Blasting Off

Aerospace Engineering

Team 5327S

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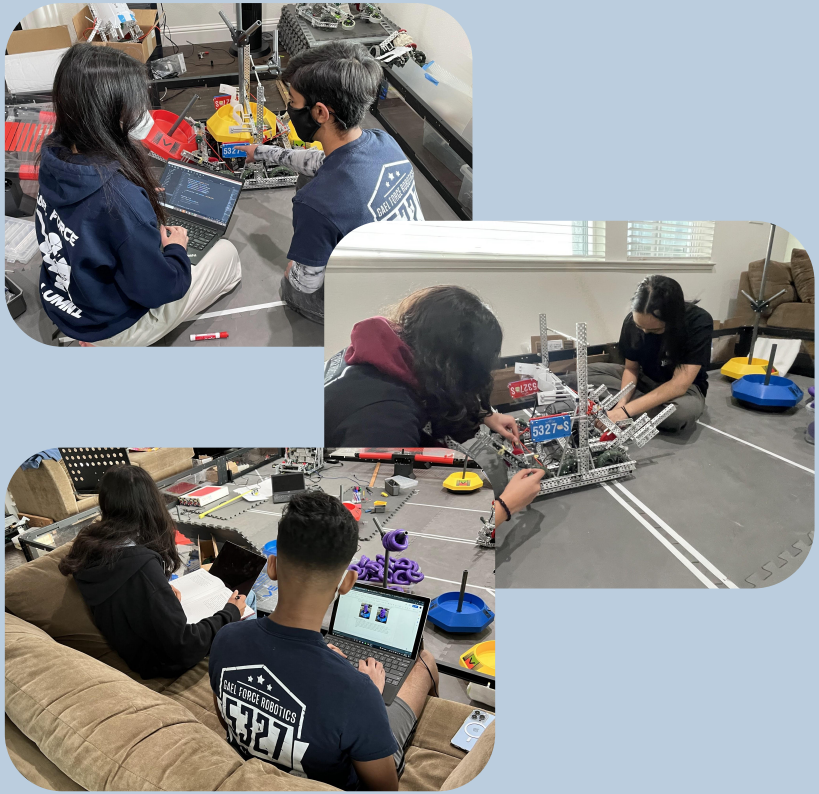
Appeal

Aerospace engineers draw from a variety of fields, including **environmental science**, **engineering design**, and **computer programming**. This is to design, construct, and test objects ranging from planes for commercial flight to airborne armaments for national defense. Naturally, with such a **wide range of fields** with a **huge scope of uses** for Aerospace Engineering, this career path appeals to a variety of engineers seeking to **conquer the skies** in one way or another.

Appeal



As a team, we were drawn to Aerospace Engineering, given how much STEM is involved in the field, as well as how relevant it was to what we are doing. Making technology that can **stay airborne** in addition to processing information requires a combination of **clever design**, **skillful construction**, and **reliable programming**, all of which are skills that are being honed by participating in VEX Robotics.

Lifting Off Through Robotics

As a competition team, we get prepared for careers in various ways. As most careers these days require **teamwork** and **collaboration**, this is one of the key factors of success, especially for aerospace engineers. Learning to **cooperate** as a team now means we'll be ready for it whenever we need to. Additionally, robotics may seem daunting and complex for many people, so **abstraction** and **user-centered design** play a key role. Although aerospace engineers are almost always people who study **extensively** in order to gain the rights to their job, they would still want the easiest controls possible for operations to go the best possible way. A great example of this would be our **robot drivers**, as they're the ones who control the robot at the end to put everyone's hard work into action.

Lifting Off Through Robotics

Another applicable skill for aerospace engineering that we've learned through competitive robotics is **presentation**. Without presentation, no ideas would be pitched, no decisions made, and no profits collected. Presentation is one of the key aspects of aerospace engineering, as it's **the root of all major projects**, both in a career and in robotics. Presentations help **start new plans**, **solve problems** along the way, and **market** the result. Lastly, everything falls apart without strong **leadership**, represented in our team by captain Elizabeth Koh especially. In aerospace engineering, you have people like CEOs and managers to **oversee** and **supervise**, while in competition teams, we have team captains. Although these people may have the most leadership necessary to execute something properly, everyone has to show leadership at times.

Areas of Aerospace Engineering

A few areas of aerospace engineering include **composite materials**, **spacecraft engineering**, and **aircraft control**. These can be directly correlated with roles in our competition team, such as **builders**, **programmers**, and **drivers**. Composite materials looks mainly into the construction of crafts and materials used to build them. Spacecraft engineering, however, focuses on the **individual system mechanics** and **programs** used to run them. Aircraft controllers need to go through rigorous training to be able to properly **captain their craft** in procedures such as launch, attitude adjustments, docking, and landing.

Required Skills

Many skills are required to succeed as an aerospace engineer. Firstly, you must have a great background in **mathematics**, such as algebra and geometry, even including some calculus for more advanced procedures. These are mainly applied during construction and in calculations for probes and shuttles, as even **one mistake could set the entire mission careening off into disaster**. Additionally, these mathematics have to be **applied** properly into fields such as physics, as calculations need to be made for flight trajectories and dockings. Most of the time, you must possess at least a **Bachelor's degree** to enter the field, although a Master's or above is highly recommended. You must also be fluent in a **programming language** to be able to thrive in a community of aerospace engineers - namely, **C++**, which we currently use to program our competition bots as well.

Evolution in the Next 10 Years

Seeing the aerospace activity of billionaires and organizations alike in recent years, whether that be **NASA** flying a drone on Mars, **Elon Musk** sending a Tesla car to space, or **Jeff Bezos** sending himself, paves the path for what's to come with aerospace engineering in the near future. The **evolution** of Aerospace Engineering over the next decade may put more emphasis on **space travel**. Space flight is now a feat achievable by private companies, making it cheaper. This, in turn, may allow it to be **commercialized** by businesses, which paves the path for **average people to be taken to space**.

Elon Musk

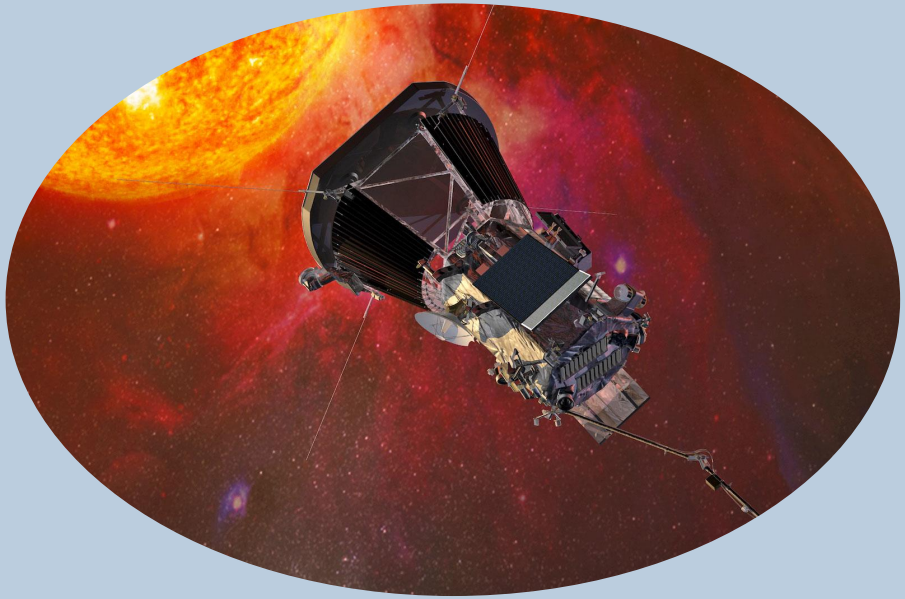
Elon Musk, South-African founder and CEO of **Tesla** and **SpaceX** is a world-famous aerospace engineer and **the richest person in the world** as of 2021 according to the Bloomberg Billionaires Index. Growing up, he loved coding and designed his first game “Blaster” at 12, which he later sold for **$500**. In 2017, SpaceX had a “successful test flight and landing of a Falcon 9 rocket made from **reusable parts**”, which made space travel much more **affordable** (Biography.com).

Neil Armstrong

Neil Alden Armstrong, astronaut and aerospace engineer, became **the first person to walk on the moon** in 1969. Growing up, he was always interested in flight and started his **first flying lessons at 14**. He was the spacecraft commander for **Apollo 11** and was a member of the National Academy of Engineering.

"ONE SMALL STEP FOR MAN, ONE GIANT LEAP FOR MANKIND"
- NEIL ARMSTRONG

Parker Solar Probe



The Parker Solar Probe is a **revolutionary** project in the field of aerospace engineering. It's the first manmade object to **touch the matter the sun is made of** and survive, let alone give us major data we may use to **advance** the field. As conventional mechanics would be greatly damaged by the sun's heat, many innovations had to be made to achieve the goal. For example, the **actively cooled solar array system** developed by APL was a prime factor in the success of the mission. It helped to run much of the probe itself while also being able to withstand the **high temperatures** and **rough conditions** of the sun's corona.

Works Cited

“Aerospace Engineers : Occupational Outlook Handbook.” U.S. Bureau of Labor Statistics, U.S. Bureau of Labor Statistics, 8 Sept. 2021, https://www.bls.gov/ooh/architecture-and-engineering/aerospace-engineers.htm.

Arnold, Heidi. “Areas of Interest in Aerospace Engineering.” Mechanical and Aerospace Engineering, 5 Dec. 2020, https://mae.ucdavis.edu/undergraduate/areas-interest-aerospace-engineering#DynamicsAeroelasticity.

Editors, Biography.com. “Elon Musk.” Biography.com, A&E Networks Television, 7 Apr. 2021, https://www.biography.com/business-figure/elon-musk.

Jhuapl. “Cool Power.” Parker Solar Probe, NASA, 21 June 2017, http://parkersolarprobe.jhuapl.edu/News-Center/Show-Article.php?articleID=30.

Reddy, Narendra, and Arpita Singh. “10 Interesting Facts about Elon Musk - the Real-Life Iron Man.” Technotification, 26 Nov. 2020, https://www.technotification.com/2015/12/10-interesting-facts-about-elon-musk

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Pictures Cited

http://businessinsider.com/spacex-valuation-approaches-10-billion-2014-8

https://www.army.mil/article/217142/army_engineers_get_hands_on_with_futuristic_tiltrotor_aircraft

http://www.techspot.com/news/69526-nasa-parker-solar-probe-blast-off-2018-explore.html

https://alchetron.com/Space-Shuttle-Atlantis

https://www.mckinsey.com/industries/aerospace-and-defense/our-insights/five-keys-to-digitizing-aerospace-and-defense-companies

https://medium.com/advanced-composite-training/advantages-of-composite-materials-in-the-aerospace-industry-f27c81f78c90

https://www.somagnews.com/17-year-evolution-spacex-rockets-without-searching-science-fiction/

http://themancave-rayc.blogspot.com/2011/12/space-shuttle-atlantis.html

https://www.nasa.gov/vpmc/7-habits-of-highly-effective-project-managers/

https://wall.alphacoders.com/big.php?i=1047942