Valence Robotics 2021-22 Season Prospectus

FRC Team 8429

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SUMMARY

About Valence Robotics

Valence Robotics is a nonprofit focused on building up students of all backgrounds to become the next generation of industry professionals through the FIRST® Robotics Competition and parallel ventures.

Valence Robotics was established in Quarter 4 of 2021 as an effort by students to found an independent FIRST® Robotics Competition (FRC) team. FRC is part of the FIRST® program, and it is an international high school robotics program in which students, coaches, and mentors work to design and build a 150-pound competition robot over the course of 6-weeks, whilst simultaneously fundraising to meet team goals, designing a team brand, and furthering the incorporation of science, technology, engineering, and mathematics within the local community.

Note Regarding Forward-Looking Statements

Please note that certain statements contained within this prospectus may be forward-looking statements, which are based on Valence Robotics' current beliefs regarding future business and performance. Words such as "anticipates," "believes," "expects," "estimates," "intends," "plans," "projects" and similar expressions, may identify such forward-looking statements.

Company Profile

We realize each establishment is valuable in its background and focus. Nevertheless, we strive to work with companies that will best align with both the core values of Valence Robotics and the FIRST® program. As a result, while we are more than open to working with companies of all backgrounds, the ideal company parallels some of the qualities of Valence Robotics aims to emulate, as described below.

Valence Robotics...

- Is STEM-oriented, with an emphasis on engineering. Here, establishments related to robotics and manufacturing become exceedingly valuable partners, given the specialization of the FIRST® program.
    - Hopes to uplift future engineers and scientists through technical opportunities, delving into the likes of computer-aided design (CAD), prototyping, design, fabrication, programming, and web development, among other items.
- Values workplace readiness, so as to train the next generation of STEM professionals. We are hoping to work with establishments that aim to build a well-rounded workforce for the future industry, not just in technical aspects but in nontechnical specialties as well.
- Invests in our community, striving to bring STEM to people of all ages and backgrounds.

Risk Factors

Below, potential risks relating to sponsoring Valence Robotics have been noted. For instance, these include goals set by the team with the recognition that there are existing factors that may endanger the likelihood of achieving these said goals.

Valence Robotics was founded in the fourth quarter of 2021, with the official FIRST® Robotics Competition season occurring in the first quarter of 2022. This places Valence Robotics at a notable disadvantage in multiple aspects, which we recognize. As a result, we cannot assure a fully competitive robot by the end of the build season, a period spanning from January 8th, 2022 to April 23rd, 2022. Furthermore, Valence Robotics competes with other FIRST® Robotics Competition teams, many of whom are well-established teams and have been in operation for over a decade.

Our primary source of funding stems from grants and sponsorships. In the case that sufficient funding is not obtained, Valence Robotics team may be disbanded or become dormant until a stronger foundation is built for the following robotics seasons.

Valence Robotics is primarily a student-led organization, leading to the possibility of shortcomings on the account of student capabilities. Consequently, members will work closely with mentors and company representatives to ensure there is minimal miscommunication or error.

An integral part of an FRC team is the build space. This space functions as both a meeting place for students, as well as the primary housing for tools and materials and the workspace for building the robot. Due to our resource constraint, we cannot reliably guarantee that we will have a build space for our students to work in.

USE OF PROCEEDS

Support for Valence Robotics may come in three forms: mentorship, monetary donations, and materials, each of which we describe in detail below.

Mentorship

Mentors are an integral part of Valence Robotics, providing insight on the various components of the robotics design and building process, as well as guidance in regards to safety and business. While students constitute the major driving force behind Valence Robotics, mentors are invaluable for the support, time, and constructive criticism they provide, which encourages innovative mindsets and empowers students. Mentors come from diverse backgrounds and share their knowledge, regardless of technical or non-technical focus in order to help students raise the level at which they perform. Online mentorship and individuals new to FIRST® are certainly welcome, and mentors remain involved with the team weekly. [See Appendix A for more details]

Monetary and Material Donations

Monetary donations for our team are vital in ensuring the completion of a functional robot. Our expenses can be broken down into two main categories: materials and logistics. While monetary donations will be going towards purchasing materials, Valence Robotics welcomes material donations as well.

Materials

Building a 150-pound robot equipped with sensors, pneumatics, and the like requires a variety of tools and machinery. Crucial components, including motors, sensors, and electrical systems, must be

purchased if not donated. Once accounted for, these commercial off-the-shelf parts pose a considerable expense to the team. To successfully integrate these components with our robots, we will also need both hand tools and machinery, such as hand drills, a drill press, and a bandsaw.

Our team will also make extensive use of industry software to complete various tasks. Aside from access to marketing and graphic design software, students will be designing the robot through computer-aided design (CAD) programs. Funding will be used to help provide access to these software and provide training for said software.

Lastly, our team requires a build space. The build space will be a place where students are able to interact and work on our projects, and is the primary place where students are able to learn through hands-on experimentation. We are in the process of locating a building space for our students and will need funding to rent it. [See Appendix B for more details]

Logistics

As an organization, Valence Robotics has many operating fees in order to maintain the status of a competitive FIRST® Robotics Competition Team. Because of this, Valence Robotics needs to maintain its status as both a competing team and an organization year after year.

Our students work towards the goal of building a tangible robot and excelling in competitions. These competitions require hours of transportation, with needs ranging from transport to district events in Greenville (approximately one hour away), to -- hopefully -- flights to the FIRST® Championship in Houston. As such, we anticipate the need for funding to transport the integral robot drive teams and support. Furthermore, students are expected to need transportation to the build space because most members of Valence Robotics are a part of a residential school program. Transportation for our students to this space is needed on a near-daily basis, especially during the build season, which poses a significant expense.

There are also other fees that come in association with maintaining Valence Robotics as an organization. Firstly, business fees must be paid in regards to maintaining Valence Robotics' non-profit status to entice sponsorship, banking fees, and taxes. Secondly, to promote and expand the reach of Valence Robotics, the marketing subteam needs to maintain a social presence which can result in the occurrence of fees. This can be in the form of website fees (for domain registration and website hosting), software subscriptions (Adobe Creative Cloud), and organizational fees (Google Suite). [See Appendix C for more details]

IMPACT

Sponsorship of Valence Robotics presents an opportunity for social impact not just for current members of the community but also future generations.

Valence Robotics is unique in that our students hail from counties all across North Carolina. A significant portion of our students attend the residential program of North Carolina School of Science and Mathematics in Durham (although Valence Robotics formally is not affiliated with the school). Valence Robotics recognizes the wide range of backgrounds and experiences each member brings to the table and works to uplift these voices.

Our students, being from all different backgrounds, each have access to different amounts of resources. We often find that students from more rural parts of North Carolina have less access to resources and opportunities than those from the more urban or suburban areas, leading to a gap in experience and knowledge. We aim to bridge gaps in access to opportunities for our students and their communities as a result of socioeconomic disconnects, so as to better prepare them for a future in industries, which is why we do not require previous experiences to join our program. Valence Robotics also strives to focus on inclusion and connectivity within our community. We want to be able to provide a safe space where students can explore any and all interests in a professional application. As a team, Valence Robotics strives to provide not only its students with both professional technical and non-technical training and opportunities, but all students. Thus, we hope to achieve a safe and welcoming environment for all of our students where they are able to interact and learn.

PRODUCTION TIMELINE

Date	Check Point	Brief Description
01/08/2022	Kick Off	This is when the game details are released. After this, the team will then start to strategize on what in the game to capitalize on to earn the most points.
01/11/2022	Robot Strategy Finalized	At this time, there is a clear plan of production and we know what parts of the game we are focusing on. A list of subsystems and general mechanism concepts should already be generated.
01/15/2022	Drivetrain Designed	The base of the robot is the drivetrain which includes the wheels and motors that allow the robot to move. With the design, a drivetrain chassis can be created and code testing can start.
02/05/2022	Full Design Completed	With the full robot design completed, all mechanisms have been finalized and fully rendered through Computer Aided Design (CAD). From this, robot part fabrication can start.
02/08/2022	Designs Sent In	We would like to have custom parts fabricated for our robot out of metal. For these parts, the designs should be sent out to the manufacturer and confirmed for production by this date.
02/26/2022	Robot Production Completed	The robot should be entirely constructed from a mechanical perspective. All components and parts should be assembled and mechanisms should all work together as designed at the beginning of the season.
03/05/2022	Robot Fully Wired	The electrical component of creating the robot should be completed. All of the circuitry should be fully wired and the robot should be able to move each mechanism as intended and in conjunction with the other mechanisms. This is the final step in constructing the robot.
03/11/2022	Programming Completed	All code should be fully developed and tested. We expect to have a complex system that automates various tasks and heightens the robot's performance. At this point, the robot will be competition ready (although minor adjustments may continue).
03/11/2022 to 03/13/2022	ECU District Competition	This is the first competition that Valence Robotics will compete in. At this competition, teams compete and earn district points through placing to advance to states. After the competition, the team will continue

		to tweak and refine mechanisms and code.
03/25/2022 to 03/27/2022	Guilford District Competition	This is the second competition that Valence Robotics will compete in. At this competition, teams compete and earn district points through placing to advance to states. After the competition, the team will continue to tweak and refine mechanisms and code.
04/08/2022 to 04/10/2022	North Carolina District Championships	If Valence Robotics excels at both district competitions and advances, the team will compete at the State level. If the team ranks high enough, they will advance to Worlds. This competition is also referred to as “State Competition”
04/20/2022 to 04/23/2022	FIRST Robotics Competition World Championships	At this competition, teams from all over the world compete against each other to determine the best of the best. This competition is in Huston, Texas this year so the team will need to fly out if they qualify. Also referred to as “Worlds”.

*Timeline is not guaranteed to be followed exactly but serves as a framework for the production process.

BUDGET

Date	What do we need?	Estimated Total Costs
01/01/2022	Build Space Costs Covered	$10,000
01/08/2022	Prototyping Materials, Prototyping Tools, Prototyping Test Boardst	$3,405
02/04/2022	Fabrication Tools, Fabrication Materials, Access to Fabricators, Electrical Components, Electrical Materials, ECU Competition Hotel Costs	$17,775
02/18/2022	Guilford Competition Hotel Costs	$2,000
03/04/2022	Transportation Costs for ECU, Robot Trailer, Robot Cart	$2,230
04/04/2022	Registration for State Competition, Hotel For State Competition Due, State Competition Transportation Costs	$6,150
04/10/2022	Registration for Worlds Due, Hotel Costs for Worlds	$10,000
04/15/2022	Transportation for Worlds	$5,000

*See Appendix D for more Details

Appendix

[Appendix A] Mentor Roles

Role	Overview
Technical	
Electrical	Ensures safety in electrical wiring and gives feedback on the layout of robot circuitry to fit needs.
Engineering Design	Facilitates students' CAD and robot design process (including prototyping).
Mechanical	Gives technical advice on mechanical design and helps facilitate full observance of the engineering design process. Ensures students' safety while operating tools and part fabrication.
Programming	Provides technical expertise to advise and troubleshoot software.
Nontechnical	
Finance and Legal	Assists the team with finances, legal items, and the business plan.
Marketing	Helps the team with outreach, fundraising, promotional materials, and websites.
Strategy	Advises the team with game strategy and facilitates event scouting responsibility.

[Appendix B] Material Sponsorship: FRC Recommended Shop Tool List

Recommended FRC Tool List Overview: https://bit.ly/Rec_Shop_QCRA

Suggested by FRC Team 3506: YETI Robotics

Tool Category	Equivalent Value
Hand Tools	$1,110.00
Roller Chain, Related Tooling	$637.00
Electrical	$1,149.00
Power Tools	$3,278.00
Total	**$6,174.00**

[Appendix C] Community Analysis

Strengths	**Weaknesses**
● Pulls students from counties across North Carolina. ○ Ability to conduct state-wide community outreach ● Students are from a diverse variety of FRC, FLL, and FTC teams ○ Connections with other North Carolina teams ● Strong team communication ● Dedicated, foundational team ● Access to mentors for support	● Currently in the process of searching for a buildspace ● Have never worked together before (students are from across the state) ● Students will cycle through at a high rate (since NCSSM is a two-year school) ● Students live on campus and, consequently, have restricted mobility
Opportunities	**Threats**
● Significant local population ● Students are from varying economic, social, and cultural backgrounds, placing an opening into diverse communities across the state ● Involving school faculty (many with industry connections) in *FIRST®* ● Relationship with the University of North Carolina system	● Unable to afford buildspace without support ● Residential school administrators restrict student activities ● Logistical difficulties in organizing transportation

[Appendix D] Budget: Expanded*

Allotment	**Total**
Build Space Costs	$10,000
Prototyping Materials	$605
Prototyping Tools	$2,450
Prototyping Test Boards	$350
Fabrication Tools	$1,800
Fabrication Materials	$5,000
Access to Fabricators	$7,000
Electrical Components	$1,600
Electrical Materials	$375

ECU Competition Hotel Costs	$2,000
ECU Transportation Costs	$150
Robot Trailer	$2,000
Robot Cart	$80
Guilford Competition Hotel Costs	$2,000
Registration for State Competition	$4,000
State Competition Hotel Costs	$2,000
State Competition Transportation Costs	$150
Registration for Worlds	$5,000
Worlds Hotel Costs	$5,000
Worlds Transportation Costs	$5,000
Total	**$56,560**

**All costs are estimations and may be rounded or inflated. To see how Valence Robotics estimated these costs please visit https://bit.ly/VRmaterialsbudget*