example, you could select "What is your pet's name?"

Figure 3. Identity Question drop-down menu

4. Type in the answer to the identity question you selected in the Identity Answer textbox. For example, you could type in "Rover" as the answer to your pet's name.

5. Click on the Submit button to submit the information you have entered into WebSAT and go to Login page.

5 Forgot Password

If you forget your password, click on the Forgot Password link on the WebSAT Login page to access the page seen in Figure 4. If you wish to exit the Forgot Password page, click on the Cancel button to return to the WebSAT Login page.

Human Computer Systems Laboratory   Creation Date: 08/03/04
Department of Industrial Engineering
Clemson University
www.ces.clemson.edu/ie/research/hcsl/websat

Figure 4. Forgot Password Page

To request for your existing password:

1. Enter your first name, last name and email address in the text boxes provided.

2. Click on the Submit button to provide your information to WebSAT. If the email address provided matches with the one that exists in WebSAT then your password will be sent to the email address provided.

6 Global Navigation Tabs

Once you login, you will arrive at the Start New Surveillance page.

Figure 5. Global Navigation Tabs

This page includes three global navigation tabs at the top: Enter Data, View Data and Reports. A fourth tab, Administration, exists exclusively for the manager. A description of the four tabs is provided below:

1. Enter Data: Using this tab, you can perform the three data entry tasks listed below.

a. Surveillance Schedule: Click on the Surveillance Schedule link to view and access the scheduled/sampled surveillance activities of a work order for data entry. WebSAT system will assign all the mandatory surveillance activities to the primary quality assurance representative responsible for the ongoing surveillance event on the aircraft. See Section 7 for details.

b. Enter New Surveillance: Click on this link to enter data related to any surveillance activity that is not listed in the surveillance schedule but still is within the scope of the surveillance event. See Section - for details.

c. Enter New NR: Click on this link to enter data related to any non routine activity that cannot be accessed through View NR Information link. See Section - for details.

2. View Data: This tab allows the user to access various types of surveillance activities. The five tasks that can be accomplished using this tab are:

a. Search Surveillance Activities: Click on the Search Surveillance Activities link to retrieve data for different types of surveillance activities such as work cards, ADs, NRs, EOs, and so on of a particular work order. See Section 16 for details.

b. View Surveillance Data: Click on this link to view the data related to all the surveillance activities of a surveillance event that have been accomplished. See Section 11 for details.

d. View NR Information: Click on the View NR Information link to access non-routines that result from a work card rejection, a non-routine rejection, vendor generated non-routines and non-routines that are generated by the QAR which might be in or out-of vendor scope for that particular surveillance event. See Section 22 for details.

e. My Activity Distribution: Click on this link to view the distribution of the different categories of surveillance activities you performed and the number of activities remaining to be performed to achieve the target percentage. See Section 13 for details.

3. Reports: This tab includes the two reports that can be generated by WebSAT.

a. Risk Evaluation: Click on this link to assess the performance on a vendor and generate a report which indicates the rejection rate of the vendor for specified date range. See Section 24 for details.

b. Productivity Report: Click on this link to generate a report that details the productivity of a QAR for the specified time period. See Section 25 for details.

4. Administration: This tab includes the three administrative tasks that managers can perform.

a. Edit QARs: Click on this link to add, modify or delete a Quality Assurance Representative (QAR). See Section 32.1 for details on Edit QARs.

b. Edit Vendors: Click on this link to add, modify or delete a vendor. See Section 32.2 for details on Edit Vendors.

c. Set Goals: Click on this link to set goals for a QAR. This link can be used to set the minimum number of activities that a QAR is required to perform for each process measure. See Section 32.4 for details.

7 Surveillance Schedule

7.1 *Purpose*

Click on Surveillance Schedule link on the global navigation tab to view the sampled surveillance activities also known as the surveillance schedule for the ongoing surveillance event. This will allow you to start data entry of surveillance activities of an ongoing work order. This page allows you to view your surveillance schedule, the other

schedules generated for an aircraft and a master schedule which contains all the activities listed in the schedules for an aircraft.

Figure 6. Start New Surveillance Page

7.2   Task Details

To get the Surveillance Schedule of surveillance event or a work order of an aircraft on this page (see Figure 6):

1. Aircraft Tail Number: Enter the aircraft tail number in the text box provided.

2. Work Order Number: Enter the work order number in the text box provided.

3. Go: Click on the Go button after entering data in at least one of the fields to go to one of the following pages correspondingly.

     3.1 If you enter only the aircraft tail number you will go to the Work Order Details page of the given aircraft tail number

     3.2 If you enter only the work order number or both aircraft tail number and the work order number you will go to the Surveillance Schedule Details page which displays the list of the scheduled surveillance activities for the given work order number.

The Work Order Details page consists of a table listing the current work orders of the specified aircraft tail number. The work order details table displays the fields, Work Order#, Description, Site, Planned Date, Check Type, Visit # and WRI (or Work Release Item) providing information related to a work order. In Figure 7 below, for example, the

Work Order # is 4579, the description is Test Work Order, the Site is MAE, the Planned Date is 8/25/2006, the Check Type is B, the Visit # is 2 and the WRI is True.

Figure 7. Work Order Details Page

Click on the Work Order # link to view the Surveillance Schedule page.

8   Surveillance Schedule Details

8.1   Purpose

When you select a work order to start a new surveillance activity in WebSAT, you will be taken to the Surveillance Schedule page which contains the list of sampled surveillance activities for the scheduled surveillance event (in other words, the selected work order) along with all the mandatory items. This list is automatically updated when new ADs are introduced into the system.

The five fields, Type, Number, Title, Last Performed, and Completion Status, generated by WebSAT, provide information related to a surveillance activity such as a work card or an AD. In Figure 8 below, for example, the WorkCard number 165 with the title Remove Panels - Major Zone 120, and the Last Performed Date is 8/22/2006 has a Completion Status NR.

Figure 8. Surveillance Schedule Details Page

8.2   Task Details

The tasks that can be completed on this page are:

1. Select an Activity: Click on the Number link corresponding to a surveillance activity type (e.g. Work Card, EO, AD, Lub Card) to go to the Activity Data page.

Note: ADs and Lub Cards are mandatory and are highlighted in bold letters with a darker background.

9   Activity Data

9.1   Purpose

After you select a work card or any other surveillance activity, you will arrive at the Activity Data page where you can enter data or edit the existing data.

As seen in Figure 9, information related to the surveillance activity is provided at the top below the global navigation tabs. Specifically, for Work Card 204 the Work Card Title is

Human Computer Systems Laboratory   Creation Date: 08/03/04
Department of Industrial Engineering
Clemson University
www.ces.clemson.edu/ie/research/hcsl/websat

Remove Panels - Major Zone 34. The Work Order # is 4581 belonging to the Aircraft
Tail Number (ACN) 7824. This work order is taking place at the Mobile (MAE) site.
Below this general work card description are the various fields which display the work
card data. If the work card data has not been entered yet then all the fields will be blank.

9.2 Task Details

The tasks that can be completed on this page are:

Figure 9. Enter/Edit Activity Data Page

1. Status: Click on one of the radio buttons provided next to Status which is a required
field (as indicated by the red star next to it). If an ACCEPT radio button is selected, only
the Comments field will be displayed to document any information regarding this
surveillance activity (see Figure 9).

If the Reject radio button is selected, the three text boxes for Discrepancy, Corrective Actions and Comments will be displayed to enter data. Discrepancy is a required field when the activity is rejected. Aircraft Level Impact and Organizational Category are also required fields when an activity is rejected.

If the Other radio button is selected, the three text boxes for Discrepancy, Corrective Actions and Comments will be displayed to enter data. Select the WCCR or the PFCR checkbox when the surveillance activity status is OTHER.

2. Process Measure: Use the Process Measure drop-down menu to choose the Process Measure associated with the surveillance activity performed. This is a required field regardless of the status of the activity.

3. Mx Task: Use the Mx Task drop-down menu to choose the Mx Task associated with the surveillance activity performed. This is a required field if the status of the activity is either ACCEPT or REJECT.

4. Mx Source: Use the Mx Source drop-down menu to choose the Mx Source associated with the surveillance activity performed. This is a required field if the status of the activity is either ACCEPT or REJECT.

5. Aircraft Level Impact: Use the Aircraft Level Impact (ALI) drop-down menu to choose the Aircraft Level Impact associated with the surveillance activity performed. This is a required field if the activity is rejected. This field does not appear if the Status is selected to be as ACCEPT or OTHER.

5.1 "What is this Link?": Click on the "What is this?" link that appears next to the Aircraft Level Impact (ALI) drop-down menu to open a pop-up window with information pertaining to ALI as shown in Figure 10.
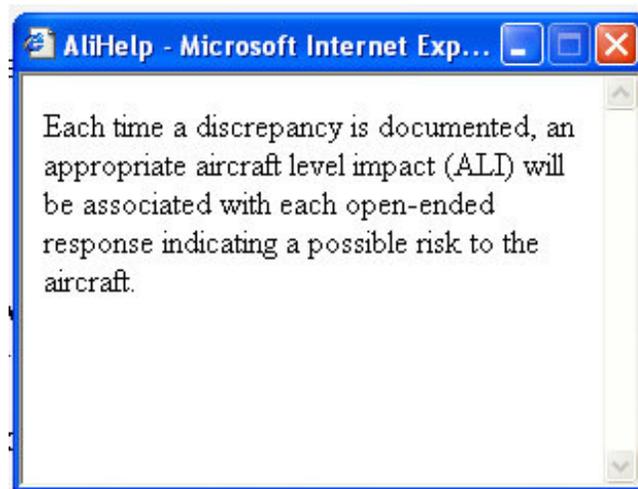
Figure 10. "What is this?" link pop up for ALI

6. Organizational category: Use the Organizational Category (OC) drop-down menu to choose the Organizational Category associated with the surveillance activity performed. This is a required field if the activity is rejected. This field does not appear if the Status is selected to be as ACCEPT or OTHER and hence it does not appear if the Status is selected to be REJECT.

      6.1 "What is this Link?": Click on the "What is this?" link that appears next to the Organizational Category (OC) drop-down menu to open a pop-up window showing the Risk Management matrix as shown in Figure 11.

Figure 11. Risk Management Matrix

7. Non Routine Number: Enter the Non Routine Number when you reject a surveillance activity. If you do not have a NR number with you while entering data then leave the field blank.

8. Submit Information: Click on the Submit button to submit all the information entered for that particular surveillance activity. If you have rejected the activity and did not enter the Non Routine (NR) Number associated with the reject, the system will display the pop-up as shown in Figure 12 to confirm NR generation before submitting the information to the system. If you want to create an NR and you don't have NR # with you at that point, the system will generate placeholder NR# which can be replaced once you have NR #.
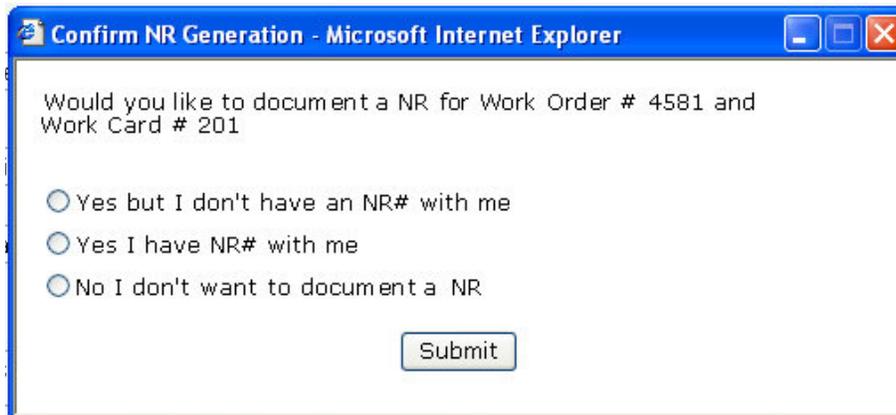
Figure 12. NR Generation confirmation pop-up dialogue box

9. Add Another Activity: Click on the Save and Add another Activity to save the data entered for the surveillance activity and add another activity from the same Work Card. If you have rejected the surveillance activity and have not entered a Non Routine Number, the system will display the pop-up as shown in Figure 12 before adding another activity.

10. Cancel: Click on the Cancel button to exit from this screen to the surveillance schedule without saving any information entered.

10 Enter New Surveillance

10.1 Purpose

Click on the Enter New Surveillance link on the global navigation tabs to access the Activity Data page and enter surveillance data related to activities that are not listed in the Surveillance Schedule Details page. Surveillance data related to Non Routines cannot be entered through this page, however, surveillance data related to any other type of surveillance activity such as Work Cards, ADs, EOs and so on can be entered using this link.

Creation Date: 08/03/04

Figure 13. Enter New Surveillance

10.2 Task Details

To Enter New Surveillance (see Figure 13):

1. Work Order Number: Enter the work order number in the text box provided.

2. Activity Type: Select the surveillance activity type from the drop-down menu provided.

3. Activity Number: Enter the activity number in the text box provided.

4. Submit: Click on the Submit button once the information has been entered in all the fields to go to the surveillance activity data page for entering the surveillance data (For details on entering activity data see section 9).

11 Enter New NR

11.1 Purpose

Click on the Enter New NR link on the global navigation tabs to enter data related to non routines that are not listed in the View NR Information page.

Human Computer Systems Laboratory   Creation Date: 08/03/04
Department of Industrial Engineering
Clemson University
www.ces.clemson.edu/ie/research/hcsl/websat

11.2 Task Details

To Enter New NR (see Figure 14):

Figure 14. Enter New NR

1. Work Order Number: Enter the work order number in the text box provided which is a required field as indicated by the red astryx next to it.

2. NR Number: Enter the NR number in the text box provided. If no number is entered in this field, then the system will automatically generate a dummy number which can be revised at a later time before the work order is closed.

3. Submit: Click on the Submit button to go to the non routine data entry page for entering the data.

12 Non Routine Data

12.1 Purpose

Once you click on the Enter New NR link on the global tabs to enter Non-routine data and provide details on the work order you are interested in then you go to the Non Routine Data page (see Figure 15).

Figure 15. Non Routine Data (Information details) page

12.2 Task Details

To enter data related to out-of-vendor scope non routines, you need to complete the following tasks:

1. Status: Click on one of the radio buttons provided below Status. If an ACCEPT radio button is selected, the Comments field will be displayed to document any information regarding this surveillance activity as shown in Figure 15.

If the Reject radio button is selected, the three text boxes for Discrepancy, Corrective Actions and Comments will be displayed to enter data. Discrepancy is a

required field when the activity is rejected. Aircraft Level Impact and Organizational Category are also required fields when an activity is rejected.

If the Other radio button is selected, the three text boxes for Discrepancy, Corrective Actions and Comments will be displayed to enter data. Select the WCCR (i.e. Work Card Change Request) or the PFCR (Publication Form Change Request) checkbox when the surveillance activity status is OTHER.

2. Process Measure: Use the Process Measure drop-down menu to choose the Process Measure associated with the surveillance activity performed. This is a required field regardless of the status of the activity.

3. Mx Task: Use the Mx Task drop-down menu to choose the Maintenance Task associated with the surveillance activity performed. This is a required field if the status of the activity is either ACCEPT or REJECT.

4. Mx Source: Use the Mx Source drop-down menu to choose the Maintenance Source associated with the surveillance activity performed. This is a required field if the status of the activity is either ACCEPT or REJECT and hence it does not appear if the Status is selected to be OTHER.

5. Aircraft Level Impact: Use the Aircraft Level Impact (ALI) drop-down menu to choose the Aircraft Level Impact associated with the surveillance activity performed. This is a required field if the activity is rejected. This field does not appear if the Status is selected to be as ACCEPT or OTHER.

5.1 "What is this Link?": Click on the "What is this?" link that appears next to the Aircraft Level Impact (ALI) drop-down menu to open a pop-up window with information pertaining to ALI as shown in Figure 16.

Figure 16. "What is this?" link pop up for ALI

Human Computer Systems Laboratory   Creation Date: 08/03/04
Department of Industrial Engineering
Clemson University
www.ces.clemson.edu/ie/research/hcsl/websat

6. Organizational category: Use the Organizational Category (OC) drop-down menu to choose the Organizational Category associated with the surveillance activity performed. This is a required field if the activity is rejected. This field does not appear if the Status is selected to be as ACCEPT or OTHER and hence it does not appear if the Status is selected to be REJECT.

> **6.1 "What is this Link?"**: Click on the "What is this?" link that appears next to the Organizational Category (OC) drop-down menu to open a pop-up window showing the Risk Management matrix as shown in Figure 17.

Figure 17. Risk Management Matrix

8. Non Routine Number: Enter the Non Routine Number if you reject the surveillance activity.

9. Submit Information: Click on the Submit button to submit all the information entered to the system. If you have rejected the activity and did not enter the Non Routine (NR) Number associated with the reject, the system will display the pop-up as shown in Figure 18 to confirm NR generation before submitting the information to the system. If you want to create an NR and you don't have NR # with you at that point, the system will generate a substitute NR# which can be replaced once you have the original NR #.
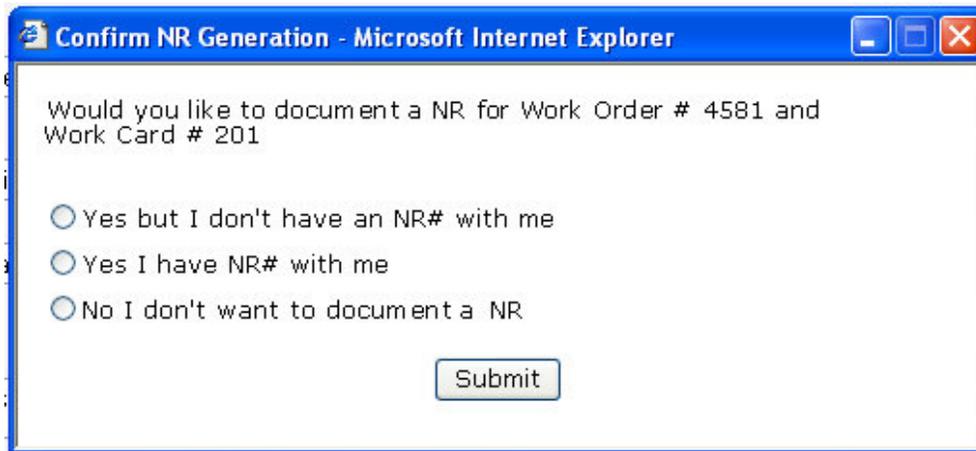
Figure 18. NR Generation confirmation pop-up dialogue box

10. Cancel: Click on the Cancel button to exit from this screen to the Work Order Details page without saving any information entered.

13 Search Surveillance Activities

13.1 Purpose

Click on the Search Surveillance Activities link in the global navigation tabs to search for different types of surveillance activities that have already been performed and for which data exists in the WebSAT system. Data related to surveillance activities of ongoing work orders which have not been worked upon cannot be viewed or accessed through this page.

13.2 Task Details

To Search Surveillance Activities enter (see Figure 19):

1. Work Order Number: Enter the work order number in the text box provided if you want to avoid selecting a work order from search results.

2. Aircraft Tail Number: Enter the aircraft tail number in the text box provided.

3. Activity Type: Select the surveillance activity type from the drop-down menu provided if you wish to view only a particular type of surveillance activity such as work card. If not all types of surveillance activities will be included in search results for the specified criteria.

4. Activity #: Enter the activity number in the text box provided if you want to proceed directly to the activity data page and avoid intermediate selections.

Human Computer Systems Laboratory
Department of Industrial Engineering
Clemson University
www.ces.clemson.edu/ie/research/hcsl/websat

Creation Date: 08/03/04

5. Date Range: Click on the calendar icons next to the text boxes provided for specifying the date range. The pop-up calendar allows selecting a particular date. Alternatively, the date range can be entered in the text boxes provided in the specified format (mm-dd-yyyy).

6. Submit: Click on the Submit button once the information has been entered in all the fields to go to the surveillance activity data page for entering the surveillance data (For details on entering activity data see section 9).

Figure 19. Search Surveillance Activities

14 Search Results

14.1 Purpose

Once you click on the Work Order Number link in the Work Order Details page you go to the Search Results page (see Figure 20). The search results page displays all the surveillance activities that belong to the specified search criterion.

14.2 Task Details

If the selected activity belongs to an open work order you will be able to go to edit the existing data. If the activity belongs to a closed work order you can only view the data

and no changes can be made to the data displayed. Click on the Item # link to choose a particular activity and go to the Activity Data page. If the selected activity belongs to an ongoing work order you will be able to go to the editable version of the activity data page to update the information, if necessary.

If there are more than 20 activities to be displayed then they are paginated. Click on the link Next to go the subsequent page listing the search results of surveillance activities. Click on the link Prev to go to the previous list of activities. Click on the link First to go directly to the first page listing the search results of surveillance activities. Click on the link Last to go directly to the last page of search results listing the surveillance activities.

Search Activities > Work Order Details > Search Results

Search Results

Printer Friendly

Work Order Number 4579   **Aircraft Tail Number** 7824

Site MAE

* **MANDATORY ITEMS MARKED IN BOLD**

FIRST PREV NEXT LAST

Item #	Type	Status	Performed By	Process Measure	MX Task	MX Source
181	WC	Completed	Steve Johnson	Documentation Surveillance	Visual Check (VC)	Engineering Maintenance Program Specification (work card) (EMPS)
182	WC	Completed	Steve Johnson	Final Walkaround	Service(SV)	Engineering Maintenance Program Specification (work card) (EMPS)
183	WC	NR	Steve Johnson	Final Walkaround	Service(SV)	Engineering Maintenance Program Specification (work card) (EMPS)
184 (Activity 2)	WC	Not Worked on				Engineering Maintenance Program Specification (work card) (EMPS)
184	WC	Completed	Steve Johnson	In Process Surveillance	Open/Remove (O/R)	Engineering Maintenance Program Specification (work card) (EMPS)
185	WC	Not Worked on				Engineering Maintenance Program Specification (work card) (EMPS)
186	WC	Not Worked on				Engineering Maintenance Program Specification (work card) (EMPS)
5597-55-5422	WC	Completed	Steve Johnson	Final Walkaround	Functional Check(FC)	Engineering Maintenance Program Specification (work card) (EMPS)
5597-58-5422	WC	NR	Steve Johnson	In Process Surveillance	Lubricate(LU)	Engineering Maintenance Program Specification (work card) (EMPS)
000466 (Activity 3)	WC	Not Worked on				

Figure 20. Search Results Page

15 Activity Data

15.1 Purpose

Once you click on an Item # link in the Search Results page you go to the selected Activity Data page (see Figure 21).

15.2 Task Details

If the selected activity belongs to an ongoing work order you will be able to go to the editable version of the activity data page to update the information, if necessary. If the activity belongs to a closed work order you can only view the data and the edit button will not be visible.

1. Back: Click on the Back button to go back to the Search Results page.

Figure 21. Activity Data (Non-Editable version)

16 View Surveillance Data

16.1 Purpose

Click on the View Surveillance Data link on the global navigation tabs to access the View Surveillance Data page (see Figure 22) which allows viewing the surveillance data pertaining to the selected Work Order of an Aircraft Tail Number. This includes data on all surveillance activities that have been performed on work order as well as shown in Figure 22.

Figure 22. View Surveillance Data

16.2 Task Details

To View Surveillance Data (see Figure 14):

1. Aircraft Tail Number: Enter the aircraft tail number in the text box provided to go to the Work Order Details page.

2. Work Order Number: Enter the work order number in the text box provided to view the Surveillance Data page.

3. Go: Click on the Go button after entering the aircraft tail number or the work order number or both to proceed with the task.

If you enter the aircraft tail number you will go to the Work Order Details page which consists of a table listing the current work orders of the specified aircraft tail number. The work order details table displays the fields, Work Order#, Description, Site, Planned Date, Check Type, Visit # and WRI (or Work Release Item) providing information related to a work order. In Figure 15 below, for example, the Work Order # is 4579, the description is Test Work Order, the Site is MAE, the Planned Date is 8/25/2006, the Check Type is B, the Visit # is 2 and the WRI is True.

Figure 15. Work Order Details Page

Click on the Work Order # link to go to the Surveillance Data page.

17 Surveillance Data

17.1 Purpose

When a work order is selected to view the surveillance data, data on all the surveillance activities including Work Cards, ADs and NRs that have been performed on that particular work order will be presented on the Surveillance Data page in a tabular format as shown in Figure 16. The Rejection table displays the fields, Item#, Type, Performed By, Process Measure, Mx Task, and Mx Source. In Figure 16 below, for example, the Item # is 180, the type is WC (work card), Performed by Steve Johnson, belonging to the Process Measure Documentation Surveillance, and the Mx Task is Clean (CL) and the Mx Source is Special Non Routine Maintenance (or SNRM).

17.2 Task Details

The four tasks that can be performed on this page are:

View Surveillance Data > Work Order Details > Surveillance Data

Surveillance Data

Aircraft Tail # 7824   **Work Order #** 4579
Work Order Title   Test work order
Site Name - Location BFM-Mobile-United States

| Surveillance Activity Distribution | | Back | | View Activities |

Work Order Start Date 8/26/2006   **Work Order End Date** 11/15/2006

Work Order Completion Period 80 days

Aircraft Model 727 233   **Check Type** B

Number of Activities in the Work Order : 38

Number of Activities Worked on by Representative(s) : 21

Number of Non Routines reviewed by Representative(s) : 8
Number of EO(AD) reviewed by Representative(s) :   2
Number of WC reviewed by Representative(s) :   8
Number of Other reviewed by Representative(s) :   3

Number of Accepts : 8 = 38.1% (Acceptance Rate)
Number of Rejects : 13 = 61.9% (Rejection Rate)

Rejection Table

Item	Type	Performed By	Process Measure	Discrepancy	Corrective Action
180	WC	Steve Johnson	Documentation Surveillance	ergwe	etwet
181	WC	Steve Johnson	Documentation Surveillance	dcz	
182	WC	Steve Johnson	Final Walkaround	test	
183	WC	Steve Johnson	Final Walkaround	oc test	oc test
5597-55-5422	WC	Steve Johnson	Final Walkaround	Testing this card	tough one
5597-58-5422	WC	Steve Johnson	In Process Surveillance	wire connectors lube stale	fix this

Figure 16. Surveillance Data page

1. Surveillance Activity Distribution: Click on the Surveillance Activity Distribution button to view process measure, aircraft level impact and organizational categories data distribution as shown in next section.

2. View Activities: Click on the View Activities button to view data on all activities as shown in Figure 17.

3. Back: Click on the Back button to return to the Work Order Details page.

Human Computer Systems Laboratory
Department of Industrial Engineering
Clemson University
www.ces.clemson.edu/ie/research/hcsl/websat

Creation Date: 08/03/04

4. View or Edit Data: Click on the Item # link to go to corresponding Work Card/ AD / NR data pertaining to the corresponding surveillance activity. If the work order is closed, then the data can only be viewed and cannot be edited.

View Surveillance Data > Work Order Details > Surveillance Data > **View Activities**

View Activities

Printer Friendly

Work Order Number 4579   **Aircraft Tail Number** 7824

Site BFM-Mobile-United States

* **MANDATORY ITEMS MARKED IN BOLD**

WC [ ] Go

PREVIOUS   Page 2 [ ] Go

Item #	Type	Status	Performed By	Title	Process Measure	MX Task
000466	WC	Completed	Steve Johnson	Fuselage- Repair to cover Access hole		
000472	WC	Not Worked on	Steve Johnson	Smoke Detection and Fire support placards removal		
180	WC	Completed	Steve Johnson	Remove Panels - Major Zone 322	Documentation Surveillance	Clean(CL)
181	WC	Completed	Steve Johnson	Remove Panels - Major Zone 323	Documentation Surveillance	Visual Check (VC)
182	WC	Completed	Steve Johnson	Remove Panels - Major Zone 324	Final Walkaround	Service(SV)
183	WC	NR	Steve Johnson	Remove Panels - Major Zone 325	Final Walkaround	Service(SV)
184	WC	Completed	Steve Johnson	Remove Panels - Major Zone 326	In Process Surveillance	Open/Remove (O/R)
184 (Activity 2)	WC	Not Worked on		Remove Panels - Major Zone 326		
185	WC	Not Worked on		Remove Panels - Major Zone 327		
186	WC	Not Worked on		Remove Panels - Major Zone 328		
5597-55-5422	WC	Completed	Steve Johnson	Panel Lubrication	Final Walkaround	Functional Check(FC)
5597-58-5422	WC	NR	Steve Johnson	Wire connectors	In Process Surveillance	Lubricate(LU)
187	WC	Not Scheduled	-	-	-	-
188	WC	Not Scheduled	-	-	-	-
189	WC	Not Scheduled	-	-	-	-

Figure 17. View Activities with Only Work Cards

18 Surveillance Activity Distribution

18.1 Purpose

In this page, the process measure, aircraft level impact and organizational categories for the chosen work order in the surveillance data page is presented. In Figure 18, for the work order number 4579 and Aircraft Tail Number 7824 in BFM site, the surveillance activity distribution is presented in a tabular format.

The table consists of list of all the process measures, number of accepts for each process measure, number of rejects for each process measure, total number of accepts and rejects for each process measure and the total % of surveillance activities performed on each process measure. This information helps the quality assurance representative to review the distribution of process measures and aircraft level impact and organizational categories.

Human Computer Systems Laboratory
Department of Industrial Engineering
Clemson University
www.ces.clemson.edu/ie/research/hcsl/websat

Creation Date: 08/03/04

View Surveillance Data > Work Order Details > Surveillance Data > Surveillance Activity
Distribution

Surveillance Activity Distribution

Aircraft Tail # 7824
Work Order Title Test work order
Site Name BFM-Mobile-United States

Work Order # 4579

Process Measure Distribution Table for the Work Order

Process Measure	Accepts (A)	Rejects (R)	Total A + R	R/(A+R) * 100
In Process Surveillance	4	2	6	33.33
Verification Surveillance	0	1	1	100
Final Walkaround	1	7	8	87.5
Documentation Surveillance	1	2	3	66.67
Facility Surveillance	1	1	2	50
Procedures Manual Violation	0	0	0	0
Additional Findings	0	0	0	0
TOTAL	7	13	20	

Aircraft Level Impact for the Work Order

Aircraft level Impact	Rejects (R)	R/(Total R) * 100
Safety	0	0
Regulatory Compliance	5	38.46
Procedures and Paperwork Inadequacy	6	46.15
House-keeping	2	15.38
Operational	0	0
TOTAL	13	

Organization Category for the Work Order

Organizational Category	Rejects (R)	R/(Total R) * 100
High Risk	1	7.69
Medium Risk	5	38.46
Low Risk	7	53.85
TOTAL	13	

Back

Figure 18. Surveillance Activity Distribution

19 View NR Information

19.1 Purpose

Click on the View NR Information link in the global navigation tabs to access data on all the types of Non Routines. This page allows you to view data related to non-routines generated by work card rejects and regular non-routines some of which may be out of the scope of vendor's scheduled surveillance event.

Figure 19. View NR Information

Enter an Aircraft Tail Number or a Work Order Number as shown in Figure 19 and click on the Go button to view a list of Work Orders associated with the specified Aircraft Tail Number or view the Non Routine Details of the specified work order respectively. Select a particular work order by clicking on the Work Order # to go to the Non Routine Details page of the selected Work Order.

20 Non Routine Details

20.1 Purpose

The Non Routine Details page displays the different types of non-routines. Once you select a work order you will see a list of Non Routines generated due to work card rejections as shown in Figure 36.

Human Computer Systems Laboratory   Creation Date: 08/03/04
Department of Industrial Engineering
Clemson University
www.ces.clemson.edu/ie/research/hcsl/websat

Figure 20. Non Routine Details

20.2 Task Details

The four tasks that can be completed on this page are:

1. Work Cards NR: Click on the NR # link to proceed to Non Routine Data page.

2. QAR NR: Click on the QAR tab to view a non-routine table with a list of non-routines that are generated by a QAR for that particular work order. Click on the NR# to proceed to the selected non-routine data page.

3. Vendor NR: Click on the Vendor NR tab to view a non-routine table with a list of sampled vendor non-routines that were worked upon. Click on the NR# to proceed to the selected non-routine data page.

4. Out of Scope NR: Click on the Out of Scope NR tab to view a non-routine table with a list of out-of-vendor scope non-routines that have been generated. Click on the NR# to proceed to the selected non-routine data page.

The different fields in the non-routines table, as seen in Figure 36, are:

- *NR#*: In Figure 36, for example, there is a NR with NR# NR2323.
- *Work Card#*: In Figure 36, NR# NR2323 belongs to the WorkCard # 180.
- *Originating NR#*: If a NR is generated by rejecting a NR then this field refers to the NR# which generated the NR.
- *Generate By*: In Figure 36, the name of the employee who generated the NR is Steve Johnson.
- *NR Generation Date*: In Figure 36, the NR Generation Date field shows the date when NR was generated as 26 August 2006.
- *Status*: In Figure 36, the work card status field shows as ACCEPT.
- *Title*: In Figure 36, the work card title is shown as Remove Panels – Major Zone 392.

21 Non Routine Data

21.1 Purpose

After you select a NR, you will arrive at the Non Routine Data page (see figure 32) where new data can be entered or existing data can be updated.

21.2 Task Details

To enter data related to non-routines, you need to complete the following tasks:

1. Status: Click on one of the radio buttons provided below Status. If an ACCEPT radio button is selected, only the Comments field will be displayed to document any information regarding this surveillance activity as shown in Figure 32.

If the Reject radio button is selected, the three text boxes for Discrepancy, Corrective Actions and Comments will be displayed to enter data. Discrepancy is a required field when the activity is rejected. Aircraft Level Impact and Organizational Category are also required fields when an activity is rejected.

Figure 21. Non Routine Data Page

2. Process Measure: Use the Process Measure drop-down menu to choose the Process Measure associated with the surveillance activity performed. This is a required field.

3. Mx Task: Use the Mx Task drop-down menu to choose the Mx Task associated with the surveillance activity performed. This is a required field.

4. Mx Task: Use the Mx Source drop-down menu to choose the Mx Source associated with the surveillance activity performed. This is a required field.

5. Aircraft Level Impact: Use the Aircraft Level Impact drop-down menu to choose the Aircraft Level Impact associated with the surveillance activity performed. This is a required field if the activity is rejected. This field does not appear if the Status is selected to be ACCEPT.

6. Organizational category: Click on the Select OC Link to choose the Organizational Category associated with the surveillance activity performed. This is a required field if the activity is rejected. This field does not appear if the Status is selected to be ACCEPT.

7. **"What is this Link?"**: Click on the "What is this?" link that appears next to the ALI drop-down menu or OC link to open a pop-up window with information pertaining to ALI or OC as shown in Figure 33.
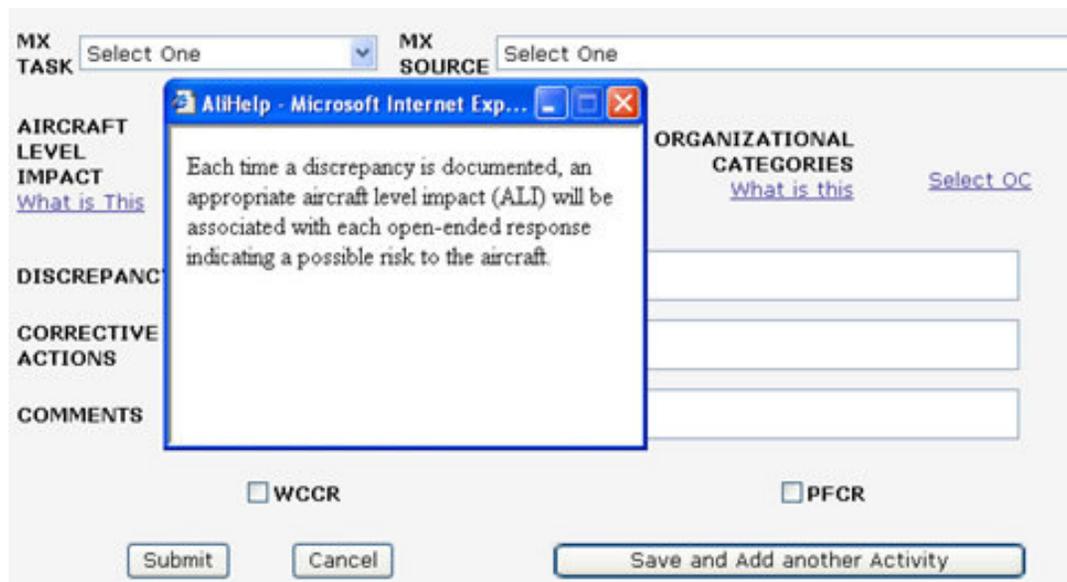
Figure 22. "What is this?" link pop up for ALI

8. Non Routine Number: Enter the Non Routine Number if you generate a non routine for this activity.

9. Non Routine Title: Enter the Non Routine Title if you if you generate a non routine for this activity.

10. Submit Information: Click on the Submit button to submit all the information entered to the system. If you have rejected the activity and did not enter the Non Routine (NR) Number associated with the reject, the system will display the pop-up as shown in Figure 34 to confirm NR generation before submitting the information to the system. If you want to create an NR and you don't have NR # with you at that point, the system will generate a substitute NR# which can be replaced once you have the original NR #.

11. Cancel: Click on the Cancel button to exit from this screen to the Work Order Details page without saving any information entered.

Human Computer Systems Laboratory
Department of Industrial Engineering
Clemson University
www.ces.clemson.edu/ie/research/hcsl/websat

Creation Date: 08/03/04
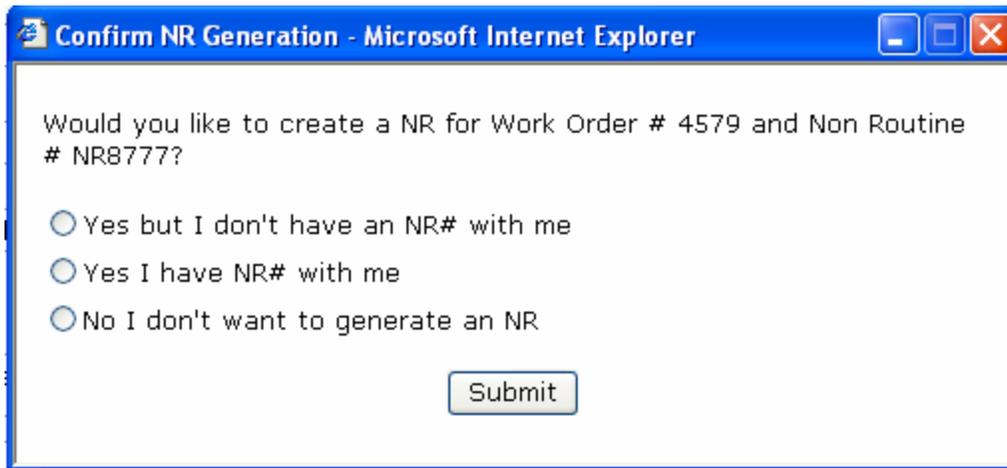
Figure 23. NR Generation confirmation pop-up dialogue box

22 View My Activity Distribution

22.1 Purpose

Click on the View My Activity Distribution link on the global navigation tab to access the View My Activity Distribution page shown in Figure 24. This page provides the representative who logged in with details on total number of surveillance activities performed by him/her in the specified date range and in specified facility(s). This page also gives information on the target to be achieved by the representative and if it has been met with or not.

22.2 Task Details

To view data related to process measures distribution of the activities, you need to complete the following tasks:
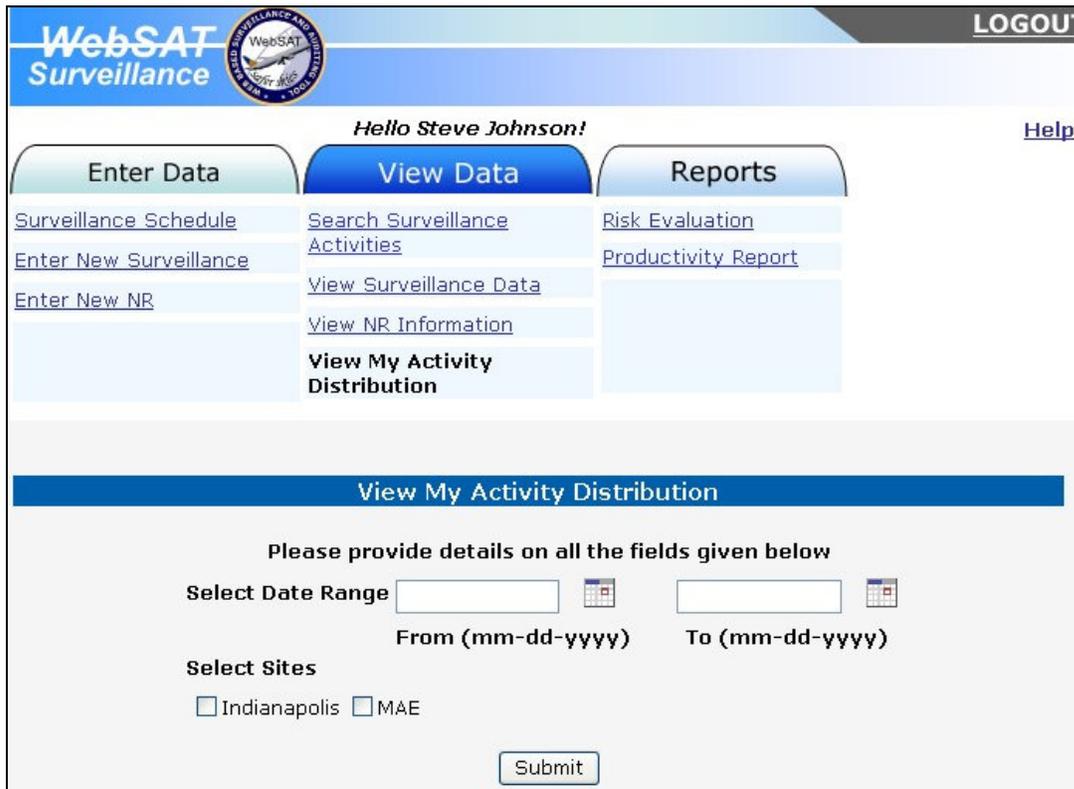
Figure 24. View My Activity Distribution

1. Select Date Range: Click on the calendar icon next to the From textbox to choose the starting date. A pop up calendar (see Figure 25) will display dates of the current month. The back and forward arrow can be used to navigate from one month to another. The date can also be entered in the text box provided in the mm/dd/yyyy format. Repeat the steps to specify date in the To textbox.

Figure 25. Calendar Pop-Up Screen

Human Computer Systems Laboratory   Creation Date: 08/03/04
Department of Industrial Engineering
Clemson University
www.ces.clemson.edu/ie/research/hcsl/websat

2. Select Sites: Select the check box next to the site name to include data stored for each site.

23 My Process Measure Activity Distribution

You can come to this page only after specifying date range in the View My Activity Distribution page. This page displays a table that consists of list of all the process measures, number of Accepts for each process measure, number of rejects for each process measure, total number of accepts and rejects for each process measure, the total % of surveillance activities performed on each process measure, and the target % of surveillance activities to be performed on each of these process measures for all the surveillance activities that fall in the date range specified. This information helps the quality assurance representative to identify if the target has been met or not. A graphical representation of the same information is presented below the table displaying the target % and the % of activities completed for each process measure. This page also displays the work orders to which the surveillance activities belong to apart from the aircraft tail number and the Site names.
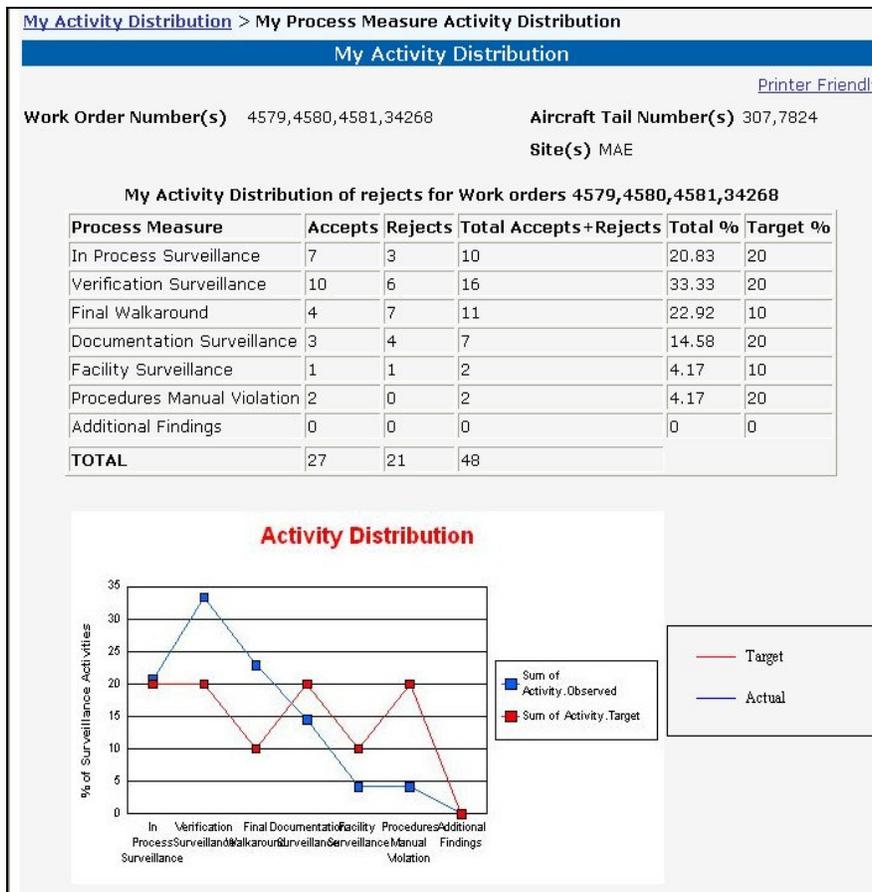
Figure 26. My Process Measure Activity Distribution

Process Measure Activity Distribution is also provided per work order based on the number of work orders that fall in the date range selected as shown in figure 27.

Process Measure	Accepts	Rejects	Total Accepts+Rejects	Total %
In Process Surveillance	4	2	6	31.58
Verification Surveillance	0	1	1	5.26
Final Walkaround	2	6	8	42.11
Documentation Surveillance	1	2	3	15.79
Facility Surveillance	0	1	1	5.26
Procedures Manual Violation	0	0	0	0
Additional Findings	0	0	0	0
TOTAL	7	12	19	

Activity Distribution for Work Order Number 4580

Process Measure	Accepts	Rejects	Total Accepts+Rejects	Total %
In Process Surveillance	0	1	1	4.55
Verification Surveillance	7	4	11	50
Final Walkaround	2	1	3	13.64
Documentation Surveillance	2	2	4	18.18
Facility Surveillance	1	0	1	4.55
Procedures Manual Violation	2	0	2	9.09
Additional Findings	0	0	0	0
TOTAL	14	8	22	

Activity Distribution for Work Order Number 4581

Process Measure	Accepts	Rejects	Total Accepts+Rejects	Total %
In Process Surveillance	3	0	3	42.86
Verification Surveillance	3	1	4	57.14
Final Walkaround	0	0	0	0
Documentation Surveillance	0	0	0	0
Facility Surveillance	0	0	0	0
Procedures Manual Violation	0	0	0	0
Additional Findings	0	0	0	0
TOTAL	6	1	7	

Figure 27. My Process Measure Activity Distribution

Click on the Printer Friendly link above the table to print the entire activity distribution displayed.

24 Risk Evaluation

24.1 Purpose

Click on the Risk Evaluation link on the global navigation tabs to access the vendor Risk Evaluation page seen in Figure 28. The Risk Evaluation page evaluates the performance of a vendor for a specific aircraft type, or for several aircraft types over a period of time.

Figure 28. Risk Evaluation Page

24.2 Task Details

To identify the work orders of an aircraft type and choose the contents of the Risk Evaluation Report, fill the following fields:

1. Site Name Drop-Down Menu: Choose the Site name from the drop-down menu. The red star (*) next to this field indicates that this is required. The menu lists the sites currently providing services for the airline.

Human Computer Systems Laboratory
Department of Industrial Engineering
Clemson University
www.ces.clemson.edu/ie/research/hcsl/websat

Creation Date: 08/03/04

2. Aircraft Type Drop-Down Menu: Click on the Aircraft Type drop-down menu and choose the type of aircraft. This drop-down menu will display the aircraft types associated with the vendor. Choose All Applicable in the drop-down menu to include all the aircraft types the vendor may be associated with.

3. Maintenance Dates: This feature helps you to specify a particular date range to search for the work orders. You may enter the From and To date fields by typing in the date in the mm-dd-yyyy format OR you could click on the calendar icon next to the From and To text field to select a date from the pop-up calendar. The pop-up calendar will display dates of the current month. Select the month using the drop-down menu. The back and forward arrow can be used to navigate from one year to another as shown in Figure 29. Note that if the maintenance event dates are not chosen, WebSAT will default the search to maintenance events in the last five years.

Figure 29. Calendar Pop up

4. Process Measure Drop-Down Menu: Click on the Process Measure drop-down menu and choose the process measure to be considered for analysis. This drop-down menu will display the six process measure categories. WebSAT will default the analysis to All Applicable in the process measures drop-down menu to include data related to all the process measures.

5. Report Analysis Choices: The Report Analysis Choices field includes the following checkboxes as shown in Figure 28:

Site analysis by aircraft numbers: Check the Site Analysis by Aircraft numbers checkbox to view Site Analysis per aircraft.

Site analysis for all aircraft: Check the Site Analysis for all aircraft checkbox to view site analysis for all aircraft for each aircraft type.

Rejection rate graph for all aircraft: Check the Rejection rate Line Graph checkbox to view line graph comparing the current rejection rates with predicted rejection rate.

Select All: Click on the Select All button to include all the report analysis choices for risk evaluation.

6. Submit: Click on the Submit button after all the required information has been provided to go to the Aircraft Selection page.

25 Aircraft Selection

25.1 Purpose

The Aircraft Selection page, as shown in Figure 30, displays the different aircraft matching the criteria specified in the Risk Evaluation page. You can access this page only from the Risk Evaluation page.

The page begins by identifying the criteria chosen in the Risk Evaluation page. As seen in Figure 30, the Aircraft Selection page is displaying aircraft of vendor FEDEX-Indianapolis-Indiana from 15 November 2001 to 15 November 2006 for aircraft type A300. The process measures applicable for this analysis are shown in the Process Measures field.

Figure 30. Aircraft Selection Page

25.2 Task Details

The two tasks that can be completed from this page, as shown in Figure 30, are:

1. Aircraft Selection for Analysis: Click on checkboxes under the Select column to choose aircraft you would like to include for this analysis. For faster selection, click on

the Select All button to choose all the aircraft listed in the Aircraft table. The Select All button changes to Uncheck All. Click on Uncheck All to uncheck all the selected items. Click on the Perform Analysis button to go to the next page depending on your choices in the Reports Analysis field in the Risk Evaluation page (see Section 24).

2. Back to Risk Evaluation page: Click on the Back button to go back to the Risk Evaluation page.

26 Site Analysis by Aircraft

26.1 Purpose

The Site Analysis by Aircraft page, as shown in Figure 40, displays the Site Analysis for each aircraft chosen in the Aircraft Selection page. You can access this page only if the Site Analysis by Aircraft checkbox in the Report Analysis Choices field in the Risk Evaluation page is checked.

The page begins by identifying the criteria chosen in the Risk Evaluation page. As seen in Figure 39, the Site Analysis by Aircraft page is displaying aircraft of vendor FEDEX-Indianapolis-Indiana from 15 November 2001 to 15 November 2006 for aircraft type A300. The process measures applicable for this analysis are shown in the Process Measures field. The number of aircraft selected for this analysis is 1.
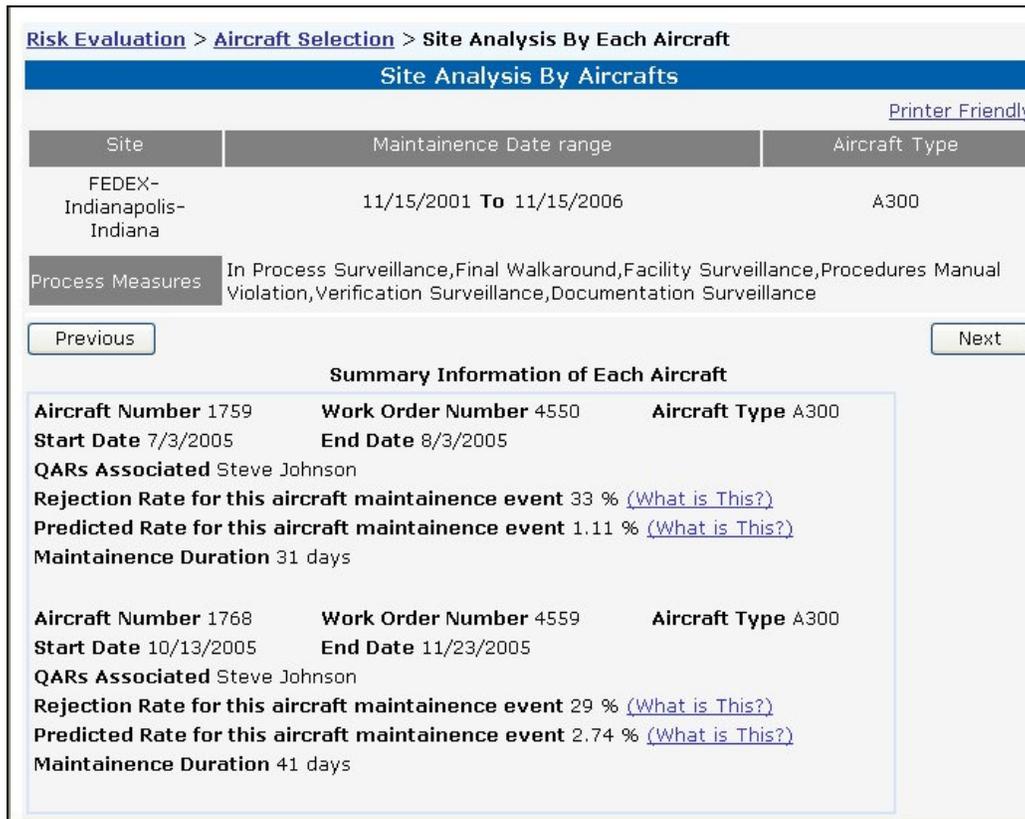
Figure 31. Site Analysis by Aircraft Page

26.2 Field Description

The various fields in the Site Analysis by Aircraft page, as shown in Figure 31, are:

1. Summary Information of Each Aircraft table: The Summary Information of Each Aircraft table includes the various aircraft selected in the Aircraft Selection page. Each row in this table contains analysis of an aircraft.

As seen in Figure 31, for Aircraft Number 1759 and Work Order Number 4550 of Aircraft Type A 300 with Steve Johnson as the QAR associated, the rejection rate for this aircraft maintenance event is 33 percent. This means that if there were 100 surveillance activities in this aircraft maintenance event, there were approximately 33 REJECT responses. The Model's Predicted Outcome for this Aircraft is the percentage REJECT predicted using a Multi Level Logistic Regression model embedded in WebSAT which performs analysis based on historical data. The model's predicted outcome for this aircraft is 1.11 percent. This means that based on historical evidence and considering all the various parameters in the model, it predicts an aircraft rejection rate of approximately 1.11 for every 100 surveillance activities.

2. Previous and Next Button: Click on the Previous and Next button to navigate to the other pages.

27 Site Analysis for all Aircraft

The Site Analysis for all Aircraft page, as shown in Figure 32, displays the Site Analysis for all aircraft chosen in the Aircraft Selection page. You can access this page only if the Site Analysis for all Aircraft checkbox in the Report Analysis Choices field in the Risk Evaluation page is checked.

The page begins by identifying the criteria chosen in the Risk Evaluation page. As seen in Figure 32, the Site Analysis for all aircraft page is displaying aircraft of site FEDEX-Indianapolis-Indiana from 15 November 2001 to 15 November 2006 for aircraft type A300. The process measures applicable for this analysis are shown in the Process Measures field.

Figure 32. Aggregated Aircraft Information (Site Analysis for all Aircraft) Page

For the aircraft type A300, the Aggregated Aircraft Rejection rate is 31 percent. This means that for the one aircraft, the rejection rate is approximately 31 REJECT responses for every 100 surveillance activities in the surveillance event.

The Aggregated Model Rejection rate using the Multilevel Logistical Regression model is 1.93 percent. The Aggregated Model Rejection rate is the percentage REJECTS predicted for all the aircraft maintenance events of a particular aircraft type using a Multi Logistic Regression model embedded in the system which performs analysis based on historical data. Standard Deviation is a measure of the average distance of the aircraft

rejection rate from the aggregated aircraft rejection rate. Click on the Previous and Next button to navigate to the other pages.

28 Risk Evaluation Graphs

The different graphs displaying trends and distribution of the site data are explained below:

28.1 Rejection rate graph

The Rejection Rate Graph page, as shown in Figure 33, displays the trend on site's performance in terms of aircraft rejection rate. You can access this page only if the Rejection Rate Graph checkbox in the Report Analysis Choices field in the Risk Evaluation page is checked.

The page begins by identifying the criteria chosen in the Risk Evaluation Report page. As seen in Figure33, the Rejection Rate Graph page is displaying aircraft of vendor for all aircraft page is displaying aircraft of vendor FEDEX-Indianapolis-Indiana from 15 November 2001 to 15 November 2006 for aircraft type A300. The process measures applicable for this analysis are shown in the Process Measures field.

The red line in the graph is the rejection rate of the aircraft chosen in the Aircraft Selection page while the blue line is the Model's predicted rejection rate generated from the different parameters of each aircraft.

Human Computer Systems Laboratory   Creation Date: 08/03/04
Department of Industrial Engineering
Clemson University
www.ces.clemson.edu/ie/research/hcsl/websat
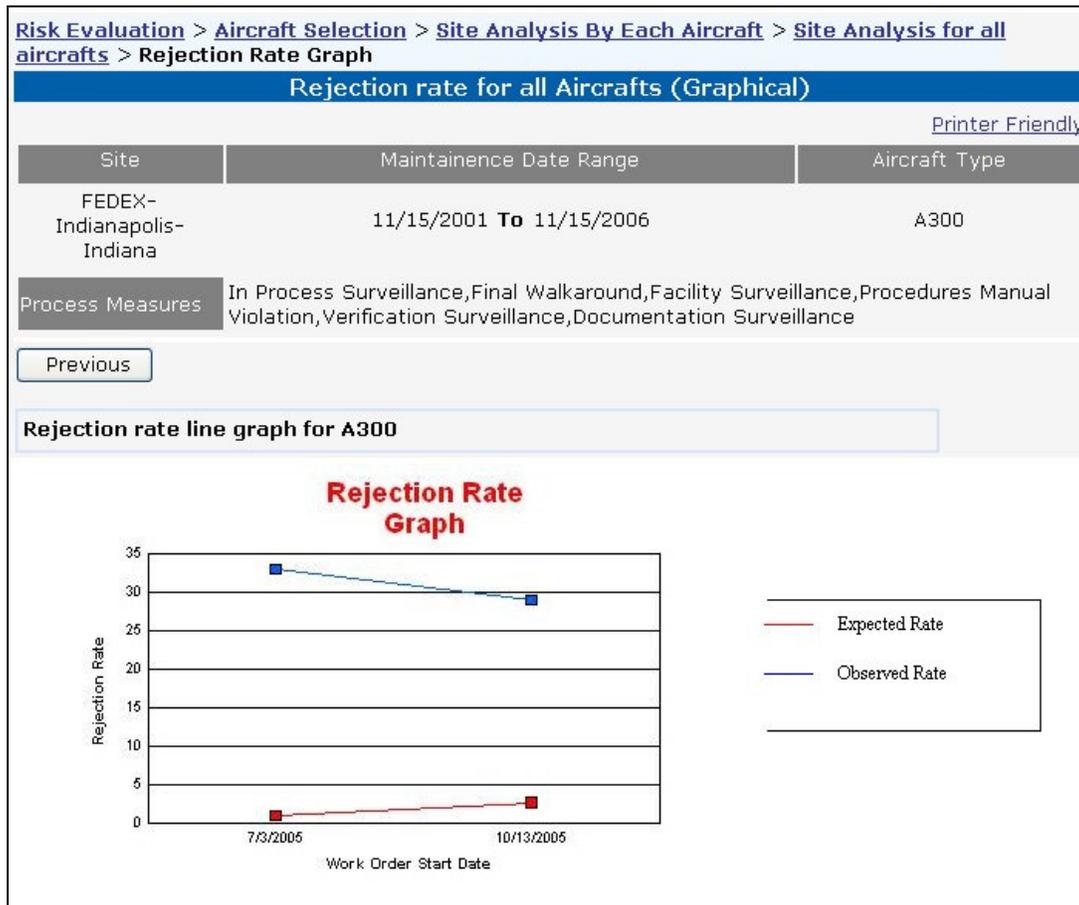
Figure 33. Rejection Rate Graph Page

29 Productivity Report

29.1 Purpose

Click on the Productivity Report link on the global navigation tab to access the Productivity Report page shown in Figure 34. This page provides the user with an ability to be able to generate a report with details on total number of surveillance activities performed in the specified date range and in specified facility(s). This page gives information on the total number of activities performed specific to work order(s) and specific to site(s) based on the input provided. It also presents information specific to work order(s) and aircraft tail numbers.

29.2 Task Details

To view data related to process measures distribution of the activities, you need to complete the following tasks:

Human Computer Systems Laboratory   Creation Date: 08/03/04
Department of Industrial Engineering
Clemson University
www.ces.clemson.edu/ie/research/hcsl/websat

Figure 34. Productivity Report using Site(s)

1. Select Date Range: Click on the calendar icon next to the From textbox to choose the starting date. A pop up calendar (see Figure 35) will display dates of the current month. The back and forward arrow can be used to navigate from one month to another. The date can also be entered in the text box provided in the mm/dd/yyyy format. Repeat the steps to specify date in the To textbox.

Figure 35. Calendar Pop-Up Screen

2. Select Sites: Select Site(s) in the drop down and mark the check box next to the site name to include data stored for each site.

3. Report Analysis Choices: The Report Analysis Choices field includes the following checkboxes as shown in Figure 34:

Overview: Check the Overview checkbox to view site specific and work order specific details on the total number of surveillance activities performed, the observed number of rejects, accepts and others, the compliance index and the number of representatives who worked on each site and similar details on each work order. The target number of activities to be achieved specific to a site is also provided.

View Surveillance Summary: Check the View Surveillance Summary checkbox to view distribution of the rejects with respect to the different types of performance metrics namely, Process Measures, Aircraft Level Impact Categories and Organizational Categories which are indicative of the risk level.

Major Category Distribution: Check the Major Category Distribution checkbox to view the distribution of the rejects with respect to the major categories namely Technical, Housing ad Facilities, Administration and Programs. Information on the target to be achieved for the total number of activities performed per each category and the number achieved is also provided.

Monthly Activity Charts: Check the Monthly Activity Charts checkbox to view the bar graphs of distribution of the average number of activities performed per each month in the specified date range and the average number of surveillance activities per employee per month.

Process Measure Distribution: Check the Process Measure Distribution checkbox to view the bar graph providing the distribution of number of rejects for each process measure.

Aircraft Level Impact Distribution: Check the Aircraft Level Impact Distribution checkbox to view the bar graph displaying the distribution of number of rejects for each aircraft level impact category.

Organizational Category Distribution: Check the Organizational Category Distribution checkbox to view the bar graph displaying the distribution of number of rejects for each organizational category.

Select All: Click on the Select All button to include all the report analysis choices for productivity report.

30 Productivity Report Overview

You can come to this page only after specifying date range and selecting the Overview checkbox in the Productivity Report page. This page displays a table that consists of the total number of surveillance activities performed, the total number of Rejects, the number of Accepts, Net Surveillance, the rejection rate, compliance index, the number of QARs who worked at the specified site in the specified date range and the target number of activities that need to be achieved for the total number of working days in the specified date range. This page also displays information specific to each work order that fall in the specified date range and belong to selected sites as shown in Figure 36 below.

Human Computer Systems Laboratory
Department of Industrial Engineering
Clemson University
www.ces.clemson.edu/ie/research/hcsl/websat

Creation Date: 08/03/04

Productivity Report > Overview

Productivity Report Overview

Printer Friendly

From 2/1/2005   **To** 12/28/2006   **Site(s)** Fed_INDI-Indianapolis-United States

Site(s)	Total Surveillance activities(I)	Others (II)	Net Surveillance (I + II)	Total Rejects	Reject Rate / 100	Compliance Index	# of QARs	Target #
Indianapolis	58	1	57	12	21	79	2	20850
TOTAL 1	58	1	57	12	21	79	2	20850

Onsite QA Surveillance Summary

Number of Work Orders included 3
Average surveillance per site 58
Average surveillance per QAR 29
Average rejections per site 6

Work Order #	Total Surveillance activities(I)	Others (II)	Net Surveillance(I + II)	Total Rejects	Reject Rate / 100	Compliance Index	# of QARs
4559	7	0	7	2	29	71	1
4550	6	0	6	2	33	67	1
4578	45	1	44	8	18	82	2
TOTAL 3	58	1	57	12	21	79	4

<< Previous   Next >>

Figure 36. My Process Measure Activity Distribution

Click on the Printer Friendly link above the table to print all the information displayed on this page.

Click on the Next Button to proceed to subsequent report analysis options that were specified on the Productivity Report page. Click on the Previous Button to go to the pages that were displayed prior to the current page.

31 Surveillance Summary

You can come to this page only after specifying date range and selecting the View Surveillance Summary checkbox in the Productivity Report page. This page displays a table that consists of the distribution of the rejects with respect to the different types of performance metrics namely, Process Measures, Aircraft Level Impact Categories and

Organizational Categories as shown in Figure 37 below. This information is provided for all the selected sites.
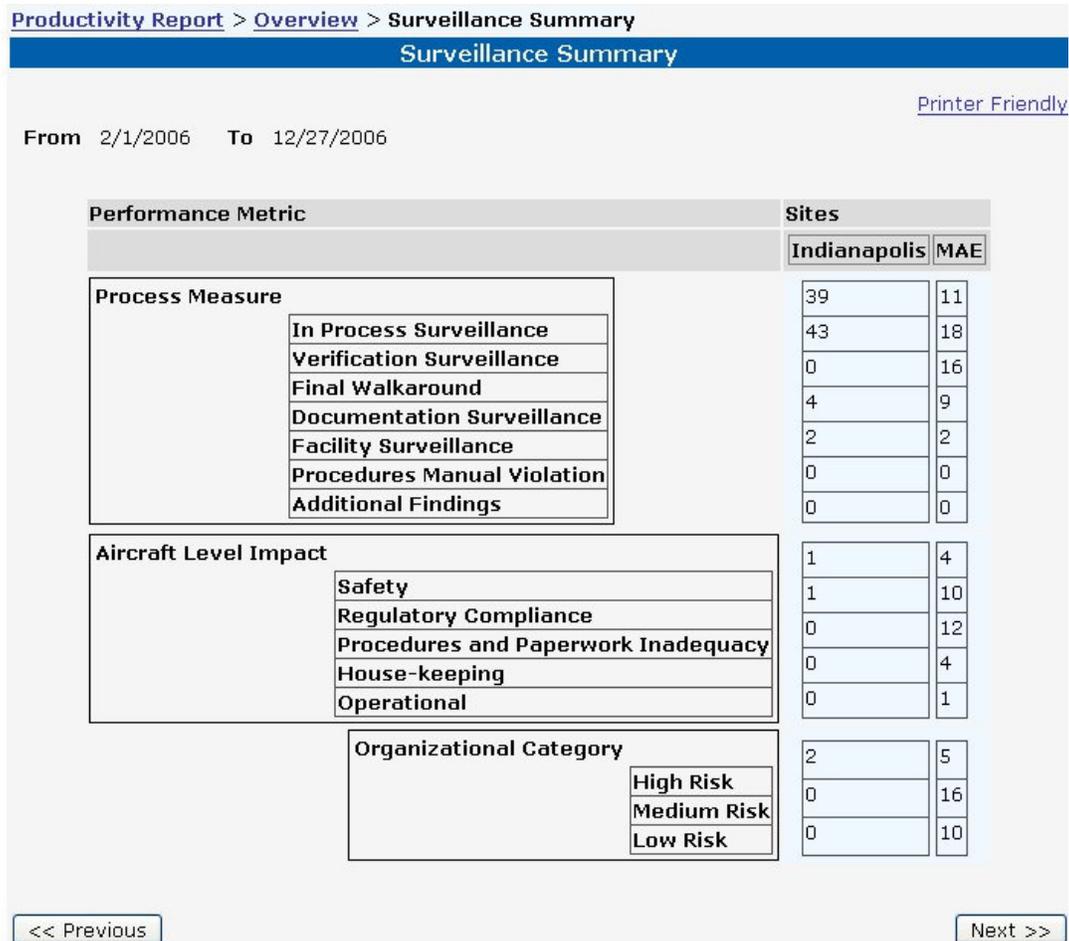
Figure 37. Surveillance Summary

Click on the Printer Friendly link above the table to print all the information displayed on this page.

Click on the Next Button to proceed to subsequent report analysis options that were specified on the Productivity Report page. Click on the Previous Button to go to the pages that were displayed prior to the current page.

32 Major Category Distribution

You can come to this page only after specifying date range and selecting the Major Category Distribution checkbox in the Productivity Report page. This page displays a distribution of the rejects per site and per major category namely Technical, Housing and Facilities, Administration and Programs as shown in Figure 38 below. Information on the

Human Computer Systems Laboratory
Department of Industrial Engineering
Clemson University
www.ces.clemson.edu/ie/research/hcsl/websat

Creation Date: 08/03/04

target to be achieved for the total number of activities performed per each category and the number achieved per site is also provided.
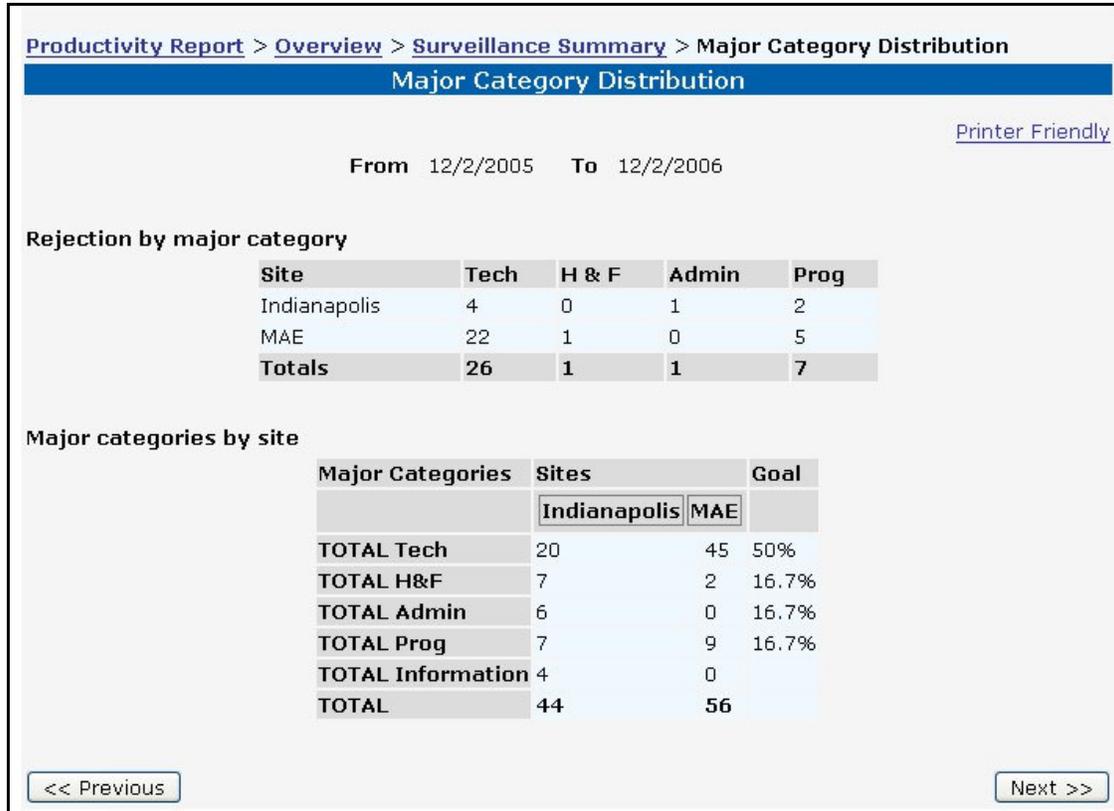
Figure 38. Major Category Distribution

Click on the Printer Friendly link above the table to print all the information displayed on this page.

Click on the Next Button to proceed to subsequent report analysis options that were specified on the Productivity Report page. Click on the Previous Button to go to the pages that were displayed prior to the current page.

33 Monthly Activity Charts

You can come to this page only after specifying date range and selecting the Monthly Activity Charts checkbox in the Productivity Report page. This page displays bar graphs of distribution of the average number of activities performed per each month in the specified date range and the average number of surveillance activities per employee per month as shown in Figure 39 below.
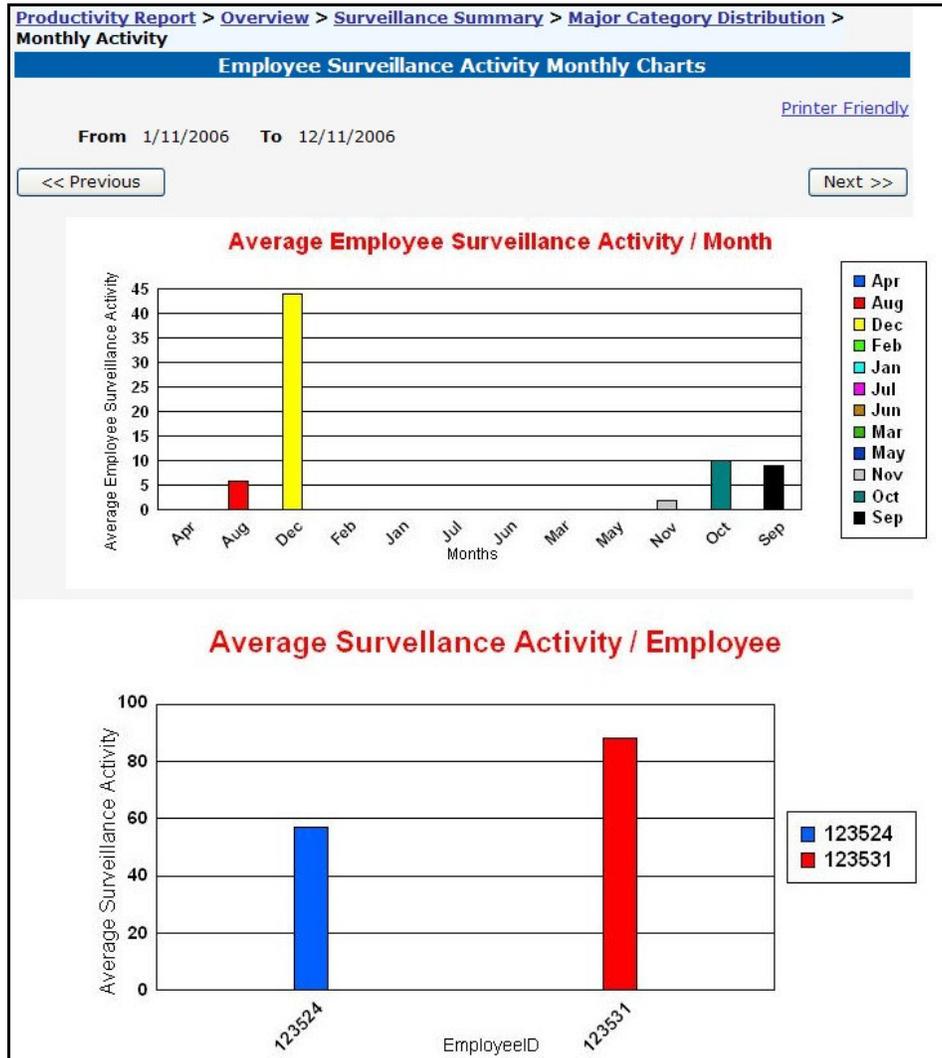
Figure 39. Major Category Distribution

Click on the Printer Friendly link above the table to print all the information displayed on this page.
Click on the Next Button to proceed to subsequent report analysis options that were specified on the Productivity Report page. Click on the Previous Button to go to the pages that were displayed prior to the current page.

34 Process Measure Distribution

You can come to this page only after specifying date range and selecting the Process Measure Distribution checkbox in the Productivity Report page. This page displays a distribution of the total number of surveillance activities performed, the total number of accepts, the total number of rejects per each Process Measure and the % of surveillance activities performed in the specified date range. The target % to be achieved is also provided next to the total % of activities performed as shown in Figure 40 below. The

display presents a bar graph providing the distribution of total number of activities performed per each process measure.

If the parameters chosen the Productivity report page includes multiple sites, this page will also display process measure distribution table for each site.

Click on the Printer Friendly link above the table to print all the information displayed on this page.

Click on the Next Button to proceed to subsequent report analysis options that were specified on the Productivity Report page. Click on the Previous Button to go to the pages that were displayed prior to the current page.
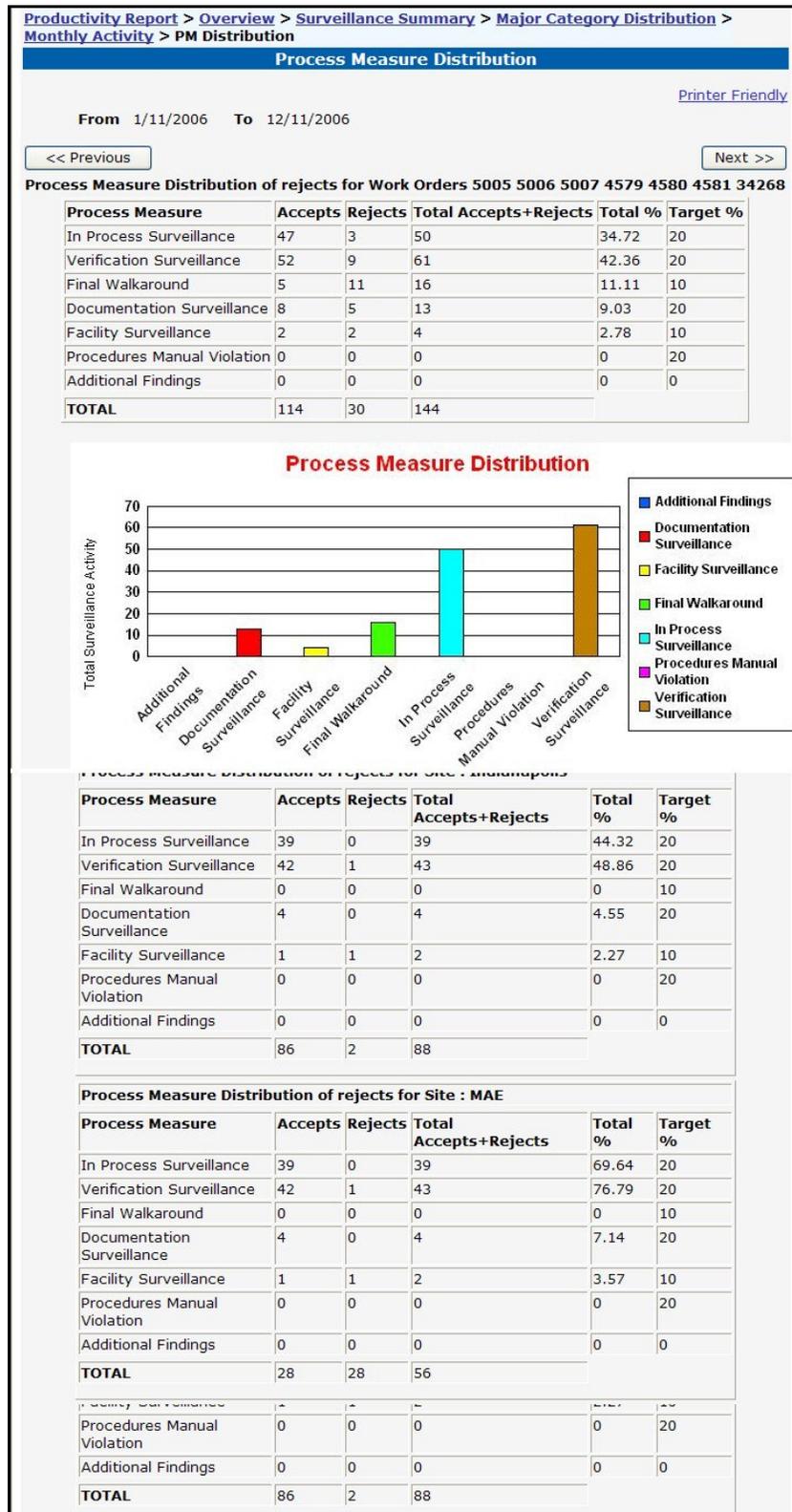
Figure 40. Process Measure Distribution

35 Aircraft Level Impact Distribution

You can come to this page only after specifying date range and selecting the Aircraft Level Impact Distribution checkbox in the Productivity Report page. This page displays a distribution of the number of rejects for each aircraft level impact category. A bar graph is displayed presenting the distribution of rejects for each ALI.

Click on the Printer Friendly link above the table to print all the information displayed on this page.

Click on the Next Button to proceed to subsequent report analysis options that were specified on the Productivity Report page. Click on the Previous Button to go to the pages that were displayed prior to the current page.

36 Organizational Category Distribution

You can come to this page only after specifying date range and selecting the Organizational Category Distribution checkbox in the Productivity Report page. This page displays a distribution of the number of rejects for each organizational category (OC). A bar graph is displayed presenting the distribution of rejects for each OC.

Click on the Printer Friendly link above the table to print all the information displayed on this page.

Click on the Next Button to proceed to subsequent report analysis options that were specified on the Productivity Report page. Click on the Previous Button to go to the pages that were displayed prior to the current page.

37 Administration Tasks (Manager Only)

The Administration tab is available exclusively for managers. The manager can edit information of Quality Assurance Representatives (QARs) and different sites, can set goals for QARs and re-open work orders using this global navigation tab.

37.1 Edit QARs

Click on the Edit QARs link on the global navigational tab to access the Add QARs page which allows you, as the manager, to edit information associated with the QARs. The manager can add a new QAR, remove an existing QAR, or modify the current information associated with a QAR.

Figure 41. Add QARs Page

37.1.1 Add New QAR

Use the Add New QAR page in Figure 41 to enter information on a new QAR. The red star (*) indicates required fields. Click on the Submit button to save this information and to go to the Edit QAR Information page shown in Figure 42.

Human Computer Systems Laboratory   Creation Date: 08/03/04
Department of Industrial Engineering
Clemson University
www.ces.clemson.edu/ie/research/hcsl/websat

Figure 42. Information added for a new QAR

37.1.2 Add QAR – Edit Information

To edit the submitted information, click on the Edit Above Information button on the lower left of the screen. To add the next QAR, click on the Add New QAR button on the lower right of the screen.

37.1.3 Remove QAR

Click on the Remove link, to remove a QAR from the system. Use the drop-down menu to select the QAR to be removed and then click on the Delete button, as shown in Figure 43.

Figure 43. Remove QAR Page

The dialogue box in Figure 44 pops up asking if you want to remove the QAR from the system. Click on the OK button in the dialogue box.

Figure 44. Dialogue Box Inquiry

Feedback indicates that the QAR has been successfully removed as shown in
Figure 45.
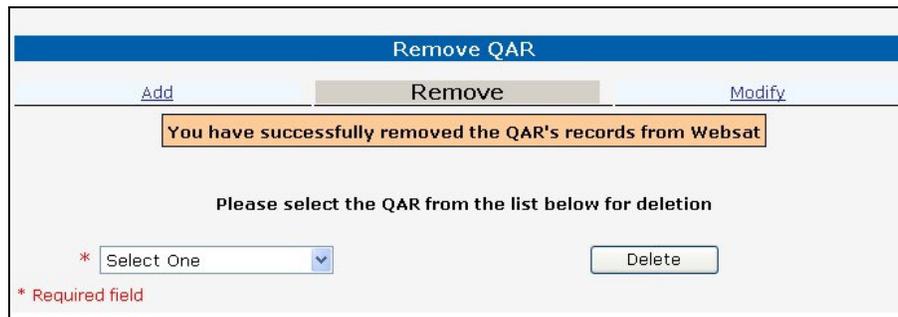
Figure 45. Feedback Page

Click on the Cancel button in the dialogue box to avoid QAR deletion and to
return to the screen shown in Figure 43.

37.1.4 Modify QAR

To modify existing QAR information, click on the Modify link in the Edit QARs
page to access the screen seen in Figure 46.
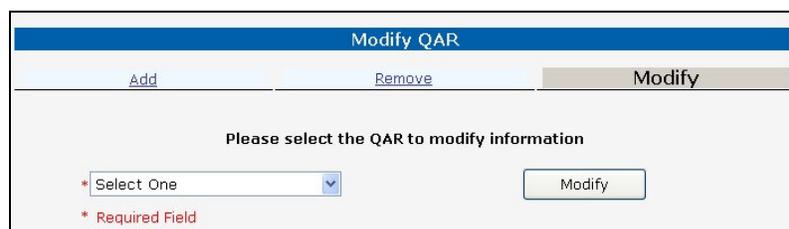
Figure 46. Modify QAR Page

Select the QAR in the drop-down menu shown in the figure and click on the Modify button to access to the Modify QAR Information page in Figure 47.

Figure 47. Modify QAR Information

Use the Modify QAR Information page to edit information on an QAR. The red star (*) indicates required fields. Click on the Submit button to save this information. Clicking the Submit button will give feedback message on successful modification.

37.2 Edit Sites

Click on the Edit Sites link on the global navigational tab to access the Add Sites page to edit Site information. The manager can add a new Site, remove a Site or modify the current information associated with a Site.

37.2.1 Add Site

Use the Add New Site page in Figure 48 to enter information on a new Site. The red star (*) indicates that it is a required field. Click on the Submit button to save this information and to go to the Edit Site Information page shown in Figure 49.

Figure 48. Adding a New Site Page

37.2.2 Add Site– Edit Information with Feedback

To edit the submitted information, click on the Edit Above Information button on the lower left of the screen as shown in Figure 49. To add the new Site, click on the Add another Site button on the lower right of the screen.

Figure 49. Information feedback indicating a Site has been added

37.2.3 Remove Site

Click on the Remove link, to remove a Site from the system. Use the drop-down menu to select the Site to be removed and then click on the Delete button as shown in Figure 50. This process is similar to the Edit QARs - Remove section (see Section 32.1.3).

Figure 50. Remove Site Page

37.2.4 Modify Site

To modify existing Site information, click on the Modify link in the Edit Site page to access the screen seen in Figure 51. Select the Site in the drop-down menu shown in the figure and click on the Modify button to access the Modify Site Information page. The process is similar to the Edit QARs - Modify section (see Section 32.1.4). The fields displayed are identical to Edit Sites- Add section (see Section 32.2.2).

Figure 51. Modify Site Information

37.3 Set Goals

Click on the Set Goals link on the global navigational tab to access the Set Goals page which allows you to set the target number of surveillance activities to be accomplished per process measure by each QAR per site day as shown in Figure 52. This page also allows you to specify the % of surveillance activities to be accomplished per major category and per technical category process measures.

Click on the Submit button after entering the target numbers.

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Figure 52. Set Goals

37.4 Re-Open Work Order

Click on the Re-Open Work Order link in the global navigation tab to access the Re-open Work Order page as shown in Figure 53. You may choose to use this feature when an airplane is still in the hangar and the work order has been closed in the WebSAT system because of the work order end date that was specified earlier.

Enter the work order number which needs to be re-opened. This is a required field as indicated by the red asterix next to the field. Specify the revised end date. Click on the Submit button to update the end date. The system asks for confirmation before the action occurs.

Figure 53. Re-Open Work Order Page

38 Surveillance Planning

Click on the Surveillance Planning link in the global navigation tab to access the Surveillance Planning page, as shown in Figure 54, which displays the fields required to plan a surveillance activity.

The Surveillance Planning page varies in the number of predictions that can be made for the surveillance representative and surveillance manager. The Surveillance Planning page for the surveillance representative can provide predictions for only one specified set of data for the parameters provided. The Surveillance Planning page allows the manager, to predict the rejection rate by specifying at the most three sets of values to the various parameters.

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Figure 54. Surveillance Planning

38.1 Task Details

To conduct surveillance planning:

1. Vendor Name Drop Down: Choose the vendor name from the drop-down menu. This menu selection lists the vendors currently providing services for the airline.
2. Aircraft Tail Number Drop Down: Click on the Aircraft Tail drop down and choose an aircraft tail number.
3. Process Measure Drop Down: Click on the Process Measure drop down and choose a process measure.
4. Calculate Predicted Rejection Rate: Click on the Calculate Predicted Rejection Rate button to go to the Predicted Response Rate page.

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Figure 55. Predicted Rejection Rate Page

The Predicted Rejection Rate page, as shown in Figure 55, displays the expected rejection rate for the criteria specified in the Surveillance Planning page. The manager/ representative can use this page to estimate the rejection rate if a surveillance activity was to be conducted at the vendor location on an aircraft.

As seen in Figure 55, the surveillance was conducted on vendor located at Greensboro for a Boeing 727 about 31 years old. Using the parameters, the model predicts a rejection rate of approximately 28 percent. This means that based on historical evidence and considering all the various parameters, the model predicts a probability of 28% that the surveillance activity will result in a reject.

39 Help

Click on the Help link at the top right portion of the screen to access the Help page which allows you to view the WebSAT Surveillance User Manual and the process measure definition document (see Figure 56).
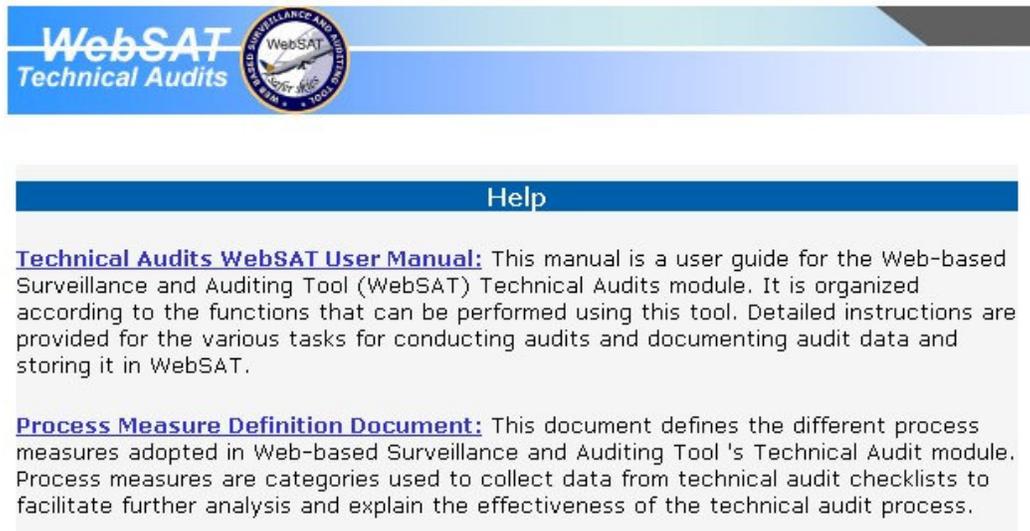
Figure 56. Help Page

Acknowledgements: We would like to thank the FAA for this opportunity to work on this project. We would also like to thank FedEx for their cooperation in this project. The design of this tool would not have been possible without their cooperation and support.

APPENDIX D

WebSAT User Manual for Airworthiness Directives Tracking Module

Web-based Surveillance and Auditing Tool

User Manual - Airworthiness Directives Control Group

Contents

1 Introduction

This is a user guide for the Web-based Surveillance and Auditing Tool (WebSAT) Airworthiness Directives module. It is organized according to the functions that can be performed using this tool. Detailed instructions are provided to store airworthiness directives tracking information in WebSAT. It is intended to be a straightforward introduction to how this tool works and assumes that the reader has a basic level of familiarity with computer and internet applications and with the business processes involved in a typical airline's Quality Assurance Department.

To view ONLY one particular topic, click the appropriate section in the Table of Contents. To print instructions for that topic, click on the Print button on your browser.

1.1 WebSAT Description

The research team at the Human Computer Systems Laboratory has developed WebSAT. It is a tool for analyzing aircraft maintenance data using results from statistical techniques such as logistical regression, to determine risk trends. It is intended to collect, reduce, and analyze surveillance, auditing and airworthiness directives operations data in a standardized way to reflect the impact of maintenance error on the safety of an aircraft. This will allow users at various hierarchical levels in a work function to collect and analyze data on.

Over time the WebSAT tool will become a repository of aircraft maintenance data. This will mean that the quality assurance personnel will be able to use verified records as evidence to analyze aircraft maintenance data, rather than managers depending on scattered and largely un-documented data to validate trends. The airline information and technology department will help maintain WebSAT and ensure the integrity of the data stored in it.

2 Introduction to WebSAT Terms

This section provides a brief explanation of the terms used in the different screens and forms of WebSAT, which may be unfamiliar to the user.

2.1 Airworthiness Directives ID

Airworthiness Directives ID refers to the airworthiness directive identification number. This is generated by WebSAT.

2.2 Aircraft Type

Aircraft Type refers to the type of aircraft associated with the airworthiness directive.

2.3 Process Measures for Airworthiness Directives

The data collected from the airworthiness directives control group will be grouped into categories to facilitate further analysis and comment on the effectiveness of the loading and tracking of airworthiness directives. These categories are defined as process measures. The process measures identified for airworthiness directives are defined below.

2.3.1 Information Verification

2.3.2 Loading and Tracking

3 Login

Figure 1. WebSAT Login Page

You can accomplish three tasks using the Login page:

1. Log into WebSAT: To login, type in your Username and Password (see Figure 1) and click on the Login button. If the information provided is correct, you will be taken to either the Start Airworthiness Directives Process page or the Resume Airworthiness Directives page. You will arrive at the Start Airworthiness Directives Process page if you do not have any Airworthiness Directives associated with you. You will arrive at Resume Airworthiness Directives page if you have Airworthiness Directives associated with your login name.

2. Change Password: Click on the Change Password link, to change your password (see Section 4 for details).

3. Request for Existing Password: Click on the Forgot Password link on the WebSAT Login page, if you have forgotten your password and are unable to login (see Section 5 for details).

4 Change Password

Clicking on the Change Password link on the WebSAT Login page takes you to the Change Password page shown in Figure 2. If you wish to exit the Change Password page, click on the Cancel button to return to the WebSAT Login page.

Figure 2. Change Password Page

To enter the information required to change your password:

    1. Type your username, old password and new password.

    2. Verify new password by re-typing it in the Confirm New Password text box.

    3. Select your identity question from the drop-down menu shown in the Figure 3 below. The Identity Question field helps you access your password in case you forget it. For example, you could select "What is your pet's name?"

Figure 3. Identity Question drop-down menu

    4. Type in the answer to the identity question you selected in the Identity Answer textbox. For example, you could type in "Rover" as the answer to your pet's name.

    5. Click on the Submit button to submit the information you have entered into WebSAT and go to Login page.

5 Forgot Password

       If you forget your password, click on the Forgot Password link on the WebSAT Login page to access the page seen in Figure 4. If you wish to exit the Forgot Password page, click on the Cancel button to return to the WebSAT Login page.

Figure 4. Forgot Password Page

To request for your existing password:

1. Enter your first name, last name and email address in the text boxes provided.

2. Click on the Submit button to provide your information to WebSAT. If the email address provided matches with the one that exists in WebSAT then your password will be sent to the email address provided.

6 Global Navigation Tabs

Once you login, one of the two pages will appear: (a) Start Airworthiness Directives Process (b) Resume Airworthiness Directives. You will arrive at the Start Airworthiness Directives Process page if you do not have any airworthiness directives associated with you. You will arrive at Resume Airworthiness Directives page if you have airworthiness directives associated against your name.

Figure 5. Global Navigation Tabs

This page includes three global navigation tabs at the top: Airworthiness Directives Tasks, Canned Statements and Reports.

1. Airworthiness Directives Tasks: This tab includes airworthiness directive loading and tracking related tasks. The four tasks that can be accomplished using this tab are:

a. Start Airworthiness Directives Process: Click on the Start Airworthiness Directives Process link to start the process.

b. Resume Airworthiness Directive: Click on the Resume Airworthiness Directive link to continue working on an Airworthiness Directive process where you left off.

c. View Rejects: Click on the View Rejects link to view canned statement attributes concerning a specific Airworthiness Directive, which have been rejected.

d. Search Airworthiness Directives: Click on the Search Airworthiness Directives link to look for Airworthiness Directives.

2. Canned Statements: Using this tab, you can perform the three canned statement-related tasks listed below.

a. View Canned Statements: Click on the View Canned Statements link to view and print a canned statement.

b. Modify Canned Statements: Click on this link to modify the canned statements.

c. Modify Corrective Actions: Click on this link to modify the possible list of corrective actions.

3. Reports: Click on the data analysis link to analyze data and generate reports associated with airworthiness directives.

7 Start Airworthiness Directives Process

7.1 Purpose

Click on Start Airworthiness Directives link on the global navigation tab to access the Start Airworthiness Directives page (see Figure) which allows you to start a airworthiness directives process.

Figure 6. Start Airworthiness Directives Page

7.2 Task Details

To Start Airworthiness Directives on this page (see Figure 6):

1. Airworthiness Directives Number: This is a number to identify each airworthiness directive process and is generated by the WebSAT system.

2. Completion Date: Click on the calendar icon next to the Completion Date textbox to choose the airworthiness directive process start date. A pop up calendar (see Figure) will display dates of the current month. The back and forward arrow can be used to navigate from one month to another. The date can also be specified in the text box provided in the mm/dd/yyyy format. This date is the date when the airworthiness directives control group completes the loading and tracking of a directive.

Figure 7. Calendar Pop-up

3. Target Date: The target date is the date when the airworthiness directives control group wants to complete the loading and tracking of an airworthiness directive.

4. Effective Date: The effective date is the date when the Federal Aviation Administration wants the airworthiness directive process to be introduced into the aircraft maintenance process.

8 Resume Airworthiness Directive

8.1 Task Details

This page is associated with proceeding ahead with the information associated with an airworthiness directive process.

8.2 Purpose

After you login, you will arrive at the Resume Airworthiness Directive page which lists all airworthiness directives currently associated with personnel.

Figure 8. Resume Airworthiness Directive Page

1. Data Entry for an airworthiness directive: Click on the Airworthiness Directive ID link to proceed to the canned statements page to enter data.

2. Airworthiness Directive Details page: Click on the airworthiness directive ID to view airworthiness directive details.

9 View Rejects

9.1 Purpose

Click on the View Rejects link on the Airworthiness Directives Tasks tab to access information about rejected aspects of an airworthiness directive (see Figure 9).

Figure 9. View Rejects Page

9.2 Task Details

This page is associated with viewing rejects associated with an airworthiness directive process:

1. View Rejects: Click on the Airworthiness Directive ID associated with a particular fleet type to view all the rejected canned statements.

10 Search Airworthiness Directives

10.1 Purpose

Click on the Search Airworthiness Directives link on the global navigation tab to access the Search Airworthiness Directives page which allows you to search airworthiness directives by specifying the appropriate criteria as shown in Figure. Enter the search criteria and click on the Search button to view a list of airworthiness directives. Select a particular airworthiness directive by clicking on the airworthiness directive ID and view the associated data.

Figure 10. Search Airworthiness Directives Page

10.2 Task Details

To search for an airworthiness directive, fill any one of the fields listed below:

1. Fleet Type Drop-Down Menu: Click on the Fleet Type drop-down menu to select an aircraft fleet type.

2. Airworthiness Directive Representative Name Drop-Down Menu: Click on the Representative Name drop-down menu to select a representative.

3. Airworthiness Directive ID: Type in the associated airworthiness directive ID.

4. Completion Status: Click on the drop-down menu options to select the status of the airworthiness directive status.

11 View Canned Statements

11.1 Purpose

Click on the View Canned Statements on the global tab known as Canned Statements to view the specifics of modified revisions of the canned statements.

Figure 11. View Canned Statements Page

11.2 Task Details

The details of previous revisions can be viewed. There are three attributes which can be seen on the grid. The unique identifier for each revised canned statement list is the Revision Number. The two attributes associated with each revision number are: Modification date, indicating the day when a certain revision was modified, and Modified by, indicating the airworthiness directives control group personnel responsible for the modification.

12 Modify Canned Statements

12.1 Purpose

Click on Modify Canned Statements link on the global tab to modify the canned statements.
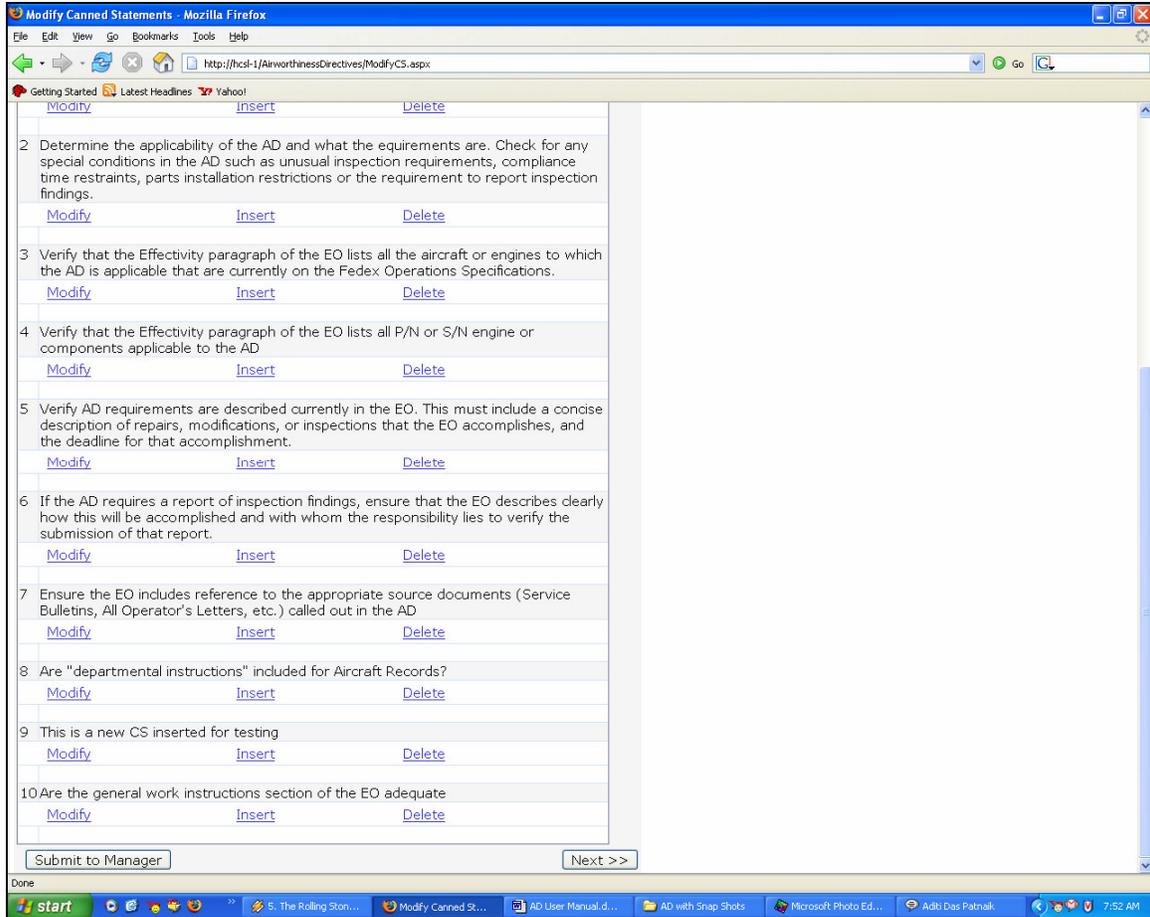
Figure 12. Search Airworthiness Directives Page

12.2 Task Details

The task is to modify a certain version of the canned statements by selecting the latest template. Once a version is selected, modifications can be made to the existing version.

13 Modify Corrective Actions

13.1 Purpose

Click on Modify Corrective Actions link on the global tab to modify the corrective actions possible for rejects associated with the canned statements.

Figure 13. Modify Corrective Actions Page

13.2 Task Details

The task is to modify a certain version of the corrective actions statements by selecting the latest template. Once a version is selected, modifications can be made to the existing version.

14 Report

14.1 Purpose

Click on the Data Analysis link in the global navigation tab to access the Data Analysis Report page (see Figure 14) which allows you to generate airworthiness directives reports. Airworthiness Directives Report is a summary of loading and tracking, and information verification process of an airworthiness directive. It displays the findings, comments and concerns associated with rejected canned statements.

In order to generate a report for an audit, all the responses must have been entered into and findings for each Reject must have been entered. In addition to report generation, this page allows you to either send the report to the manager or any other individual.

Figure 14. Reports Page

14.2 Task Details

To choose an airworthiness directive for generating an airworthiness directive report, fill any of the following fields:

1. Airworthiness Directive ID: Type in the airworthiness directive unique identifier number, also know as Airworthiness Directive ID.

2. Process Measure Drop-Down Menu: Select the process measure on the basis of which analysis needs to be conducted.

3. Date Range: Select the date range to conduct analysis on airworthiness directives which were loaded into the system during this time period.

4. Fleet type Drop-Down Menu: Select the fleet type for which airworthiness directives were introduced into the system.

15 Help

Click on the Help link at the top right portion of the screen to access the Help page which allows you to view the WebSAT Airworthiness Directives User Manual and the process measure definition document (see Figure 15).

Figure 15. Help Page

APPENDIX E

WebSAT Installation Manual

Web-based Surveillance and Auditing Tool

Installation Manual

Developed by
Human Computer Systems Laboratory
Department of Industrial Engineering
Clemson University, Clemson, SC 29634

TABLE OF CONTENTS

1. System Requirements

Browser	Any
Web Server	IIS 5.1 or above
Server Operating System	Windows Server 2003 (Preferred) Windows XP Professional
Framework	.NET Framework 1.1 or above
Database	Oracle 10.2
Software Requirements for Editing and Debugging the Code	Visual Studio.NET 2003 and above (with Crystal Reports 9.0 or above).

2. Restoring the database

The WebSAT.dmp file is created by exporting the WebSAT database on the Oracle server. This file contains all the tables that are used in different modules of WebSAT.

The database administrator needs to import this file into their oracle database server. The location of the database and the user name and password must be noted down.

3. Installing the Web Applications

You need to install 4 Applications separately on the web server.
Copy the following files from the email into the C: drive -
    a. WebSAT_TA_setup.msi (TAModule)
    b. WebSAT_TAVA_setup.msi (TAVendorAccess)
    c. WebSAT_IA_setup.msi (IAModule)
    d. WebSAT_IADA_setup.msi (IADepartmentAccess)

The steps from 3.1 to 3.5 provided for the Technical Audits Module will have to be repeated for the other 3 modules.

Website Installation (Technical Audits Module)

3.1 Copy the WebSAT_TA_setup.msi file into the C:
3.2 Run the WebSAT_TA_setup.msi file by double clicking on it. The screen shown below will appear. Click on Next.
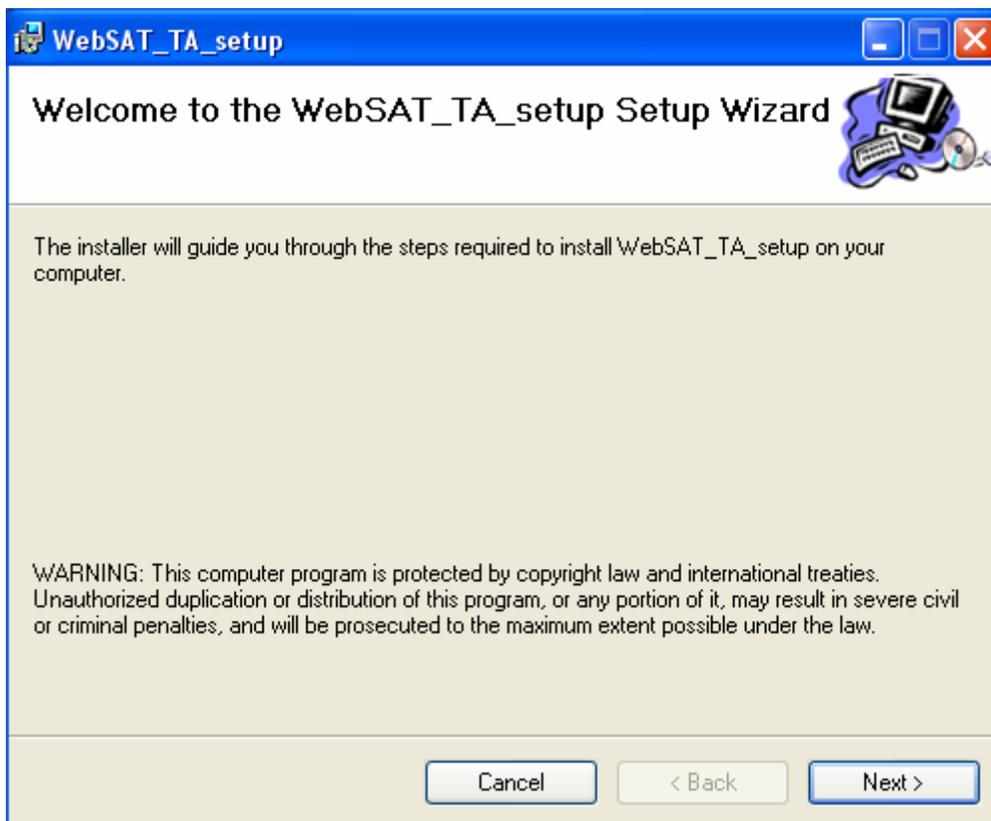
3.3. Rename the Virtual directory from **WebSAT_TA_setup** to **TAModule** and click on Next.
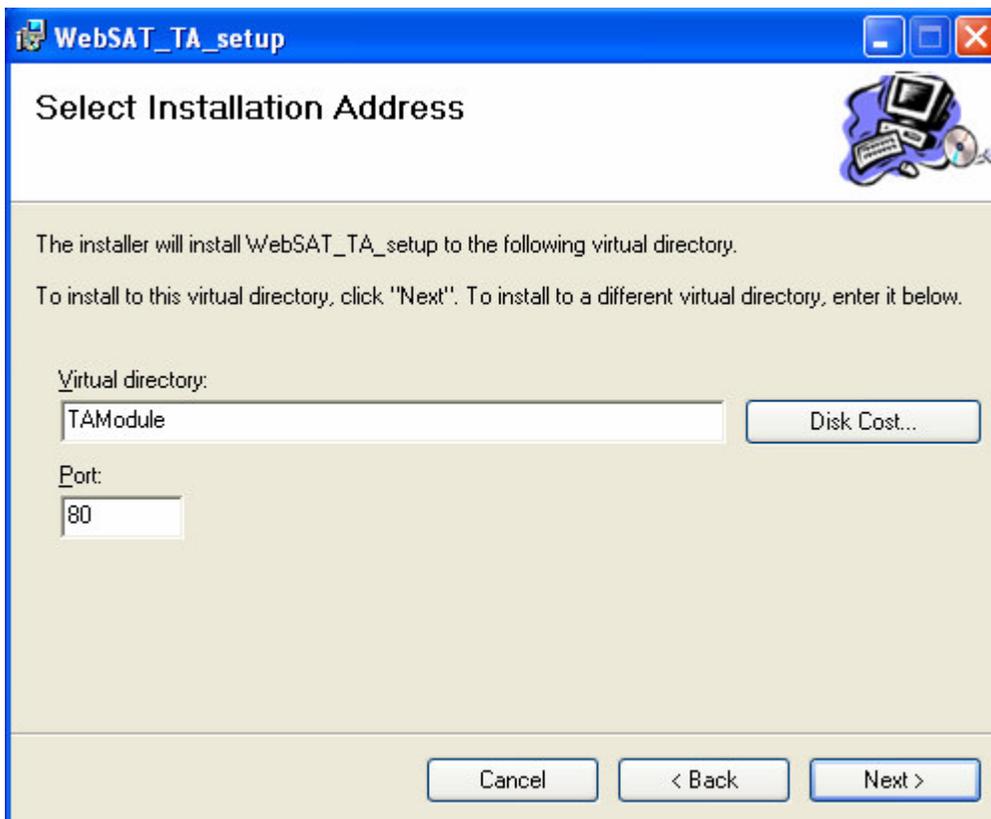
3.4.   A Confirm Installation window appears. Click on Next to begin the Installation
       process.
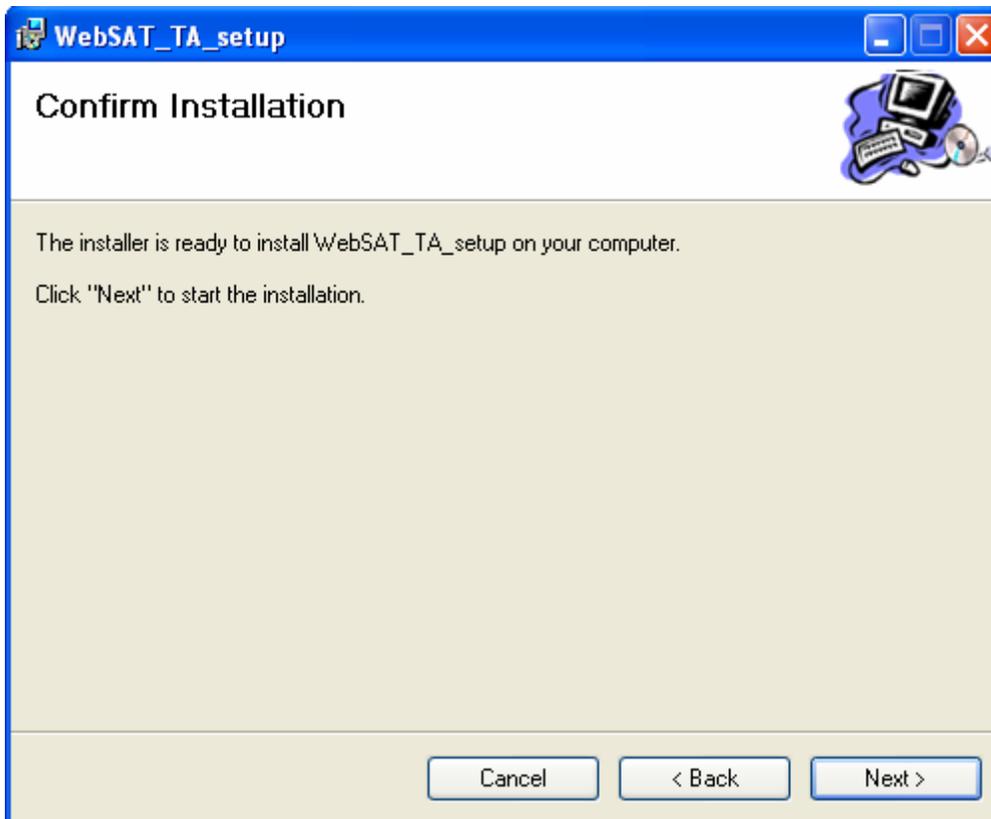
3.5. The Installation complete window appears after the installation is completed. Click Close to exit the setup.
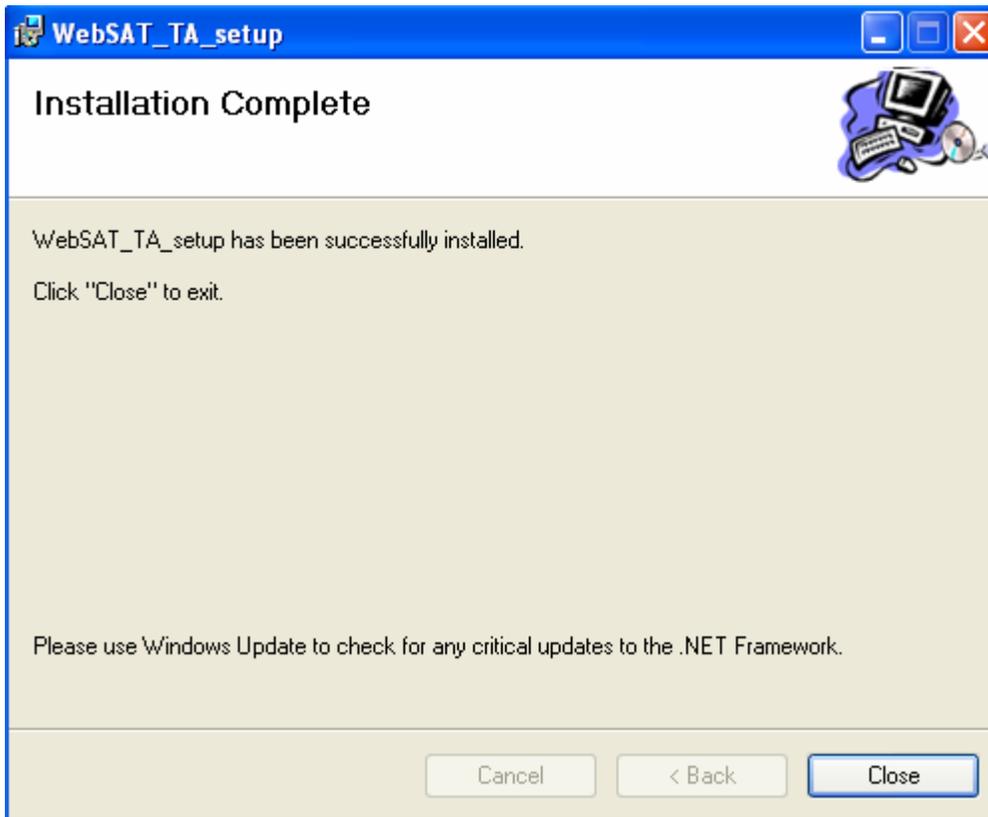
Installing the remaining three modules

- **TAVendorAccess Module**

  Repeat steps 3.1 to 3.5 to install WebSAT_TAVA_Setup.msi

  Note:
  In step 3.3, rename Virtual Directory from WebSAT_TAVA_Setup to TAVendorAccess.

- **IAModule**

  Repeat steps 3.1 to 3.5 to install WebSAT_IA_Setup.msi

  Note:
  In step 3.3, rename Virtual Directory from WebSAT_IA_Setup to IAModule

- **IADepartmentAccess Module**

  Repeat steps 3.1 to 3.5 to install WebSAT_IADA_Setup.msi

  Note:
  In step 3.3, rename Virtual Directory from WebSAT_TAVA_Setup to IADepartmentAccess.

Web.Config Changes (for TAModule)

3.6.   Go to C:\Inetpub\wwwroot\TAModule. Open the Web.config file using notepad.
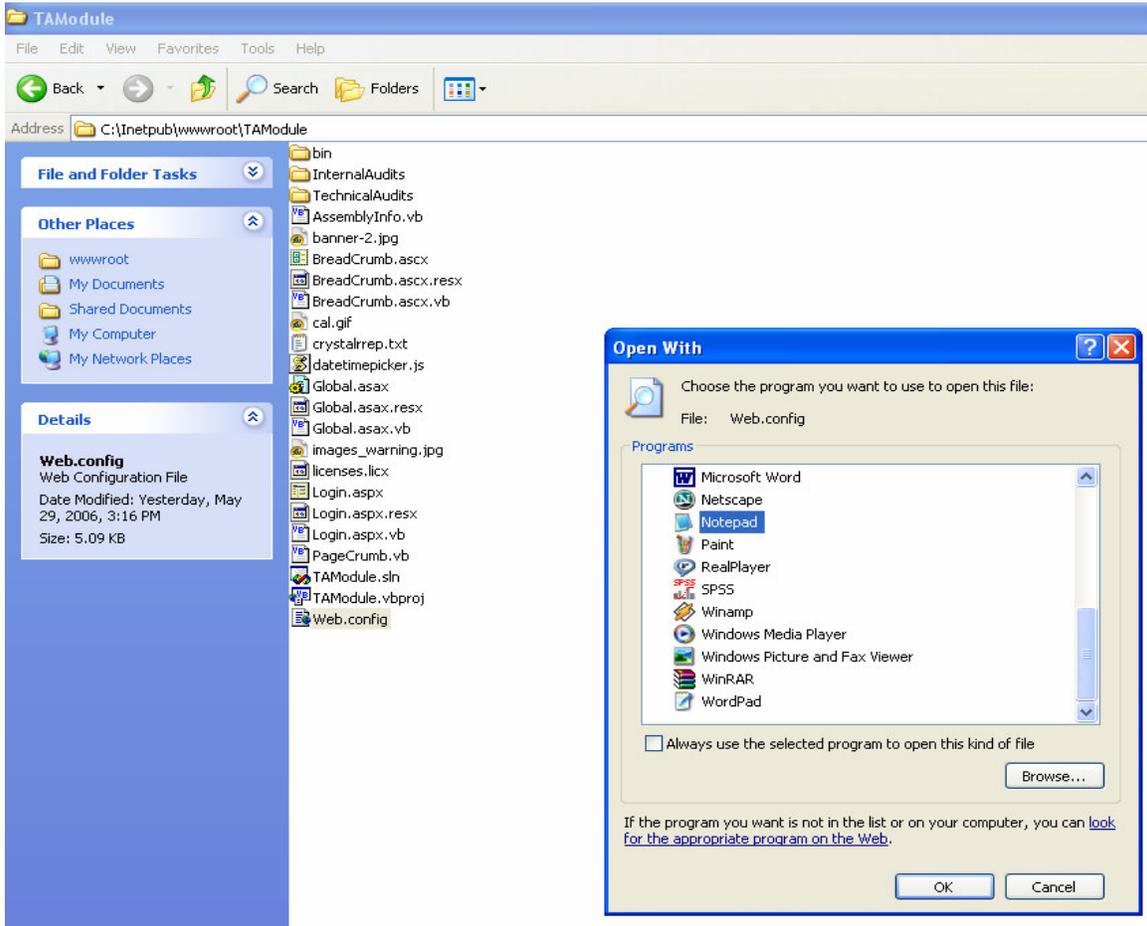
3.7 Search for the appSettings element within the configuration element.
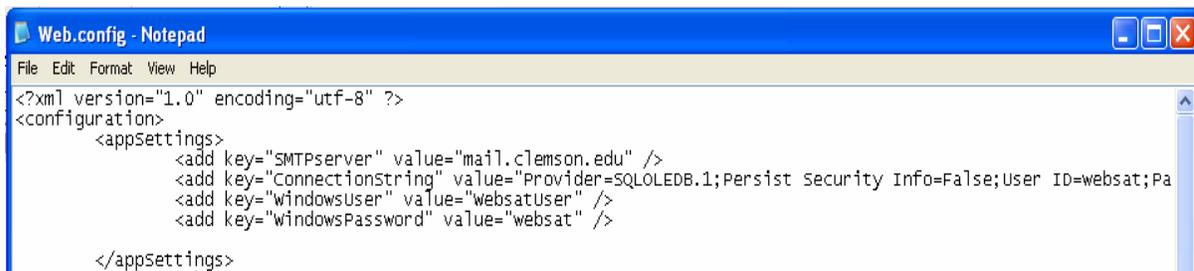
a) Change the value strings for the SMTP server.
For example if the SMTP server is mail.WebSAT.com then the following change will be needed:

<add key="SMTPserver" value="mail.WebSAT.com" />

b) Change the Connection String so that it points to the location where the WebSAT database was restored. The following fields will have to be modified :

   I.   User ID (database user)
   II. Password (database user password)
   III. Initial Catalog (This contains the name of the database)
   IV. Data Source (Server where the database is located)

c) Change the WindowsUser string to the user ID of some machine user.
Note: You will have to create a special user account.
(For eg. User ID – WebsatUser , Password - websat) on the machine with limited permissions. Set the WindowsUser string to the user ID of this created account.

d) Change the WindowsPassword string to the password of the Windows user created in the earlier step.

Save the changes made in the web.config file and close the window.

Web.Config Changes for the remaining three modules

- **TAVendorAccess Module**
  Locate the file Web.Config in C:\inetpub\wwwroot\TAVendorAccess.
  Repeat steps 3.6 and 3.7 for this file.

- **IAModule**
  Locate the file Web.Config in C:\inetpub\wwwroot\IAModule.
  Repeat steps 3.6 and 3.7 for this file.

- **IADepartmentAccess Module**
  Locate the file Web.Config in C:\inetpub\wwwroot\IADepartmentAccess.
  Repeat steps 3.6 and 3.7 for this file.

IIS Settings for Session Timeout (for TAModule)

3.8 Go to Start->Run and type **inetmgr**. Run inetmgr. Right Click on the TAModule. Go to Properties.
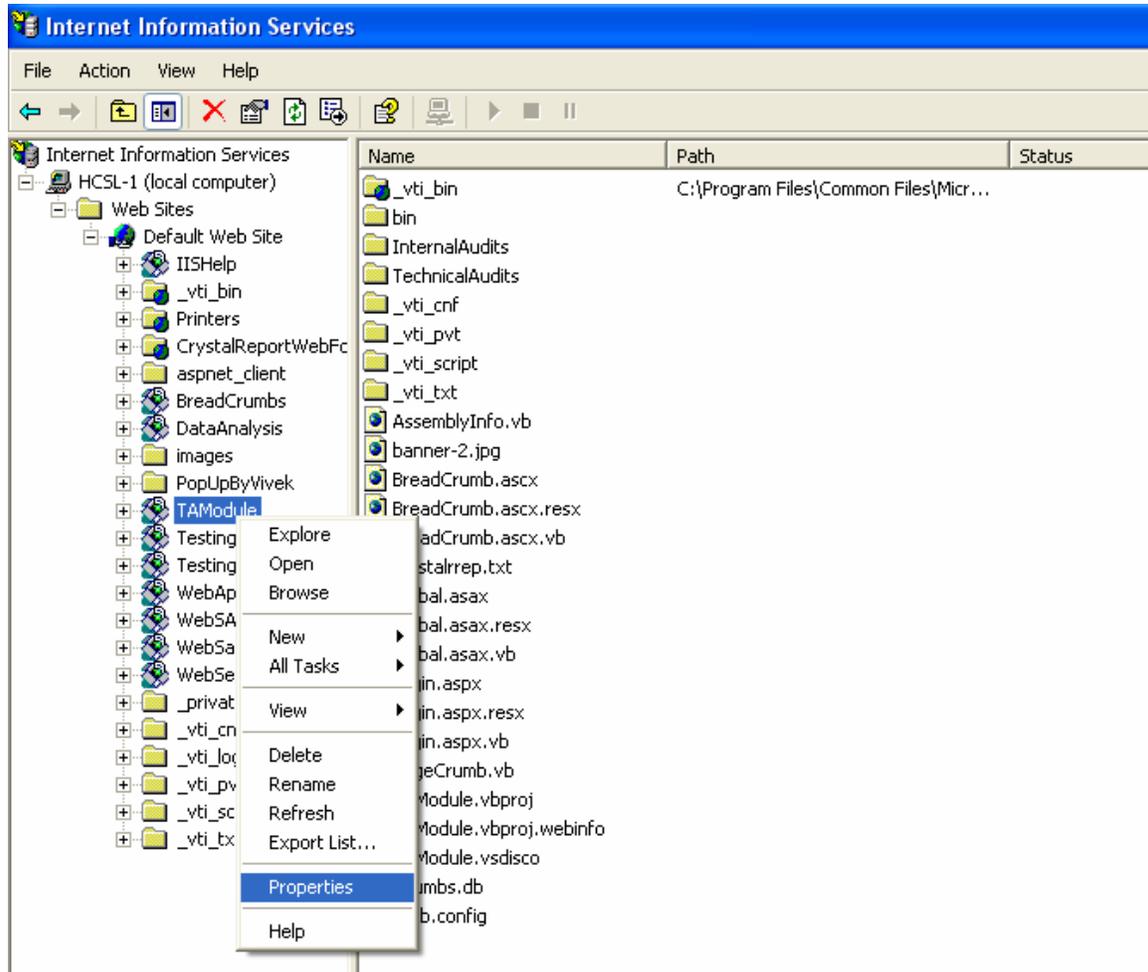
3.9 Click on the Directory tab. Click on Configuration
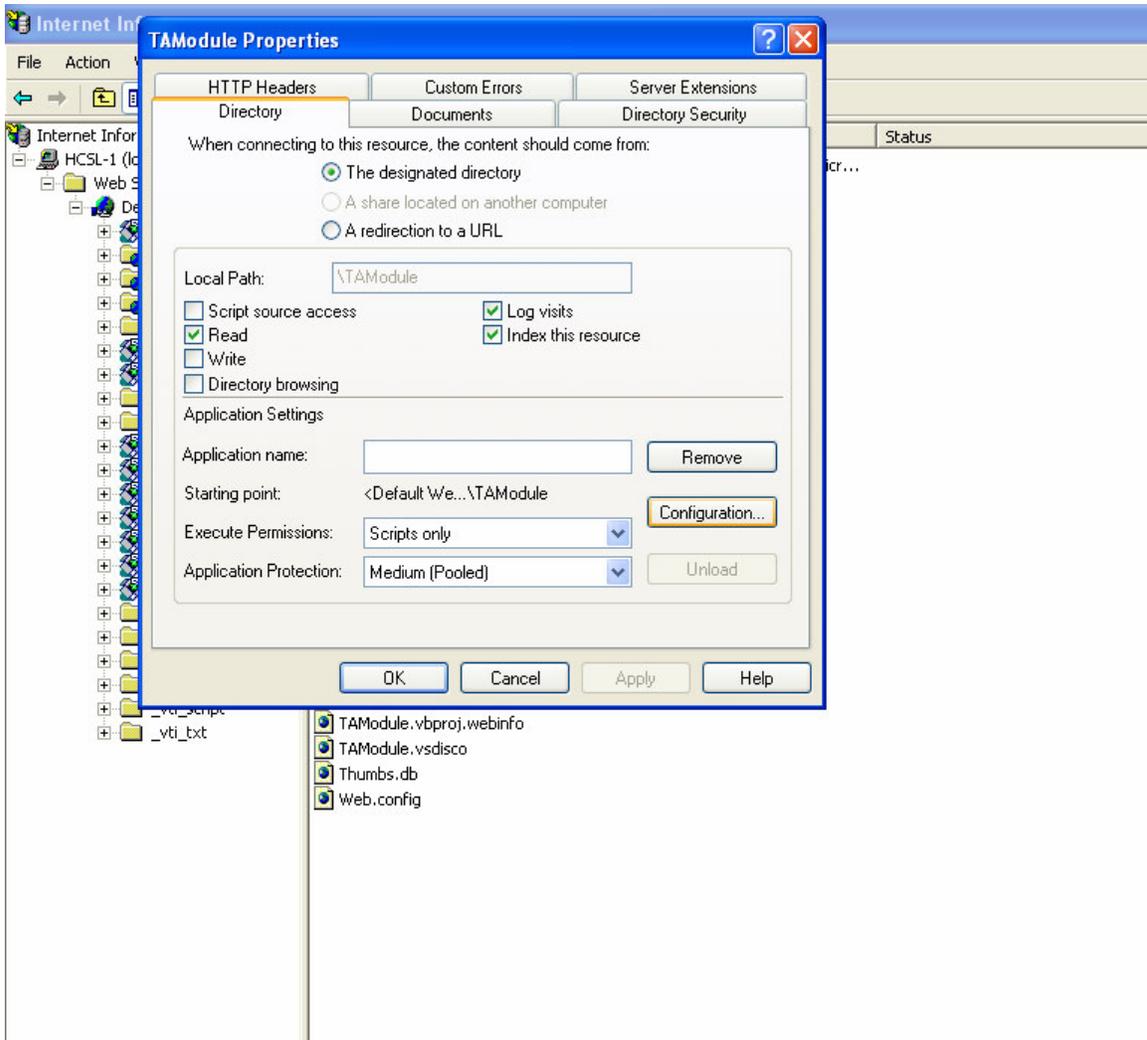
3.10   Click on the Options tab. Change the Session Timeout to 120 minutes.
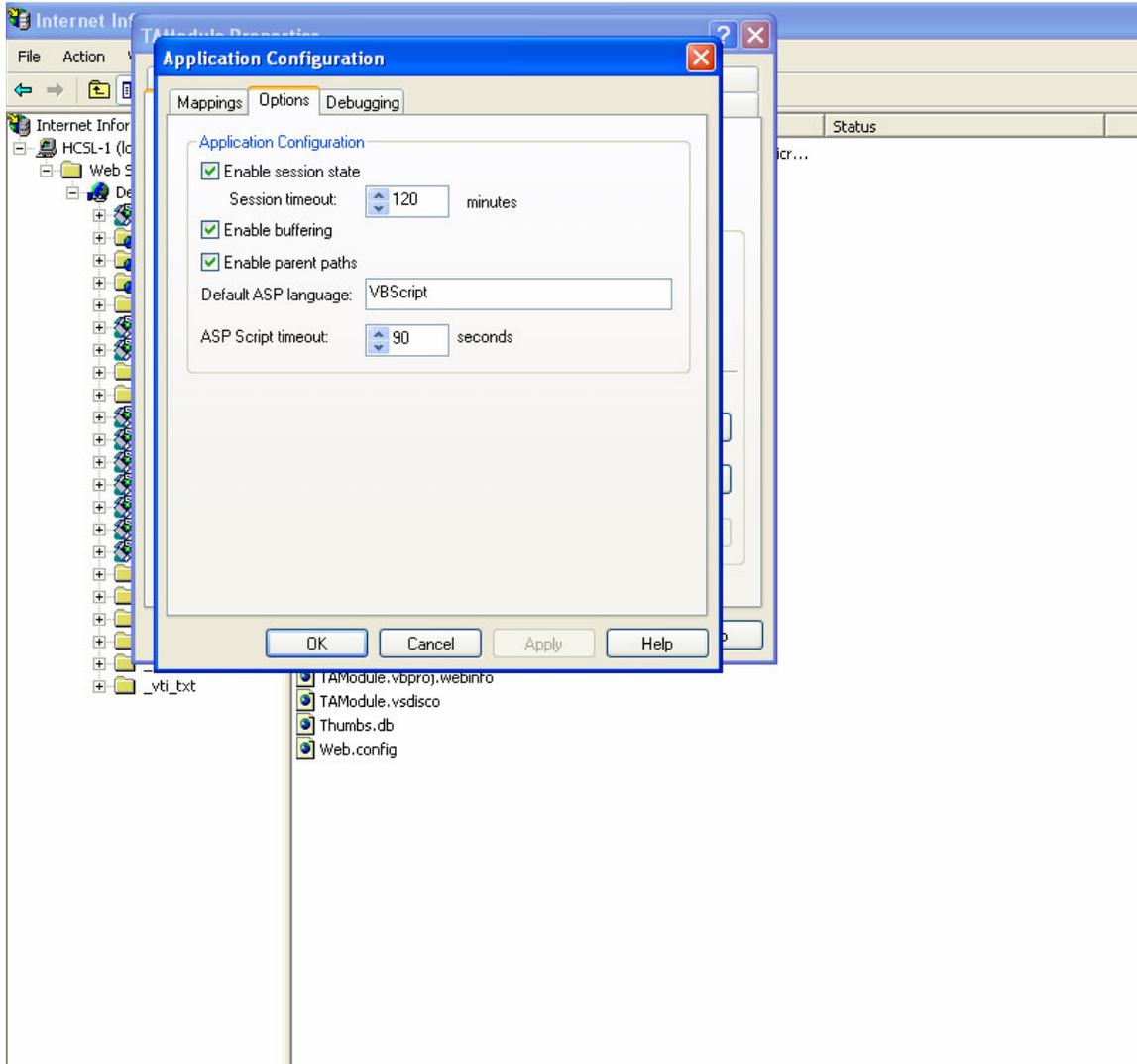
Click on Apply to save the settings and then close the window

IIS Settings for Session Timeout for the remaining three modules

- **TAVendorAccess Module**
  Repeat steps 3.8 to 3.10 for TAVendorAccess.
  Note: In step 3.8, right click on TAVendorAccess

- **IAModule**
  Repeat steps 3.8 to 3.10 for IAModule
  Note: In step 3.8, right click on IAModule

- **IADepartmentAccess Module**
  Repeat steps 3.8 to 3.10 for IADepartmentAccess.
  Note: In step 3.8, right click on IADepartmentAccess

Setting Permissions (for TAModule)

3.11   Go to C:\inetpub\wwwroot\
3.12   Right click on the TAModule folder
3.13   Go to Sharing and Security
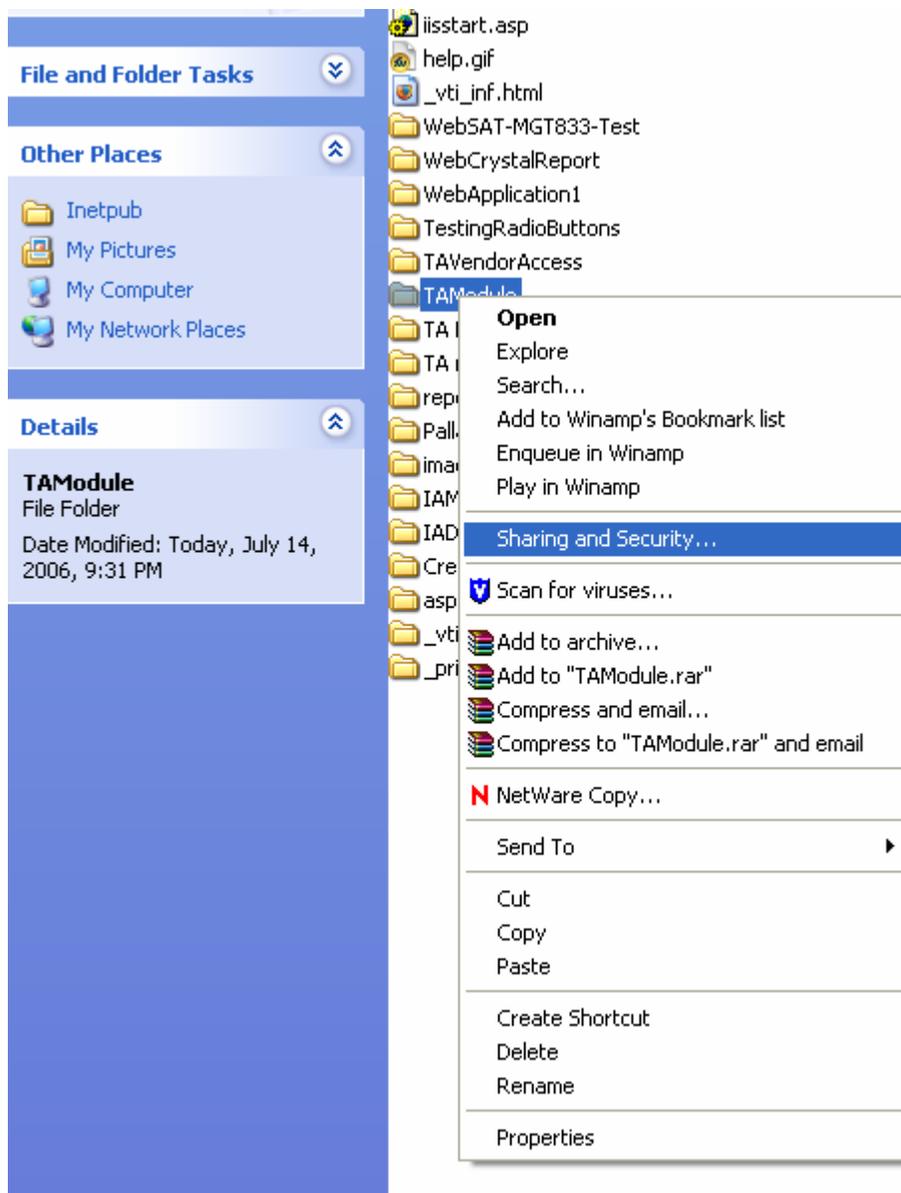
3.14 Click on the Security tab
3.15 For the user account that you created in step 3.7 c), give write permissions on the folder and click on Apply and then OK.
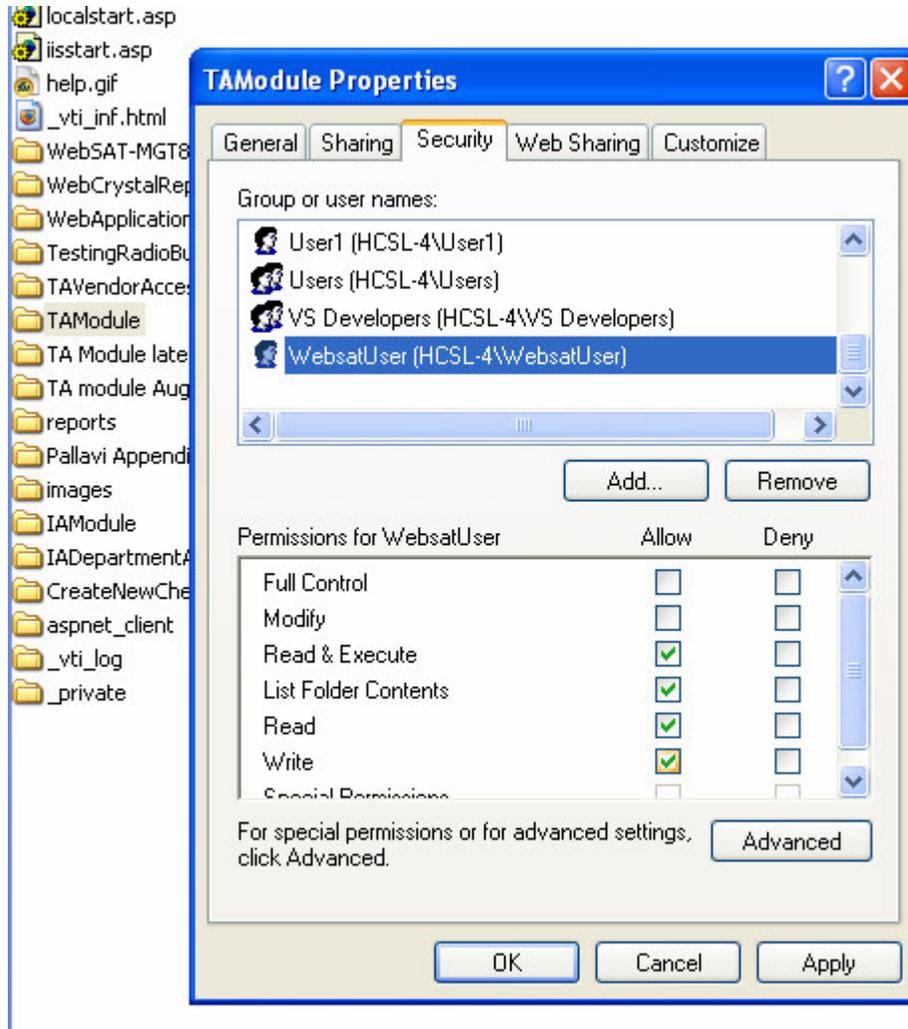
Note: If you do not see the user account created, click the Add button and enter the username in the check Names text box, then click on Check Names and then click on OK as shown below.
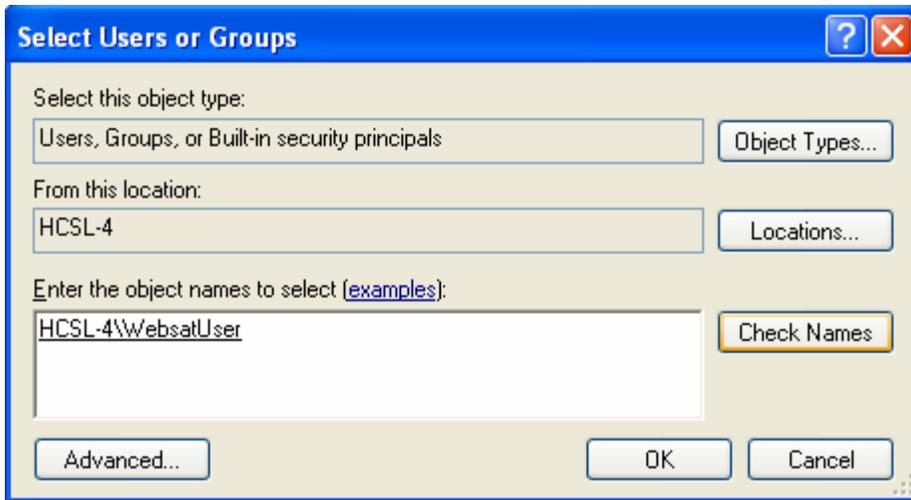
Once you have set the permissions you can close the window.

Setting Permissions for the remaining three modules

- **TAVendorAccess Module**
  Repeat steps 3.11 to 3.15 for TAVendorAccess.
  Note: In step 3.12, right click on TAVendorAccess

- **IAModule**
  Repeat steps 3.11 to 3.15 for IAModule.
  Note: In step 3.12, right click on IAModule

- **IADepartmentAccess Module**
  Repeat steps 3.11 to 3.15 for IADepartmentAccess.
  Note: In step 3.12, right click on IADepartmentAccess

This successfully installs the following applications:-
- TAModule application
- TAVendorAccess application
- IAModule application
- IADepartmentAccess application

You can test run the applications by browsing:-
http://localhost/TAModule/Login.aspx for TAModule application
http://localhost/TAVendorAccess/Login.aspx for TAVendorAccess application
http://localhost/IAModule/Login.aspx for IAModule application
http://localhost/IADepartmentAccess/Login.aspx for IA DepartmentAccess application

You will see the Login screen where you can enter the initial username and password that you received in the email.

APPENDIX F1
User Testing Results of Performance Specifications of Technical and Internal Auditing Modules

	u1	u2	u3	u4	u5	u6	u7	u8	u9	u10	Mean TA	Mean IA	Mean Overall	Curr_TA	Curr_IA	Marginal Value	Ideal Value
1 Find Past Audit findings	71.12	119.42	303	122.32	354	170.16	28.06	171	355.18	90.62	194	163	178	>300	>600	<300	<120
2 Start New Audit	97.68	22	39.21	24	22	27	17.53	32	37.9	17	40.98	26.29	33.632	>300	>300	<300	<60
3 Select a Checklist to an Audit	79.96	64.54	335	190	82	21	19.9	22	45.81	40.3	150.3	29.8	90.051	300	300	<= 300	30-60
4 Print Checklist	119.84	51.35	160.34	20	35.21	146.18	6.62	4.09	4.28	84.62	77.35	49.16	63.253	120	300 - 4500	<=300	<120
5 Enter Checklist Data	226.84	176.47	143.49	351.88	168.32	178.5	116.34	473	602.01	187.35	213.4	311.4	262.42	N/A	>900	<0.75*900	<450
6 Identify ALI and OC	91.75	43.43	120.75	60.46	75.96	55.28	26.58	40	50.62	41.65	78.47	42.83	60.648	N/A	60 - 300	<=120	<60
7 Identify Reference of a Question	42.31	12	63.81	25	16	12	5.9	18	90.18	46.6	31.82	34.54	33.18	>= 480	>300	<=150	60-120
8 Email Audit Report to Vendor	146.84	144.58	177.99	219	218	113.25	44.78	191.11	183.12	180.54	181.3	142.6	161.92	>3600	>2400	<0.25*2400	<300
9 Approve Corrective Actions	65.34	81.32	217	335	69.07	102.14	6.12	17.24	12.34	10.32	153.5	29.63	91.589	>900	>900	<0.5*900	<225
10 Retrieve Vendor Contact Information	173.71	120.21	957	62	77	208.58	43.06	124.35	86.59	39.12	278	100.3	189.16	>600	60-120	<=300	<150
11 Find Audit Type	1.18	6	7.8	2	10	4.37	3.96	5.84	42	12	5.396	13.63	9.515	>600	>600	<=60	<=60
12 Find Audit Status	85.5	57.56	21	34	9.37	80.53	13.21	49.37	405	80	41.49	125.6	83.554	300 - 4500	>900	<=300	<=150
13 Use Online Help	108.81	154.37	200	147	71.7	21.34	13.4	32	154.56	22.42	136.4	48.74	92.56	N/A	N/A	<=300	120 - 300
14 Create a New Checklist	160.25	75.26	1329	311	354	450.87	215.06	510.04	431	535	445.9	428.4	437.15	>1800	>600	<600	<300
15 Modify Current Checklist	488.96	224.3	629.82	428	54	236.76	69.68	180.23	274	130.1	365	178.2	271.59	>1200	200 - 300	<500	<300
16 Vendor Assessment	213.25	171.06	341	212	45	122.9	54.81	26	148.75	101.25	196.5	90.74	143.6	3 - 5 days	>1800	<1800	<600

1. u1, u2, u3, u4 and u5 are the IDs of the five users who participated in the user testing of the technical audits module.
2. u6, u7, u8, u9 and u10 are the IDs of the five users who participated in the user testing of the technical audits module.
3. The Metric column in the above table indicates the metric # being assessed by the scenario described in the scenario column.
4. Mean Overall column indicates the mean of the values obtained for all 10 users (users from both technical and internal audits group)
5. The shaded values indicate that the user was not able to complete the task
6. The Mean TA column in the above table indicates the mean value obtained from the 5 users of the technical audits work group
7. The Mean IA column in the above table indicates the mean value obtained from the 5 users of the internal audits work group
8. The Marginal value column in the above table indicates the target value to attain for the system to be acceptable. These values were set by the design team members based on the specifications of the existing systems at the client location and other benchmarked products.
9. The Ideal value column in the above table indicates the value for each metric set by the team which when achieved signifies that the system's performance is above and beyond acceptable performance.

APPENDIX F2
Satisfaction Ratings (After Scenario Questionnaire) of
Technical and Internal Auditing Modules

		u1	u2	u3	u4	u5	u6	u7	u8	u9	u10	Mean TA	Mean IA	Mean Overall	Range IA	Range TA
1	1 Find Past Audit findings	1	2	1	1	1	3	2	2	2.33	2.11	1.2	2.289	1.74	2-3	1-2
2	2 Start New Audit	1	1	1	1	1	1	2	1.333	1.44	1.59	1	1.474	1.24	1-3	1-1
3	3 Select a Checklist to an Audit	2.33	3	2	1.333	2	1	2	1.667	1.56	1.74	2.133	1.593	1.86	1-2	1 - 3
4	4 Print Checklist	1.67	4.67	1	1	1.333	4	2	2.444	2.81	2.42	1.933	2.736	2.33	2-4	1-5
5	5 Enter Checklist Data	1	2.67	1	1	1	1	2	1.333	1.44	1.59	1.333	1.474	1.40	1-2	1-3
6	6 Identify ALI and OC	2.33	1	1	1	1	1	2	3.33	1	1	1.267	1.666	1.47	1-4	1-3
7	7 Identify Reference of a Question	1	1	1	1	1	1	2	1.333	1.44	1.59	1	1.474	1.24	1-2	1-1
8	8 Email Audit Report to Vendor	1	1	1	1	1	2	2	1.667	1.89	1.85	1	1.881	1.44	1-3	1-1
9	9 Approve Corrective Actions	1	1	1.67	2.333	1	3.5	2	2.167	2.56	2.24	1.4	2.493	1.95	1-4	1-3
10	10 Retrieve Vendor Contact Information	3	2	7	1.333	2.333	7	3	4.111	4.7	3.94	3.133	4.551	3.84	3-7	1-7
11	11 Find Audit Type	1	1	1.67	1	1	1	2	1.333	1.44	1.59	1.133	1.474	1.30	1-3	1-3
12	12 Find Audit Status	1	1	1.33	1	1	1	1	1	1	1	1.067	1	1.03	1-1	1-3
13	13 Use Online Help	6	3	1	1	1	1	1	1	1	1	2.4	1	1.70	1-1	1-6
14	14 Create a New Checklist	5	2	1	3	2.333	1.5	2	1.944	1.81	1.92	2.667	1.836	2.25	1-3	1-3
15	15 Modify Current Checklist	2	2	2	1.333	1	1	1	1	1	1	1.667	1	1.33	1-1	1-2
16	16 Vendor Assessment	2	1	2	2	1	1	1.5	1.167	1.22	1.3	1.6	1.237	1.42	1-2	1-2

1. u1, u2, u3, u4 and u5 are the IDs of the five users who participated in the user testing of the technical audits module.
2. u6, u7, u8, u9 and u10 are the IDs of the five users who participated in the user testing of the internal audits module.
3. Mean TA column indicates the mean of the values obtained for the five users from technical audits group
4. Mean IA column indicates the mean of the values obtained for the five users from internal audits group
5. Mean Overall column indicates the mean of the values obtained for all 10 users (users from both technical and internal audits group)

SUMI Results and Analysis for Technical and Internal Audit Modules

Scores on the Six usability Scales

	Global	Efficiency	Affect	Helpfulness	Control	Learnability
UF	89	85	72	82	85	79
Ucl	74	65	68	67	64	69
Median	68	58	66	61	60	65
Lcl	63	51	64	56	55	61
LF	33	28	62	34	37	49

Individual Scores as obtained from the Users

User	Global	Efficiency	Affect	Helpfulness	Control	Learnability
1	72	66	66	67	71	71
2	49	47	57	44	53	50
3	70	71	71	63	67	69
4	60	52	69	57	58	65
5	51	38	62	50	49	58
6	70	57	66	66	59	65
7	69	59	69	68	69	68
8	70	66	66	60	60	59
9	68	66	68	63	69	69
10	52	39	65	46	52	59

Interpretation of Scores as given in SUMI analysis

The Median is the middle score when the scores are arranged in numerical order. It is indicative sample statistic for each usability scale.

The Ucl and Lcl are the Upper and Lower Confidence Limits. They represent the limits within which the theoretical true score lies 95 % of the time for this sample of users.

The UF and LF are the upper and lower fences. They represent values beyond which it may be plausibly suspected that a user is not responding with the rest of the group – indicating the user may be responding with an outlier.

Shaded areas represent values obtained when subjects were not able to complete the tasks

SUMI Results and Analysis for Surveillance Module

Scores on the Six usability Scales

	Global	Efficiency	Affect	Helpfulness	Control	Learnability
UF	76	73	69	79	80	81
Ucl	68	62	69	65	65	69
Median	64	56	65	60	61	63
Lcl	59	50	61	54	57	57
LF	49	40	60	45	41	39

Individual Scores as obtained from the Users

1	44	37	47	35	53	40
2	61	51	63	58	60	53
3	56	53	60	56	56	48
4	63	52	65	53	62	67
5	58	61	66	59	51	64
6	73	71	71	71	71	71
7	64	71	66	60	54	67
8	66	46	66	67	66	71
9	67	62	65	60	67	53
10	69	59	65	67	71	62

Interpretation of Scores as given in SUMI analysis

The Median is the middle score when the scores are arranged in numerical order. It is indicative sample statistic for each usability scale.

The Ucl and Lcl are the Upper and Lower Confidence Limits. They represent the limits within which the theoretical true score lies 95 % of the time for this sample of users.

The UF and LF are the upper and lower fences. They represent values beyond which it may be plausibly suspected that a user is not responding with the rest of the group – indicating the user may be responding with an outlier.

APPENDIX H1
User Testing Results of Performance Specifications of
Surveillance Modules

		u1	u2	u3	u4	u5	u6	u7	u8	u9	u10	Mean Surv	Range Surv	Curr_Surv	Marginal Value	Ideal Value
1	Identify the % of activities to be carried out for each process measure of a surveillance event.	38.3	187	61.7	80	94	107	82	157	79	85	97.06	38-186	1920	<1000	<500
2	Time taken to classify the data collected in terms of a process measure, ALI, OC	90.2	75.7	80.5	45.5	35.5	43.2	45.3	33.3	30.3	25.5	50.5	120-900	400	<120	<60
3	Time taken to access an AD	50.8	110	14.1	10	109	79	10	50	43	68	54.37	10-109	263	<200	<100
4	Time taken to access the sampled surveillance activities	394	56.5	247	93	70	84	120	36	50	120	127.1	56.5-395	50	<=300	<150
5	Time taken to view the % of discrepancies	302	54.8	23.7	22	176	70	120	65	161	146	114.1	22-302	60-600	<400	<200
6	Time taken to evaluate the vendor performance	275	322	179	240	115	70	120	70	151	125	166.7	70-322	600	<400	<200
7	Time taken to access information on non-routines	64.5	111	46.5	187	23	27	58	110	110	88	82.53	23-187	420-480	<300	<150
8	Time taken to access information on non-routines generated by vendor	50	94	27.6	10	25	26	55	23	56	20	38.65	10-94	600-900	<0.5*600 = <300	<150
9	Time taken to generate a weekly status report	294	167	80	219	105	105	121	118	188	93	149	80-294	3600	<0.5*3600	<225
10	Time taken to access help information	172	253	374	300	20	133	120	180	178	115	184.4	20-374	no help provided by current tool or IT	<=120	120 - 300

The unit for all the values shown in the above table is seconds.

The shaded areas indicate that the subject was not able to complete the task and volunteered to quit it.

The Mean Surv column represents the mean value obtained for all the 10 users for each metric.

The Curr_Surv column indicates the values of the current system being used by the end users. WebSAT was benchmarked against the current surveillance system for all the metrics.

The Marginal value column in the above table indicates the target performance value to attain for the system to be acceptable. These values were set by the design team members based on the specifications of the existing systems at the client location and other benchmarked products.

The Comp_Ideal value column in the above table indicates the value for each metric set by the team which when achieved signifies that the system's performance is above and beyond acceptable performance.

APPENDIX H2
Satisfaction Ratings (After Scenario Questionnaire)
of Surveillance Module

		Metric #	u1	u2	u3	u4	u5	u6	u7	u8	u9	u10	Mean
1	Identify the % of activities to be carried out for each process measure of a surveillance event.	29	1	1	2	3.3	1	7	1	3.7	1	3.3	2.4
2	Time taken to classify the data collected in terms of a process measure	35, 41	1	2.7	2	3	1	2	1.7	2.3	1.3	4.7	2.2
3	Time taken to access an AD	31, 30	2	2	1	6.3	2	2.3	1	2	1	3.3	2.3
4	Time taken to access the sampled surveillance activities	32	3	2	5	3	7	5	7	2	6	7	4.7
5	Time taken to view the % of discrepancies	33	5	1	2	5	5	1.3	1	2	3	4.7	3
6	Time taken to evaluate the vendor performance	37, 39, 40	3	3.3	2	4.7	1	1.3	2.3	2	2.3	5	2.7
7	Time taken to access information on non-routines	42	2	2.7	2	3	1	1.3	2.7	2	3	5	2.5
8	Time taken to access information on non-routines generated by vendor	43	1	1	2	3	1	1.3	2.7	2	1	3	1.8
9	Time taken to generate a weekly status report	45	1.3	1	2	6	1	1.7	1.3	2	2.3	3.3	2.2
10	Time taken to access help information	17	2.7	2	2	3	4	4	1	7	1.7	4.7	3.2

The shaded areas indicate that the subject was not able to accomplish the task.

APPENDIX I

Technological Details on WebSAT

WebSAT Technical Documentation

1. Structure of Modules

WebSAT is composed of four modules namely, Technical Audits module, Internal Audits module, Surveillance module and Airworthiness Directives module.

- Each of the modules is developed as a separate VB ASP.NET project.
- None of the files are common among the modules.
- Every module has a separate Login Page that provides access to the user into WebSAT into that specific module only.
- WebSAT uses the ASP.NET forms authentication security principle to provide secured access into the modules.

2. Scripting Language used

- The Coding Language used in WebSAT for server side coding is VB and ASP.NET.
- The Scripting language used for Client side coding is Javascript.

3. Use of CSS files
- Each module has a separate CSS file where the styles are defined and used globally in the module

4. Naming Convention used for the VB files

- Technical Audits module files are named as per the functionality provided by the file. For e.g. AuditDetails.aspx page displays the audit details of the selected audit.
  The pages that have Manager Access are prefixed by "Manager".

  The same convention goes for Surveillance and Airworthiness Directives modules.

- Internal Audits module files are named as per the functionality provided by the file pre-fixed by "IA" that denotes the Internal Audits module. For e.g. IAAuditDetails.aspx page displays the audit details of the selected audit.
  The pages that have Manager Access are prefixed by "Manager".

5. Use of Crystal Reports

WebSAT uses Crystal Reports extensively to generate 3 kinds of charts –
- Bar graphs
- Line Graphs
- Pie charts

The bundled version of Crystal Reports that comes with Visual Studio.NET 2003 has been used.

Crystal Reports can be used in 2 modes – Push Model and Pull Model. WebSAT uses the Push Model where in the data from the database is obtained through a normal query and populated into a dataset. The dataset is then given as a data source to the crystal report which uses this data to generate the different kinds of charts.

The Pull model on the other hand gets the data from the database directly into the crystal report. The reason why the Pull model was not used is that some specific model equations had to be applied to the existing data before supplying the data to the crystal reports for graphical display.

Exporting of Crystal Reports to PDF:

Crystal Reports have inbuilt export functionality for exporting the report to a PDF document, which has been used in some of the pages for getting the crystal report in a pdf document format.

6. Checklist Versioning in Technical and Internal Audits module

Both the Technical and Internal Audits module maintain checklist revisions and provide features for modifying checklist revisions and creating new revisions. From the database point of view there are four tables that manage checklist versioning and modification process. They are:-

- ChecklistVersion – This table has an entry for every checklist revision that is created.
- QuestionVersion – This table has the actual questions with their descriptions.
- ChecklistQuestions – This table is a mapping between the ChecklistVersion and the QuestionVersion tables. It stores the QuestionVersionID's of all the questions that belong to a particular checklist version along with their question numbers.
- TemporaryChecklist – This table is a temporary table that stores all the questions of a particular checklist version while the checklist is under modification. Once the modification is complete and the modified

checklist is approved, the questions are cleared from the
TemporaryChecklist table and transferred into the ChecklistQuestions
table and the new revision entry is made in the ChecklistVersion table.

Internal Audits module follows the same procedure for checklist versioning
except that the table names are prefixed with IA_<table name>.

7. Generation of PDF documents dynamically

WebSAT uses the Full version of DynamicPDF™ Generator v4.0.1 for .NET
Community Edition for generating pdf documents dynamically in all the
modules. The dynamicPDF dll is included in each of the projects. There are
some inbuilt classes for document creation, page creation within a document
and writing text into the document which have been used for creating the pdf
documents.

8. Work Card Sampling in Surveillance module

WebSAT contains two tables – Surv_workCards which contain all the job cards
for a particular work order and Surv_SurveillanceEvent which contain only
the sampled job cards for a particular representative. When a representative
starts a new surveillance on a work order, a sample (10 %) of the total job
cards are transferred to Surv_SurveillanceEvent under that representative's
name. In the sampling process, first those job cards are chosen which have
never been used before and then the remaining are sorted as per their date of
use. The job card which has not been used lately is selected first. For a
different Representative a different sample is generated which is different
from the earlier one
ADs are not sampled. The primary representative gets the responsibility of all the
Ads

9. How to start a new Surveillance for a new set of work orders.

In order to start a new Surveillance for a given set of work orders there are some
tables that need to be populated before using the WebSAT tool for conducting
the Surveillance on those work orders.
First, the aircraft table (Surv_Aircrafts) needs to be populated with the new
aircraft entry if it is not already present. The site table (Surv_Site) needs to be
populated with the new site entry if it not already present. The site ID of the

concerned site is noted. These tables are described below in the database overview section.

Then, a new entry is created in the work order table (Surv_Workorder) and its fields are populated. The required fields are described below.

- WorkOrderNumber – Should be populated with the work order number
- Description - Should be populated with the work order description if any
- StartDate – Should be populated with the date when the work order is scheduled to start
- CompletedDate – Should be populated with the date when the workorder is supposed to close
- AircraftTailNo – Should be populated with the Aircraft Tail number to which the work order belongs. (Should match with the entry in the Surv_Aircrafts table)
- StatusClosed – Should be populated with the value '0'.
- SiteID – Should be populated with the siteID from the corresponding entry in the Surv_Site table.

Finally import all the job cards information from the Fedex job cards table into the Websat's job cards table (Surv_Jobcards). Both tables are identical. The trigger (ParseJobCards) then automatically filters the job card entries into 3 separate tables – Surv_WorkCards, Surv_Ads, Surv_NonRoutines.

The trigger action of the ParseJobCards trigger is explained as follows:

```
-------------------------------------------------------------------------------------------------
BEGIN
    workOrderNumber := :NEW.WO_NO;
reference := :NEW.JC_REF;
title := :NEW.JC_SHORT_DESC;
workCardNumber := :NEW.JC_REF;
nrNumber := :NEW.JC_SEQ_NO;
adNumber := :NEW.JC_REF;
airworthiness_dir_no := :NEW.AIRWORTH_DIR_NO;
cardType := :NEW.CARD_CATG_CD;

if (cardType like 'EA') then
 activityType := 1;
elsif (cardType like 'EO') then
 activityType := 2;
elsif (cardType like 'EO(AD)') then
 activityType := 3;
elsif (cardType like 'EMPS') then
 activityType := 4;
elsif (cardType like 'FCD') then
```

```
 activityType := 5;
elsif (cardType like 'OEM') then
 activityType := 6;
elsif (cardType like 'VEN') then
 activityType := 7;
elsif (cardType like 'SNRM') then
 activityType := 8;
elsif (cardType like 'AML') then
 activityType := 9;
elsif (cardType like 'AG') then
 activityType := 11;
else
 activityType := 4;
end if;

if (nrNumber like 'N%') then
     INSERT INTO Surv_NonRoutines(NRStatus, MXSourceID, WorkedOn,
WorkOrderNumber,NRTitle,NonRoutineNumber) values
('4','8','0',workOrderNumber,title,nrNumber);

elsif (activityType = 2 OR activityType = 3 AND (airworthiness_dir_no like
'%AD%' OR airworthiness_dir_no like '%ad%')) then
     title := title || ' ' || airworthiness_dir_no;
     if (title like '%LUB%' or title like '%lub%')  then
        INSERT INTO Surv_ADs(WorkOrderNumber, ADReference, Title,
Used, ADNumber,Status, MXSourceID, WorkedOn, ActivityNumber,
CompletionStatusID, LubType) values (workOrderNumber, reference, title, '0',
adNumber, '4','3','0','1','2','1');
      else
         INSERT INTO Surv_ADs(WorkOrderNumber, ADReference, Title,
Used, ADNumber,Status, MXSourceID, WorkedOn, ActivityNumber,
CompletionStatusID, LubType) values (workOrderNumber, reference, title, '0',
adNumber, '4','3','0','1','2','0');
     end if;

else

     INSERT INTO Surv_WorkCards(WorkOrderNumber, WorkCardReference,
Title,Used, WorkCardNumber, ActivityType) values (workOrderNumber,
reference, title, '0', workCardNumber,activityType);

end if;

END ParseJobCards;
```

Explanation-

      We get the activity type of the Job card based on the CARD_CATG_CD field of the JobCards table. We filter the jobcards into Workcards, Ads and NonRoutines and insert them into the respective tables in the following way –

NonRoutine: If the NonRoutine number which is taken from the JC_SEQ_NO field of the JobCards table begins with 'N' then the jobcard is inserted into the Surv_NonRoutines table with some fields like NRStatus and WorkedOn populated with the default values.

AD: If the activity type of the job card is EO or EO(AD) and the AIRWORTH_DIR_NO field of the jobcards table has a number beginning with 'AD' or 'ad' then the job card is inserted into the Surv_Ads table with some fields like Status, WorkedOn, CompletionStatusID, LubType populated with the default values.

Work Card: If the job card is none of the above then it is considered to be a normal workcard and inserted into the Surv_WorkCards table with some fields like Used populated with the default values.

10. Populating Employee, Suppliers and Department tables

The WebSAT database contains an Employees table to store the information of all the employees. The Employees table is common for all the 4 modules of WebSAT. The EmployeeModule field indicates the module in which the employee is added. '1' is for Technical Audits, '2' for Internal Audits, '3' for Surveillance and '4' for Airworthiness Directives. The PermissionID field indicates whether the employee has manager privileges. '4' is for manager privileges and '3' for normal privileges. The details of the Employee table are given in the database overview section below. Apart from this, the manager of each module can add new employees and set their privileges using the tool itself

The Suppliers table needs to be populated with the vendors needed for Technical Audits. The details of the Suppliers table are given in the Database Overview section below. The Manager can also add new vendors using the tool.

The IA_Departments table needs to be populated with the departments needed for Internal Audits. The details of the IA_Departments table are given in the Database Overview section below. The Manager can also add new departments using the tool.

Database Overview

TECHNICAL AUDITS MODULE

ALI - Table that lists down the Aircraft Level Impact

Field Name	Field Type	Description
ALI_ID	Number	Primary Key
ALI_Name	Varchar2(40)	Name
ALI_Description	Varchar2(400)	Description

Answers – Table that contains all the answers stored

Field Name	Field Type	Description
AnswerID	Number	Primary Key
AnswerDescription	Nvarchar2(100)	Answer description
AnswerEnteredDate	Date	Date when the answer is entered
AuditID	Number	Specifies the audit to which this answer belongs
QuestionVersionID	Number	Specifies the question version to which this answer belongs
SubQuestionID	Number	Specifies the sub question if this answer belongs to a sub question
ALI_ID	Number	Specifies the Aircraft Level Impact
SLI_ID	Number	Specifies the Organizational Category
AuditFindings	Nclob	Gives the Findings associated with this answer
AuditFindingsEnteredDate	Date	Specifies the date on which the findings are entered
AuditConcerns	Nclob	Gives the Findings associated with this answer
AuditConcernsEnteredDate	Date	Specifies the date on which the findings are entered
AuditComments	Nclob	Gives the Findings associated with this answer
AuditCommentEnteredDate	Date	Specifies the date on which the findings are entered
CorrectiveActions	Number	Index to the corrective actions table

Audits – Table that provides information about all the audits

Field Name	Field Type	Description
AuditID	Number	Primary key
ChecklistID	Number	Specifies the Audit type
AuditDescription	Nclob	Gives the Audit Description
StatusID	Number	Specifies the Status
EmployeeIDAuditor1	Number	Primary Auditor
EmployeeUserID	Nvarchar2(50)	Primary Auditor User ID
EmployeeIDAuditor2	Number	Secondary Auditor
ExternalAuditor1	Nvarchar2(200)	External Auditor 1
ExternalAuditor2	Nvarchar2(200)	External Auditor 2
AuditStartDate	Date	Start Date
AuditEndDate	Date	Completion Date
SupplierID	Number	Specifies the Supplier on which the audit was done
Vendor	Number	Field no longer used
ManagerID	Number	Specifies the manager (Field no longer used)
SrManagerID	Number	Specifies the senior manager (Field no longer used)
DirectorID	Number	Specifies the director (Field no longer used)
VicePresidentID	Number	Specifies the Vice President (Field no longer used)
PreAuditBriefing	Nclob	Field no longer used
PosrAuditBriefing	Nclob	Field no longer used
NextSchedAuditDate	Date	Next scheduled date of the same audit
Transaction_date	Date	Field no longer used
DateModified	Date	Date on which the audit details were modified
EmployeeIDUpdater	Number	Employee who updated the audit details
ChecklistVersionID	Number	Checklist revision associated with the audit
Association	Number	Bit value indicating whether association with a checklist revision exists or not
CorrectiveActionsApproval	Date	Date of corrective actions approval
ReportSentDate	Date	Date on which the audit report was sent
VendorManagerName	Nvarchar2(200)	Manager of the vendor where audit is conducted
CorrectiveActionStatus	Number	Bit value indicating whether all corrective actions for this audit were

		accepted or not
ReportReceivedDate	Date	Date when the report is received from the vendor

AuditStatus – Table that lists down the different audit statuses

Field Name	Field Type	Description
StatusID	Number	Primary Key
StatusName	Nvarchar2(50)	Status name
StatusDescription	Nclob	Description
StatusExists	Number	Bit value indicating whether the status is valid

Categories – Table that lists down all the categories

Field Name	Field Type	Description
CategoryID	Number	Primary Key
CategoryName	Varchar2(100)	Category Name
ProcessMeasureID	Number	Specifies the Process Measure

Checklist – Table that lists down the different audit types

Field Name	Field Type	Description
ChecklistID	Number	Primary Key
ChecklistName	Nvarchar2(50)	Audit Type Name
ChecklistDescription	Nclob	Description
ChecklistCreationDate	Date	Creation Date
ChecklistExists	Number	Bit value indicating whether the audit type still exists
AuditCode	Number	Code associated with the audit type

ChecklistQuestions – This table contains all the questions contained in a checklist revision

Field Name	Field Type	Description
ChecklistVersionID	Number	Index to the checklist version table
QuestionVersionID	Number	Index to the question version table
QuestionNo	Number	Question Number

ChecklistVersion – This table contains the details of different revisions of all checklists

Field Name	Field Type	Description
ChecklistVersionID	Number	Primary Key
ChecklistID	Number	Specifies the audit type
CreationDate	Date	Creation Date of the checklist
Version	Number	Version number
EmployeeIDUpdater	Number	Employee who updated the checklist
ProcessMeasureOrder	Varchar2(50)	Process measure order of the checklist
CategoriesOrder	Varchar2(50)	Categories order of the questions in the checklist
TemplateChecklist	Number	Bit value indicating whether this checklist is a template checklist or not
SupplierID	Number	Specifies the vendor to which this checklist is tied

CorrectiveActionComments – This table contains the corrective actions comments of the auditor

Field Name	Field Type	Description
CorrectiveActionCommentsID	Number	Primary key
AnswerID	Number	Specifies the answer for which the corrective action is
AuditorComents	Nclob	Auditor comments
Concern	Number	Bit value indicating whether this is a concern or not

CorrectiveActionDocument – This table contains the list of the documents uploaded

Field Name	Field Type	Description
CorrectiveActionDocumentID	Number	Primary key
AnswerID	Number	Specifies the Answer for which the documents are uploaded
FileSize	Nvarchar2(25)	Size of the file uploaded
OriginalName	Nvarchar2(50)	Original Name of the file
DomainPath	Nclob	Domain path of the file

FilePath	Nclob	Path where the file is stored
Concern	Number	Bit value indicating whether this file is uploaded for a concern or not

CorrectiveActionPlan – This table contains the details of the corrective action plan

Field Name	Field Type	Description
CorrectiveActionPlanID	Number	Primary key
AnswerID	Number	Specifies the answer
Question1	Nclob	Question 1 description
Answer1	Nclob	Question 1 description
Question2	Nclob	Question 2 description
Answer2	Nclob	Answer 2 description
Question3	Nclob	Question 3 description
Answer3	Nclob	Answer 3 description
Question4	Nclob	Question 4 description
Answer4	Nclob	Answer 4 description
TargetDate3	Date	Target Date 3
TargetDate4	Date	Target Date 4
ManagerName	Nvarchar2(50)	Mamager Name
PlanDate	Date	Plan Date
SentToAuditor	Number	Bit value indicating whether the corrective action plan was sent to the auditor or not
CorrectiveActionResponse	Nclob	Response
Concern	Number	Bit value indicating whether this is a concern or not

FindingDocument – This table contains information about the documents uploaded for a particular answer

Field Name	Field Type	Description
FindingDocumentID	Number	Primary key
AnswerID	Number	Specifies the answer for which the documents are uploaded
FileSize	Nvarchar2(25)	Size of the file
OriginalName	Nvarchar2(50)	Original name of the file
DomainPath	Nclob	Domain path of the file
FilePath	Nclob	Actual path of the file where it is saved

ProcessMeasure – This table lists down all the process measure

Field Name	Field Type	Description
ProcessMeasureID	Number	Primary key
ProcessMeasureName	Varchar2(40)	Name
ProcessMeasureDescription	Varchar2(400)	Description
ProcessMeasureCode	Number	Code associated with the process measure

QuestionType – This table contains the list of different types of answer

Field Name	Field Type	Description
QuestionTypeID	Number	Primary key
QuestionTypeName	Nvarchar2(100)	Name
QuestionTypeDescription	Nclob	Description
QuestionTypeModificationDate	Date	Modification date

QuestionVersion – This table contains the list of questions

Field Name	Field Type	Description
QuestionVersionID	Number	Primary key
EmployeeIDQUpdater	Number	Employee who updated the question
QuestionUpdateDate	Date	Date on which the question got modified
QuestionDescription	Nclob	Description
QReference	Nclob	Reference
QuestionTypeID	Number	Type of answer for this question
ProcessMeasureID	Number	Specifies the Process Measure
SubQuestions	Number	Bit value indicating whether this question has sub questions or not
CategoryID	Number	Specifies the category
TemplateQuestion	Number	Bit value indicating whether this question is a template question or not

SLI – This table lists down the organizational categories for Technical Audits

Field Name	Field Type	Description
SLI_ID	Number	Primary key
SLI_Name	Varchar2(40)	Name
SLI_Description	Varchar2(400)	Description

SubQuestions – This table lists down the sub questions

Field Name	Field Type	Description
SubQuestionID	Number	Primary key
QuestionVersionID	Number	Specifies the question to which the subquestions belong
QuestionID	Number	Field not used
EmployeeIDQUpdater	Number	Employee who updated the question
SubQuestionUpdateDate	Date	Date on which the sub question was updated
SubQuestionDescription	Nclob	Description
SubQReference	Nclob	Reference
QuestionTypeID	Number	Answer type
ProcessMeasureID	Number	Process Measure
SubQNumber	Number	Sub question number
GroupID	Number	Group identifier
GroupName	Nclob	Name of the group

AdditionalObservations – This table contains the additional observations per page

Field Name	Field Type	Description
AdditionalObservationID	Number	Primary key
AuditID	Number	Specifies the audit ID
PageNumber	Number	Page to which the additional observation belongs

Observations	Nclob	Description of the observation

Suppliers – This table contains the details of all vendors

Field Name	Field Type	Description
SupplierID	Number	Primary key
SupplierActive	Number	Bit value indicating whether Vendor is active
FacilityName	Nvarchar2(50)	Name
FacilityType	Nvarchar2(50)	Audit type
SupplierContactName	Nvarchar2(50)	Contact Person Name
SupplierContactTitle	Nvarchar2(50)	Contact Person Title
SupplierStreetAddress	Nvarchar2(255)	Street Address
SupplierCity	Nvarchar2(50)	City
SupplierState	Nvarchar2(20)	State
SupplierZipCode	Number	Zip code
SupplierCountry	Nvarchar2(50)	Country
SupplierCountryCode	Number	Phone – Country code
SupplierPhoneACode	Number	Phone – Area code
SupplierWorkPhoneNumber	Number	Phone number
SupplierFaxACode	Number	Fax – Area code
SupplierWorkFaxNumber	Number	Fax Number
SupplierWorkEmailAddress	Nvarchar2(50)	Email Address
Notes	Nvarchar2(200)	Notes
PermissionID	Number	Specifies the permission
SupplierCode	Number	Code associated with the vendor
SupplierContinent	Number	Specifies the continent code
SupplierUserID	Nvarchar2(25)	User name
SupplierPword	Nvarchar2(25)	Password
SupplierFaxCCode	Number	Fax – Country code
ContactName2	Nvarchar2(50)	Contact person 2 name
ContactTitle2	Nvarchar2(50)	Contact person 2 title
EmailAddress2	Nvarchar2(50)	Additional Email address
PhoneCountryCode2	Number	Phone2 – Country code
PhoneAreaCode2	Number	Phone2 – area code
Phone2	Number	Phone 2 Number
FaxCountryCode2	Number	Fax 2 – Country code
FaxAreaCode2	Number	Fax 2 – Area code
Fax2	Number	Fax 2 Number

TemporaryChecklist – This table holds all the modified questions till they are approved

Field Name	Field Type	Description
TemporaryChecklistID	Number	Primary key
QuestionVersionId	Number	Specifies the index of the original question
EmployeeIDQUpdator	Number	Employee who updated the question
QuestionUpdateDate	Date	Date of modification
QuestionDescription	Nclob	Description
QReference	Nclob	Reference
QuestionTypeID	Number	Answer Type
ProcessMeasureID	Number	Process Measure
SubQuestions	Number	Bit value indicating whether this question has sub questions or not
CategoryID	Number	Category
QuestionNO	Number	Question number
FlagModified	Number	Indicates whether this question was modified or inserted
ProcessMeasureOrder	Varchar2	Process measure order of the checklist
CategoryOrder	Varchar2	Category order of the checklist
EmployeeIDChecklistUpdater	Number	Employee who modified the checklist
ManagerApproved	Number	Bit value indicating whether the manager approves the checklist or not
PreviousChecklistVersionID	Number	Specifies the index of the original checklist revision
ChecklistID	Number	Audit type of the checklist
VersionNumber	Number	Revision number
SendForManagerApproval	Number	Bit value indicating whether this checklist is send for manager approval or not
RequestForModification	Number	Bit value indicating whether manager has asked for more modifications or not
TemplateQuestion	Number	Template question or not
SupplierID	Number	Vendor
TemplateChecklist	Number	Template checklist or not

TempoararyChecklistSubQuestions- This table contains all the modified sub questions

Field Name	Field Type	Description
TCSubQuestionsID	Number	Primary key
SubQuestionID	Number	Specifies the index of the original sub question
QuestionVersionID	Number	Question which contains this sub question
EmployeeIDQUpdater	Number	Employee who updated the question
SubQuestionUpdateDate	Date	Date of modification
SubQuestionDescription	Nclob	Description
SubQReference	Nclob	Reference
QuestionTypeID	Number	Answer type
ProcessMeasureID	Number	Process Measure
SubQNumber	Number	Question number
GroupID	Number	Group identifier
GroupName	Nclob	Group name
ParentID	Number	Parent Question
FlagModified	Number	Indicates whether this question was modified or inserted

INTERNAL AUDITS MODULE

IA_ALI - Table that lists down the Aircraft Level Impact for Internal Audits

Field Name	Field Type	Description
ALI_ID	Number	Primary Key
ALI_Name	Varchar2(40)	Name
ALI_Description	Varchar2(400)	Description

IA_Answers – Table that contains all the answers stored

Field Name	Field Type	Description
AnswerID	Number	Primary Key
AnswerDescription	Nvarchar2(100)	Answer description
AnswerEnteredDate	Date	Date when the answer is entered
AuditID	Number	Specifies the audit to which this answer belongs
QuestionVersionID	Number	Specifies the question version to which this answer belongs
SubQuestionID	Number	Specifies the sub question if this answer belongs to a sub question
ALI_ID	Number	Specifies the Aircraft Level Impact
SLI_ID	Number	Specifies the Organizational Category
AuditFindings	Nclob	Gives the Findings associated with this answer
AuditFindingsEnteredDate	Date	Specifies the date on which the findings are entered
AuditConcerns	Nclob	Gives the Findings associated with this answer
AuditConcernsEnteredDate	Date	Specifies the date on which the findings are entered
AuditComments	Nclob	Gives the Findings associated with this answer
AuditCommentEnteredDate	Date	Specifies the date on which the findings are entered
CorrectiveActions	Number	Index to the corrective actions table

IA_Audits – Table that provides information about all the audits

Field Name	Field Type	Description
AuditID	Number	Primary key
DepartmentID	Number	Specifies the Department
AuditDescription	Nclob	Gives the Audit Description
StatusID	Number	Specifies the Status
EmployeeIDAuditor1	Number	Primary Auditor
EmployeeUserID	Nvarchar2(50)	Primary Auditor User ID
EmployeeIDAuditor2	Number	Secondary Auditor
ExternalAuditor1	Nvarchar2(200)	External Auditor 1
ExternalAuditor2	Nvarchar2(200)	External Auditor 2
AuditStartDate	Date	Start Date
AuditEndDate	Date	Completion Date
DepartmentID	Number	Specifies the Department on which the audit was done
PreAuditBriefing	Nclob	Field no longer used
PosrAuditBriefing	Nclob	Field no longer used
NextSchedAuditDate	Date	Next scheduled date of the same audit
Transaction_date	Date	Field no longer used
DateModified	Date	Date on which the audit details were modified
EmployeeIDUpdater	Number	Employee who updated the audit details
ChecklistVersionID	Number	Checklist revision associated with the audit
Association	Number	Bit value indicating whether association with a checklist revision exists or not
CorrectiveActionsApproval	Date	Date of corrective actions approval
ReportSentDate	Date	Date on which the audit report was sent
DepartmentManagerName	Nvarchar2(200)	Manager of the Department where audit is conducted
CorrectiveActionStatus	Number	Bit value indicating whether all corrective actions for this audit were accepted or not
ReportReceivedDate	Date	Date when the report is received from the vendor

IA_AuditStatus – Table that lists down the different audit statuses

Field Name	Field Type	Description
StatusID	Number	Primary Key
StatusName	Nvarchar2(50)	Status name
StatusDescription	Nclob	Description
StatusExists	Number	Bit value indicating whether the status is valid

IA_Checklist – Table that lists down the different audit types

Field Name	Field Type	Description
ChecklistID	Number	Primary Key
ChecklistName	Nvarchar2(50)	Audit Type Name
ChecklistDescription	Nclob	Description
ChecklistCreationDate	Date	Creation Date
ChecklistExists	Number	Bit value indicating whether the audit type still exists
AuditCode	Number	Code associated with the audit type

IA_ChecklistQuestions – This table contains all the questions contained in a checklist revision

Field Name	Field Type	Description
ChecklistVersionID	Number	Index to the checklist version table
QuestionVersionID	Number	Index to the question version table
QuestionNo	Number	Question Number

IA_ChecklistVersion – This table contains the details of different revisions of all checklists

Field Name	Field Type	Description
ChecklistVersionID	Number	Primary Key
Department ID	Number	Specifies the Department
CreationDate	Date	Creation Date of the checklist
Version	Number	Version number
EmployeeIDUpdater	Number	Employee who updated the checklist
ProcessMeasureOrder	Varchar2(50)	Process measure order of the checklist
TemplateChecklist	Number	Bit value indicating whether this checklist is a template checklist or not
PreviousChecklistVersionID	Number	Specifies the parent revision

IA_CorrectiveActionComments – This table contains the corrective actions comments of the auditor

Field Name	Field Type	Description
CorrectiveActionCommentsID	Number	Primary key
AnswerID	Number	Specifies the answer for which the corrective action is
AuditorComents	Nclob	Auditor comments
Concern	Number	Bit value indicating whether this is a concern or not

IA_CorrectiveActionDocument – This table contains the list of the documents uploaded

Field Name	Field Type	Description
CorrectiveActionDocumentID	Number	Primary key
AnswerID	Number	Specifies the Answer for which the documents are uploaded
FileSize	Nvarchar2(25)	Size of the file uploaded
OriginalName	Nvarchar2(50)	Original Name of the file
DomainPath	Nclob	Domain path of the file
FilePath	Nclob	Path where the file is stored
Concern	Number	Bit value indicating whether this file is uploaded for a concern or not

IA_CorrectiveActionPlan – This table contains the details of the corrective action plan

Field Name	Field Type	Description
CorrectiveActionPlanID	Number	Primary key
AnswerID	Number	Specifies the answer
Question1	Nclob	Question 1 description
Answer1	Nclob	Question 1 description
Question2	Nclob	Question 2 description
Answer2	Nclob	Answer 2 description
Question3	Nclob	Question 3 description
Answer3	Nclob	Answer 3 description
Question4	Nclob	Question 4 description
Answer4	Nclob	Answer 4 description
TargetDate3	Date	Target Date 3
TargetDate4	Date	Target Date 4
ManagerName	Nvarchar2(50)	Mamager Name
PlanDate	Date	Plan Date
SentToAuditor	Number	Bit value indicating whether the corrective action plan was sent to the auditor or not
CorrectiveActionResponse	Nclob	Response
Concern	Number	Bit value indicating whether this is a concern or not

IA_FindingDocument – This table contains information about the documents uploaded for a particular answer

Field Name	Field Type	Description
FindingDocumentID	Number	Primary key
AnswerID	Number	Specifies the answer for which the documents are uploaded
FileSize	Nvarchar2(25)	Size of the file
OriginalName	Nvarchar2(50)	Original name of the file
DomainPath	Nclob	Domain path of the file
FilePath	Nclob	Actual path of the file where it is saved

IA_ProcessMeasure – This table lists down all the process measure

Field Name	Field Type	Description
ProcessMeasureID	Number	Primary key
ProcessMeasureName	Varchar2(40)	Name
ProcessMeasureDescription	Varchar2(400)	Description
ProcessMeasureCode	Number	Code associated with the process measure

IA_QuestionType – This table contains the list of different types of answer

Field Name	Field Type	Description
QuestionTypeID	Number	Primary key
QuestionTypeName	Nvarchar2(100)	Name
QuestionTypeDescription	Nclob	Description

IA_QuestionVersion – This table contains the list of questions

Field Name	Field Type	Description
QuestionVersionID	Number	Primary key
EmployeeIDQUpdater	Number	Employee who updated the question
QuestionUpdateDate	Date	Date on which the question got modified
QuestionDescription	Nclob	Description
QReference	Nclob	Reference
QuestionTypeID	Number	Type of answer for this question
ProcessMeasureID	Number	Specifies the Process Measure
SubQuestions	Number	Bit value indicating whether this question has sub questions or not
AttributID	Number	Field not used
SectionID	Number	Gives the section to which the question belongs
TemplateQuestion	Number	Bit value indicating whether this question is a template question or not

IA_OC– This table lists down the organizational categories for Internal Audits

Field Name	Field Type	Description
OC_ID	Number	Primary key
OC_Name	Varchar2(40)	Name
OC_Description	Varchar2(400)	Description

IA_SubQuestions – This table lists down the sub questions

Field Name	Field Type	Description
SubQuestionID	Number	Primary key
QuestionVersionID	Number	Specifies the question to which the subquestions belong
QuestionID	Number	Field not used
EmployeeIDQUpdater	Number	Employee who updated the question
SubQuestionUpdateDate	Date	Date on which the sub question was updated
SubQuestionDescription	Nclob	Description
SubQReference	Nclob	Reference
QuestionTypeID	Number	Answer type
ProcessMeasureID	Number	Process Measure
SubQNumber	Number	Sub question number
GroupID	Number	Group identifier
GroupName	Nclob	Name of the group

IA_AdditionalObservations – This table contains the additional observations per page

Field Name	Field Type	Description
AdditionalObservationID	Number	Primary key
AuditID	Number	Specifies the audit ID
PageNumber	Number	Page to which the additional observation belongs
Observations	Nclob	Description of the observation

IA_ Departments – This table contains the details of all vendors

Field Name	Field Type	Description
DepartmentID	Number	Primary key
DepartmentActive	Number	Bit value indicating whether Department is active
DepartmentName	Nvarchar2(50)	Name
DepartmentType	Nvarchar2(50)	Audit type
DepartmentContactName	Nvarchar2(50)	Contact Person Name
DepartmentContactTitle	Nvarchar2(50)	Contact Person Title
DepartmentStreetAddress	Nvarchar2(255)	Street Address
DepartmentCity	Nvarchar2(50)	City
DepartmentState	Nvarchar2(20)	State
DepartmentZipCode	Number	Zip code
DepartmentCountry	Nvarchar2(50)	Country
DepartmentCountryCode	Number	Phone – Country code
DepartmentPhoneACode	Number	Phone – Area code
DepartmentWorkPhoneNumber	Number	Phone number
DepartmentFaxACode	Number	Fax – Area code
DepartmentWorkFaxNumber	Number	Fax Number
DepartmentWorkEmailAddress	Nvarchar2(50)	Email Address
ChecklistID	Number	Specifies the Audit type
DepartmentContinent	Number	Specifies the continent code
DepartmentUserID	Nvarchar2(25)	User name
DepartmentPword	Nvarchar2(25)	Password
DepartmentFaxCCode	Number	Fax – Country code
ContactName2	Nvarchar2(50)	Contact person 2 name
ContactTitle2	Nvarchar2(50)	Contact person 2 title
EmailAddress2	Nvarchar2(50)	Additional Email address
PhoneCountryCode2	Number	Phone2 – Country code
PhoneAreaCode2	Number	Phone2 – area code
Phone2	Number	Phone 2 Number
FaxCountryCode2	Number	Fax 2 – Country code
FaxAreaCode2	Number	Fax 2 – Area code
Fax2	Number	Fax 2 Number

IA_TemporaryChecklist – This table holds all the modified questions till they are approved

Field Name	Field Type	Description
TemporaryChecklistID	Number	Primary key
QuestionVersionId	Number	Specifies the index of the original question
EmployeeIDQUpdator	Number	Employee who updated the question
QuestionUpdateDate	Date	Date of modification
QuestionDescription	Nclob	Description
QReference	Nclob	Reference
QuestionTypeID	Number	Answer Type
ProcessMeasureID	Number	Process Measure
SubQuestions	Number	Bit value indicating whether this question has sub questions or not
DepartmentID	Number	Specifies the Department
QuestionNO	Number	Question number
FlagModified	Number	Indicates whether this question was modified or inserted
ProcessMeasureOrder	Varchar2	Process measure order of the checklist
DeleteFlag	Number	Bit value indicating whether this question is supposed to be deleted or not
EmployeeIDChecklistUpdater	Number	Employee who modified the checklist
ManagerApproved	Number	Bit value indicating whether the manager approves the checklist or not
PreviousChecklistVersionID	Number	Specifies the index of the original checklist revision
ChecklistID	Number	Audit type of the checklist
VersionNumber	Number	Revision number
SendForManagerApproval	Number	Bit value indicating whether this checklist is send for manager approval or not
RequestForModification	Number	Bit value indicating whether manager has asked for more modifications or not
TemplateQuestion	Number	Template question or not
AttributeID	Number	Field not used
TemplateChecklist	Number	Template checklist or not
SectionID	Number	Specifies the Section of this question

SURVEILLANCE MODULE

Surv_Ads : Table that holds all the mandatory items

Field Name	Field Type	Description
AD_ID	Number	Primary Key
WorkOrderNumber	Number	Work order to which the AD belongs
ADReference	Nvarchar2(200)	Reference of the AD
Title	Nvarchar2(200)	The AD Title
LastWorkedOnDate	Date	Specifies the latest date on which this particular AD was worked upon
Used	Number	Bit value indicating whether this AD is used or not in a particular work order
ADNumber	Nvarchar2(25)	The AD number
Status	Number	Index to the Status table which indicates whether the AD is accepted or rejected
ProcessMeasureID	Number	Specifies the Process Measure
MXTaskID	Number	Specifies the Maintenance task
MXSourceID	Number	Specifies the Maintenance Source
ALI_ID	Number	Specifies the Aircraft Level Impact
OC_ID	Number	Specifies the Organizational Category
Discrepancy	Nclob	Gives the discrepancy noted
CorrectiveActions	Nclob	Specifies the corrective actions
Comments	Nclob	Gives the comments of the representative
WorkedOn	Number	Bit value indicating whether this AD has been worked on
WCCR	Number	Bit value indicating whether WCCR was noted
PFCR	Number	Bit value indicating whether PFCR was noted
EmployeeID	Number	Specifies the Employee who worked on the AD
ActivityNumber	Number	Gives the Activity number. Used to differentiate multiple activities with same AD number
FlagReject	Number	Bit value indicating whether this AD was rejected
CompletionStatusID	Number	Specifies the state of completion
LubType	Number	Bit value indicating whether this activity is a Lubricant card
BelongsTo	Number	Specifies the employee to which this activity belongs

Surv_Aircraft – Table that contains a list of all the aircrafts

Field Name	Field Type	Description
AircraftID	Number	Primary Key
AircraftTailNo	Nvarchar2(200)	Tail number
SiteID	Number	Site to which aircraft belongs
Age	Number	Age of the aircraft
Company	Nvarchar2(500)	Aircraft company
FleetTypeID	Number	Specifies the fleet type

Surv_Ali – Table which lists down the Aircraft Level Imapct

Field Name	Field Type	Description
ALI_ID	Number	Primary Key
ALI_Name	Nvarchar2(200)	Name
ALI_Description	Nclob	Description

Surv_CompletionStatus

Field Name	Field Type	Description
CompletionStatusID	Number	Primary Key
CompletionStatusName	Nvarchar2(25)	Name

Surv_FleetType – Table that lists down all the Fleet types

Field Name	Field Type	Description
FleetTypeID	Number	Primary key
FleetTypeName	Nvarchar2(200)	Fleet name
FleetTypeCode	Number	Code associated with the fleet

Surv_Goals – Table that contains the manager set goals for different process measures

Field Name	Field Type	Description
GoalID	Number	Primary Key
NumOfActivities	Number	Total number of activities expected
PercTechnical	Number	Percentage of technical activities expected
PercHF	Number	Percentage of H & F activities expected
PercAdmin	Number	Percentage of Administration activities expected
PercProg	Number	Percentage of Program expected
PercInProc	Number	Percentage of In Procedure expected
PercVerification	Number	Percentage of Verification expected
PercFinalWalkaround	Number	Percentage of Final Walkaround activities expected

Surv_JobCards : This is a replica of the job cards table at Fedex

Surv_MXSource – Table that lists down all the maintenance source items

Field Name	Field Type	Description
MxSourceID	Number	Primary key
MxName	Nvarchar2(200)	Maintenance Source Name
MXDescription	Nclob	Maintenance Source Description
MxAbbr	Nvarchar2(25)	Maintenance Source Abbreviation

Surv_MXTask - Table that lists down all the maintenance task items

Field Name	Field Type	Description
MxTaskID	Number	Primary key
MxName	Nvarchar2(200)	Maintenance Task Name
MXDescription	Nclob	Maintenance Task Description

Surv_NonRoutines : Table that holds all the system generated non routines

Field Name	Field Type	Description
NonRoutineID	Number	Primary Key
WorkOrderNumber	Number	Work order to which the non routine belongs
SurveillanceID	Number	Index to the Surveillance table
NRTitle	Nvarchar2(200)	The non routine Title
NonRoutineNumber	Nvarchar2(25)	The non routine number
NRStatus	Number	Index to the NRStatus table which indicates whether the non routine is accepted or rejected
Type	Number	Indicates whether this Nonroutine was generated from an AD or work card
ProcessMeasureID	Number	Specifies the Process Measure
MXTaskID	Number	Specifies the Maintenance task
MXSourceID	Number	Specifies the Maintenance Source
ALI_ID	Number	Specifies the Aircraft Level Impact
OC_ID	Number	Specifies the Organizational Category
Discrepancy	Nclob	Gives the discrepancy noted
CorrectiveActions	Nclob	Specifies the corrective actions
Comments	Nclob	Gives the comments of the representative
GeneratedBy	Nvarchar2(200)	Employee who generated this non routine
GeneratedDate	Date	Date on which this non routine was generated
WorkedOn	Number	Bit value indicating whether this non routine has been worked on
SurveillanceEventID	Number	Index to the Surveillance Event table indicating the activity which generated this non routine
NRDocumentation	Nclob	Specifies the non routine documentation
EmployeeID	Number	Specifies the Employee who worked on the non routine
ActivityNumber	Number	Gives the Activity number. Used to differentiate multiple activities with same non routine number
FlagReject	Number	Bit value indicating whether this non routine was rejected
LastWorkedOnDate	Date	Last worked on date for this non routine
OriginatingItemNumber	Nvarchar2	Specifies the Activity number from which this non routine was generated
BelongsTo	Number	Specifies the employee to which this non routine belongs

Surv_NRStatus – Table that lists down the different non routine statuses

Field Name	Field Type	Description
StatusID	Number	Primary key
StatusName	Navarchar2(50)	Non routine status name

Surv_OC – Table that lists down the Organizational categories

Field Name	Field Type	Description
OC_ID	Number	Primary key
OC_Name	Nvarchar2(200)	Organizational category Name
OC_Description	Nclob	Organizational category description

Surv_ProcessMeasure – Table that lists down all the process measures

Field Name	Field Type	Description
ProcessMeasureID	Number	Primary key
ProcessMeasureName	Nvarchar2(200)	Name
ProcessMeasureDescription	Nclob	Description
Target	Number	Target Expected
MajorCategory	Char(1)	Character field indicating the major category
ProcessMeasureCode	Number	Code associated with the process measure

Surv_Site : Table that gives information about the different surveillance sites

Field Name	Field Type	Description
SiteID	Number	Primary key
SiteStreetAddress	Nvarchar2(300)	Street Address
SiteCity	Nvarchar2(50)	City
SiteState	Nvarchar2(25)	State
SiteCountry	Nvarchar2(75)	Country
SiteActive	Number	Bit value indicating whether Site is active
BaseName	Nvarchar2(50)	Name of the site
BaseCode	Nvarchar2(50)	Code associated with the Site
Description	Nclob	Site description
Identifier	Nvarchar2(20)	Site identifier
SiteContactName	Nvarchar2(50)	Name of the contact person in the site
SiteContactTitle	Nvarchar2(50)	Contact person title
SiteEmailAddress	Nvarchar2(50)	Email address
SiteAge	Number	Age of the site
DurationOfService	Number	Duration for which the site has been in service
NumHangers	Number	Number of hangers in the site
NumEmployees	Number	Number of Employees in the site
NumAirlines	Number	Number of Airlines serviced by the site
MaintTypes	Nvarchar2(100)	Maintenance type of the site
AvgAge	Number	Average age of the employees at the site
AvgExp	Number	Average experience of the employees at the site
PhoneCC	Number	Phone – Country code
PhoneAC	Number	Phone – Area code
PhoneNo	Number	Phone Number
FaxCC	Number	Fax – Country code
FaxAC	Number	Fax – Area code
FaxNo	Number	Fax Number
SiteZipcode	Number	Zip code
NumOfActivities	Number	Number of Activities handled at the site

Surv_Surveillance – Table that contains entries for the different Surveillance events.

Field Name	Field Type	Description
SurveillanceID	Number	Primary key
AircraftID	Number	Specifies the aircraft
SiteID	Number	Specifies the site where the surveillance is carried out
EmployeeID	Number	Employee in charge of the Surveillance
StartDate	Date	Start Date of surveillance
EndDate	Date	End Date of the surveillance
SurveillanceClosed	Number	Bit value indicating whether was closed

Surv_SureillanceEvent – Table that holds the information of the different sampled and scheduled activities

Field Name	Field Type	Description
SurveillanceEventID	Number	Primary Key
WorkOrderNumber	Number	Work order to which the Activity belongs
SurveillanceID	Number	Index to the Surveillance table
WorkCardID	Number	Index to the Surv_WorkCards table
LastWorkedOnDate	Date	Specifies the latest date on which this particular Activity was worked upon
Status	Number	Index to the Status table which indicates whether the Activity is accepted or rejected
ProcessMeasureID	Number	Specifies the Process Measure
MXTaskID	Number	Specifies the Maintenance task
MXSourceID	Number	Specifies the Maintenance Source
ALI_ID	Number	Specifies the Aircraft Level Impact
OC_ID	Number	Specifies the Organizational Category
Discrepancy	Nclob	Gives the discrepancy noted
CorrectiveActions	Nclob	Specifies the corrective actions
Comments	Nclob	Gives the comments of the representative
WorkedOn	Number	Bit value indicating whether this Activity has been worked on
WCCR	Number	Bit value indicating whether WCCR was noted
PFCR	Number	Bit value indicating whether PFCR was noted
EmployeeID	Number	Specifies the Employee who worked on the Activity
ActivityNumber	Number	Gives the Activity number. Used to differentiate multiple activities with same Activity number
FlagReject	Number	Bit value indicating whether this Activity was rejected
CompletionStatusID	Number	Specifies the state of completion
BelongsTo	Number	Specifies the employee to which this activity belongs

Surv_WorkCards : Table that lists down all the activities (Sampled and non sampled)

Field Name	Field Type	Description
WorkCardID	Number	Primary key
WorkOrderNumber	Number	Work order number
WorCardReference	Nvarchar2(200)	Activity reference
Title	Nvarchar2(200)	Activity title
LastWorkedOnDate	Date	Last worked on date
Used	Number	Bit value indicating whether this work card was sampled or not
WorkCardNumber	Nvarchar2(25)	Activity number
ActivityType	Number	Specifies the maintenance source

Surv_WorkCardStatus – Table that liss down the different activity statuses

Field Name	Field Type	Description
StatusID	Number	Primary Key
StatusName	Nvarchar2(10)	Name of the status

Surv_WorkOrder – Table that lists down the information of different work orders

Field Name	Field Type	Description
WorkOrderID	Number	Primary Key
WorkOrderNumber	Number	Work order Number
Description	Nclob	Work order Description
PlannedDate	Date	Planned start date of the work order
StartDate	Date	Actual Start date of the work order
CompletedDate	Date	Completed date of the work order
WRI	Number	
AircraftTailNo	Nvarchar2(200)	Aircraft tail number to which the work order belongs
StatusClosed	Number	Bit value indicating whether the work order was closed
SurveillanceID	Number	Index to the Surveillance table
VisitNo	Number	
CheckType	Nvarchar2(25)	
PrimaryEmployeeID	Number	Primary employee responsible.
SiteID	Number	Index to the Site table

Airworthiness Directives module

AD_ADDetails

Field Name	Field Type	Description
AD_ID	Number	Primary key
ActionDocNumber	Nvarchar2(50)	Action Document Number
FleetTypeID	Number	Index to the Fleet Type table
AircraftID	Number	Index to the Aircraft table
ADDescription	Nclob	The description of the AD
CompletionDate	Date	Completion Date of the AD
TargetDate	Date	Target Date of the AD
EffectiveDate	Date	Effective Date of the AD
CompletionStatus	Number	0 indicates not completed 1 indicates completed
ADRepID	Number	Representative ID
CSRevisionID	Number	Index to the CSRevision table
CARevisionID	Number	Index to the CA Revision table
StartDate	Date	Date when the AD started
FinalDate	Date	Date when the AD closed
ADNumber	Nvarchar2(200)	Airworthiness Directives number

AD_Aircraft

Field Name	Field Type	Description
AircraftID	Number	Primary Key
AircraftTailNo	Nvarchar2(200)	The aircraft tail number
SiteID	Number	Index to the site table
Age	Number	The age of the aircraft
Company	Nvarchar2(500)	The name of the company to which the aircraft belongs
FleetTypeID	Number	Index to the Fleet Type table

AD_CAItemRevisionID

Field Name	Field Type	Description
CAItemRevisionID	Number	Primary key
EmployeeIDQUpdater	Number	Index to the Employee table indicating the employee who modified the corrective action item

ItemUpdateDate	Date	The date on which the corrective action item revision was last modified
ItemDescription	NClob	The corrective action item description

AD_CAItems - Lists down all the questions that belongs to a given CA Revision

Field Name	Field Type	Description
CARevisionID	Number	Primary key
CAItemRevisionID	Number	Foreign key to the AD_CAItemRevisionID
QuestionNo	Number	The Question Number

AD_CARevision - Contains the different CA Revisions

Field Name	Field Type	Description
CARevisionID	Number	Primary key
CreationDate	Date	Date of creation
Revision	Number	Revision number
EmployeeIDUpdater	Number	Index to the Employee table indicating the employee who created the revision

AD_CompletionStatus – This table gives the names of different statuses

Field Name	Field Type	Description
CompletionStatusID	Number	Primary key
StatusName	Nvarchar2(25)	Name

AD_CSAnswers – This table contains all the answers

Field Name	Field Type	Description
AnswerID	Number	Primary key
AnswerEnteredDate	Date	Date when the answer was entered
AD_ID	Number	Specifies the AD to which the answer belongs
ProcessMeasureID	Number	Process Measure
Comments	Nclob	Comments
CorrectiveActionID	Number	Corrective Action Index
AnswerStatus	Number	Status of the answer
QuestionVersionID	Number	Specifies the question
FlagReject	Number	Bit value to indicate whether this question was rejected or not

AD_CSQuestions – This table contains the mapping of questions and canned statements

Field Name	Field Type	Description
CSRevisionID	Number	Primary key
QuestionVersionID	Number	Index to the question version table
QuestionNo	Number	Question number

AD_CSQuestionVersion – This table contains all the questions

Field Name	Field Type	Description
QuestionVersionID	Number	Primary key
EmloyeeIDQUpdater	Number	Employee who updated the question
QuestionUpdateDate	Date	Date of modification
QuestionDescription	Nclob	Description

AD_CSRevision – This table contains information on canned statements revisions

Field Name	Field Type	Description
CSRevisionID	Number	Primary key
CreationDate	Date	Date of creation
Revision	Number	Revision number
EmployeeIDUpdater	Number	Employee who updated the revision

AD_ProcessMeasure – Table that lists down all the process measures

Field Name	Field Type	Description
ProcessMeasureID	Number	Primary key
ProcessMeasureName	Nvarchar2(200)	Name
ProcessMeasureDescription	Nclob	Description

AD_TemporaryCA – This table contains the modified CA items till they are approved

Field Name	Field Type	Description
TemporaryCAID	Number	Primary key
CAItemRevisionID	Number	Index to the original CA item
EmployeeIDQupdater	Number	Employee performing Item modification
ItemUpdateDate	Date	Update date
ItemDescription	Nclob	Description
QuestionNo	Number	Item number
FlagModified	Number	Indicates whether the Item is modified or inserted
EmployeeIDCSupdater	Number	Employee performing CA modification
ManagerApproved	Number	Bit value indicating whether the manager approved the CA or not
PreviousRevisionID	Number	Parent Revision
VersionNumber	Number	Revision number
SendForManagerApproval	Number	Bit value – 1 indicates it is sent for manager approval ; 0 otherwise
RequestForModification	Number	Bit value – 1 indicates manager needs further modification ; 0 otherwise

AD_TemporaryCS – This table contains the modified CS items till they are approved

Field Name	Field Type	Description
TemporaryCSID	Number	Primary key
QuestioVersionID	Number	Index to the original item
EmployeeIDQupdater	Number	Employee performing question modification
QuestionUpdateDate	Date	Update date
QuestionDescription	Nclob	Description
QuestionNo	Number	Question number
FlagModified	Number	Indicates whether the question is modified or inserted
EmployeeIDCSupdater	Number	Employee performing CS modification
ManagerApproved	Number	Bit value indicating whether the manager approved the CA\S or not
PreviousCSRevisionID	Number	Parent Revision
VersionNumber	Number	Revision number

Field Name	Field Type	Description
SendForManagerApproval	Number	Bit value – 1 indicates it is sent for manager approval ; 0 otherwise
RequestForModification	Number	Bit value – 1 indicates manager needs further modification ; 0 otherwise

COMMON TABLES

Employees – This table contains information of all Employees

Field Name	Field Type	Description
EmployeeID	Number	Primary key
EmployeeName	Nvarchar2(255)	Full Name
EmployeeTitle	Nvarchar2(255)	Title
EmployeeStreetAddress	Nvarchar2(255)	Street Address
EmployeeZipCode	Number	Zip code
EmployeeCountry	Nvarchar2(255)	Country of residence
EmployeeWorkCountryCode	Number	Phone – Country code
EmployeePhoneACode	Number	Phone – Area code
EmployeeWorkPhoneNumber	Number	Phone number
EmployeeFaxACode	Number	Fax – Area code
EmployeeWorkFaxNumber	Number	Fax Number
EmployeeWorkEmailAddress	Nvarchar2(255)	Email Address
Notes	Nvarchar2(255)	Notes
EmployeeUserID	Nvarchar2(50)	User name
EmployeePword	Nvarchar2(50)	Password
PermissionID	Number	Specifies the permission
CountEmp	Number	Field not used
HintQuestion	Nclob	Hint Question for 'Forgot Password'
HintAnswer	Nclob	Hint Answer for 'Forgot Password'
EmployeeStatus	Number	Bit value indicating whether the employee is still on enrollment or not
EmployeeWorkFaxCountryCode	Number	Fax Country code
EmployeeModule	Number	Specifies one of the 4 modules to which the employee belongs
EmployeeCode	Number	Code associated with the employee
EmployeeCity	Nvarchar2(255)	City of residence
TemplateModification	Number	Bit value indicating whether the employee has Template modification privilege or not
Comat	Nvarchar2(70)	Comat
EmployeeCellPhoneCountryCode	Number	Cell phone – Country code

EmployeeCellPhoneAreaCode	Number	Cell phone – Area code
EmployeeCellPhoneNumber	Number	Cell phone number

Modules – This table contains information about the 4 WebSAT modules

Field Name	Field Type	Description
ModuleID	Number	Primary key
ModuleName	Varchar2(100)	Name
ModuleDescription	Nclob	Description

Permissions – This table contains information about the different auditor privileges

Field Name	Field Type	Description
PermissionID	Number	Primary key
PermissionDescription	Nclob	Description

Appendix J

Process Measures Definitions Document

WebSAT Process Measures Validation Survey for Airworthiness Directives

WebSAT Goal: The purpose of Web-based Surveillance and Auditing Tool (WebSAT) is to capture and analyze data for different processes involved in the surveillance, auditing, and airworthiness directives departments of the aviation maintenance industry. To achieve standardization in data collection, data needs to be collected on certain variables which measure maintenance processes and eliminate existing inconsistencies. These variables are defined by the research team as process measures.

The process measures incorporate the response and observation-based data collected during surveillance, audits, and the airworthiness directives control processes. Once data is captured in terms of these process measures, data analysis can be conducted to identify the potential problematic areas affecting the safety of an aircraft.

Airworthiness Directives Control: The evaluation of the applicability, loading, and tracking of airworthiness directives is referred to as airworthiness directives control. The work function of the airworthiness directives control department is to review AD-related EO/WIC, acquisition process, and the customer's maintenance manual.

Process Measures for Airworthiness Directives Control: The data collected from the AD-related EO/WIC review, acquisition process, and the revision of the customer's maintenance manual will be grouped into categories to facilitate further data analysis and comment on the effectiveness of the airworthiness directives control department. These categories are defined as process measures. The identified process measures for airworthiness directives control are defined in the "Process Measures Definitions for Airworthiness Directives Control" section of this document.

Document Structure: This document includes the following sections:
I   Process Measures Definitions for Airworthiness Directives Control
II   Glossary

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Creation Date: 08/03/04

I   Process Measures Definitions for Airworthiness Directives Control

1   Information Verification: This process measure validates the information presented on AD-related EO/WIC, manuals and other documents involved with the compliance of airworthiness directives. It also verifies information related to the AD status reports.

2   Loading and Tracking Verification: This process measure verifies the adequacy of the activities involved in the loading and tracking of airworthiness directives, including inspection intervals.

II   Glossary

Abbreviation	Full Form
C.A.S.E.	Coordinating Agency for Supplier Evaluation
DPM	Desktop Procedures Manual
EO	Engineering Order
EA	Engineering Authorization
FAA	Federal Aviation Administration
FR	Federal Register
FAR	Federal Aviation Regulation
NPRM	Notice of Proposed Rule Making
QA	Quality Assurance
WIC	Work Instruction Card

Acknowledgements: We would like to thank FedEx for their cooperation in this project. FedEx's Desktop Procedures Manual was used to derive the terms used in this document.

WebSAT Process Measures Validation Survey for Internal Audits

WebSAT Goal: The purpose of Web-based Surveillance and Auditing Tool (WebSAT) is to capture and analyze data for different processes involved in the surveillance, auditing, and airworthiness directives departments of the aviation maintenance industry. To achieve standardization in data collection, data needs to be collected on certain variables which measure maintenance processes and eliminate existing inconsistencies. These variables are defined by the research team as process measures.

The process measures incorporate the response and observation-based data collected during surveillance, audits, and the airworthiness directives control processes. Once data is captured in terms of these process measures, data analysis can be conducted to identify the potential problematic areas affecting the safety of an aircraft. In this stage of data analysis, the performance of processes and those conducting these processes will also be evaluated.

Internal Audits: The evaluation of internal processes in the departments of an organization is referred to as Internal Audit.

Process measures for Internal Audits: The data collected from the internal audit checklists will be grouped into categories to facilitate further data analysis and comment on the effectiveness of the internal audit process. These categories are defined as process measures. The identified process measures for internal audits are defined in the "Process Measures Definitions for Internal Audits" section of this document.

Customer and Vendor: A customer refers to an airline organization itself. A vendor refers to a company providing its services to the airline (customer).

Document Structure: This document includes the following sections:
I   Process Measures Definitions for Internal Audits
II   Glossary

I   Process Measures Definitions for Internal Audits

1   Administration: This process measure verifies the departments' ability to manage up-to-date documented systems and ensure the adequacy of various programs followed in-house.

2   Training: This process measure verifies that the employees of the departments within the organization are trained properly, and have the required certification to perform operations.

3   Records: This process measure validates the records provided by the departments within an organization.

4   Safety: This process measure validates the overall safety aspect of the departments within an organization.

5   Manuals: This process measure validates technical data, manuals, and forms provided by the departments within an organization.

6   Procedures: This process measure verifies that the vendor adheres to regulatory guidelines while executing various operations within each program such as shelf life, Storage, etc., at the vendor's facility.

II Glossary

Abbreviation	Full Form
C.A.S.E.	Coordinating Agency for Supplier Evaluation
DPM	Desktop Procedures Manual
EO	Engineering Order
EA	Engineering Authorization
FAA	Federal Aviation Administration
FR	Federal Register
FAR	Federal Aviation Regulation
NPRM	Notice of Proposed Rule Making
QA	Quality Assurance
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WebSAT Process Measures Definitions for Surveillance

WebSAT Goal: The purpose of Web-based Surveillance and Auditing Tool (WebSAT) is to capture and analyze data for different processes involved in the surveillance, auditing, and airworthiness directives departments of the aviation maintenance industry. To achieve standardization in data collection, data needs to be collected on certain variables which measure maintenance processes and eliminate existing inconsistencies. These variables are defined by the research team as process measures.

The process measures incorporate the response and observation-based data collected during surveillance, audits, and the airworthiness directives control processes. Once data is captured in terms of these process measures, data analysis can be conducted to identify the potential problematic areas affecting the safety of an aircraft. In this stage of data analysis, the performance of processes and those conducting these processes will also be evaluated.

Surveillance: It is the day-to-day oversight of the vendor's maintenance activities performed by the customer's representatives. It involves the continuous monitoring and evaluation of contracted work to determine the level of compliance with FAA regulations, the vendor's procedures manual and with the customer's maintenance manual. This oversight is to guarantee that each aircraft dispatched from an airframe substantial maintenance vendor is safe, airworthy, reliable, and regulatory compliant.

Process measures for Surveillance: Surveillance is conducted on the work cards of a scheduled maintenance event accomplished by a vendor at his facility. The data obtained from surveillance process will be grouped into categories to facilitate further data analysis and comment on the effectiveness of the surveillance process. These categories are defined as process measures. The identified process measures for surveillance are defined in the "Process Measures Definitions for Surveillance" section of this document.

Some of the terms used consistently throughout this document have been defined carefully for the reader to better understand the process measures explained in the subsequent sections.

Customer and Vendor: A customer refers to an airline organization itself. A vendor refers to a company providing its services to the airline (customer).

Technical Process Measures (T): Process measures which include surveillance involving scheduled maintenance activities performed on an aircraft during a maintenance event are referred to as Technical Process Measures. These process measures include technical activities that are hands-on and performed directly on the aircraft. Technical activity also includes maintenance that is performed in a back shop

setting on a removed aircraft part. Example would be a panel removed and routed to a composites back shop for repair, then reinstalled on the aircraft.

Non-Technical Process Measures (NT): The surveillance activities involving verification of standardized procedures, referenced manuals, equipment, and facility maintenance requirements are referred to as Non-Technical Process measures.

I Process Measures Definitions for Surveillance

1 **In-process Surveillance (T):** It is the act of observing a maintenance task that is currently in work. The on-site surveillance representatives will select certain work cards, AD driven work cards, EOs, EAs, non-routines and observe the task being accomplished by the vendor mechanic or inspector to ensure competency, correctness and adequacy of the customer's paper work to complete the task. This surveillance should be performed progressively throughout the maintenance event. Preparation before a job, torquing of an item, the use of tooling and such items, are typical examples of in-process surveillance activities.

2 **Verification Surveillance (T):** It is the re-inspection/re-accomplishing of completed work cards, AD driven work cards, EOs, EAs and non-routines that are signed off by the vendor personnel as "Complete." No additional reopening of access panels that have been closed or disassembly of the aircraft or assistance from vendor personnel will be required unless poor workmanship or other conditions are evident during the surveillance. This surveillance activity is to ensure that the intent of the task has been complied with, the workmanship meets acceptable standards and that the customer's paper work is adequate to complete the task. This surveillance should be performed progressively throughout the maintenance event as the tasks are completed.

3 **Final Walk Around (T):** It is a surveillance of the aircraft at the end of the scheduled maintenance event that checks the general condition of the aircraft usually after the vendor has completed the work scope assigned. For example: obvious safety, legal fitness, airworthiness items, general condition, cleanliness and completeness of the aircraft's cockpit, lavatory, courier area and cargo compartments, landing gear wheel wells, all access panels properly installed and no indication of fuel, oil or hydraulic leaks. Proper completion of the aircraft logbook should also be included in this activity.

4 **Documentation Surveillance (NT):** This surveillance is performed on the vendor's documented system to validate the quality control, technical data control, inspection, and work-processing programs, as presented in C.A.S.E. standard 1-A (Revision 45- 1/7/2004). The vendor should be able to provide the required documents and certificates upon request.

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i) **Certifications:** This surveillance ensures that the certification program includes certificates, operations specifications, licenses, repairman certificates, antidrug and alcohol misuse program certificates, registrations and capabilities listing required by the Code of Federal Regulations for any individual, equipment or facility. These documents are required to be kept current and made readily available for inspection and verification. For detailed instructions and description refer to C.A.S.E. standard 1-A section 2.

ii) **Quality Control:** This surveillance ensures that the quality control program includes procedures and operation which must be described in a quality control manual or other appropriate document. These documents are required to be kept current and made readily available to the surveillance representatives. For detailed instructions and description refer to C.A.S.E. standard 1-A section 3.

iii) **Inspection:** This surveillance ensures that the inspection program includes procedures to maintain an up-to-date roster of supervisory and inspection personnel who are appropriately certified and are familiar with the inspection methods, techniques and equipment that they use. For detailed instructions and description refer to C.A.S.E. standard 1-A section 4.

iv) **Technical Data Program:** This surveillance ensures that the technical data program requires all the maintenance operations to be accomplished in accordance with customer's manuals. It also ascertains that the vendor has a documented system to maintain current technical data and a master copy of each manual. For detailed instructions and description refer to C.A.S.E. standard 1-A section 6.

v) **Work Processing:** This surveillance ensures that there exists a documented system for all the programs and procedures that the vendor adopts for training, identification of parts, and use of appropriate tools and equipment in good condition to perform a maintenance task. For detailed instructions and description refer to C.A.S.E. standard 1-A section 13.

vi) **Tool/Test Equipment (NT):** This surveillance ensures that the tools and the test equipment used by the vendor for maintenance are frequently calibrated to the required standards. It also ensures that the tools and the test equipment program includes identification of tools and test equipment, identification of individuals responsible for the calibration, accomplishment of periodic calibrations, and applicable tolerance or specification. For detailed instructions and description refer to C.A.S.E. standard 1-A section 8.

5 **Facility Surveillance (NT):** This surveillance is performed on the vendor's facility to validate the shelf life control, housing and facilities, storage and safety/security/fire protection programs, as presented in C.A.S.E. standard 1-A (Revision 45- 1/7/2004). The vendor should implement programs to maintain the facility and prevent damage, material deterioration, and hazards.

i) **Shelf Life Control:** This surveillance ensures that the vendor describes in their manual a shelf life program, procedure, and a detailed listing of parts and materials which are subjected to shelf life. It also identifies the expiration date of each shelf life item. For detailed instructions and description refer to C.A.S.E. standard 1-A section 7.

ii) **Storage:** This surveillance ensures that the vendor identifies, maintains and protects parts and raw material during a maintenance event. For detailed instructions and description refer to C.A.S.E. standard 1-A section 12.

iii) **Housing and Facilities:** This surveillance ensures that the vendor houses adequate equipment and material, properly stores supplies, protects parts and sub-assemblies, and ensures that the facility has adequate space for work. For detailed instructions and description refer to C.A.S.E. standard 1-A section 10.

iv) **Safety/Security/Fire Protection:** This surveillance ensures that the vendor provides adequate safety, security and fire protection at the maintenance facility. It also ensures that the fire protection devices and systems are inspected periodically, and maintained in serviceable conditions. For detailed instructions and description refer to C.A.S.E. standard 1-A section 11.

6 Procedures Manual Violation (NT): This surveillance ensures that the vendor is complying with the requirements set forth in the customer maintenance manual, and compliance requirements presented in the vendor Inspection Procedures Manual (IPM) or Repair Station Manual (RSM).

i) **Customer Maintenance Manual Compliance:** This surveillance requires the vendor to comply with programs, documented procedures, and standards described in the customer maintenance manual.

ii) **Vendor Inspection Procedures Manual Compliance:** This surveillance ensures that the vendor complies with programs, documented procedures, and standards described in the vendor IPM or RSM. It also ensures if the vendor IPM is adequate to meet with the customer maintenance manual requirements.

II Glossary

Abbreviation	Full Form
C.A.S.E.	Coordinating Agency for Supplier Evaluation
DPM	Desktop Procedures Manual
EO	Engineering Order
EA	Engineering Authorization
FAA	Federal Aviation Administration
FR	Federal Register
FAR	Federal Aviation Regulation
NPRM	Notice of Proposed Rule Making
QA	Quality Assurance
WIC	Work Instruction Card

WebSAT Process Measures Validation Survey for Technical Audits

WebSAT Goal: The purpose of Web-based Surveillance and Auditing Tool (WebSAT) is to capture and analyze data for different processes involved in the surveillance, auditing, and airworthiness directives departments of the aviation maintenance industry. To achieve standardization in data collection, data needs to be collected on certain variables which measure maintenance processes and eliminate existing inconsistencies. These variables are defined by the research team as process measures.

The process measures incorporate the response and observation-based data collected during surveillance, audits, and the airworthiness directives control processes. Once data is captured in terms of these process measures, data analysis can be conducted to identify the potential problematic areas affecting the safety of an aircraft. In this stage of data analysis, the performance of processes and those conducting these processes will also be evaluated.

Technical Audits: The system level evaluation of standards and procedures of suppliers, fuel vendors, and ramp operations done on a periodic basis is referred to as Technical Audit.

Process measures for Technical Audits: The data collected from the technical audit checklists will be grouped into categories to facilitate further data analysis and comment on the effectiveness of the technical audit process. These categories are defined as process measures. The identified process measures for technical audits are defined in the "Process Measures Definitions for Technical Audits" section of this document.

Customer and Vendor: A customer refers to an airline organization itself. A vendor refers to a company providing its services to the airline (customer).

Document Structure: This document includes the following sections:
I   Process Measures Definitions for Technical Audits
II   Glossary

I   Process Measures Definitions for Technical Audits:

1   Compliance/Documentation: This process measure verifies vendor's documentation systems, authorization of personnel and administration requirements. The process measure includes items such as quality programs, manuals and forms control, list of authorized persons, certification, certificate forms, etc. Listed below are some of the items that may occur in a technical audit checklist and will be evaluated by this process measure.

(a) Quality programs
(b) Certification
(c) Certificate forms
(d) Internal audit and surveillance
(e) Manuals and forms control
(f) Paper work control
(g) Administration requirements

2   Inspection: This process measure verifies the certification of the inspector, the existence of acceptable sampling procedures of parts, compliance of parts to specifications, and the validity of the inspection stamps at the vendor location. Listed below are some of the items that may occur in a technical audit checklist and will be evaluated by this process measure.

(a) Fuel inspection (Fuel truck inspection, Fuel farm inspection, Hydrant inspection)
(b) Inspection programs

3   Facility Control: This process measure verifies the vendor facility for shelf life control, housing and facilities, storage, and damage protection programs. Listed below are some of the items that may occur in a technical audit checklist and will be evaluated by this process measure.

(a) Housing and facilities
(b) Material control and storage
(c) Segregation of parts
(d) Packaging
(e) List of shelf items
(f) Practices to prevent damage and cannibalization
(g) Shelf life control and material storage

4   Training and Personnel: This process measure verifies that the vendor employees are properly trained, and have the required certification to perform operations. It also verifies the supervisory personnel, inspection personnel, return-to-service personnel, and personnel responsible for various programs in the facility like shelf life, technical data, calibration etc. Listed below are some of the items that may occur in a technical audit checklist and will be evaluated by this process measure.

(a) Employee training
(b) Verification of personnel
(c) List of authorized personnel

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5 **Procedures:** This process measure verifies that the vendor adheres to regulatory guidelines while executing various operations within each program such as shipping procedures, NDT evaluations, and Aircraft deicing programs at the vendor facility. Listed below are some of the items that may occur in a technical audit checklist and will be evaluated by this process measure.

  (a) Shipping procedures
  (b) Tool and test equipment (calibration & measurement) and procurement
  (c) Scrapped parts
  (d) Work processing
  (e) Processing
  (f) Process control
  (g) NDT evaluation
  (h) Precision tool control
  (i) Aircraft anti-tipping and tether maintenance
  (j) Aircraft deicing program
  (k) Weight and balance
  (l) Weighing scales
  (m)Ramp operation *

* Note: The findings of ramp activities related to administration requirements, employee training, and dangerous goods are not included in this process measure - 'Procedures.'

6 **Data Control:** This process measure verifies the availability of up-to-date technical data for parts at the vendor's facility. It also verifies the identification of parts to their testing records and validates the fuel audit records. Listed below are some of the items that may occur in a technical audit checklist and will be evaluated by this process measure.

  (a) Technical data control
  (b) Record keeping
  (c) Fuel records (Fuel facility records, Fuel vehicle records, Pipeline fuel receipt records, Transport truck fuel receipt records)

7 **Safety:** This process measure overlooks the safety of the vendor facility. Listed below are some of the items that may occur in a technical audit checklist and will be evaluated by this process measure.

  (a) Safety
  (b) Fire protection
  (c) Fire protection and flammable material protection
  (d) Aircraft maintenance procedures
  (e) Dangerous goods

Note: Please refer to FAR 121 and C.A.S.E. 1A and 3A standards for detailed descriptions of these process measures.

II Glossary

Abbreviation	Full Form
C.A.S.E.	Coordinating Agency for Supplier Evaluation
DPM	Desktop Procedures Manual
EO	Engineering Order
EA	Engineering Authorization
FAA	Federal Aviation Administration
FR	Federal Register
FAR	Federal Aviation Regulation
NPRM	Notice of Proposed Rule Making
QA	Quality Assurance
WIC	Work Instruction Card

Acknowledgements: We would like to thank FedEx for their cooperation in this project. FedEx's Desktop Procedures Manual was used to derive the terms used in this document.