

## Personal Report

By Alex Bonnifield

This summer at Santa Cruz Institute for Particle Physics was a good experience in many different ways. We had one major project and a couple of minor projects on the side to work on in spare times. The major project was a "Balloon Deployable Detector" (BDD). My part in this project was Project Manager, so I was basically in charge of the whole team and I was the person that wrote all of the scheduling and kept everyone on task. Some of the problems I encountered were: time restraints, Hardware failure, and the project not being able to finish. These problems were not major but some put a dent in the project as a whole.

Time is always a big problem in many projects. We had 5 weeks to build a Muon detector to go to 1000 ft. It may sound like an easy concept but we had very complex electronics that could send the data collected instantly to a laptop so we could view the data collections live from ground. We had to have all of our shipment orders for parts requested about the first week. So any "emergency" parts we needed were unavailable. So when there was a part we needed that was unavailable we would have to work around that part and "rig" it some how because the part will not arrive in time. So The time constraint damaged our project because if we had the right parts then we wouldn't of had to rig the project.

During the 5 week duration we had many hardware failures. For instance both of our onboard WALT Boards were shorted out and were fried. So this event caused our Balloon Deployable Detector to not be ready for launch within these 5 weeks. A lot of our hardware failures were caused by the wrong voltage being inserted through the equipment causing it to fail. If these hardware failures our Balloon Deployable Detector would most likely have launched on the designated date. Other Hardware issues where that we ordered a wireless transmitter kit and we thought it would be as easy as you install it and it is ready to go but after we received it we read more into the manual to find that we need a very complex circuit in order to properly transmit data. So in order to fix this problem we used a BASIC Stamp programming board which is basically an

onboard computer that will take in the data and store it in its internal memory. The only bad thing about this is that we will not be able to have live data feed to a laptop and we will not be able to control the Payload from ground. These hardware issues were the issues that devastated our original project and forced us to call off the launch.

The most important issue I faced was the issue of the project not being able to finish. I figured that we had 80% of the project finish but the other 20% was the actual launch and the key parts of the electronics being completed. What held us back from completing the other 20% was the failure of our WALTA board which is basically the heart of the project and without the heart our project is basically incapable of being successful during a launch. So since we could not do an actual launch until we got a new WALTA board which would take a while to get. We decided to get everything up to par so that future groups could start where we finished and they could have a successful launch in the future. Once someone can get the electronics fixed and ready to fly the project is ready to go. The scintillator is built and everything is ready to go except for the electronics.

I learned that an unexpected event can almost never be predicted. We were ready to launch until 3 days before when we found out that the boards were ruined and that the heart of our project was not working. I also learned that as project manager it is best to have a visual schedule for all of the project workers can see so they can visually see when they need to have things done. I learned that on almost any project you work on there is bound to be a problem that can potentially devastate an experiment. No matter how good a person can schedule it is almost guaranteed that they will need more time. I feel that this internship with Santa Cruz Institute for Particle Physics has expanded my knowledge on how to work on a project and how you should almost expect for the worse of problems in working on a project because there is bound to be a problem no matter how well a person prepares.