

Shelly Sun
CST 300 Writing lab
1/17/19

Aerospace industry

Software engineering in the United States is a growing field that produces software for products that one uses in his or her daily life. Mainly these products are computers, the embedded systems in cars, printers, the complex systems in airplanes, the embedded system in medical devices, and smartphones. Thus, the demand of software engineers has increased in the past years making software engineering jobs in high demand. According to the U.S. Department of Labor, the demand for software engineers has increased to 24 percent (Bureau of Labor Statistics, 2018) for software development.

In the aerospace industry, software development has been used in many aerospace products such as rockets, missiles and aircraft. The major corporations for the industry are Lockheed Martin, the Raytheon Company, United Technologies Corporation, Northrop Grumman, Airbus, NASA, SpaceX, Honeywell, and Boeing. Some of these corporations are suppliers to many governments' defense industry, spacecraft industry and suppliers to the commercial aircraft industry. One of the large corporations in the aerospace industry is Lockheed Martin. Lockheed Martin is also one of the largest defense suppliers in the United States (Choi, 2016). Lockheed Martin Corporation had an \$1.1 billion dollars contract in 2015 for supplying "Patriot Advanced Capability-3 (PAC-3) missiles and PAC-3 Missile Segment Enhancement (PAC-3 MSE) missiles to the U.S. Army, and to the militaries of Saudi Arabia, South Korea, and Qatar" (Smith, 2016). The major aerospace defense corporation Raytheon Company also is a supplier of radar system products and missiles products. One of the major aerospace part

suppliers is United Technologies Corporation. Lockheed Martin will use the United Technologies Corporation aerospace supplies such as the “touchscreen primary flight” for “head-up display (HUD) symbology, synthetic vision” (“Collins Aerospace goes supersonic with win on new X-59 QueSST demonstrator aircraft,” 2019). They will also use the United Technologies Corporation’s ARC-210 radio and their “navigation and surveillance equipment” (“Collins Aerospace goes supersonic with win on new X-59 QueSST demonstrator aircraft,” 2019). Another one of the major suppliers of military aerospace products is Northrop Grumman, which also supplies rockets, aircrafts and missiles. Furthermore, the European aerospace and defense company, Airbus, supplies the commercial airplane Airbus A320, which holds “from 100 to 240 passengers” (“A320 Family”, n.d.). These Airbus A320 series aircrafts has been the “second best-selling airliner of all time” after the Boeing 737 (Zhang, 2019).

The United States Federal agency of the National Aeronautics and Space Administration (NASA) is developing a spacecraft. This spacecraft, “the Gateway”, would be able to orbit the moon and allow the astronauts to live there for three months (Mahoney, 2018). Moreover, another large aerospace corporation is SpaceX (founded by Elon Musk). SpaceX will produce one of the largest rockets, “the Super Heavy”, which is a 63 meters in height rocket. (Wang, 2019). Honeywell is also a major supplier for supplying aerospace components to the aerospace industry to corporations like Boeing (“Customer Services Shines at Piedmont Aviation”, 2019). Among the remaining, one of the largest corporations in the aerospace industry is the Boeing company. The Boeing company products includes commercial airplanes, rockets, spacecraft and military defense aircraft.

The Boeing company was established in 1916 by the founder William E. Boeing in the United States. Boeing decided to start an aircraft manufacturing company because he wanted to “build a better airplane” (“Biography of William E. Boeing,” n.d.). In 1934, due to the Great Depression in the United States, “Boeing sold his interests in the Boeing Airplane Co.” (“Biography of William E. Boeing,” n.d.). The current Chairman, Chief Executive, and president at the Boeing company is Dennis A. Muilenburg. Muilenburg has a B.S. in aerospace engineering and a doctorate degree obtained from the Iowa State University. He attended University of Washington for his master’s in aeronautics and astronautics (MSAA). Prior to Muilenburg current leadership assignment at Boeing, “he served as vice president of Programs & Engineering for Boeing Air Traffic Management and director of Weapon Systems” (“Executive Biography of Dennis A. Muilenburg,” n.d.). Furthermore, he is a board member of Caterpillar Inc., and an Aerospace Industries Association executive member (“Executive Biography of Dennis A. Muilenburg,” n.d.).

In the Boeing International company unit, Bertrand-Marc (Marc) Allen has served as president since 2015. Prior to becoming the president in the Boeing International company unit, Allen was an appointee as a “U.S. Supreme Court Justice Anthony M. Kennedy’s law clerk” (“Executive Biography of Bertrand-Marc (Marc) Allen”, n.d.). Allen has served as a lawyer in the United States. Allen was the “vice president of Boeing International and president of Boeing China” (Executive Biography of Bertrand-Marc (Marc) Allen, n.d.). Allen deals with the Boeing company internationally for Boeing’s products for the world market and legal policies.

The Boeing company has grown since 1916, and now has 174 offices throughout the United States (“Boeing company profile” n.d.). According to the Boeing company, “Boeing

employs more than 140,000 people across the United States and in more than 65 countries” (“Boeing in Brief”, n.d.). The Boeing company has changed since the inception because Boeing also makes spacecrafts due to modern technology innovations. The Boeing company has become one of the largest aerospace corporations, one of the largest manufactures in the aerospace industry and one of the top defense contractors. Boeing is a supplier of aerospace products for commercial airplanes, the government defense industry, spacecraft industry, and Boeing is also a supplier of satellites.

The Boeing company is a huge supplier of commercial airplanes for transporting cargo supplies and passengers. The transportation of cargo and traveling passengers has solved many problems and made life easier. According to the Boeing company, “about 90 percent of the world’s cargo is carried onboard Boeing planes” (“Boeing in Brief”, n.d.). The Boeing company has been manufacturing aircraft since 1916. According to Business Insider, most people have taken the Boeing 737 passenger airplane on American airlines (Zhang, 2018) and “the Boeing 737 is the best-selling airliner of all time” for the Boeing company (Zhang, 2018). Boeing’s second best and fastest selling airplane is the Boeing 777 (Zhang, 2018). According to the Boeing company, the Boeing 737 series airliners holds from 149 passengers up to 220 passengers (“Boeing Next-Generation 737”, n.d.). The Boeing 777 commercial airplane series, according to the Boeing company can hold 200 passengers to 500 passengers (“Boeing 777”, n.d.). Boeing also produces business jets that are used worldwide, such as the BBJ Max 7 which can only hold 8 passengers (“Boeing business jets”, n.d.). Furthermore, the defense market for the government defense is one of Boeing’s largest market in the United States and globally. Boeing manufactures products such as the 702 satellites series, military crafts and autonomous

products. The Boeing AH-64 Apache helicopter is a defense helicopter that is used by multiple governments (“An Advanced Multi-role Helicopter”, n.d.).

One of the interesting developments in the aerospace industry is unmanned aerial vehicle (UAV) that can be used for cargo transportations and passenger flights. The autonomous unmanned aircrafts are controlled by a single human pilot or multiply human pilots on the ground to carry out cargo transportations and passengers on airplanes with the autopilot technology. These complex automation systems of unmanned aircraft solves the potential problem of shortages of pilots. The autonomous unmanned aerial vehicle (UAV) also solves the problems of combat because they are remote controlled aircraft. The Boeing company has many products of unmanned aircrafts which the Boeing company supplies to the United States government. One of the first unmanned combat airplanes supplied by the Boeing company to the U.S. Air Force was the X-45. (“X-45 Joint Unmanned Combat Air System,” n.d.). One another of Boeing’s unmanned aircrafts include Boeing’s MQ-25 which was particularly made for the U.S. Navy. (“Boeing's MQ-25 is ready”, n.d.).

Although the Boeing company is one the largest aerospace corporations and defense contractors. According to the Motley Fool, Boeing must rebuild their reputation due to a late delivery to the U.S. Air Force. “Air Force officials are telling reporters they fear the first KC-46 deliveries, which were originally slated for August 2017, will not arrive until 2019” (Whiteman, 2018) from the Boeing company. Even though the reputation of Boeing must be rebuilt, according to The Street, Boeing's stock went up 3.8 % and it is now valued at 340.53 dollars (Smith, 2019).

The Boeing company has an above average review for its reputation as an employer. According to Glassdoor, Boeing has a 3.5 out 5 rating for its employment (“Boeing Reviews,” n.d.). According to Boeing career search, Boeing has engineering jobs for electrical engineers, flight engineers, mechanical engineers, product engineers, industrial engineers, software engineers and system engineers. For an entry level software engineering job, the Boeing employer requires the employee to have a Bachelor of Science degree from an ABET accredited college. The Boeing employer also looks for someone that is experienced with the programming languages such as Java, XML, HTML 5 and experience with Test Driven Development (TDD) (Software Engineer - Entry Level”, 2018). The job requires the employee to support software testing. However, for their entry level software engineering job, the job description does not have any requirement for the years of experiences in the field. As the position opening show, the aerospace industry trend is a growing field that utilizes software for its manufactured products.

A Bachelor of Science degree is required for entry level software engineering jobs. The core classes in computer science program at Monterey Bay State University covers skill sets that allows one to expand their knowledge in areas in computer science. The CST 311 and 312 will be used for understanding computer networks and computer security. The CST 205 python programming language could be used for writing test codes in the python language. The CST 336 internet programming will give one experience with languages like HTML, CSS, PHP and MySQL. The CST 370 of design and analysis of algorithms will assist in solving programs regarding the how the data in computers are organized and stored.

With the growing field of software engineering, there are many opportunities for software internships. Software internships allows one to have exposure to the engineering

industry, gain hands on experiences in the engineering industry and to see if one would like to be employed by that company one does an internship with. The Intel company offers many internships. The Visual and Parallel Computing Group VPG of Intel is offering an internship working with Intel's graphic units. According to the Intel jobs search site, in order to qualify as an intern for the software engineering intern, one must be "pursuing a Bachelor's Degree in Computer Engineering, Computer Science, Software Engineering or other related field ("Software Engineering Intern in Folsom, California," n.d.). The programming languages requirements are C, C++, Python and other scripting languages. This internship requires the intern to have experience with writing software testing code with programming languages. The employer also requires the intern to have experience with debugging software and embedded software ("Software Engineering Intern in Folsom, California," n.d.). Moreover, the employer also looks for interns with experience working with the "computer hardware and software architecture" ("Software Engineering Intern in Folsom, California," n.d.). With an internship, one would be more exposed to the software engineering field.

In the aerospace industry, software development is used for large scale aircraft, government defense products and spacecraft products. Some of these products are used by many people in his or her daily live. Thus, the growing demand of software engineers for jobs has increased as expected for aerospace products such as the unmanned aerial vehicle (UAV) for cargo transportations and carrying passengers which solves many problems. As for the growing software engineering field, there are many opportunities for internships in order to gain experiences to the software engineering field. Software development in the aerospace industry is fascinating due to the products that the aerospace industries has produced.

References

A320 Family. (n.d.) Retrieved from

<https://www.airbus.com/aircraft/passenger-aircraft/a320-family.html>

An Advanced Multi-role Helicopter. (n.d.). Retrieved from

<http://www.boeing.com/defense/ah-64-apache/>

Biography of William E. Boeing. (n.d.). Retrieved from

<https://www.boeing.com/resources/boeingdotcom/history-biography/pdf/william-e-boeing-biography.pdf>

Boeing 777. (n.d.). Retrieved from

<http://www.boeing.com/commercial/777/>

Boeing Business Jets. (n.d.). Retrieved from

<https://www.boeing.com/commercial/bbj/#/aircraft/bbj-787/characteristics/787-8/>

Boeing company profile. (n.d.). Retrieved from

<https://craft.co/boeing>

Boeing: Historical Snapshot: 747 Commercial Transport/YAL-1. (n.d.). Retrieved from

<http://www.boeing.com/history/products/747.page>

Boeing in Brief. (n.d.). Retrieved from

<http://www.boeing.com/company/general-info/>

Boeing Next-Generation 737. (n.d.). Retrieved from

<http://www.boeing.com/commercial/737ng/>

Boeing Reviews. (n.d.). Retrieved from

<https://www.glassdoor.com/Reviews/Boeing-Reviews-E102.htm>

- Bureau of Labor Statistics, (2018). U.S. Department of Labor. *Occupational Outlook Handbook, Software Developers*. Retrieved from <https://www.bls.gov/ooh/computer-and-information-technology/software-developers.htm>
- Choi, D. (2016, May 25). The top 9 biggest defense contractors in America. *Business Insider*. Retrieved from <https://www.businessinsider.com/the-top-9-biggest-defense-contractors-in-america-2016-5#1-lockheed-martin-corporation-1>
- Collins Aerospace goes supersonic with win on new X-59 QueSST demonstrator aircraft. (2019, January 17). Retrieved from <https://www.collinsaerospace.com/en/newsroom/News/2019/01/collins-goes-supersonic-win-new-x59-quesst-demonstrator-aircraft>
- Customer Services Shines at Piedmont Aviation. (2019, January 16). Retrieved from <https://aerospace.honeywell.com/en/news-listing/2019/january/customer-services-shines-at-piedmont-aviation>
- Executive Biography of Bertrand-Marc (Marc) Allen. (n.d.). Retrieved from <http://www.boeing.com/company/bios/bertrand-marc-allen.page>
- Executive Biography of Dennis A. Muilenburg. (n.d.). Retrieved from <https://www.boeing.com/company/bios/dennis-a-muilenburg.page>
- Mahoney, E. (2018, December 9). Q&A: NASA's New Spaceship. National Aeronautics and Space Administration. Retrieved from <https://www.nasa.gov/feature/questions-nasas-new-spaceship>
- Perkins, S. (2018, June 21). Is The Boeing Company (NYSE:BA) A Financially Sound Company?. *Simply Wall Street*. Retrieved from

<https://finance.yahoo.com/news/boeing-company-nyse-ba-financially-180053890.html>

Software Engineer - Entry Level. (2018, December 14). Retrieved from

<https://jobs.boeing.com/job/mesa/software-engineer-entry-level/185/10245838>

Software Engineering Intern in Folsom, California. (n.d.). Retrieved from

<https://searchjobs.intel.com/folsom-ca/software-engineering-intern/42978973F8174706882C5A080A05CE2F/job/>

Smith, A. (2019, January 8). Boeing Sees Demand Take Off, Deliveries Set Yearly Record. *The Street*. Retrieved from <https://finance.yahoo.com/m/d6159476-3904-3439-a83d-d95484eba8dc/boeing-sees-demand-take-off%2C.html>

Smith, R. (2016, January 4). Lockheed Martin Corporation's Best Defense Contracts in 2015.

The Motley Fool. Retrieved from

<https://www.fool.com/investing/general/2016/01/04/lockheed-martin-corporations-best-defense-contract.aspx> <http://fortune.com/2018/01/15/airbus-boeing-orders-2017/>

Wang, B. (2019, January 13). SpaceX Will Start Building the Super Heavy First Stage Booster

This Spring. *Next Big Future*. Retrieved from

<https://www.nextbigfuture.com/2019/01/spacex-will-start-building-the-super-heavy-first-stage-booster-this-spring.html>

Whiteman, L. (2018, March 23). Boeing's reputation taking a hit because of troubled tanker program. *The Motley Fool*. Retrieved from

<https://finance.yahoo.com/news/boeing-apos-reputation-taking-hit-121500271.html>

X-45 Joint Unmanned Combat Air System. (n.d.). Retrieved from

<https://www.boeing.com/history/products/x-45-joint-unmanned-combat-air-system.page>

Zhang, B. (2019, January 2). The amazing story of how the Airbus A320 became the Boeing 737's greatest rival. *Business Insider*. Retrieved from

<https://www.businessinsider.com/airbus-a320-history-boeing-737-rival-2018-9>

Zhang, B. (2018, November 26). The amazing history of the Boeing 737, the best-selling airliner of all time. *Business Insider*. Retrieved from

<https://www.businessinsider.com/boeing-737-history-photos-2018-3>