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## **Introduction**

Old Dominion University's cybersecurity major requires an internship placement as graduation criteria, in the form of CYSE368. I switched majors from computer science to cybersecurity between sophomore and junior year, not yet being aware of said requirement. As such, there was a rush in the beginning of my senior year - specifically the fall semester - to get assigned to an internship and get this criteria underway. I worked with the ODU Co-op and internship office to find a suitable internship, which ended up being the intern position at the Virginia Air and Space Science Center. This is a museum which has exhibits detailing the history of space exploration and aviation. They provide both public exhibits and private teachings to younger students, including interactive exhibits and activities. I did not seek additional opportunities due to the pressing nature of the internship requirement; I accepted the role as soon as it was offered. I started in late January with a training session and logged 100 hours between then and May, juggling my internship responsibilities with my obligations to the ODU Men's Swim Team, which amounted to hours similar to a part-time job alongside classes and other athletic events. I also conducted an interview with my supervisor to account for the final 50 hours of internship experience, as offered by the course syllabus.

## **MOA, Learning Outcomes, and Initial Experience**

This course required a composed and signed “memorandum of agreement” between interns and their supervisors. This document was intended to highlight the goals of the student within their internship placement in order to provide fulfilling experience and prepare for a future career outside of ODU. My memorandum included four goals. The first goal was to work collaboratively with a team of peers. The second, to support hands-on learning activities. The third goal was to design or implement activities and procedures. The final objective was to understand my role in a team and to adequately fulfill it.

My first session at the VASSC was a training session which they provide to any intern who is hired. This involved a run through of the facility, giving me time to familiarize myself with the exhibits, to experience the mobile activities from a patron’s perspective, and being given a quick explanation on the rules and guidelines for workers at the center. The VASSC has a very short history: it was planned in 1985, built and opened in 1992, and has a primary mission of providing rich STEM based educational opportunities and experiences to the youth. The center employs volunteers, interns, docents, and paid staff in order to provide these services. They additionally run field trips for schools in the surrounding area: anywhere from a hundred students into the low thousands on any given day. They are open from 10AM to 5PM on all days except for Monday and Tuesday, which are maintenance days.

My first impression of the center was that it seemed very relaxed in terms of leadership, with a real passion for education and innovation. The staff contained a varied array of personalities, with some of the more maintenance related staff being less

talkative, and the docents being eager to converse with anyone in the building, regardless of them being patrons, interns, staff, etc. I learned that my schedule would be determined solely by me: I could come and go as I pleased any time between 9AM and 6PM. This helped me navigate the challenge of accumulating work hours *around* the times of my early morning and early afternoon swim practices as well as my in-person class on Tuesday and Thursday afternoons.

## **Management at the VASSC**

The Virginia Air and Space Science Center is, generally speaking, very relaxed in terms of management. As far as entrance and egress to or from the building are concerned, there are two avenues: the public entrance and the employee entrance. The employee entrance is designated for paid staff, volunteers, interns, and docents. The entrance is controlled by a security guard who is positioned within an office with a constant feed of security cameras throughout the building's interior and exterior. Outside of security issues, the guard is not involved in management. There are several types of employees and workers at the facility. The docents, volunteers, and interns are the infantry of the facility, and they answer to any of the other types of staff. Their primary role, however, is to fulfill whichever responsibilities they were assigned during their training - in my case, this meant ensuring that exhibits were clean and that patrons were receiving an educational experience.

The primary staff of the building are functionally the management. These paid employees have been at the facility for a long period of time and possess more knowledge than the volunteers or docents, such as ways by which the facility can be improved, maintenance which must be done, and other issues. They generally have offices upstairs in the back hallway of the building, separate from the public exhibits or from the private classrooms, which are located downstairs. My supervisor, Kim, was the manager specifically for interns, volunteers, and docents. She oversaw any adaptations to be made to exhibits, and assigned specific tasks to interns. She could often be found roaming the public space, watching her interns or docents in order to ensure that policy was being followed and that public perception would be positive. There were also a few

people stationed within a craftsmen workshop near the employee entrance - these people could borrow interns such as myself, but they would ask Kim prior to doing so in order to not interfere with VASSC operations.

There was one final type of staff, which were education-specific volunteers. These were the people who would chaperone field trips, explain exhibits, and run activities within the downstairs classrooms. They did not interact with interns or docents unless said interns were manning an exhibit such as stomp rockets or paper planes.

## **My Duties/Assignments/Projects**

My main task as a VASSC intern was to familiarize myself with the various mobile activities provided by the center and then operate them for patrons. There were several exhibits: stomp rockets, whirlybirds, paper planes, circuit boards, and Sphero bots. Stomp rockets was a cart which contained paper templates where patrons could cut a tube and a fin, fold the paper into a rocket shape, decorate it, and then stomp on an air pressure tube in order to launch their rocket. Whirlybirds was a mobile wind tunnel, where patrons would fold paper and attach a paperclip in order to make a helicopter reminiscent of maple tree seeds. Paper planes was a cart stationed next to an exhibit which consisted of various differently-sized holes in a wall where patrons could create paper airplanes and attempt to fly them accurately into the hole, across a medium-sized gap (a sort of runway). Circuit boards was a cart demonstrating a lego-esque set of circuits with multiple different difficulty levels, spanning from simply turning on a light, to activating a bidirectional propeller using a crank. Finally, the Sphero exhibit, a set of orb shaped robots with an optical sensor under them which could read directional signals and follow them. The task for patrons was to create a path through a maze for a Sphero to accurately navigate.

My secondary task was simply to do whatever was asked of me by Kim or any other employee. One common task was to clean the rig-a-ma-jig exhibit, an exhibit with many wooden planks, nuts, bolts, and wheels with which young patrons could attempt to build vehicles or machines. This exhibit was commonly left in a state of disarray, so my task was to find an aesthetically pleasing, neat way to display the pieces on the wall setup

while also having them be easily accessible. Whenever I would arrive in the morning, I would again have to clean the rig setup before proceeding with my day.

I assisted with a few projects during my time at the VASSC. One project, the most collaborative of them, was to set up an area for the unveiling of their new Tuskegee exhibit upstairs. I worked with another ODU intern, Justin, to bring several stacks of chairs from a storage office out toward the exhibit, and then worked with a group of other volunteers to carry and set up the chairs in a way that would allow ease of access while also having a clear view of the exhibit. This was being set up so that a meeting could be held near the exhibit with shareholders, so it was paramount that we set up the area cleanly, efficiently, and in a pleasing manner.

Another project which I assisted with was the opening and setup of a few hundred model rocket kits. This was a solo assignment, which consisted of sorting pertinent pieces into bags, opening the fuse packs, pressing the fuses into the payloads, resealing the bags and placing finished bags into a “complete” bin. These were used for a field trip, providing students with the opportunity to launch model rockets outdoors under adult supervision.

A third project which I performed was the creation of rubber bumpers for the facilities’ pedal planes. This was a task I performed with help from a docent named Danny. We took several feet of rubber tubing, split them into 1’-1.5’ length tubes, split them lengthwise along the middle, and wrapped them around the parts of the planes’ wings which could feasibly collide with the walls of the facility. We then drilled these into the planes to hold them on, being careful not to screw fully *through* the wings.

The most menial task I had was to sort nearly twenty lego SPIKE kits, which provided the materials needed to construct lego cars with sensors, which could be connected to an iPad and controlled remotely. This involved emptying each of the kits before carefully counting the proper, precise amounts of each piece which is indicated for inclusion in the kit, based on the manifest provided within the kit box. This task kept me busy for a few weeks, but it came secondary to other tasks which I'd be assigned whenever I showed up.

One of the earlier tasks I assisted with was the moving of ~900 pounds of hardback books from an upstairs vault into the downstairs workshop. For this, I was provided with a dolly, and was instructed to use the elevator to bring them from upstairs to the main floor.

On one of my final days at the facility, Kim instructed me to move several supply bins from a "purge pile" - the fire marshall had indicated that the storage room was too full and was a hazard - to a permanent shelf, and then to deconstruct a cart which possessed both a robot arm and all of the LAN infrastructure required to control said arm for an exhibit. I utilized a stepladder for the moving of bins, also having to alter the heights of the shelf in order to gain more capacity for bins, and used varied screwdrivers and wrenches in order to disassemble the robot arm and unplug all of the switches and the modem included.

The most public-facing job I performed at the center was a month ago when I provided guided tours to three groups during a field trip. This was coordinated by both Kim and an ODU iLab worker named Hunter. I led these groups on a path through the

museum, allowing them ample time to see and experience the various exhibits at the center, ending with them entering the IMAX room for a film showing.

On my last day at the center, I was tasked with removing the drive shaft from a pedal plane. I had the opportunity to tear the plane apart, remove a major part of it, and reassemble it without that shaft. This was a fun hour or so of tinkering and troubleshooting.

As a public educational facility, the center requires a lot of maintenance to exhibits as well as backend setup of any materials intended for use within the private classrooms. As such, the many projects which I completed were important for maintaining availability and safety.

## **Relation to Cybersecurity**

Despite the internship not being directly related to cybersecurity - not even involving the use of a single computer, on my part - I made efforts within my reflection papers to relate my work to concepts in cybersecurity. The most important relevance I can relay is the importance of education. A major threat in cybersecurity spaces is negligence, and this is best combatted through routine education of employees or potential victims. Evidently, education is important in cybersecurity, so with education being the driving mission of the Virginia Air and Space Center, it is a very relevant similarity. The only additional skill which I can relate to both this internship and cybersecurity is that of troubleshooting and tinkering. My experience with tearing apart the pedal plane on my last internship day gave me an important insight into the task of taking something apart, modifying it, and reassembling it; disassembly, assembly, and modification are important tools and skills to have in cybersecurity as sometimes a computer or server will not be operating correctly and requires maintenance in order to identify and rectify errors. A final skill which I will attempt to relate to cybersecurity is that of sorting, as seen in my inventorying of the Lego SPIKE kits. In cybersecurity, it is important to identify and categorize the roles of different machines, or different accounts within both those specific machines and the network as a whole. Clearly, attention to detail is a common skill within both the VASSC and the field of cybersecurity, and is something that my tasks at the center helped to develop and hone.

## **ODU Curriculum & My Internship**

Rather than specific cybersecurity courses helping me at this internship, there was a different subset of curriculum that helped me most at the VASSC: leadership and public speaking. These were free electives that I had to take in order to fulfill graduation requirements, but in a public-facing educational setting, they were extremely helpful. Optics are important at a place such as the Virginia Air and Space Science Center, and having taken classes to learn to reduce filler words, communicate in a friendly yet proper manner, and to lead with authority certainly helped me to assist in providing a safe, educational environment for patrons. On the other hand, obviously the majority of my schoolwork has been within the field of cybersecurity. With the VASSC not using computers or possessing any private assets to protect, most of my knowledge and skill went relatively unused during my time at the center.

I would say that my experience in providing guided tours as well as my experiences assisting patrons with utilizing the mobile exhibits helped to reinforce the ideas and skills I was taught during public speaking classes and leadership classes. The main “new” concept I learned at the VASSC was simply time management as well as learning to make myself useful at any occasion: whenever I had any downtime, I would go to Kim and inquire about any jobs which needed to be completed at the time. This helped me to avoid having too much downtime, and helped to accelerate my perception of time, while also ensuring efficiency at the center.

**MOA Outcomes: Satisfactory?**

The first outcome in my MOA, as indicated prior, was to work collaboratively among peers. This goal was satisfied through the maintenance of the mobile exhibits and by the plane bumper project. There were several mobile exhibits as I described in a prior section, and on each day interns and volunteers would split up to ensure that each exhibit was available for patron use. Additionally, working alongside Danny, an older gentleman, wasn't what I initially expected when hoping to work alongside "peers" but considering interns and docents had similar responsibilities, I believe that my first MOA goal was appropriately satisfied.

The second goal, to support hands-on activities, is the goal which was most obviously satisfied by my internship. Both the mobile exhibits as well as the rocket kit setup apply directly to this specific MOA goal. I am satisfied with the experience I gained from these specific tasks.

The third goal in my memorandum of agreement was to design or implement activities or procedures. For this goal, we can apply both the cleaning and design of a showcase for the rig-a-ma-jig as well as the creation of rubber bumpers for the pedal planes. While not outright creating an activity or procedure from scratch, I did create a sort of procedure for cleaning the rig-a-ma-jig in order to speed up the process as well as making the exhibit more aesthetically pleasing and easy to interact with. Additionally, the creation of bumpers for the planes helped with the fulfillment of the VASSC's safety policy, helping to prevent any injuries from occurring within the pedal plane area. In a nutshell, I did not directly fulfill goal three at my internship, but I did very closely related work which could be attributed to goal three.

Goal four was to understand and fulfill my role within a team. At this internship, I worked mostly solo. As such, I was not afforded the opportunity to identify or enhance my role within a team. Goal four is the only goal in my memorandum of agreement which I did not fulfill during the internship at the Virginia Air and Space Science Center.

### **Most Motivating Aspects**

The most motivating aspect of my internship was probably seeing visible progress within any specific task I was assigned. Completing tasks in a timely manner is a very good confidence builder when it comes to a future career. I additionally enjoyed working with both interns my age as well as the much older docents, which provided good conversation and allowed me to hear the various wisdoms that the older docents possessed.

### **Most Discouraging Aspects**

The most discouraging part of this internship for me was that it was simply not directly linked to cybersecurity. I was originally hoping to work as an intern at a cybersecurity business, as class work at ODU teaches us a lot of theory but not much practical skill nor does it provide much insight into how the hiring process will look post-grad. I do, however, believe that the VASSC will be a very valuable entry in my resume.

**Most Challenging Aspect**

The most challenging aspect of the internship was simply accumulating enough hours to fulfill my CYSE368 requirement. As someone whose passion is in computers, forcing myself to do the large amount of hours seemed like a monumental task considering that the internship wasn't going to be directly applicable to my major or the field I plan on going into after college. I eventually found that ensuring I constantly had a task to complete, as well as neglecting to check the time itself, led to time seeming to pass faster while ensuring that I was focused and efficient with my work. This is a lesson I plan on carrying into my future career, as future roles will almost certainly afford me less freedom in terms of shift times and hour count.

**My Recommendations for Future Internship Seekers**

My recommendation for future internship students would be to start the search early in order to have more options. Having started mine within the fall semester of my senior year, I felt forced to accept the first placement opportunity that I was given regardless of its relevance to my field. Had I started the search earlier, there is a chance that I might have been able to find a placement within a cybersecurity firm in order to gain real world experience and a headstart into my field. Additionally, I would recommend enhancing one's time-management skills, especially for student-athletes, as balancing practices, classes, homework, and an internship was a very challenging agenda to work through in this spring semester.

## Conclusion

My main takeaways from this internship are the importance of making yourself useful to your bosses, developing time-management skills, people skills, and the ability to focus. Having a good rapport with your bosses is the fastest and most efficient way to “climb the ladder” at work, and ensuring that you are always useful to your boss is probably the single best way to ensure that you do develop this rapport.

The internship will not be affecting the rest of my schooling at ODU, as I am walking in May and officially graduating in August. I only have two classes I still need to complete, and they are both leadership classes which I am taking remotely from my home back in Ohio. Alternatively, the internship *will* be affecting my future career, as it led me to develop people skills, employment skills, and an ability to focus, all of which will help me to get hired, develop good relationships with coworkers and bosses, and move up in the field of cybersecurity.

In conclusion, taking CYSE368 and attending my internship during this semester has been a challenging yet fulfilling part of my academic career. While I would have preferred more direct application to cybersecurity, I believe that I have developed employment skills which will help me in my future career. I am grateful both to ODU for assigning me to an internship, and to Professor Duvall and TA Josh Russell for giving me grace in the timing of my applications' completion.