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CST 300 Writing Lab  
22 January 2019

Aerospace Technology

The late physicist Stephen Hawking, in an afterword with journalist Julian Guthrie, states “I believe that life on Earth is at an ever-increasing risk of being wiped out… I think the human race has no future if it doesn't go to space” (Martin, 2016). Hawking’s solution to our impending doom is to shift our focus towards space, as it stands as our only escape route from a doomsday level disaster. Whether we take Hawking’s advice or not, the aerospace industry has been in an increasing demand which has created many jobs for people that look to grow alongside an industry that keeps improving, but they must go above and beyond and seek out extra resources to stay up to date on new advances and never stop learning.

Looking at the foreseen trajectory of Aerospace and Defense, due to the demand on fuel efficient aircrafts and with an all-time high backlog production at commercial companies, the industry is expected to continue its growth in 2019 (Lineberger). Many people have been looking at alternate resources to try to mitigate or work around the increase cost of oil and other of Earth’s diminishing resources. It is because of this that companies like Boeing, United Technologies, Lockheed Martin, Northrop Grumman, and Raytheon appear on lists of the most valued companies. Boeing places on number 24 on Fortune’s Fortune 500 list for 2017 (Fortune 500 ), a list that looks at corporations in the United States and ranks them by their revenue each year.

The high revenue of aerospace companies is good news for people concerned about the national debt, as it is estimated that for every dollar spend on space programs an average of $14 dollars get put back into the united States treasury (Allen, 2018). This not only creates a solution from the ever-growing debt, but also means an increase in opportunity for jobs to become available in the field. It is because of this that it is no surprise that Boeing is so high up on the fortune list. Ajay Jammula writes “The Boeing Company generated an annual revenue of $93.39bn in 2017, primarily driven by its aerospace and defense businesses” (Jammula, 2018), which shows Boeing completely topping the next leading company in the industry in the United States, United Technologies Corporation, by over $30 billion dollars in revenue (Jammula, 2018).

Boeing is found nationwide in the United States, with its home office facility located in Chicago, Illinois. They have created jobs for over 140 thousand people, with no intention of slowing down. Boeing is divided into three different units, Commercial Airplanes, Boeing Global Servies, and Defense, Space & Security. The Commercial Airplanes unit focuses on building Boeing commercial planes and jetliners, with over 10,000 currently in service world-wide (Boeing in brief). Boeing Global Service was their newest addition to the three units, focusing on financial solutions for Boeing customers. Last there is Defense, Space & Security, employing about 32,000 people around the world, is the second largest defense company around the globe (About Boeing Defense, Space & Security). This unit then breaks into eight branches, each specializing on a specific division in aerospace. Global Operations lead international subsidiaries of Boeing, Development consolidates management, expertise and resources into a single organization, Autonomous Systems develop and produce autonomous platforms, similar to a car chassis, and software for remote piloting, Vertical Lift provides cargo, tiltrotor, and attack platforms for the military, Strike Surveillance and Mobility controls surveillance and stationary wing aircrafts, including executive transport platforms like the Air Force One, Missile and Weapon Systems manage Boeing’s missile defense portfolio, Space and Launch offers satellite solutions as well as intelligence space systems, and Phantom Works specialized in experimentation and innovation by being the technological vanguards of the aerospace industry (Boeing Defense, Space & Security backgrounder, 2018).

Boeing was founded in 1916 by William E. Boeing as Pacific Airplane Company in Seattle Washington and ten years later became Boeing Air Transport (Schefke, 2016). William E. Boeing was also co-founder and chairman of United Aircraft and Transport Corporation, which became United Technologies Corporation after air mail acts were put in place due to Boeing being accused of holding a monopoly by mixing both air mail and passenger carriers into the same vessel (Schefke, 2016). The current CEO of Boeing is Dennis Muilenburg, who was named “Person of the Year 2018” by Aviation Week, took lead of Boeing mid-2015 and under his command the company has seen an increase of 157% higher shares trading (Bruno & Anselmo, 2019). Muilenburg has boasted his confidence on the company by saying, “I’m convinced that the first person that gets to Mars is going to get there on a Boeing rocket” (Bruno & Anselmo, 2019), putting his faith in winning the space race to Mars on the back of all the accomplishments that Boeing has accumulated. Muileburg grew up in Iowa and studied aerospace engineering, receiving a bachelors from Iowa State University and an honorary degree on aeronautics and astronautics degree from the University of Washington (Executive biography of Dennis A. Muilenburg). Among other key members of Boeing is Mark Cherry, vice president and general manager of the Phantom Works branch for the Defense, Space & Security. Cherry is a former U.S. Air Force officer whose primary role landed on engineering and acquisitions. Cherry has 20 years of experience in the industry and was involved on the development of autonomous systems. Above Cherry is Leanne Caret, executive vice president and CEO of Defense, Space & Security of Boeing, who has appeared on Fortune’s Most Powerful Women list for two years in a row. Caret holds a Master in business administration from Wichita State University and has certificates from Harvard University on Program for Leadership Development and International Security Defense Program (Executive Biography of Leanne Caret).

Thanks to Caret, Boeing achieved a win on a $805 million-dollar contract with the United States Navy back in August 2018 to develop unmanned refueling drones; winning this contract is a huge win for Boeing since the Navy will be using the drones for many years to come (Gregg, 2018). A month later, a Boeing and Saab, a Swedish aerospace company, partnership netted a win on a $9.2 billion-dollar contract to develop and deliver up to 475, next generation, training jets for the United States Air Force (Insinna, 2018). It is victories like these that have paved the way for Boeing towards a successful road ahead and, because of the new projects, new jobs are being created in the market for people with experience ranging from entry, mid and senior positions.

Taking a look at the Los Angeles county available career positions for Boeing, they have 211 listings posted, with 153 of such listings looking for someone with a Computer Science degree or similar ranging from Bachelors, Doctorate or Masters, and 126 of those listings open under Boeing’s Defense, Space & Security as of January 2019 (Boeing - search for jobs). Some of the positions listed include Systems Engineers tasked with planning, designing, developing, and deploying engineering systems, Software Engineer tasked with documenting and developing embedded avionics software, Space Systems Modeling & Simulation Engineer tasked with developing analyzing tools on custom object-oriented software, Cybersecurity System Engineers that can optimize systems and ensure security design integrity, and with related experience, a degree on Computer Science could be used for other engineering positions. It is also noted that since some of these positions deal with aerospace and the government, they require the person to obtain a security clearance to gain access to classified information. Despite there being an increase demand for people to join the industry, it remains a very competitive field, and the people they gear towards must hold the qualities of someone who is willing to keep learning every day and goes out of their way to improve oneself professionally.

The Aerospace Industry can be a very a rewarding field as technological advances are still being ironed out and this attracts many people that want to become the first to invent something. There are many resources out there that can help one achieve the opportunity to work in the aerospace industry. CSUMB provides courses that can be utilized to build a base, the Multimedia Design and Programming course teaches how to manipulate and create media using basic programming concepts, which can build the foundation of how to retrieve such media from satellites or other space devices. The course provided for Design and Analysis of Algorithms goes over algorithm efficiencies which would help identify the best option when dealing with hardware is restricted to its amount of available memory. With CSUMB’s Software Design and Software Engineering a student would be on the right track to become a software developer; the two classes cover the basis of starting a large-scale software from the ground up, taking them through all the stages one is expected to take to get a program to fruition. One of the most ambitious programs presented by CSUMB is their Directed Group Capstone course which has students come up with a problem and execute a solution, having the faculty act out as program managers of the selected project, it gives in a taste to what is like to work within a program prior to starting their professional career.

As stated above, one also must be ready to go out of their way and seek knowledge elsewhere on their own time to be successful or even land a job in the aerospace industry. There are conferences and symposiums around the country that help provide a workshop and tutorials and new technology that has been coming out, providing this information in a span of a few days at a mostly affordable price depending on the location. The “Architectural Support for Programming Languages and Operating Systems” is a conference that takes place yearly and provides a platform for both graduate and undergraduate students in the programming, architectural, and operating systems realm. This is a great conference for students to share their innovative ideas, create professional connections, answer questions they may have, and compete with others for a monetary prize. Working with restricted or unupgradable memory due to the constraints of having the device in space requires a vast knowledge on memory management, and the “International Symposium on Memory Management (ISMM)” provides their attendees with information on analysis and of memory management algorithms, novel memory architectures, memory system design and analysis, among others.

Many of these conferences and symposiums recommend becoming part of an organization such as the “Association for Computing Machinery (ACM)” which provide a community for professionals and students in the computer technology field to connect with one another while providing a library of resources to all its members. Some organizations even go as far to provide discounts for their member on selected conferences and symposiums, making the subscription be a good resource if one is interested on attending multiple conferences for year. For students who may be struggling with finding work experience, organizations such as ACM provide volunteering opportunities to get hands on experience right after or during their school career.

Elective courses play a big role on supporting the base for a student’s career. Courses like Project Management help build strong communication skills. Such skills will become useful when needing to explain to others what is going on behind a software to people who are not subject matter experts. Project Management also help understand the process and life of projects in the professional world. This will provide a basis for the student on the planning, execution and completion of a successful project. Having a good background in math can help everyone develop critical thinking skills which can give the edge one needs when applying to a competitive field. For students who like a challenge or find math to be easy to understand, going ahead past their math requirements could be beneficial in developing the skills necessary to get ahead of people applying for the same position. Communication skills are big everywhere, despite whatever field someone gets into. Learning to stand in front of a crowd and provide a briefing, teach a lesson, or explain a program goes a long way in giving credibility to an individual. A communication course will provide confidence to a graduate student applying to their first job, lessening the intimidation factor that interviews convey.

An important thing for a person looking for a job is to build professional connections on the related field, this could provide an insight on available positions prior to them being put out to the public. Websites like Linkedin help give business professionals a platform in which to connect. Going to conferences and workshops help people meet others in the field that can provide an insight into other companies, these friendships can later turn into a professional connection that can later help either one land a job in the other’s company. CSUMB provides their online computer science students with something similar. Setting students with a team of three to five, making them work together will create a bond within them that can later be used as a professional reference, or even help them build a company from the ground up.

Whichever path a student decides to take, building connections, working towards electives or traveling for conferences to visit workshops in the related industry they are interested in, they will have to remain focused on searching for way to grow and increase their skills and get an edge on the competition to achieve a job on their selected corporation.

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