Trip Report V

Development of an Industry Standardized Auditing and Surveillance Tool Prototype

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I. Introduction

This document presents details of the interviews and observation sessions held in Memphis, TN on June 23rd, 2004. The information gathered in the sessions conducted by Nikhil Iyengar, and Pallavi Dharwada from Clemson University's WebSAT team is summarized in this report.

Note: In this document the "impact variables" have been referred to as "process measures." This is a term that is being used by the WebSAT team temporarily until a consensus is arrived upon with the FedEx personnel.

The remaining sections of the document are as follows:

- II. Attendees of Memphis interview session
- III. Notes from Memphis interview session
- IV. Next steps
- V. Glossary

II. Attendees of the Memphis interview session

Attendees from FedEx: Brian D. Bittner (QA Manager, Air Operations Quality Assurance), John Blaszkowski (Manager, Internal Evaluation and Audits), Richard L. Vernon (QA/Airworthiness Liaison, Airworthiness Directive Control Group, Quality Assurance).

Attendees from Clemson's WebSAT Research Team: Nikhil Iyengar (Doctoral Student), and Pallavi Dharwada (Doctoral Student)

III. Notes from the Memphis interview session

During this trip, the research motive of the WebSAT team in conducting the interview sessions with FedEx was to understand the process measures for each of the processes involved in the QA department of FedEx. With this goal, WebSAT team has conducted interviews with the concerned personnel in auditing and airworthiness directives control group.

Discussion with Brian Bittner

The team interacted with Brian Bittner to gain an insight into the entire gamut of work functions that come under his management. The team started off with the discussion on the overlap between the fuel vendor surveillance conducted by QA representatives from Ken's surveillance department and fuel audits conducted by Brian's auditors. Brian explained that his auditors approve fuel vendors and qualify them after an initial audit. Quarterly audits are carried out by Ken's QA surveillance representative. The initial audit is as detailed as a periodic audit. Since the QA representatives of surveillance department are already at the vendor location, it is convenient for them to conduct a fuel vendor

surveillance using an abridged version of the fuel audit checklist on a quarterly basis. A report generated from this audit is forwarded to Ken, Brian and the vendor. A system audit is also done by Brian using the fuel audit checklist on an annual basis. Fuel audit is location specific. The fuel vendor is one who puts fuel into the aircraft. The fuel supplier supplies the fuel. The checklists used to audit these two vendors remain the same. In this context, Brian also mentioned that checklists are fairly stagnant and new revisions have occurred only this summer for the first time in many years. Some items in the checklist are not applicable for international locations. Before conducting the current audit, the last two audit records are looked into. Brian clarified that nothing on fuel is related to John and presently, fuel vendor operations in Memphis are not handled as a vendor. There are approximately 160 fuel vendor locations. No line maintenance or ramp audits are done at substantial vendor maintenance bases.

The latter part of the discussion with Brian was targeted on the different ways of scoring the data collected from the checklists. Ramp and line maintenance audits have a scoring system that is being implemented whereas no scoring and analysis are done for the data collected from fuel audits. Similarly, no data analysis is done with supplier audits. The answers from different checklist questions are obtained in terms of Yes, No or N/A with the exception of mail-out audits for the various types of suppliers and no further data analysis takes place. The results from these audits are currently documented in an audit report which presents the corrective action required by the vendor to implement for each "No" in the checklist. The scoring system used to analyze the ramp audits' data uses weighted scores associated with the categories which identify the questions in the checklist. These categories evolve from functional requirements of the department. Heavy scores and low tolerances are associated with those operations which are regulatory and safety specific and have a high severity consequence whereas medium scores are assigned to operations that are specific to internal policies and procedures where the consequence severity is moderate. Low scores and larger tolerances are assigned to operations related to good industry practices and freight forms where the risklevel is low. A similar scoring strategy is used for line maintenance with the exception that no weighted scores are used. Ramp audits are scored by ramp engineering while line maintenance audits are scored by Brian. Certain extraneous findings and new discrepancies may turn out of an audit. However, currently these discrepancies do not result in the checklists to be updated. The checklists to be used by the AMS are expected to accommodate extraneous findings.

The team identified that there are approximately 20 checklists in total that Brian deals with for his audits. Three checklists are related to fuel, maintenance and ramp audits and there are approximately 10 supplier audit checklists. The team was concerned about the nature of the supplier checklists and they have identified that each of these checklists are distinctive to the type of the supplier (e.g., non destructive, surplus parts, heavy maintenance). These checklists relatively cover the entire audit process. There are certain audits which may be completed by the vendors themselves. This would occur when the auditors cannot go physically to conduct the audit and consequently perform a supplier correspondence audit. In this case, the auditor mails out a checklist and hence it is also

known as desktop/ mail-out/ correspondence audits. These mail-out checklists may be referred to as hybrid checklists. In other words, these checklists have questions which have Yes, No, N/A type of answers as well as open ended subjective answers. After each audit the auditor submits an audit report. It presents the concerns related to audit compliance that require the vendor's response. These reports also document news problems encountered during the audit which have no reference in the checklist.

Answering the team's question on how do the auditors decide on the effectiveness of the vendor, Brian replied that the metrics that he uses in this regard are subjective. When the team sought for an example of such measures, he listed the following metrics that are considered in measuring the effectiveness of a vendor:

- Violation of any regulations
- Falsification of records and documents
- Unqualified personnel doing the work
- Severity of error
- Management reaction
- Vendor reaction
- Their past performance
- Have they been recently purchased or sold /any management turnover
- Ability to provide continuous oversight

Brian felt that there are two ways to evaluate the effectiveness of an audit. FAA is one indicator if they come up with some findings even after an audit is performed. Secondly, a management audit which involves Brian going personally with the auditors to perform an audit and watch their performance. Brian explained that this is a valid way to evaluate the auditors though he agreed that the auditors try to be at their best when he is with them. The other variables that he would consider in evaluating the effectiveness of an audit are:

- Constantly auditor has "no findings"
- Amount of time taken to audit if always a lot less time or always a lot more time
- Type of errors identified typographical versus technical errors
- Vendor complaints on an auditor

Brian rated watching the performance of the auditor as most important variable of all and vendor complaints being the least.

Discussion with John Blaszkowski

The team wanted to define the scope of John's work domain. In this effort, the team identified that there are totally 5 work areas which John is responsible for. They are namely EMM, FOD, SAI, EPI, and ad hoc audits. EMM and FOD are termed as internal audits whereas SAI and EPI are internal evaluations that are part of ATOS. As the name implies, ad hoc audits are those which are conducted as a result of problems that shoot up unexpectedly. The EMM and FOD audits together comprise of approximately 45 audits,

where each audit uses a unique checklist. EMM audits include audits related to the maintenance and materials work function. John has provided the team with one typical EMM checklist – a hangar checklist. There are approximately 22 departments to be audited which fall in the category of an FOD audit. Each department has its own checklist. The audit is department specific and some of the common work areas include system safety attributes, manual control and training. There is a difference between EMM and FOD checklists based on procedural questions. John uses the following categories for all his checklists: administration, training, records, safety, manuals and procedures. John also mentioned that number of findings differ from the number of negative responses in the checklist. Each negative response further results in other findings which are presented in the audit report. This report is sent by John to his superiors and to the department which was audited. The department follows up and addresses the corrective actions. If the corrective actions are adequate, the report is sent to records.

Ad hoc findings are not categorized or scored. It is a response to a problem and investigation to its root cause. They would not create a checklist for ad hoc audits. FARs, company policies and procedures that apply to the problem are looked at and all the research required to create a checklist is done. Thus, this audit is process-based. An example sited by John for this kind of an audit is that they were having trouble with aircraft flaps in the wing area which were breaking prematurely. Hence, the auditors investigated on the approval given to vendors. If something is observed in ad hoc that needs to be repetitive then it is considered for the EMM or FOD audits.

SAI and EPI are internal evaluations and are features of ATOS. John mentioned that they work towards risk mitigation as opposed to a corrective action. Though it is not an FAA regulatory requirement, FedEx perform SAI and EPI as a good business practice. These evaluations are conducted across the departments and not within a department as in the case of an EMM or FOD. SAI takes a long time and John mentioned that he could complete only three elements in one year. He also mentioned that he runs an SAI about once in every five years. SAI is more a procedural audit as compared to EPI which is more hands-on. For example, an SAI would check if there is a document for a specific work function, and someone to authorize it etc., whereas an EPI would check for the adequacy of the document. Consequently, an SAI must be conducted before an EPI. In other words, if a document doesn't exist in the first place one cannot verify its adequacy. Risk analysis reports are specific to these internal evaluations (SAI and EPI).

With respect to the team's question on MEL, John clarified that when an aircraft is certified to fly by the manufacturer, the certificate qualifies that at the minimum certain number of items must function for the aircraft to be safe to fly. This optimum list is referred as the Master MEL. The air carriers develop their own minimum equipment list. There cannot be any more restrictive list than MEL. John also mentioned that with respect to MEL he might do two things. He might do an SAI evaluation on the MEL system. When they go to audit functional areas that deal with MEL they make sure that they are following the procedures. EPI would audit the MEL system.

Regarding effectiveness of an audit, John mentioned that if they find repetitive inconsistencies, then there is a problem with either the implementation of the corrective actions or a problem with the root cause analysis. John uses a scoring system in analyzing the audit findings. The score should improve from year to year if the checklists remain the same. Overall, compliance to checklist should improve when new procedures are being adopted. John sends out quality surveys to various managers annually so as to evaluate his auditors.

The team sought clarification on ACAP program which was mentioned in page 8 of trip report II [24th November 2004]. FAA's ATOS program has set up ACAP to run audits against the airlines. John mentioned that it is a risk identifier tool. He also mentioned that the reason for him to not have access to the risk identifier could be that the data entered into the tool should not be disclosed.

Pertaining to ECM, John mentioned that ECM takes data from engine performance, loads into computer system and the system will reveal to them if the engine is prone to failure in near future. John conducted an SAI against this system.

Discussion with Richard Vernon

In the third session, the team met up with Richard from the Airworthiness Directives Control Group. The team sought clarification on the process measurement tool (Ref: 29-0-1, Date: 15 Nov'03) given by Bill Williams in the previous trip to understand if it represents the entire scope of ADCG operations. This tool consists of 12 categories of process measures given in 12 rows of a table against the four columns namely EO review, EAS loading and tracking, GMM versus Desktop Manual and Acquisition process. Richard replied that these four columns may not be all the processes occurring in the ADCG. He presented the team with a spreadsheet dated May 2004 which included the work completed in the group. This sheet, according to him, presented a true picture of the ADCG processes. The team is in the process of comparing the various work functions presented in this sheet with the process measurement tool. The team also understands that Bill Williams vision should match with Richard's for the team to proceed ahead to identify ADCG process measures.

IV. <u>Next Steps</u>

The next steps are:

- 1) Arrange for a conference call with QA group in Memphis, Tennessee
- 2) Develop a set of process measures
- 3) Conduct a survey to collect feedback from FedEx on the identified process measures
- 4) Conduct a survey to collect feedback from other airlines on the identified process measures
- 5) Conduct observation sessions at Greensboro, North Carolina

V. Glossary

This document will be used as an appendix in all the WebSAT reports. It will expand on the various abbreviations used by the aviation.

F=Form; S= System; A=Audit type	; D=Department; P= Aviation Program	; <i>M</i> = <i>Manuals</i> ; <i>R</i> = <i>Regulatory body</i> ;
I=Industry Standard.		

Abbreviation	Full Form	Item Type
ATOS 2.0	Air Transport Oversight System	D
ADCG	Airworthiness Directive Control Group	D
ADNT	Airworthiness Directive Notification Transmittal form	F
ADMT	Airworthiness Directive Management Tracking	F
ACAP		
AMS	Audit Management System	
CAMP	Continuous Airworthiness Maintenance Program	Р
CASE	Coordinating Agency for Supplier Evaluation	Ι
CAS	Continuous Airworthiness and Surveillance	Р
CRS	Certified Repair Stations	
CFR	Code of Federal Regulation	
DPM	Desktop Procedure Manual	М
EO	Engineering Order	F
EA	Engineering Authorization	F
EAS	Engineering Authoring System	S
EOCN	Engineering Order Change Notice	F
EMRA		
EMM	Engineering, Material and Maintenance	Α
ECM	Engine Condition Monitoring	А
EPI	Element Performance Inspection	Α
FAA	Federal Aviation Administration	R
FR	Federal Register	М
FAR	Federal Aviation Regulation	М
FCD	Fleet Campaign Directive	F
FMR	Fuel, Maintenance and Ramp Operations Audits	А
FOD	Flight Operations Division	
GMM	General Maintenance Manual	М
IATP	International Airline Technical Pool	Р
IPM	Inspectors Procedure Manual	
MX	A Maintenance event	
MCS	Modification Control System	S
MMF	Manufacturer's Maintenance Facilities	Α
MEL	Minimum Equipment List	F
MARS		S
NPRM	Notice of Proposed Rule Making	F
OEM	Original Equipment Manufacturer	F
PCS	Production Control system	S
PFCR	Publication Form Change Request	F
QA	Quality Assurance	D
SNRM	Non Routine Maintenance	F
SCORE	Supplier Capability and Operational Reporting	S
Specman	Specification Maintenance	S
SAI	Safety Attribute Inspection	А
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SCS	Supply Chain Services	
STS	Supply Technical Services	
WCCR	Work Card Change Request	F
WIC	Work Instruction Card	F