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**Progress Report – 1 Feb 2016 – Feb 29 2016**

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. **I completed the geometry code, tested, and debugged it. I feel like putting a few exclamation marks behind that one. The code is simpler, redundant code has been eliminated or greatly reduced, it uses less memory, and algorithms such as “find the nearest crossing” (necessary for finding out whether a particle is in the Great Lakes, an island, or an island in the lakes) are now of order log-n instead of order n. For example, answering the “isItIn” in a sample program is roughly 100 times as fast as the old code. I have not updated all of the code for building SimLand, but I am putting that off right now while I push forward on the John Squires problem and the planner umbrella SIR. The point is that 2.1 can use the new code. I still have some work for that; in particular, I have to make sure that the new code has libraries that are compatible with Jim’s code.**
2. **I have also completed a first cut at the new improved Planner. Next up is to integrate it with NlOpt (see http://ab-initio.mit.edu/wiki/index.php/NLopt). The first step is to make sure that I can build a 2.1 archive that works with everyone else’s current code. That’s what I’m working on now.**
3. **IPR. Gave a few talks. Did not go into the hard part of the geometry routines, but rather gave a very cursory explanation of the concept.**
4. **LOB case; looked into the problem and let Jack know that the issue was simply that we have too large an uncertainty on the position; that will cause longer ellipses. Jack reduced the default uncertainty. The way I handle this mathematically is my own invention so it is unlikely that it will match up with R21’s. But I think R21 doesn’t deal with position uncertainty anyway. The algorithm in the paper cited by R21 assumes no position uncertainty.**
5. **Problem with environmental data; easy to find; the Sim.err says “non-ascending times.” Once I got the environmental files, I ran my NetCdf utility on it and verified that, found the non-ascending step, and let ASA know it. It was probably just an isolated corrupt currents file.**
6. **Problem with Sim hanging (a John Squires problem). Cannot reproduce this for a particular case. John has sent me SimWebServer log files that I’m analyzing (as opposed to individual case files). I think some multiprocessing is not releasing threads and I’m trying to put code in to track it down. Since it’s 2.02, I’m reluctant to add more code and release it. But this is currently my most pressing issue.**
7. **John also found a bug in the 2.02 installer; I was including a 32-bit math library for a 64-bit installer. The math library is there for performance and the java code will use it if it’s there and some initial tests are passed. In the java code, a flag “UseNativeLibs” is set to true at the beginning of the program if a successful sample call to “cos” works. In this case it was not, a message was logged, and the java code used java’s Math routines thereafter. In other words, the error causes a small performance hit and an annoying message, but the code proceeds smoothly. When I sent John the 64-bit libraries, everything cleared up. I don’t think this is worth re-installing 2.02. The installers for 2.03 did not have this bug.**

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| **Name** | **Activity Worked** | **Hours Worked** | **Hourly Cost** | **Total Cost** |
| Kratzke | Coding/Doc/Travel | 136 | 282 | 38352 |
| Vergamini | Coding/Doc/Travel | 4 | 282 | 1128 |
| Stone | Doc | 0 | 223 | 0 |
| L White (Tech Writer) |  | 0 |  | 0 |
|  |  |  |  |  |
| **Totals** |  | 136 |  | 39480 |
|  |  |  |  |  |