Aerospace Engineering

Team 5327S - Dublin, CA

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Appeal

Given their responsibility to design, construct, and test mechanisms ranging from planes for commercial flight to airborne armaments for national defense, aerospace engineers rely on various STEM fields at their occupations. These fields include but are not limited to **environmental science, engineering design, and computer science.** With the diversity of relevant fields and numerous applications of aerospace engineering, this career naturally appeals to countless engineers looking to conquer the skies.

Appeal

Amongst hundreds of occupations, aerospace engineering stood out to us in particular because it combined fundamental principles of robotics with the exploration of the unknown. While aerospace engineering at first glance may seem overwhelmingly complex, we sought to dismantle this cryptic appearance and instead find the key skills that make up aerospace engineering. In addition to processing information, creating technology capable of staying airborne requires skillful construction, reliable programming, and clever design, all of which are cultivated by **VEX Robotics.**

Lifting Off Through Robotics

Our participation in **VEX Robotics** has prepared us for careers in STEM by helping us develop essential skills crucial to success. For instance, we've learned how to come together as a team and efficiently collaborate, qualities that are integral to succeeding in most modern careers, especially aerospace engineering. Additionally, abstraction and user-centered design play a key role since aerospace engineers must rigorously understand their field as a prerequisite but still prefer the most manageable controls possible. A great example of our application of these skills would be our **drivers**, whose efforts culminate months of work, as well as our **"Cadders,"** who make 3D models of robots and have the experience of working with modeling software.

Lifting Off Through Robotics

Presentation is another skill that can be applied to aerospace engineering through competitive robotics. Without presentation, no ideas would be pitched, no decisions made, and no profits collected. Presentation is critical to 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, and market the result. Additionally, everything falls apart without solid leadership, exemplified by captain Jeia So in our team. In aerospace engineering, delegators such as CEOs and managers oversee and supervise, while team captains serve this purpose in competition teams.

From clubs to the future

In addition to Gael Force Robotics, there are other school clubs that focus on concepts pertaining to aerospace engineering, such as the **Aerospace Club**. Two of our members, **Jia** and **Atiksh**, hold leadership positions in this club.

Jia is the **chief engineer** of her rocketry team, which participates in the American Rocketry Challenge hosted by AIAA.

Atiksh is the **captain of his drone team**, which participates in the RECF Aerial Drone Competition.

Areas of Aerospace Engineering

A few areas of aerospace engineering include **composite materials, spacecraft engineering, and aircraft control.** These directly correlate with specific roles in our competition team, such as **builders, programmers, and drivers**. **Composite materials** look mainly into the construction of crafts and materials used to build them. **Spacecraft engineering** focuses on individual system mechanics and programs used to run them. For example, **aircraft controllers** must undergo rigorous training to captain their craft in launching, attitude adjustments, docking, and landing.

Required Skills

Numerous skills are required to succeed as an aerospace engineer. **Proficiency in mathematics** – such as algebra, geometry, and even calculus for more advanced procedures – is essential for success. These subjects are mainly applied during construction and in calculations for probes and shuttles since one mistake could endanger the entire mission Additionally, **mathematics** has to be appropriately applied in fields such as **physics**, as calculations need to be made for flight trajectories and dockings. Most of the time, a Bachelor's degree is the minimum to enter the field, although a Master's or above is highly recommended. You must also be fluent in a **programming language** such as C++ to thrive in the field, which we currently use to program our bots.

Evolution in the Next 10 Years

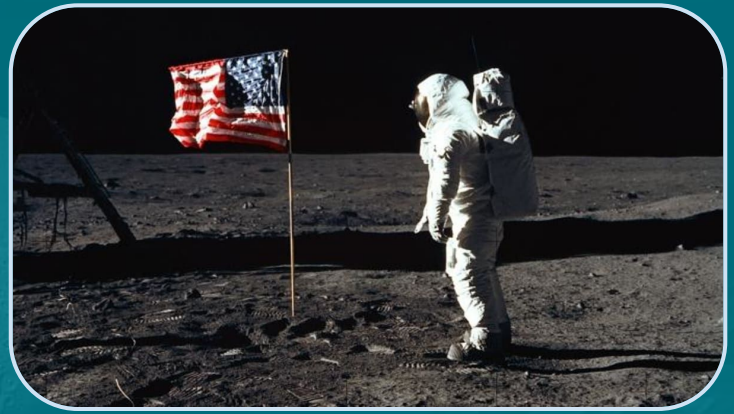
It has been encouraging to observe the aerospace activities of billionaires and organizations alike in recent years, whether it be **NASA** sending a drone to Mars, **Elon Musk** sending a Tesla car into space, or **Jeff Bezos** sending himself into space. The **evolution** of aerospace engineering over the next decade may put more emphasis on **space travel**. Space flight is now achievable by private companies, allowing the enterprise to become much cheaper. This, in turn, may allow for **commercializing** space travel.

Elon Musk

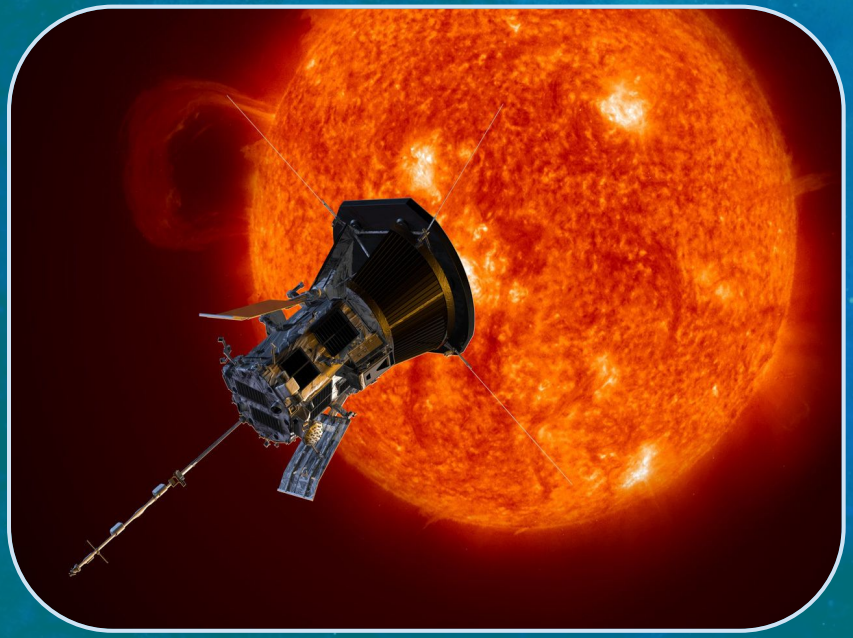
Elon Musk, South African founder and CEO of **Tesla** and **SpaceX,** is a world-famous aerospace engineer and **the wealthiest person in the world** as of 2021, according to the Bloomberg Billionaires Index. Growing up, he loved coding and designed his first game, “Blaster,” at the age of 12, which he later sold for **$500**. In 2017, his company SpaceX had a “successful test flight and landing of a Falcon 9 rocket made from **reusable parts**”, making 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 consistently held a deep fascination 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.



Parker Solar Probe



The Parker Solar Probe is a **revolutionary** project in the field of aerospace engineering. In addition to being the first manmade object to **touch the matter the sun is made of** and survive, it has also provided us with significant data that can be used to **advance** the field. Many innovations had to be made to achieve this unprecedented feat, such as the **actively cooled solar array system** developed by APL, which helped run much of the probe itself while also being able to withstand the **high temperatures** and **rough conditions** of the sun's corona.

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