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Introduction

I served in the United States Navy as an Information Systems Technician (IT) for 6 years and 7 months. It was an incredible experience that I sincerely value and owe for making me the person that I am today. Before joining the Navy at the age of 19 I knew very little about information and communications technology (ICT). My knowledge failed to exceed the use of social media sites, like Instagram and Twitter. When I think back on this, I am in awe at the level of knowledge and experience that I have today. Moreover, my knowledge and experience expands passed that of any one category of ICT. From simply dabbling or becoming a subject matter expert, I have experience in telecommunications, computer hardware, information security and assurance, networking, and systems administration. Without the Navy, I don't believe that I would have ever had the opportunity of being introduced to the world of IT at such a young age. In fact, stating that I was "introduced" to information technology is putting it lightly, when in fact, I was completely thrown into it. As we all know, that's just how the military functions for those that enlist. The mission is at the forefront and there is very little time afforded to learning before you are thrown into a situation where you must act quickly with the training that was instilled in you. At times it was daunting, but in hindsight, I would not have it any other way. Today, for what I believe is owed to the Navy, I work as a communications engineer for Huntington Ingalls Industries. My job is to implement voice communications systems for the Navy and Air Force to enable to live-virtual training. Windows machines, military radios, a device which translates analog to digital, ultra-high (UHF) frequency antennas, and sometimes cryptographic devices, are what make up our voice communications systems.

Job Hunting

Though I look back on my time in the Navy fondly, I had an understanding with myself that it would never become a career, but rather a steppingstone in setting the foundation for my life. Thus, when the time came to begin my departure from the Navy, I was prepared. I had my associate's degree and was poised to finish my bachelor's degree in cybersecurity within two months of separation, I had three IT certifications under my belt (Security+ being one of them), an active security clearance, and most importantly, an incredible support system. My only issue: I had no idea what I wanted to do. I knew I wanted to work in IT, but as I stated previously, my experience exceeded that of any one field. I was working as a network operations center (NOC) systems administrator and finishing a degree in cybersecurity at the time, however, these fields did not quite sing to me. Telecommunications is where my interest lied, yet for years I believed that I would never be able to find a good-paying job in the field. And so, two months before I would have to start terminal leave, I began my job search. It is worth noting that my separation from the Navy and the start of my cybersecurity capstone course, which required an internship in a related field, happened within days of each other. With a combination of worry and excitement, I scoured the internet of job boards, searching for positions in cybersecurity (to include information assurance) and systems administration for Windows and Linux systems. I applied to hundreds of jobs and even landed interviews and received offers from several of them. In the end, I was prepared to accept the role of a cybersecurity technician for a large company leading the way in military and government technical solutions, ManTech. That was until I received correspondence for a recruiter looking for someone to fill the role of a communications engineer

on behalf of Huntington Ingalls Industries (HII). I was filled with excitement when I read the job description. They were looking for someone to work with all the systems and concepts that brought me joy within the field of telecommunications. In addition, they requested that the person have broad knowledge of other topics as well, such as Windows and Linux operating systems, computer hardware, cryptographic devices, voice over IP, host-based intrusion prevention systems, and much more. To me, it was exactly what I was looking for: to work within a field that brought me joy while still applying and keeping up with other topics within information technology. Thus, I went forward with what would be the first of two interviews, and within an hour of the second interview I was offered the position.

The Company

Often you will hear the company referred to as Alion, short for Alion Science and Technology. This is what it was known as before it was acquired by Huntington Ingalls Industries in late 2021. Although the ownership changed, Huntington Ingalls Industries made it a point to leave many of its original features, from its management to its mission. HII is recognized for being America's largest shipbuilding company, but it is also a leader in providing mission-critical solutions to a variety of government and commercial customers.

In terms of management, I would describe it as somewhat divided. My department is divided into three different teams and each time has a senior engineer as its lead. All three of these teams fall under the same department head. The department head, also known as functional lead, takes a very laissez-faire leadership approach so, while the three teams share the same mission, each team carries themselves differently. Two of the three teams, including mine, primarily work from home while the other team is needed in office to troubleshoot with the end customer. My team holds training sessions separately from the other teams, despite the information being valuable to all. Overall, there seems to be some conflict in leadership styles between the three senior engineers; however, ultimately, they can come together and collaborate when necessary. Personally, I have found my team lead to take the best approach. He is very involved yet refrains from micromanaging; he makes it a point to gather his team in person for group lunch and training; he seeks out resources and shares them with us frequently; and he is personable while remaining professional. Overall, my initial impression of Huntington Ingalls Industries is positive. In the military you work with people from all over the state, even world, which means that your chance of meeting some unsavory people is quite high. Considering this, my hopes for my new job were never too high. I was ready for any work environment if it meant being able to continue to sharpen my skills within the field of information technology. You can imagine the relief I felt when I realized that the civilian workplace was nothing like I expected, at least not within this company.

Onboarding

My first day, which consisted of orientation and obtaining a new common access card (CAC), was fantastic. The environment was comfortable, the group was a small one of 3 people,

including myself, and the orientation lead was kind and engaging. In just my first day I learned so much about the company and its purpose. From here, when I officially started working with the people in my department, I was thrown right into processes. Within my first week I understood how certain equipment worked, was invited to attend meetings, had a one-on-one sit down with my boss, and even attended a gathering at my boss's house where I was introduced to many of my coworkers. Moreover, new hires are invited to a luncheon with some of the company's senior management. Here I was able to meet other hires and learn more about the company's current mission and potential growth.

While I have been thrown in and included on many projects and tasks since starting, much of my time has been given to on-boarding tasks and online trainings. Onboarding tasks include visiting equipment sites within the city, filling out paperwork in order to get the accounts and physical assess that I need to perform my duties, and acquiring my tool kit, among many other things. The online trainings are a combination of those which are required by Navy's cybersecurity directives and those which are required by the company; this including topics such as cyber awareness, operational security, privacy and & personally identifiable information (PII) awareness, as well as the basics of project cost estimating, procurement, task management, and other project management basics.

Objectives

Before starting my position, I established learning objectives that I hoped to achieve. Primarily, I wanted to expand on my knowledge of voice communications and other computer engineering topics, and with this, improve upon my problem-solving skills. In my position, it is extremely important that I understand the fundamentals of voice communications and related topics. Without a solid foundation of these topics, I would be incapable of understanding and participating in much of what my job requires. Fortunately, I have the fundamental knowledge and skills for the position, however, that does not mean that I have the experience to solve most of the problems that come my way. In fact, I was often left puzzled and unsure of my answer to many of the technical issues that I faced on the job. This objective is one that will never fully be measured as it will continue for as long as I desire to learn more and deepen my skills. However, I have undoubtedly learned more in two months with the company than I could have ever imagined. I'm picking up on engineering topics and solutions, such as voltage standing wave ration (VSWR) testing, soldering, radio frequency theory cryptographic device functions that I had not previously known about, and even radio frequency history. Compared to two months ago, today I'm able to engage in topics and brainstorm solutions with my peers.

In addition to expanding my knowledge and problem-solving skills, I wanted to learn how to create and work with cost estimate data, inventory data, and bills of material. A great part of doing my job is being a project manager, which requires me to inventory and order materials for my assignments. Of all the skills that I acquired being a Navy IT, project management was never one of them. Today, this objective has not yet been met. While I have had eyes on cost data (here, this is referred to as a bill of material, or BOM), if I were required to draft one up based on an upcoming project, I don't believe that I would have the necessary skills to do so accurately. This is very concerning to me considering how important financials are to a

company, especially one as well established as Huntington Ingalls. Nevertheless, I am confident that I will be able to acquire this knowledge within the next two months.

Finally, I wanted to better learn to read and interpret network drawings and plans. From my experience in working in telecommunications while in the Navy, it is imperative that you understand a circuit diagram. You were made to draw them repeatedly until they were memorized and would only be awarded qualifications if you did so properly. Never mind being able to answer whatever technical questions were thrown at you, if you could not draw your block diagrams from beginning to end, it was considered a failure. The idea behind this process is to get a comprehensive layout of your equipment and the data flow. Without this knowledge, you are incapable of troubleshooting in a strategic manner. I'm grateful for the way that this skill was engrained in me because it helped me to become a subject matter at each of my commands. Unfortunately, this skill did not extend passed typical Navy communications. Therefore, I was not equipped to easily understand and follow network drawings and plans outside of the systems that I was accustomed to. Therefore, when I was thrown into the mix in my new position and shown network diagrams and plans, I had little idea what I was looking at and was quickly overwhelmed by the visuals. Today, I would consider myself well-adept to interpreting network diagrams and plans beyond the ones that I was previously accustomed to. Within my first few weeks of joining the crew I was given the task of drafting a network diagram depicting the necessary equipment and data flow for a potential master site to be implemented within the building. I was given five days. To accomplish the task, I spent hours searching our share drive for references and pestering my coworkers with questions. Finally, on the third day I turned in my proposal which included routers, switches, radio equipment, antenna types, and even cabling descriptions. I was told that I went a little over-board but ultimately, hit the nail on the head. This task gave me the opportunity to find information on my own, ask questions when necessary, create drafts, and finally, have my work verified and validated. It was certainly rewarding. As far as learning to interpret network plans, I had the opportunity of meeting with several people from the networking department as well as the drafter. In this meeting the drafter's plan was analyzed, discussed, and revised as needed, allowing me to finally get a better understanding of what I was looking at with the same people that created it.

My Role

As communications engineer my job is to implement voice communications equipment intended for live-virtual training. This technology was originally designed primarily for Navy customers, but as of last year, the Air Force entered a contract with HII to have the same technical solution provided to them. Both branches operate entirely different, as you can imagine, so it gives me exposure to many processes and discussions. Though I have helped work Navy projects, my primary duties are with the Air Force. Air Force projects are separated by regions. Today, we're working on completing the second region. A region might include three to six sites, so region two will likely not be completed until mid-2023.

From start to finish, a project will be completed as follows: gather requirements, site survey, bill of material, shipping request, configuration of equipment, shipping request, and finally, implementation. First, you need to find out what the customer wants. This is where you

gather equipment proposed equipment requirements and quantities, as well as building and room numbers. Once this information is gathered, a site survey will be scheduled. I have yet to conduct a site survey but am set to complete one next month for a project in Mississippi. On a typical site survey, my team (communications), networks, fielding, and on occasion an RF engineer, will head to the site together. Together, these teams will walk the site, room by room, going over the items that pertains to their expertise. As communications, I'm looking for power outlets, temperature and airflow quality, checking the height from the ceiling to ground so I can make sure I have the correct cable lengths, I want to speak with the networking team so that they know how many drops and switch ports I will need for my network equipment, I also want to make sure that their antennas are operating at an optimal VSWR. If their antennas fail a VSWR test, then I'll get with an RF engineer and fielding to discuss the necessary steps for replacement of the antenna. Once we all have the information that we need, we will get together to draft and sign a site survey report detailing the layout of the site and its requirements. Once this is completed and approved, I'll begin to draft a bill of material listing equipment types, quantities, and cost associated with the site. Once this is reviewed and approved by senior management, I will put in a shipping request to have the equipment shipped to our building's warehouse. When the equipment arrives, I can begin to configure it with the help of the sustainment team. Once the equipment is configured and ready to ship, I'll put in another shipping request, this time going from our warehouse to the site. And finally, once the trip is approved and paid for, I will again head to the site and install the equipment. Before leaving it's important that I give the operators training on how to use the equipment.

Until my trip to Mississippi gets approved, my primary duties within the office are to continue learning, training, and joining sustainment in troubleshooting efforts. When one of my peers has a task to complete, they will invite me to join them. This is where I learn the most. One of the very first tasks that I was able to help with was installing cryptographic equipment into racks. Here I was able to learn how to read rack plans, which are relatively simple to follow as they identify the rack units that equipment should be placed within. There have been multiple times where I have joined other engineers in conducting VSWR tests. This is very valuable to me as it is something that I will have to conduct often when determining the quality of antennas. Additionally, these tests are necessary for determining the physical space necessary between RF equipment, as to avoid damage and even destruction of the equipment as a result of emitting too close.

Old Dominion Curriculum

Initially, I thought that there would be very little that carried over from my studies in cybersecurity to what I do now, but this is not the case. As a project manager I must be familiar with the NIST Special Publication 800-30, Guide for Conducting Risk Assessments, so that I may be able to determine risk factors and relay them to stakeholders, as well as senior management and all other responsible parties. When assigned a project one of the very first items to be drafted is the risk assessment and as the project is underway, I will perform a continuous assessment of associated risk and update involved parties. We use a risk register and a risk matrix. The risk register is a numbered list of risk factors to be considered, such as possible threats and vulnerabilities to operations, assets, individuals, and the organization. The risk is then

rated by likelihood and impact on a scale of 1 to 5. The value of 1 being the lowest and 5 being the highest. What I have found most valuable in my studies with ODU, however, is the proficiency that I have developed in the use of Linux operating systems. In general, the Linux operating systems are powerful tools in maintaining cybersecurity. However, I find that my skills are of great value within my job as well. We have equipment which runs off Linux and allows us to translate analog into digital for our voice systems. In order to operate this equipment, it is imperative that you're familiar with Linux command line. While I did use Linux command line as a systems administrator in the Navy, it was nowhere near the depth that was required for ODU's curriculum.

My experience in this new position earned me valuable skills that I had not yet encountered in school, such as navigating and configuring Cisco devices. This is something that I had to be familiar with in the Navy, as many of our routers and switches are Cisco, however this did not require in-depth knowledge, only what was necessary for verifying connectivity. After two months, I'm more familiar with configuring vlans and ports than ever before.

Motivations, Discouragement, and Challenges

One of the most exciting aspects of my job is how much I'm able to learn. It seems naïve for me to admit, but I assumed that work outside of the military was less about learning, and more about doing what you already know. This position has proved me wrong beyond measure. My team makes it a priority to train each other on a wide range of topics, including those which may not be applicable to the job. I work with some of the most intelligent people I have ever encountered and find that I'm able to learn something new, even in a casual discussion. Moreover, our admin department is constantly developing training lessons on project management. Continuous learning and development is undoubtedly a priority here.

The most discouraging aspect of my job is when my knowledge is brought into question. I do my best to shy away from taking it personal, as I am the new person, but often I'm left wondering if the lack of trust is because I am the only female in my department. I not only have to insist and prove that I know what I'm discussing, but I'm often subjected to what I know only as "locker room talk." At first, I thought it would be best for me to engage and attempt to demonstrate a different perspective to their outlook on the modern world, and even woman. I quickly realized that I was not obligated to engage and would benefit more from completely avoiding certain conversations. Since establishing these boundaries, my experience has significantly improved.

The most challenging aspect of my job is how little I know compared to my peers. As I've stated previously, I work with some of the most intelligent individuals that I have ever encountered. Though I am in awe of their knowledge and expertise, I am sometimes left feeling inadequate. This is often described as "imposter syndrome." It's this feeling that I'm not good enough to be in the position that I'm in, like I don't belong and its only a matter of time before I'm "found out" and fired. It's something that I've heard my friends in similar positions describe too. Though it might sound like cause for concern, I am truly confident that my knowledge will grow with my experience. I was hired for a reason and am good enough to work where I do. So,

in the meantime I will continue to seek challenging experiences that will help me to grow into a well-rounded technician.

My Suggestion to Others

Though I cannot speak to the process of finding an internship, I can make some suggestions for job seekers. Within the field of information technology there are many steps that come before you begin your job hunt. First and foremost, you should narrow your interest, yet keep an open mind to working in areas that you may not find as interesting but are skilled in. Once you have established your interest and skills, you should begin to gain as much education and hands on experience as possible. Even though you can work within the field of information technology without a bachelor's degree, I suggest a comprehensive approach of traditional schooling, if you can afford it, self-study, and skill validation by means of certifications. In terms of formal education, I would suggest considering majors outside of cybersecurity. This may seem surprising considering that I'm a student of cybersecurity and am set to graduate within three weeks of this writing. I say this because it is my belief that cybersecurity as a major is too narrow of an approach to the field of information technology for an undergraduate. It is better suited for a master's degree where you have the opportunity to narrow your focus and demonstrate mastery in that specific area of information technology. I would even say that cybersecurity would be suited for a minor or a concentration to compliment one's major. If I were not so far into my studies, I believe that a better approach to my career would have been majoring in computer science or computer engineering with a minor or concentration in cybersecurity. This would provide you a foundation with which to build your knowledge and interest upon. I have personally learned more technical information from my computer science classes than I have from my cybersecurity classes. However, this does not mean that I do not value the knowledge that I acquired from my cybersecurity classes. The computer science courses provided me a more technical approach to information technology, which is what I truly desired, while my cybersecurity courses allowed me to become accustomed to policies involving law, risk, and information assurance. I think it is important to emphasize that this is my individual experience and may not be the same for my fellow peers in a cybersecurity undergraduate program. I will say, however, that it is unfortunate that students often do not realize the path that is best for them until they are too far into their degree program. That is why, in an ideal situation, I would suggest beginning your journey with self-study. There is a plethora of resources out there for us to explore. Personally, I have known people with less time than myself in the field with greater skills than what I possess because of the time that they have dedicated to self-study. Finally, certifications are a major factor. Obtaining certifications, and the right ones at that, is arguably the most important part to getting a job within the field of information technology. I emphasize obtaining the right certifications because there are hundreds out there, and the best ones to acquire depend on your individual situation. You wouldn't get Microsoft Certified Azure Solutions Architect Expert (MCSA) or Project Management Professional (PMP) if you wanted to work in the field of cyber forensics. Instead, it would be best for you to earn Certified Ethical Hacker (CEH) or Computer Hacking Forensic Investigator (CHFI). Ultimately, the first certification that I encourage everyone earn is CompTIA's Security+. In my opinion, this certification is one of the most important certifications that an IT professional can have. It gets your foot in the door. With this certification you prove, to a certain

degree, that you understand the fundamentals of cybersecurity, from common ports and protocols to common vulnerabilities and exploitations, and so much more; moreover, it tells an employer that you meet certain security directives, such as the DoD directive 8570.01-M. And lastly, you absolutely must have a burning desire to learn. Technology is constantly changing. Take a moment to reflect on the changes within the last fifteen years, five years even. If you do not have a strong desire to keep up, you will be left behind.

Conclusion

This is one of the last classes that is required before I can earn my bachelor's degree in cybersecurity. To me, it is the perfect note to leave on. I am immensely grateful to Old Dominion University and my professors for engaging their students in the curriculum, encouraging learning, and challenging us to become better cybersecurity professionals. While I have not given up interest in cybersecurity, my aim certainly has changed. I never imagined that I would be presented with an opportunity to work with the theories, concepts, and equipment that I find to be most interesting about the field of information technology, yet here I am. This job continues to excite me, and I leave each day having learned something new. While I'm not entirely sure where this position will take me, I am fully invested in developing my skills within this arena. I look forward to returning to ODU soon to continue my studies.