**Aidan Flynn** Senior Design  
 Individual Reflection

As I worked on the development of the Portal Box system over the last year, I've gained invaluable experience. In contrast to the autumn semester, which was more research-heavy, the spring semester was hands-on and thoroughly involved in the design process. I discovered that I appreciated this change since being able to physically see and test our work gave me a greater sense of accomplishment. While I was not in a leadership position like SPE or PM, I felt like I took ownership of certain essential components, particularly the RFID system and the enclosure, and I found great joy in seeing my contributions integrate with the rest of the system.

One of the most important occasions in our early process was my interview with Zachary Winter, the previous project manager. His perspective influenced how I thought about our entire system architecture and raised critical concerns regarding user security and machine access. His concept for remote certification was particularly thought-provoking; it offered up possibilities for convenience while also introducing hazards. This motivated me to consider how to strike a balance between convenience of use and the essential levels of protection.

During the first weeks of the semester, our team concentrated on unit testing and datasheet preparation. While these tasks were more regimented, they served as a platform for future in-depth integration efforts. Working on the MFRC522 RFID scanner was a significant turning point in my personal development this semester. I prepared a thorough datasheet outlining the power requirements, pin arrangements, and communication methods. It was the first time I had truly owned a component from specification to testing, and the hands-on experience taught me a lot about hardware troubleshooting as well as team communication. Testing went smoothly overall, and while there were hiccups as we migrated to the ESP32-C6 microcontroller, I felt secure in the choice.

As the semester progressed, things started to click. Our focus shifted to integration and iteration. I was able to work closely with teammates during our debugging sessions, contributing testing data and making sure the RFID functions were robust. I felt that my role began to solidify not only as someone handling a subsystem but also as someone others could rely on for specific technical insight. As we entered the integration phase, having even a partially functioning prototype made a huge difference in morale. Seeing the pieces come together gave me a renewed energy to push forward and smooth out the final bugs.

I also contributed feedback to some of the enclosure and power system considerations, especially when it came to what the RFID hardware needed to operate reliably. While I wasn’t heavily involved in coding the system logic end-to-end, I was often helping to test it, find bugs, and report edge cases. I tried to serve as a bridge between different parts of the project by understanding the hardware I worked with and the constraints that affected the team’s broader design goals.

Looking back on the year, I can say without a doubt that this project was one of the most impactful learning experiences I’ve had at Bucknell. It pushed me to think beyond theory, to communicate more effectively, and to work in tandem with teammates across different disciplines. I also take pride in the fact that our Portal Box system isn’t just a class project—it’s something that will continue to serve a purpose on campus long after I graduate. Knowing that my work will leave behind a meaningful and usable product is a powerful way to end my undergraduate experience.