Valence Robotics 2022-23 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 six 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.

Organization Profile

We realize each establishment is valuable in its background and focus. Nevertheless, we strive to work with organizations that 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 organizations 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.
    - For nontechnical specialties, we aim to give our students opportunities to develop and strengthen soft skills. These are skills such as public speaking, professional communication, presentation, writing and creativity.
- 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 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.

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. This encourages innovative mindsets and empowers students. Mentors come from diverse backgrounds and share their knowledge, regardless of their focus (technical or business) in order to help students raise the level at which they perform. Remote 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. 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. Due to the limitations of the program, only a select number of specific components from specific vendors can be used. 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.

The team also seeks to expand their community presence through outreach initiatives and branding. These outreach ventures can provide crucial STEM experience to other students, however, may need certain materials for facilitation. Examples include LEGO® MINDSTORMS robots and robot building materials for FIRST® TECH CHALLENGE. For branding, we hope to establish Valence Robotics as a well-respected and recognized name. For this, students seek to create merchandise and promotional material. Examples include team shirts, jackets, flags, banners, posters and flyers.

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 in-state district events, 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. The team currently compensates mentors that provide transportation for gas expenses.

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 banking fees, taxes, and maintaining Valence Robotics' non-profit status through Parent Booster®. 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).

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, coming 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. This 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 its students with both professional technical and non-technical training and opportunities. 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

This timeline is what we hope and expect to emulate for the 2023 Build Season. This includes estimations.

Date	Check Point	Brief Description
01/07/2023	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.
01/9/2023	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.
01/13/2023	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.
01/30/2023	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.
02/01/2023	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.
02/20/2023	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.
02/24/2023	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.
02/28/2023	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).
03/3/2022 to 03/5/2022	District Event 1 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.
03/17/2023 to 03/19/2023	District Event 2 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.
03/31/2023 to 04/02/2023	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”
04/19/2023 to 04/22/2023	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”.

BUDGET

Date	What do we need?	Estimated Total Costs
05/30/2022	Off-Season Funding*	$5,000
01/01/2023	Season Logistics Funding*	$3,250
01/07/2023	Prototyping Materials	$2,000
01/30/2023	Fabrication Materials and Services, Electrical Components, Electrical Materials	$13,975
02/18/2023	District Event 1 Competition Logistics Costs	$4,500
03/04/2023	District Event 2 Competition Logistics Costs	$1,500
04/04/2023	Registration for State Competition and Logistics Costs	$8,000
04/08/2023	Worlds Funding*	$15,000

**This Funding is optional and will be allocated to the team's discretion. 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.
Business	
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] 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 ○ 2023 - Support from Duke Robotics Club ● Connected to Duke ○ Have a sustainably reliable space to build from ● Strong documentation for information transfer between classes of students	● Students will cycle through at a high rate (most students attend a two-year school) ● Students live on campus and, consequently, have restricted mobility ● The team is heavily student run and led, leading to a lack of experience
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 ○ NCSU, UNC	● Residential school administrators restrict student activities ● Logistical difficulties in organizing transportation ● Mentors are students of universities ○ As students, they are expected to leave upon graduation

[Appendix C] Season Budget: Expanded*

Allotment	**Total**
Prototyping Materials	$2,000
Fabrication Materials and Services	$10,000
Electrical Components	$1,600
Electrical Materials	$375
Total Design and Fabrication Costs	**$13,975**
Competition Season Registration	$6,000
District Event 1 Competition Logistics Costs**	$4,500
District Event 2 Competition Logistics Costs**	$1,500
Registration for State Competition	$5,000
State Competition Logistics Costs**	$3,000
Total Mandatory Logistics Costs	**$20,000**
Total	**$33,975**

**All costs are estimations and may be rounded or inflated.*

***Competition Logistical Costs include items such as hotel and transportation costs.*

[Appendix D] Discretionary Budget: Off-Season, Season Logistics and Worlds

Allotment	**Total**
Season Logistics: Non-Profit Status**	$500
Season Logistics: Transportation	$2,000
Season Logistics: Meals	$750
Total Season Logistics Cost	**$3,250**
Off-Season: Fabrication Materials and Services	$3,000
Off-Season: Electrical Components	$500
Off-Season: Logistics	$1,500
Total Off-Season Cost	**$5,000**
Worlds: Registration for First Championship	$5,000
Worlds: Hotel Costs	$2,500
Worlds: Transportation Costs	$7,500
Total Worlds Cost	**$15,000**
Total Additional Costs***	**$20,000**

**While Off-Season and Worlds funding is optional, Season Logistics funding is necessary to continue team operations in 2023. The allocation and division of expenditures for Season Logistics is discretionary, however.*

***Valence Robotics qualifies as a 501(c)3 federally recognized non-profit due to a group ruling from Parent Booster®. In order to maintain this status under Parent Booster®, certain organizational fees must be paid.*

****This total only includes Off-Season and Worlds funding. It is meant to be added onto the total calculated in [Appendix C] for an overall estimate.*