

59735A

COBRATRONIX

Concord, NC

Cabarrus Early College of
Technology

CAREER
READINESS:

MECHATRONICS

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Shubh, and Cooper**

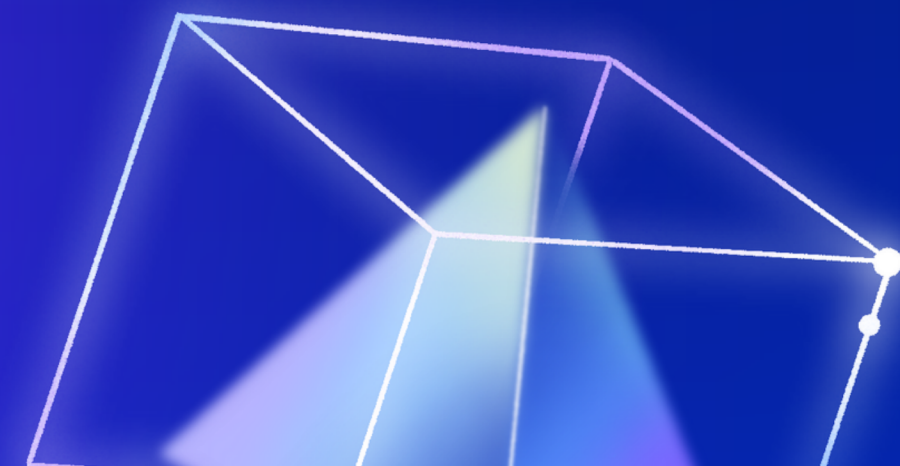


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OUR TEAM



VRC has not only allowed us to meet people and make good memories but also has taught invaluable skills to our team that we will use in future passions. We must learn to overcome any struggle we face together to better the world in the future. These slides present 59735A's drive for the future of engineering and the passion for teamwork. From left to right: Anthony, William, Cooper, Shubh, Tobor (The robot), Kat, and Lucas.

MECHATRONICS: TO US

Mechatronics is significant to our team, serving as the basis for innovation and design. The multifaceted design and engineering process found in mechatronic engineering closely ties into all the passions of our team. The application of Mechatronics in our projects allows for precise control, automation, and seamless interaction between mechanical elements and electronic systems. Mechatronics serves as a catalyst for innovation within our team, fostering a collaborative environment where diverse engineering disciplines converge to create solutions that go beyond the sum of their parts. Lastly, Mechatronics ties into many functions and aspects of vex and other careers allowing us to express our individual passions, if it may be: design, building, programing, etc.

RECOGNITION OF NEED

For professionals in the mechatronics industry, the first step is to identify the problem they wish to solve. This involves looking at the restrictions and the overall objective.

Our team utilizes a very similar manner of approaching problems. We look at the starting goal based on the game of the year. Before brainstorming we look into the rules to look at possible restrictions that could hinder designs.

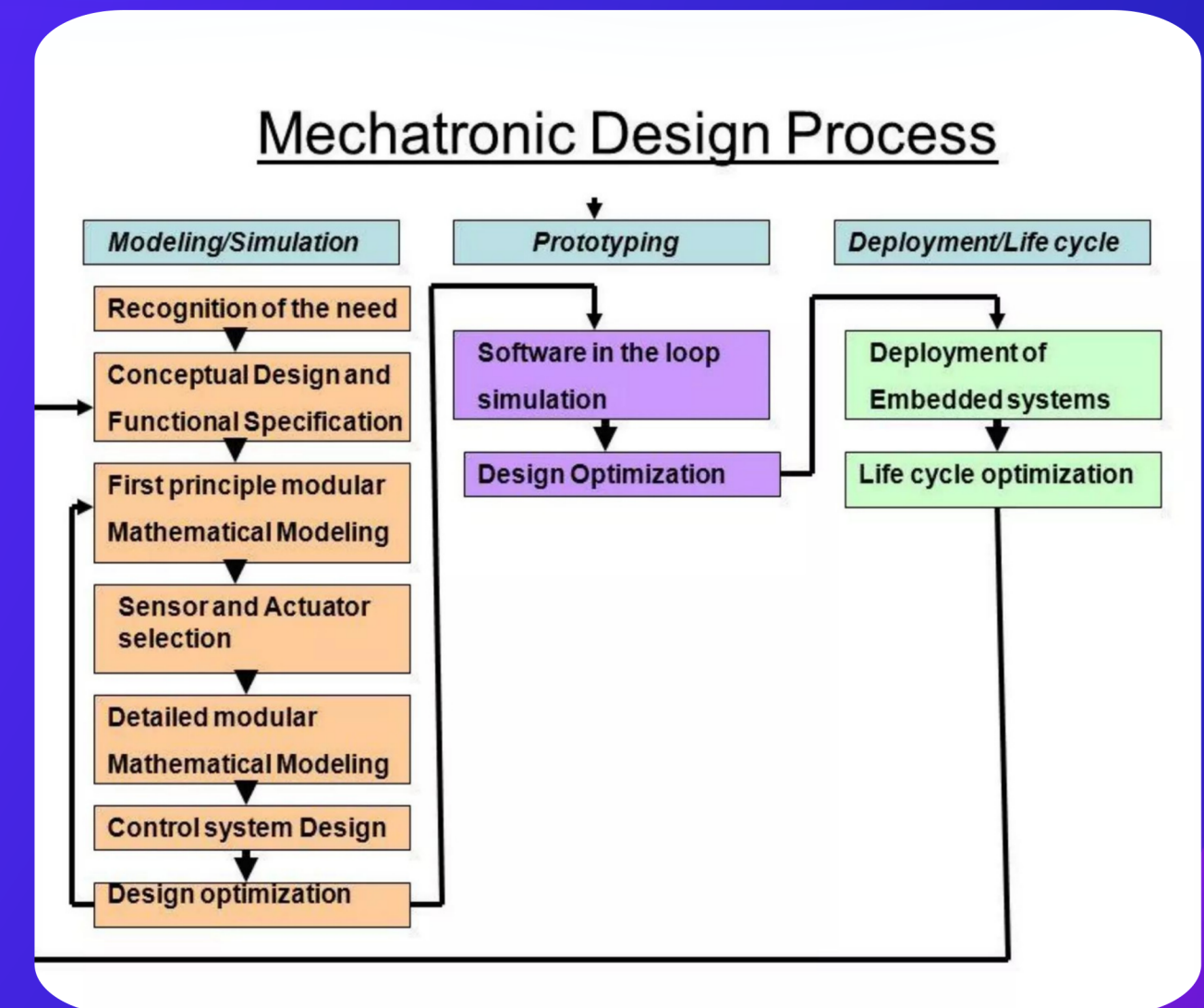


Fig. 1
Mechatronics
design process

CONCEPTUAL DESIGN

Professionals in the Mechatronics industry will often work with colleagues specializing in many types of engineering to plan creative solutions to the issue.

Furthermore, they look into what has already successfully been done or design processes that could help to make a final product.

Our team uses a similar method to brainstorm designs. We utilize the different aspects members of our team specialize in, and the ideas they are able to create based on this specialization. Lastly, we look into engineering designs that have worked previously either using vex parts or real-world aspects such as those used in car manufacturing or robotics, both of which are part of mechatronics.

DESIGN//MODELING

Mechatronics engineering professionals will often utilize computer software to illustrate their designs. This can often be seen in the use of CAD software to show how a design would work. Furthermore, they will use software to show stress points and behaviors to better work on design functionality.

Fig. 3 CAD model example



Our team uses CAD as a primary way to illustrate our designs, making almost every design in the software to better show how it would work. We also use paper to model the design and go through further brainstorming if issues appear. Lastly, we utilize the previous designs in our design notebook to get further ideas.

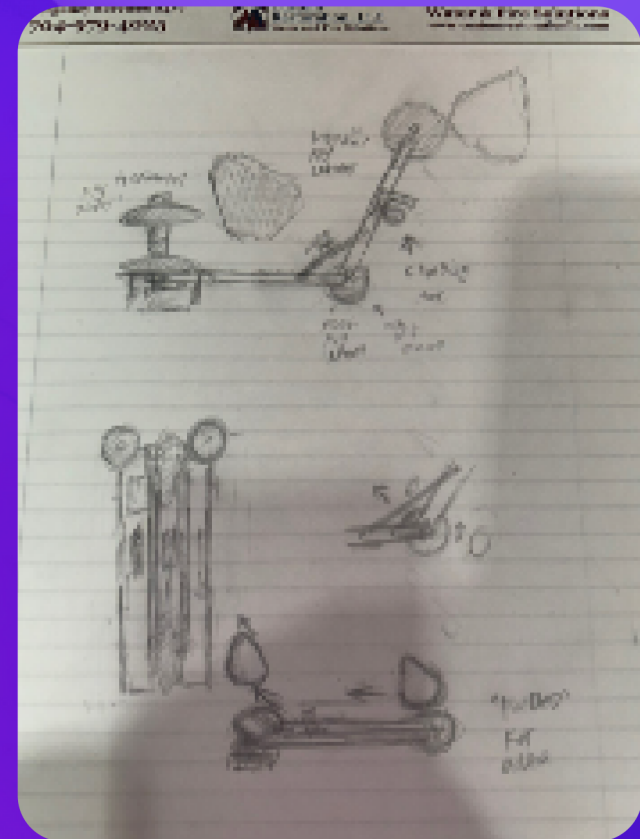


Fig. 2
Examples of designs with differing components

PROTOTYPING

Mechatronics professionals will use prototypes to test new materials and to alter the design based on the successes and failures of the prototype. Using these prototypes they can look for areas of stress and fatigue along with the performance of different processes. During this phase programming is finalized based on the design to perfect the system functionality.

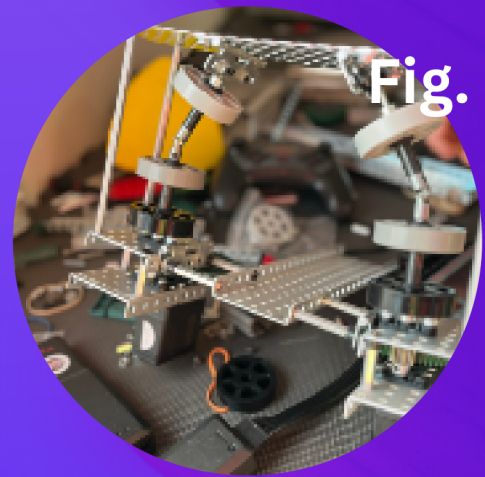


Fig. 4 Prototype

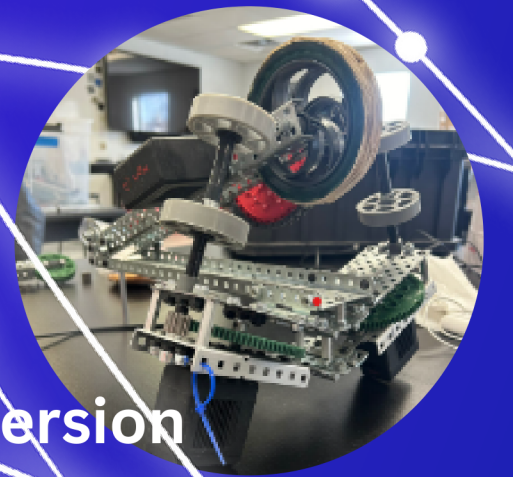


Fig. 5 final version

Our team utilizes prototypes in a similar but differing manner. Primarily focusing on individual parts of a design, we concentrate on the strengths and weaknesses to make a final version. We can also use prototypes to look for points of high stress or areas that could be an issue over time and lead to failure. Similar to mechatronics engineers, our team finalizes the programming of the design to look for any issues with our code or robot functionality.

DEPLOYMENT AND OPTIMIZATION

Professional mechatronics engineers will present their engineering in showcased events or research documents, often illustrating different parts and designs that worked to make the final goal. After completion of prototype designs, they will look over analytical data to see what could cause further issues and what to improve upon.

Our VEX team employs a systematic approach to presenting and analyzing data, utilizing our engineering design notebook much like a research journal for a mechatronic engineer. Furthermore, we use data from game statistics, brain motor readings, and more to ensure our designs and strategies are working at maximum efficiency.

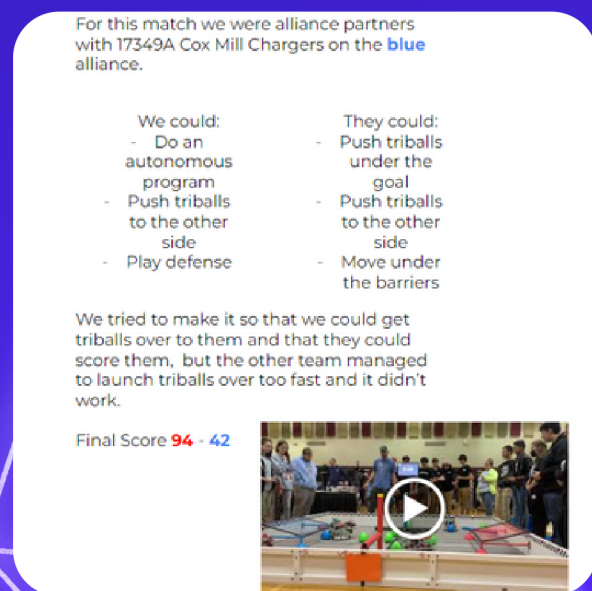


Fig. 6 Game statistics in the notebook



Fig. 7 Motor readings post-game to test motor heat

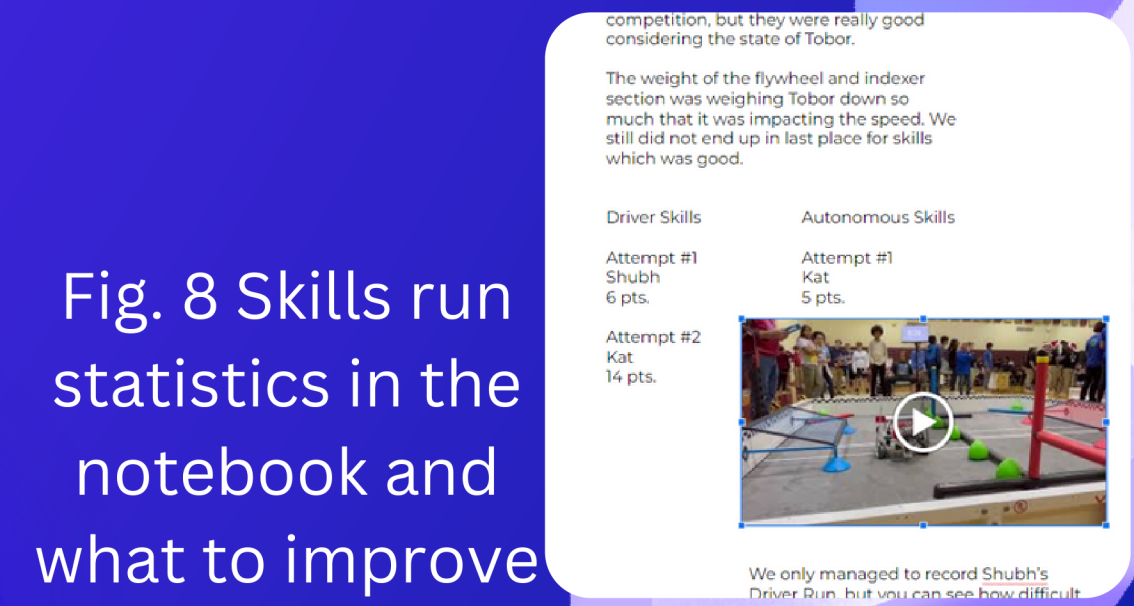


Fig. 8 Skills run statistics in the notebook and what to improve

HOW HAS VEX HELPED?

Vex is a multifaceted game with different aspects that tie into the passions of many careers especially with mechatronics. Vex offers many skills to assist in a mechatronics career such as hands-on design and engineering experience, programming, and handling of robotic systems. Additionally, VEX Robotics introduces participants to a diverse range of technologies, which assist in the understanding of technology and software programming.



Fig 9. Our team getting hands-on experience with the robot.



Fig 10. Our team programming and building before competition using a variety of Mechanics skills, each member possess

SOURCES

THANK YOU!



**Fig. 11 Team
Picture
including
mascot Camber
(The dog)**

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