Mon 1/23/2006 12:18 PM

Dan---Please work with Lee to see if requirements are met and get back to me with findings. Thanks Rod

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Von: DudleyDevices@aol.com [mailto:DudleyDevices@aol.com]
Gesendet: Mo 23.01.2006 08:47
An: Ebner, David A NWP
Cc: Wittinger, Rodney J NWP; Sheldon, Lee H NWP; Ramirez, Dan E NWP
Betreff: To Do list becomes a Been Done list

Dave,
You wanted a copy of the ToDo list with an explanation of what I did to fix all of them.
Here it is; does this satisfy the hurdles to get the retainage money?

The updated ITB Program will be on it's way to Dan shortly.
Best,

Dave, final entries in Green. All items on this list have been fixed, except for #s 1 & 2, which I cannot fix without you giving me the SoftPLC again, and telling Ed to remove the Zero Snatcher from the SoftPLC program.
Best,   Doug.   06-01-22

INDEX TEST BOX
MCNARY UNIT 9
PROOF OF CONCEPT TESTING

The following comments, suggestions or information are provided to document findings encountered by the HDC test team during the testing of Unit 9, the week of 11 – 16 Dec 2005. The contractor ATEC (Doug Albright and Greg Luna) were witness to and participated in the tests performed under W9127N-04-D-0009. The purpose of these field tests is to perform a “proof of concept” test of the device and software to establish if the “Best Effort” of ATEC met the minimum requirements of W9127N-04-D-0009.

The testing revealed and the contractor verbally agreed that many of the items listed would be corrected and a corrected software and hardware would be provided at no additional cost to the Government. If there are items that do not fall into the “no cost” category, Mr. Albright will let David Ebner know immediately. On this basis, ATEC shall correct all the numbered items below, unless otherwise noted. All of this stuff is done now.

The term “data collection” refers to the raw measurements and the calculation routine for logging ITB steady state measurements. The term “post processing” refers to process performed on the ITB steady state measurements to establish a steady state data set from which an “on cam” curve and the associated turbine performance curve are derived.

1. With perturbation initiated in the ITB, attempts to execute certain functions built into post processor cause program failure; namely functions which change displayed output graph scaling. This will be hard to diagnose without a SofPLC to work with. The perturbation function is specific to the OPC communication between the ITB and GDACS computers. I will work on this problem as data and equipment become available. 06-01-22 No change in my answer. I’ve tried this a few more times here with my ITB working in simulation. I see no evidence of any problem when the program is running with the OPC server connected to itself in simulation from rescaling data display graph by dragging and dropping the edge of the form to resize it. No trouble found.

2 This is a comment to ATEC seeking confirmation of the finding of the test team. The perturbation routine requires (1) a non-zero set point and alternating dummy signal ("-222") be sent continuously to GDACS and (2) a logical value (1= perturbate on, 0= perturbate off) be sent to GDACS. This is correct. The nature of this communication was dictated by HDC and ACSI. Both signals must be recognized by GDACS for perturbation to occur. A blade perturbation set point of zero sent to GDACS eventually results in the logical value in GDACS being reset to 0, even though a logical value of 1 (sent as the Perturbation ON signal) has been sent by the ITB. Subsequent changes in set point to a nonzero value will not set logical to 1 in GDACS, and blade perturbation will not occur. This will cause problems when ITB is in "AUTO" mode.

The Perturbation function became a great point of contention between HDC, ACSI and Actuation Test Equipment that has not been resolved to any satisfaction.

Here's how it works:
The GDACS interface requires two inputs from ITB to engage the Perturbation function.

1.) The Perturbation On/Off bit in the SoftPLC is set to a 1
2.) The SetPoint value must be set to a non-zero value.

The SoftPLC 3-D cam has a Watchdog function that monitors the SetPoint output of the ITB. If there is not a new SetPoint value transmitted by the ITB to the SoftPLC at least every 10 seconds, the WatchDog will disengage the Perturbation function.

Whenever the SoftPLC reads a valid SetPoint value from the designated input register, the SoftPLC reads it in, adds it to the Ideal Blade value, and then writes a dummy value (-222) back into that register. This new "Perturbed" value becomes the SetPoint for the blade controller.

Every time the SoftPLC executes its Relay Ladder Logic code (approximately once every 130 milliseconds) it looks at this register again to check for a new valid SetPoint value.

If the value in the register is still –222, the WatchDog timer is updated to add the elapsed time since the last read.

The ITB to SoftPLC communication uses the industry standard OPC protocol, which is a "change-oriented" methodology. In short, if the value to be transmitted over the OPC link has not changed since the last time a value was sent, in the interest of reducing network traffic the new SetPoint is not sent. For this reason, if the SetPoint has not changed, the ITB will not send the value to the SoftPLC, because the OPC server knows the SoftPLC already has this value in it.

To keep feeding the SoftPLC WatchDog and prevent it from timing out, the ITB sends a dummy value (-222) to the SoftPLC alternating with the SetPoint every 5 seconds, this allows it to maintain the transmission interval and prevent the WatchDog from timing out.

This system works well, unless the SetPoint value from the ITB is a zero. This is where the problem comes in. The following narrative describes the events surrounding this problem.

If you don't like the fact that the SetPoint cannot be a zero, take it up with Ed.

06-01-22 No change in my position on this one. Take the presence of the Zero Snatcher in the SoftPLC up with Ed.

3 In general, the user interface and plotting routine information as presented on screen is difficult to sort out to initial user. Sizing window for plotting is cumbersome, and re-scaling can cause program to crash. Presenting blade, power, flow, and efficiency against gate on same plot can make plot difficult to decipher.

The PostProcessor has been modified to add selector buttons to turn the Blade, Flow, Power and Efficiency trances on and off individually. As time allows and operator feedback comes in, this will be improved to make it just like you want it.
I've changed the type of the small display windows so they can be resized.

Both steady state and "near real-time" values for each are plotted, as well as a history, which over substantial length of time makes plot virtually unreadable. Suggested streamlining information presented, and presenting only a limited history trace. A new logic pattern sets up the method that collects data until the number of averages selected has been collected. This is where it can record a point if all of the SteadyState limits are met. Whenever a point is recorded by this new method, the graph is updated at the same time.

4 Manually adjusting individual limits (e.g. limits for first and second pass standard deviations, outliers, and rate of change/slope) is not possible when in "Index Test" and/or "OPC connected" mode. Adjusting limits using the "AUTOLIMITS" option works, however all limits are scanned and adjusted accordingly, which can be problematic. For example, if user desires to expand limits on forebay elevation and hits "AutoLimit" to adjust, before limit adjustments are complete, another variable may exceed limits and "AutoLimit" will then try to expand limits for this second variable, which may not have been desirable. Suggest allowing individual adjustment of limits when using "AUTOLIMITS".

Done, Each of the measured parameters are individually AutoLimits adjustable now. To use individual AutoLimit, click on the data value flag on the SteadyState form.

5 After check calibrating the W-K TD, we had some difficulty with the ITB calibration routine-- with balancing valve opened, a calculated negative value results which bombed the ITB program. Please correct. No bombing allowed.

This has been fixed. Software bug was fixed.

6 While making an editorial correction, we changed identifier in "SECURITY" window from "Unit 5" to "Unit 9". Doing so unregistered the program requiring "backdoor" password to resolve. We also noticed the limits for defining steady state had been reset to minimum levels. Previously stored limits were not recoverable using "LOAD LIMITS" function.

This has been fixed. Load Limits feature was modified to correct his.

7 There were numerous ITB program bombs, (Tsk, tsk. Bombing again!) which were unexplained, but it appeared that buffer file(s) somewhere fill up and program stopped. Failures were intermittent in nature, did not appear to be related to length of time program was running. A relaunch of program following failure causes the overwriting of some of the stored data (notably "5K average" file, which is log of all data initiated when "RECORD ALL" option is toggled).

I believe the crashing has been fixed, and the overwrite problem was fixed. This is fixed.

8 Headers at the top of each steady state data file overwrite the first six lines of logged data.

The headers don't overwrite the data, but the data counter does count the header lines in addition to new data. Done. Reconciled the data array pointers to each other.

9 During testing, a setting of 200 second pass scans was used, meaning second pass averages are based on 200 data scans collected, requiring roughly 280 seconds of elapsed time to collect. A "rolling" average is used, based on the most recent 200 scans collected. This can result in consecutive steady data points being logged which are based on 199 of 200 scans having duplicated data and a tremendous amount of data being logged. It is recommended that once a data point is logged, the buffer be reset to establish 200 unique scans that meet steady state criteria doing so each data element logged will represent 200 distinct points.

Sure, no problem. The program has a feature where it won't save a data point to disk until 200th point is taken, and then it will save one average and erase the lot. This will be an optional collection mode in addition to how it works now. Done.

10 During a recalibration check of the W-K transducer, air had entered the system during the flushing operation. The drain/flushing valves are too large in diameter for calibration adjustments by bleeding to be made.

A new manifold has been constructed that has smaller valves, and small bleeders on every valve. Let's haggle about how to get it into your hands… I have two more manifolds on test carts. One is done, the second is under construction.

11 There were some problems with starting up the ITB program with values not being read into headers. It appeared that there was some difficulty with the initial buffer filling and simultaneously turning on the OPC prior to the buffers filling with information. This is provided as information to ATEC for resolution.

This problem has been fixed.

12 On restart of the ITB program, it appears default values are re-established in some cases and comparisons of resulting calculations before and after system crash/restart may be misleading. For example, flow calculation appears to default to without screen parameters on restart. If with screen parameters were used prior to system crash making direct comparisons of recorded data invalid. Suggest a warning be provided to the user on any restart of the program that default values are now being used.

This problem has been fixed.

13 "Post-processing" is limited to presenting logged data

The PostProcessing function is available to work on the data files after they are recorded. The live display uses the PostProcessor utilities for on-line analysis and display of the test results. As it is now, the ITB paints the data on the monitor while the program runs.

14 "Post processing" data analysis should be performed starting with raw data. Logged flow results are based on user defined flow coefficient and exponent, which due to system crashes were not consistently applied over several days of testing. Similarly, adjusted power and flow results are based on single user defined head. Over extended unattended operation, head variations may be excessive, requiring data to be separated and normalized to several heads. Logged values for ITB calculated efficiency is in error, appears conversion from kW to hp was not performed in calculation.

This problem has been fixed. The PostProcessor loads up the field test data files. The calculated values of inches W.C., Ft W.C. flow, corrected flow, corrected power and efficiency are all discarded from the field test data files. When these files, or anyother .prn file of this format, these values are all recomputed using operator input values during PostProcessing.

15 All “data collection” (raw data) should be logged to maximum of 6 significant figures. Data logged from GDACS/3D cam for gate, blade, head and flow volts are truncated to 4 significant figures. Unclear if data as received from 3D cam is truncated or if truncation or rounding is part of ITB data logging. Any rounding should occur after calculations are performed. And only by authorized rounding personnel.

Data logged is 5 significant figures. Output was rounded to 4 places in a few places. Authorized rounding personnel? How much does this job pay? This has been set to 5 significant figures everywhere. The 4-Place rounding was in the PostProcessor output and has been fixed.

With the lessons learned from this Field Test, I have been, and will continue to make many improvements to the ITB program function and operator interface. I welcome all comments and suggestions and will continue to send updates as they become available, as long as I still have this identical computer here. I need to know exactly what the program is doing in your computer by working on it in my identical computer here.
All of the items on this list, with the exception of #s 1 & 2, have been fixed.

Best,
Doug