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WebSAT Quarterly Report (April 7th, 2006)

Title: Development of an Industry Standardized Auditing and Surveillance Tool:
Minimizing Maintenance Errors

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Institution: Clemson University

Category: Aviation Maintenance

Project Status Category: Green (G) – Indications are that the project is on track and will be completed as planned.

1.) Significant Milestones achieved as of April 7th, 2006:

In support of auditing and surveillance tool prototype development milestone, preliminary usability evaluation of the Technical Audits (TA) module of WebSAT was conducted using methods such as heuristic evaluation and cognitive walkthrough. Subsequently, the design team members worked on enhancing the visual design of the TA module. Five members of the design team were involved in conducting the preliminary software testing of the TA module of WebSAT. The testing results were used to iterate the TA module design. The TA module prototype for the auditor- user category as well as the manager user category was completed.

As a part of the conceptual design phase, the data architecture for Internal Audits (IA) module was developed and task analysis for the IA module was conducted to generate the product map. Persona-based scenarios were developed for the IA module. The screens of this module for the managers and auditors were designed and developed. The information architecture of the prototype of the IA module for the manager and the auditor user categories was finalized.

In support of the development of advanced data analysis module into prototype application, the audit and surveillance data gathered in previous trips were converted into a digital version of discrete elements using optical character readers to facilitate data analysis. Analysis was conducted to identify missing data and outliers. The algorithms for the risk model of the data analysis module of the tool were evaluated. A field study using card sorting technique was conducted with 19 subjects to determine the aircraft-level impact categories that need to be incorporated into the data analysis module. This study recruited subjects that belonged to the job roles of auditors, or quality assurance representatives or managers at FedEx and took place at Memphis, TN (March 20-23, 2006), Mobile, AL (March 27, 2006), and at Greensboro, NC (March 29, 2006).

2.) Work in Progress from April 7th – June, 2006:

The research team will conduct user testing of the TA and IA modules at FedEx and the Human Computer Systems Laboratory. For the Surveillance module, the team will develop a data model and create persona-based scenarios with screen designs. For the airworthiness directives, the team will finalize the schema for the module in collaboration with the ADCG at FedEx in addition to performing task analysis. Further, for this module the team will develop a data model and screen designs.

For the development of the advanced data analysis module, the research team is currently entering the data collected during the experiments conducted at FedEx, following which analysis will be conducted to finalize the aircraft impact categories. The team is also conducting advanced



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data analysis to finalize the variables to be accommodated in the risk analysis model. Validation on the utility of the data analysis module will be carried out at FedEx. To validate the utility of personas for enhanced interaction of the WebSAT system with its users, a study will be conducted at Memphis, Tennessee and Mobile, Alabama. Simultaneously, laboratory experiments will be conducted to validate research hypothesis made by the three doctoral students on the project. The team will also finalize the benchmarking metrics of the tool to conduct competitive benchmarking and establish target specifications. Writing the user manual for the product will commence in this period.