30 Jun, 2013

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**Progress Report – 1 Jun 2013 – 30 Jun 2013**

Contract Number: HSHQDC-06-D-00022

Contract Number 7500097279

Order Number: HSCG23-07-J-TED150

Task Order – Performance Work Statement (PWS) 1.12

Attachments: (1) SAROPS subcontractor financial reports

1. **SAROPS Systems Component Services Tasks**
   1. **Activities completed:**
      1. **Finally resolved last month’s bug involving POS values in 1.4. This included tracing down and explaining why both Sim and Plan were affected.**
      2. **Streamlined output in Sim as per discussion with Jack and Judy on May 30th. Got rid of some fields, a duplicate version of the xml model, and all “POC/POD” references in the Plan output file. Updated the “SimCleanup” doc on June 4th.**
      3. **Updated and cleaned up the Land Processing doc (on June 4th). Minor changes.**
      4. **Seemed to reconcile the minor differences between the alpha-planner out and the bravo sim out that takes the alpha planner’s completed searches. These should be the same, *or at least the differences should be explainable.* The previous bug would have been detected earlier if we had run this test *and* we had confidence that any mismatch was worth investigating. I used Jim’s test case for the bug that involved times (I’ve put that in my non-regression set). I finally got a perfect match; I had to change the start and end times in the bravo run to match the alpha run, use the alpha environmental files, and use the waypoints from the alpha planner run. Somehow these waypoints were modified when going to the bravo run. I then increased the number of digits in the output to verify the match.**
      5. **Updated third party software, including the java I use and bundle with a distribution.**
      6. **Did paperwork for CAC card.**
      7. **Went over more fields with Jack; he seems to agree that the Case tag is not necessary. I investigated questions about the Env tag and the standard deviations.**
      8. **Looked at a bug generated from the May09 Sim.jar. I think it was fixed in the May23 Sim.jar**
      9. **Answered several questions about the structure of the particle file and timing, in preparation for the Jun 13th teleconf.**
      10. **A bug that has been there since day 1, reared its ugly head on Jun 12th. An infinite loop occurred in the computation of the theoretical max pos. This may be the first time this bug has been noticed. I found and fixed the problem, tested it in the Feb 25b version (the one that’s deployed right now). It failed as Squires and Frost noted, and with the fix, it worked fine. Put the fix into the current 1.4 code. FWIW, I put it into the 1.5 code as well, but as part of the cleanup, we’re not making this computation any more anyway.  
          BTW, that code hadn’t been touched or even looked at for quite a while. My records go back to November, 2008 and the bug was there then. Hence, familiarizing myself with this code took a bit of doing. The infinite loop was in a binary search for the “correct derivative,” where the derivative was for POS wrt effort put into the cell. The more effort that goes into the cell, the lower the derivative is, and the idea is to put effort into the cells until all of the derivatives are equal.**
      11. **Thursday conf call with Robert Netsch et. al. I had fixed everything except the off-by-one-tick. Built a jar file as soon as conf call ended.**
      12. **A day and a half in, 1.4.1.7 is not showing any problems.**
      13. **Jack wanted me to look at a case where the POS went down. I wrote code to dump the waypoints to demonstrate that the waypoints given to me when I give a box back, are not the same waypoints I generate internally from a box. The difference was in the 3rd digit but I had to track it down, generate output to demonstrate the different waypoints, and report that. In short, lots of analysis and explanations, but no code change.**
      14. **Rob had another case with the apparent mismatch between alpha-plan and bravo-sim. I know how to demonstrate that this is not really a mismatch by essentially copying the sim xml from alpha to bravo and the alpha-plan’s waypoints to bravo-sim’s completed search. Still, it takes time to do this. Since I’m the only one who can do this, I’m happy to provide this proof. In short, lots of analysis and explanations, but no code change.**
      15. **More effort on eliminating possible problems similar to the 1.4.1.7 one. This is in 1.5 only. Details on this effort are highly technical and difficult to explain here. Short story is that I’m trying to make the code so that it’s impossible to get a mismatch in 1.4.1.6 that caused the POS problem.**
      16. **Looking into the Mersenne Twister (random number generator) problem. Jack was concerned that some probability distributions under the 64-bit version didn’t appear uniform enough. Using the 1.4.1.7 code, I generated random 2 random sequences and noted that they were identical. I then ran Jack’s old case under 32 and 64, took screen shots of both the particles and probability distribution and noted that they were identical. I then uninstalled all Sim programs from my machine, installed Dec 18th, 2012 versions, replaced their jar files with the 1.4.1.7 one, ran Jack’s new case, and noted that they were identical. I then noticed that Jack’s picture of Sarops’ 32-bit and 64-bit cases seemed to have a different number of particles. So I told Jack where he could find the Sim.properties that was ultimately used for both cases (32 and 64) and he noticed that Comprehensive’s “# of particles” was different. This Sim.properties is a file that I write to Engine Files as part of my paper trace. I then tried to work with Jack to find why they were different but we lacked the permissions necessary to run this down. So Jack ran the 64-bit version on a different machine and that one *did* match. John Squires is looking into whether or not <SimInstallDir>/data/Sim.properties exists and has a modified value for Comprehensive’s # of particles on the 64-bit machine that had the mismatch. Rob Wilson later confirmed that this was indeed the case. In short, lots of analysis and explanations, but no code change.**
      17. **A bug showed up involving minimum track spacing. Succintly, I was reading and storing the minimum track spacing, which is 0.1, in single precision. That number is larger than 0.1 represented in double precision. When a track spacing is computed by planner to be 0.104, and I am to round it, I was rounding it to 0.1 in double precision. That is less than the threshold, which is 0.1 in single precision. Hence another tenth was added to the track spacing and planner recomputed its boxes based on that. The result was that the pos went down. In this case, significantly.  
          I then was asked how long this problem has been there and I determined that it has been there since November 20, 2010. In short, lots of analysis and explanations, but no code change,-at least not for 1.4. I have fixed this issue in 1.5. I had made a small fix in 1.4 that applied only to minimum track spacing, but then when it was decided to let it go for 1.4, I retrieved the 1.4.1.7 code from the jar file so that the current 1.4.1.7 here has the bug in it.**
      18. **Ran the non-regression cases for the latest 1.5 code. Found one inconsequential error. Time-consuming process since there are ~20 to run.**
      19. **Ran down problems that Jack and Robert were having with rivers. Identified the issue, verified that my code worked when the proper data was available (via old cases), and explained what was happening. Communicated the problem to Guy and I think it’s fixed. Again, it took some time to verify that there was nothing wrong with my code. I’m putting a warning in sim.err.txt when “river” is called for but the environmental data does not support riverine interpolation. Anything in sim.err.txt shows up as a warning or error message. Perhaps, since I can continue (and do) using 2-point interpolation, I shouldn’t put that warning out.**
      20. **Rebuilt the common waypoint generator as part of building a new distribution. The test code (ConsoleApp.cpp) in that was broken because some code was moved around in the java world. Found and fixed that so I could verify that the dll is working. ConsoleApp is simply a small program that calls the common waypoint generator dll. Built the new distributions for June 27, 2013, but couldn’t get them uploaded to the NG FTP site. Got them to oilmap.**
      21. **A case Jack was running didn’t work. It was a very simple case and I tried it here under 1.5 and 1.4; both worked. Looked at the sim.out.txt; seemed healthy, and since Jack was running 1.4.1.7, the .sar file and the engine files contained very little more information than that (In 1.4, Sim doesn’t stash a results file in Engine Files the way Planner does.). Eventually Jack tried the case on another machine and it worked fine. Problem solved.**
      22. **Wrote up slides for both “new ways of stopping planner” and non regression testing. Have interesting test case as well.**
   2. **Travel completed:**
      1. **None.**
   3. **Upcoming activities scheduled:**
      1. **IPR. Cleanup of Output Files. Respond to questions and/or bugs.**
   4. **Travel planned:**
      1. **IPR**
   5. **Concerns or recommendations:**
      1. **.**

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| --- | --- | --- | --- | --- |
| **Name** | **Activity Worked** | **Hours Worked** | **Hourly Cost** | **Total Cost** |
| Kratzke (New Contract) | Coding/Doc/Travel | 114 | 255.16 | 29088 |
| Stone | Doc | 0 | 223 | 0 |
| L White (Tech Writer) |  | 0 |  | 0 |
|  |  |  |  |  |
| **Totals** |  | 110 |  | 29088 |
|  |  |  |  |  |