Aerospace Engineering

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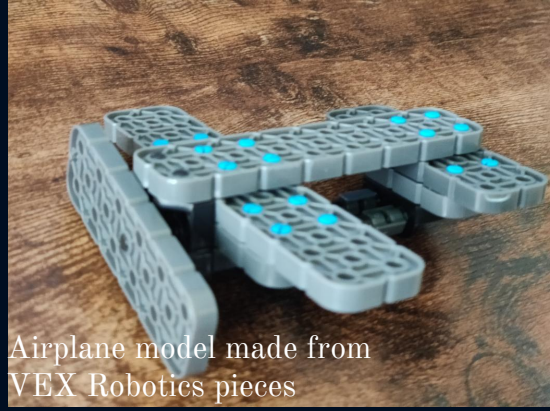
What is Aerospace Engineering?

Aerospace engineering focuses on the design, development, and production of aircraft and spacecraft. It has two main branches: aeronautical engineering and astronautical engineering. Aeronautical engineering focuses on designing aircraft that fly within earth's atmosphere, such as gliders, airplanes, jets, and helicopters. Astronautical engineering focuses on developing vehicles that can be sent into space, out of earth's atmosphere.

These engineers design, test, prototype, and manufacture aircraft, spacecraft, satellites, and missiles. They also design subassemblies for them such as engines, wireframes, and wings. They also work mainly in the aerospace industry, in places such as systems and software suppliers, corporate labs, government labs, and universities. A select few are even chosen to work on the International Space Station. Aerospace engineers usually have a very broad skill set and the majority of jobs in this field require at least a bachelor's degree in engineering.

VEX Robotics and Aerospace Engineering

From teamwork and problem solving, to the more technical parts of engineering, our experience with VEX Robotics has taught us many valuable skills that could be useful for a career in aerospace engineering.



Airplane model made from VEX Robotics pieces

❖ Teamwork

In VEX, we have to collaborate and communicate with not only members of our own team, but with other teams as well, in order to reach success. Just like any other engineering field, aerospace engineering requires communicating ideas, and working together to make those ideas a reality.

It definitely took more than a couple people to build this. Building things like rockets and planes takes hundreds of people, who specialize in all sorts of things, and although VEX Robotics might not have quite as many team members, the general idea of teamwork still applies.

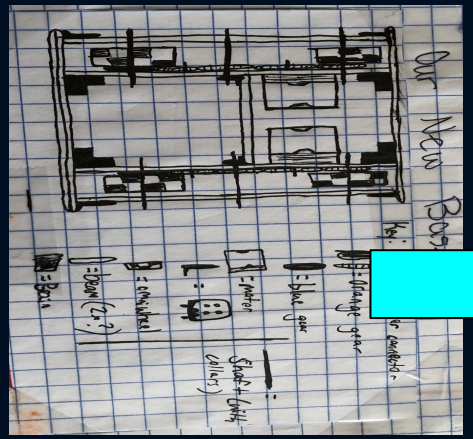
❖ Critical Thinking and Problem Solving

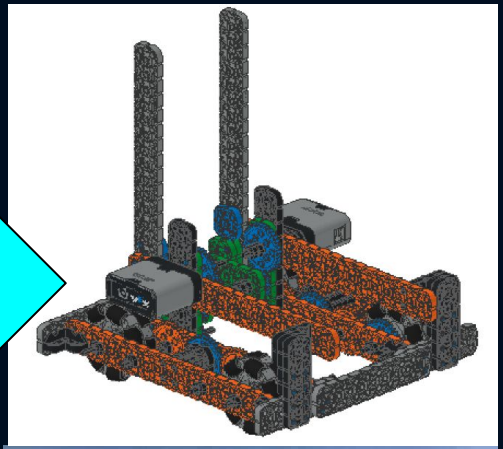
As in practically anything, obstacles preventing success arise in both aerospace engineering, and in VEX. We get past these obstacles using critical thinking, and problem solving. Last year, when dealing with the balls in VEX challenge “Squared Away”, we needed to find a productive method to drop the balls. We used critical thinking and problem solving, and after trying many possibilities, we finally found something that works, and with some tweaking, it was perfect!

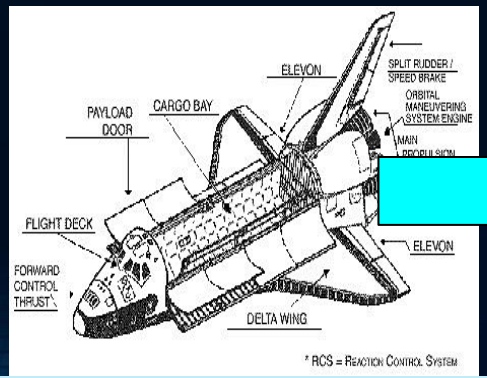
VEX Robotics and Aerospace Engineering

- Planning

In VEX, before we build ideas onto our robot, we brainstorm and sketch out those ideas, so we have a thorough understanding of our build, and we don't waste time trying to figure out where a piece goes while we're building it. In all fields of engineering, planning is key, and without it, engineering would be way more chaotic.



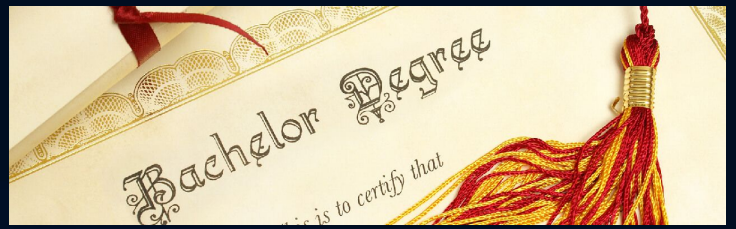




The Required Fields of Study

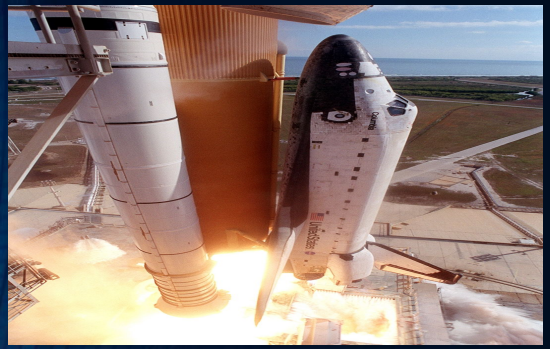
To be an aerospace engineer, a bachelor's degree in Aviation/ Aerospace is required. Majors offered in the Aviation/Aerospace degree program are Aviation Safety, Aviation Security, Flight Operations, Management, Airport Maintenance Management, and Aviation Operations Management. It takes about 4-5 years to study the subject before being able to become an aerospace engineer.

Some required skills that are needed to be an aerospace engineer is an understanding of engineering science and technology. This includes knowledge of how math and physics are applied to world situations and how you can use design principles to solve problems. Aerospace engineers need to use math to calculate the exact design of the aircraft/ spacecraft, and they need to know how propulsion works so they can get their aircrafts/ spacecraft to move and in the right direction.



Who Was Kalpana Chawla?

Picture of *"Columbia"*



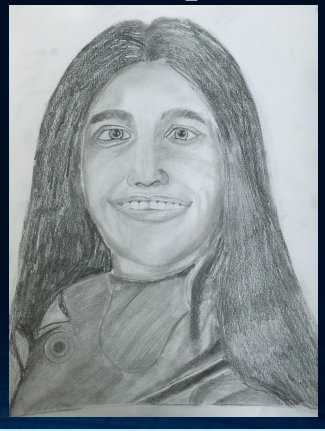
Personal Life

Kalpana Chawla was born in Karnal, India on July 1, 1961 and died on February 1, 2003 in Texas. She got a Bachelor of science degree in aeronautical engineering from Punjab Engineering College, India, a Master of science degree in aerospace engineering from The University of Texas, and a Doctorate of philosophy in aerospace engineering from the University of Colorado.

Work at NASA

Kalpana Chawla went on a total of two missions in space. She was assigned the role of a mission specialist and prime robotic arm operator on STS-87. She also specialized in the multiple moving bodies problem. Kalpana flew on both STS-87 and STS-107 and logged a total of 30 days 14 hours and 54 minutes in space.

Sketch of Kalpana Chawla



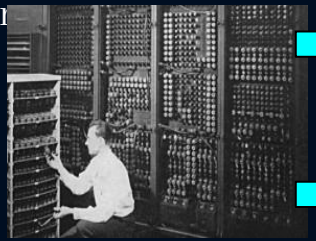
Legacy

Even though Kalpana died in the "*Columbia*" disaster, her legacy lives on. In the NASA Mars Rover Exploration mission, NASA named one of the hills on Mars "Chawla Hill" in order to honor her. She is also regarded as a national hero in India and has many universities named after her.

What Changes Should we Expect in this Field?

Over the next ten years, this career field could evolve immensely. The demand for this field could increase, due to the speed of research with resources such as the internet and labs. This may cause more demand for jobs in the science industry, and may cause more success with companies. This is because companies can improve productivity. Labs which are testing experiments on repeat, so that data can be analyzed and collected thoroughly so we can

Scientists ask questions about the world's problems around them, and solve them with innovative solutions. For example, at NASA and SPACEX, materials which were in the space suits were bulky, and uncomfortable and heavy. Scientists and mathematics worked together in order to make the space suit more efficient by asking questions and putting some of the functions in the seat that the astronauts were sitting on. By solving problems we have today, it can lead to more questions, which lead to more answers and investigation. This is how aerospace engineering might evolve quickly.



In the past, we have made huge amounts of progress in such a short amount of time, and it's possible we could do the same with aerospace engineering, but huge advances are not definite over the next ten years, but in the next hundred, we could have a real USS Enterprise!

Citation Section

Team: Circuit Girls

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Team Number: 66954A

Title: Aerospace Engineering

Bibliography on next page

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