**Appendix A: Detailed JLab report**

**Report Period of Performance:**

1/1/2021 –3/31/2021

**Co-Principal Investigator:**

Riad Suleiman, with Joe Grames and Matt Poelker

**Work-scope Highlights:**

Jefferson Lab’s contribution to this project is to provide a Compton Transmission Polarimeter, which will be used to measure beam polarization when the SRF photogun employs a GaAs photocathode.

**Q2 FY21 Brief summary of activity issues, concerns, successes:**

*Activity successes:*

1. Compton polarimeter will be installed in place of Low Power Beam Dump and will operate at nominal electron beam kinetic energy of 5.0 MeV
2. Design of the Data Acquisition system (DAQ) is complete – see Figure 1. Jefferson Lab Fast Electronics Group is now working on the programming of the flash analog-to-digital convertor (FADC) and the DAQ user interface. The new DAQ design will be able to read out any macro pulse structure of the polarized electron beam.
3. Agreed on a synchronization scheme between laser, Pockels Cell, electron beam, Helicity Generator Board and DAQ – see Figure 2. No modifications to the Helicity Control Board are needed.
4. Student Benjamin Fernandes Neres will start May 10th. He will model the polarimeter in GEANT4. He will work 3 months in France and then come to JLab for 1 month to wrap up the design aspects of the polarimeter.



Figure : Polarimeter control rack and data acquisition system.



Figure : Synchronization scheme for the polarimeter. The Pockels Cell is synchronized to laser. The Helicity Board will provide a gate to determine which voltage (positive or negative) is applied to the Pockels Cell.

*Issues and concerns:*

1. Exploring the Beam Current Monitor (BCM) signal available now and whether there is a need for new BCM hardware.

**Milestones**

1. DAQ design completed
2. Agreed upon the basic operational parameters of the polarized electron beam and polarimeter

**Budget**

Summary of total expenditures:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ID # | **Item/Task** | **Baseline**  **Total Cost**  (AY$) | **Costed &**  **Committed**  (AY$) | **Estimate**  **To Complete**  (AY$) | **Estimated**  **Total Cost**  (AY$) |
| COMTRA | Compton Trans Polarimeter | $200,100 | $0 | $200,100 | $200,100 |
|  | Totals: | **$200,100** | **$0** | **$200,100** | **$200,100** |

*Notes:*

* *Costed and Committed numbers are as of March 31st, 2021.*

Summary of expenditures by fiscal year (FY):

|  |  |
| --- | --- |
|  | FY 2020 |
|  |  |
| a) Funds allocated | $200,100 |
| b) Actual costs to date | $0 |
| c) Uncosted commitments | $0 |
| d) Uncommitted funds | $200,100 |