Maintenance Information Management Using Access/Visual Basic

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Maintenance Entries

The Accelerator Electronic Support Group (AES) is the group responsible for maintaining over 100 subsystems of the Nuclear Physics Accelerator at Jefferson Lab. Presently, there are 30 employees in the AES group. It is each individual's responsibility to make entries into the AES Database. This Access/Visual Basic based database is the center for all work performed to the Accelerator by the AES group. At any time, an AES technologist can supply valuable information needed to track pending maintenance, data analysis of recurring problems, inventory tracking and the ability to export all of this information to a web based electronic log generated by Jefferson Lab Operations Group.
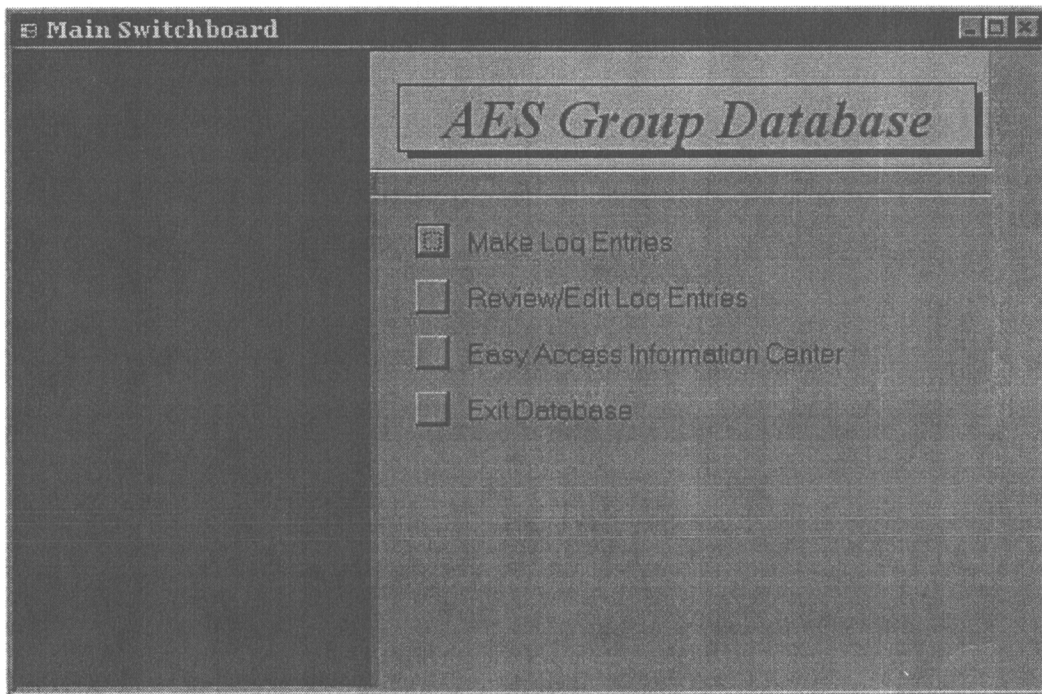

Figure 1

Figure 1 is the top-level menu for all AES personnel to interface with the database. To insert an entry the user must go to the "Make Log Entries" area and decide which system requires an entry. The AES maintained systems have been broken up into subsystems. They are Controls, Diagnostics, Magnets, RF, Vacuum (arc & srf), Gun and Satellite systems. Figure 2 is an example of the Controls System entry form.

Figure 2

Pending Maintenance

Many problems go unresolved due to severity and operational priorities. Many problems require immediate attention and others can be put on hold until the next scheduled down. In either case, the AES database tracks this information. In Figure 2 the "Check if this problem needs to be looked at during next maintenance day" is available for all system entries. This flags the entry for further investigation during the next scheduled down. Figure 3 illustrates typical Controls and Diagnostic System pending maintenance report.

Controls Log Maintenance

Date Failed	Test ID	Controls Problem Types	Tech Name	Tech2 Name	Failure Description	Solution Description	IOC Locations
3/24/98 3:46:54 PM	CN1495	IOC Crash	cumbia	memory	Iochla, iochla3 crashes sometimes only under beam conditions. Suspecting OMS stepper motor card.	Added new ioc iochla4. Moved OMS stepper motor hardware and cables from iochla to iochla4. Marie and Sally moved and verified the software. 3/27/98 2:58:46 PM : Continue to monitor. 4/21/98 4:07:01 PM : Swapped iochla with iochla4 to see if the problem follows the ioc.	IOCHLA

Diagnostic Log Maintenance

Date Failed	Test ID	Diagnostic Problem Types	Tech Name	Failure Description	Solution Description	Location Failed
4/22/98 11:42:30 PM	DG1469	SEE Checkout	gblink	This card was in the data base as being suspected bad. (DG1466)	The IF card for 1C11 (which has been disabled because of a bad RF module) was swaped with the IF card for 1C12 because it is in a high dispersion area.	IPM1C12
4/22/98 11:36:14 PM	DG1468	BPM Checkout	gblink	This BPM had been disabled for having no wire sum voltage when beam was present.	Upon investigation, it was found that the LED that indicated communications between the 0007 card and the CAMAC controller was not lighting as it should. The 0007 card was replaced but, the new card showed the exact same symtoms. This BPM was not indicating a position when a 10MHz signal was injected into the four ports on the 0007 card either.	IPM1A10
4/21/98 4:06:43 PM	DG1466	Other	wagner	SEE BPM 1C12 reported bad	suspect IF module is bad	
4/15/98 3:54:29 PM	DG1453	Supercal Saturation	francis	IPM2A24 status bad but enabled. Last History file 11-5-97 Krause "Always saturated". Needs repair / checkout, history file update, and enabled.		IPM2A24
4/15/98 3:52:55 PM	DG1452	Other	francis	IPM2A14 disabled. Last History file 12-17-97 Wagner "Good". Needs repair / checkout, history file updated, and enabled.		IPM2A14

Figure 3

The above report is generated by SQL queries and is viewable on the web.

Data Analysis

The most valuable part of a database is the data analysis. This can help in finding repeat problems and trends. SQL queries pull information from the database. Information is displayed in a variety of formats. Figure 4 shows a count of Arc Vacuum Problem Key Words. This simple query gives us information for the most common occurring problem in the Arc Vacuum System.

ARC Data Analysis for Problem Types

This may take a few minutes....please be patient

Date: 4/30/98

Time: 10:02:15 AM

Auto Elog Test = 1

ADC Failure = 2

Buggers = 15

Convectron Dead = 3

Digitel PS = 1

DP Station = 4

Electrostatic Precipitator = 2

Forced Valve = 3

FSD/FSD Chassis = 17

High ION Pump Current = 10

Ion Pack Dead = 6

Old/New Ion Pack Change = 7

Valve Not Open = 21

Valve State Undetermined = 3

Figure 4