Basis of Cost Estimate for SoLID Software and Simulations

Ole Hansen, Jefferson Lab
for the
SoLID Simulations and Data Analysis Groups

The estimates of effort required (in person-weeks) for the SoLID simulations and offline analysis tasks under WBS 1.2.8 are based on experience with similar projects at Jefferson Lab. Specifically, we have looked to the Jefferson Lab GlueX project for guidance regarding labor units required, as summarized in the following document:

https://halldsvn.jlab.org/repos/trunk/docs/offline/ProjectProgress/OfflineComputingActivities2013.xlsx

Starting from the GlueX numbers, we base the SoLID estimates on our experience with the following additional activities:

1. Development and maintenance of the Hall A offline data analysis software (https://redmine.jlab.org/projects/podd) over the past 15 years.

2. Carrying simulations for the Hall A SuperBigBite project (https://hallaweb.jlab.org/12GeV/SuperBigBite).

3. Developing and running simulations for the initial SoLID design studies as described in the SoLID pre-CDR document.

Furthermore, we have used the well-known *sloccount* tool (https://dwheeler.com/sloccount) to analyze the GlueX simulation and reconstruction software repositories, which can be found at https://github.com/JeffersonLab/halld_sim and https://github.com/JeffersonLab/halld_recon. This tool counts lines of source code by programming language used and makes a (conservative) estimate of person-time required for the development (from scratch) of the analyzed code base. Using the sizes of the GlueX code bases as a guide, we estimate that the SoLID software *within scope of this project* will comprise roughly 50,000 source code lines. *sloccount* estimates 635 person-weeks of development time for such a project. This number needs to be adjusted because (a) the SoLID code will not be written from scratch and (b) other Jefferson Lab software projects have required significantly less time to complete than estimated by *sloccount*. Specifically, the Hall A offline analysis software was completed with about 300 person-weeks of effort for 70,000 lines of code. (That project was also partly based on existing code.) Scaling this number to the estimated SoLID software line count yields 215 person-weeks, consistent with our time estimate of 235 person-weeks for SoLID.

The standard 35% contingency for the “Lab” BOE type appears reasonable for this project.