



# Royal Robotics

Lynnwood High School  
18210 North Road, Bothell WA 98012

## EXECUTIVE SUMMARY

### Mission statement

Our mission is to create a strong robotics team at Lynnwood High School that:

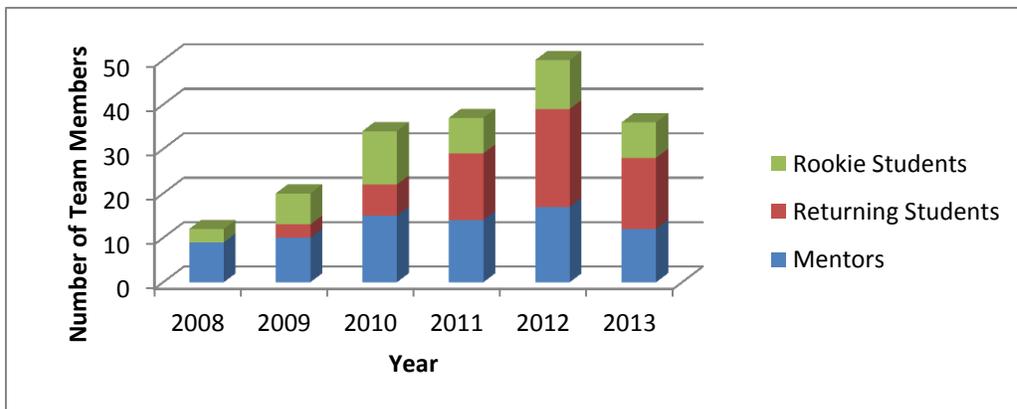
1. Welcomes all students, mentors and sponsors as an important part of our team.
2. Provides experience with and teaches skills in all technology areas required to compete in robotics competitions.
3. Provides experience with and teaches team management skills in all areas helpful to running a successful robotics team.
4. Informs our community about the benefits of STEM education and encourages support and involvement in such programs.
5. Competes effectively while following the *FIRST*<sup>®</sup> ideals of Coopertition<sup>™</sup> and Gracious Professionalism<sup>™</sup>.

### Team Information

Name: Royal Robotics Team 2522  
Founded: 2008  
Founders: Coaches -Brad Nelson, Kevin Crader  
Students – 3 - Taylor Nesheim, Erika Hinze, Bryan Hinze  
Sponsors - Lynnwood H.S., Boeing, NASA, SPEEA, CH2MHill, Dan Terry Inc.

Members: 25 (20% female and 50% minority)  
Mentors: 9 (60% engineering and 40% non-engineering)  
Coaches: Bradley Nelson, Wynnmarie Hinze, Brian Blomquist  
Host: Lynnwood High School, 18210 North Road, Bothell Washington  
Major Sponsors: Boeing, Microsoft, OSPI, SPEEA, Edmonds Public School Foundation, Summit Imaging

### Team Growth





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## Keys to Continuing Success and Growth

- Support from school and school district leadership
- A strong base of corporate sponsorship providing both financial resources and mentors
- Sound accounting practices that leave an adequate fund balance for next year's team
- Outreach programs to elementary and middle schools in district

## 2012-13 Team Challenges and Successes

- Raised \$25,000 in 5 weeks to attend 2012 Championships in St. Louis, MO after winning the Engineering Inspiration Award at the Seattle Cascade Regional. Many donations received from Lynnwood High school staff (principals, teachers, paraeducators and office staff) and community supporters. School Drama department put on a One Act Plays benefit event to help fund Robotics team travel expenses.
- Our District Superintendent sponsored petition to WIAA (Washington Interscholastic Activities Association) for making FIRST Robotics a recognized sanctioned activity with a State Championship event.
- Four, out of five, Edmonds School District Board of Directors attended 1 or more events sponsored by our team and personally donated to support us. School Board publicly recognized our coaches at their August 14, 2012 meeting.
- Increased awareness of the FIRST program and Lynnwood robotics team through a variety of outreach events including participation in the Seafair Tour de Terrace parade, Spokane HoopFest, Celebrate Schools 5K run at Alderwood Mall, Lynnwood High Homecoming assembly, Alderwood Boys & Girls Club summer camp, numerous presentations at local elementary schools. Also produced YouTube video series, "The Six Week Project."
- Worked with district accounting staff to reconcile fund balance to find missing \$6,500 in expected carryover. Implemented new account tracking system to manage annual budget of over \$35,000 spread in multiple accounts and created a cash flow model for team sustainability.
- Established connections with Red Dot, Mobile Tools Management and district Technology department to provide internship opportunities for team members based on their experiences gained from FIRST Robotics.

## 2013-14 Goals

- Retain all eligible team members, while recruiting new members from middle school. Utilize our Junior Member program to build interest and develop skills of 8<sup>th</sup> graders.
- Retain Boeing and Microsoft mentors and recruit new ones. Provide a welcoming environment where their expertise and skills are valued, and students respect and appreciate their contributions.
- Build upon past successes by increasing school participation in team's activities and development of school pride.



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## BUSINESS PLAN

Our objective is to support and promote STEM<sup>1</sup> education for students within the Edmonds School district through participation in robotics competitions.

### I. Market Analysis

#### A. Niche Description

There is a growing demand for employees in technology-based careers. Students need to be properly prepared for these positions. The current educational system requires four years of history and English, but only two years of math and science. Budget cuts have also tended to limit the ability for the school system to consistently provide CTE<sup>2</sup> courses. A robotics team would help provide students with opportunities to learn and apply technology skills while also learning about the non-engineering aspects of leading a team.

#### B. Target Market

1. Students: Our main target is students within the Edmonds School District. Royal Robotics can accept members that are high school age from any school or are home-schooled within district boundaries. We also have an active junior member program that allows Middle school students to participate in our training programs. We also reach out to younger students with robotics presentations to encourage them to consider taking STEM classes when they enter high school.
2. Community: In order to promote STEM education within the school system it is also important to present our message to decision-makers and tax-payers to get support for these programs.

#### C. Competition

1. Educational programs: We compete with other educational programs within the school system such as CTE classes or Sno-Isle Technical School.
2. Extra-curricular activities: We compete with a host of other after school activities such as clubs, sports, and even jobs. Students have limited time to devote to extra-curricular activities, and we have to vie for their coveted time.
3. Other robotics teams: Within our district two other high schools have robotics teams.

#### D. Limitations

1. Membership: Because of insurance requirements, members may be selected only from within the Edmonds School District boundaries. Also, any student from a school with another team should be encouraged to join that team, prior to being accepted to ours.

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<sup>1</sup> Science, Technology, Engineering and Mathematics

<sup>2</sup> Career and Technical Education – educational department



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2. Financial: A typical year costs nearly \$35,000 to do the FTC, FRC and ROV competitions. Our funds are provided mainly through grants, corporate matching funds and fundraising efforts. Our program is adjusted depending on funds availability.
3. Physical facilities: The shop within the school is shared with other classes. The growth of our team may be impacted by space considerations.

## II. Team Information

### A. Description

Royal Robotics is a team hosted by Lynnwood High School and registered with the *FIRST*<sup>3</sup> and MATE<sup>4</sup> organizations which design and run robotics competitions. Team members consist of students within the Edmonds School District boundaries, age 14-19 and adult coaches and mentors. The team has a junior member program which includes students, age 12-14 in our training and MATE ROV programs. The team was organized in November 2008 with three student members. We were mentored by the Mountlake Terrace *FIRST* Team 1778 and shared their shop facilities for two years until our new building was completed. The team has grown significantly with student membership for 2013 at twenty-five students and twelve coaches and mentors.

### B. Values

Our team has certain values that we endeavor to promote within its members, both students and mentors. We consistently seek to reinforce these values within our programs.

1. Welcoming new members
  - a) Students: We encourage students with diverse interests and backgrounds to partake in our organization. We make sure that every member has an impact within the team. We make sure everyone has leadership and learning opportunities, and strive to help them feel comfortable and enjoy those experiences. We make sure that every member has an equal responsibility for the team's success.
  - b) Mentors: We encourage professional mentors from local businesses as well as parents to join our team. We value their time and talent and want to make sure that they have a positive impact on the team. Our mentors are here to guide and inspire our students, assisting them in the process of reaching future education and job skill goals.
  - c) Sponsors: We rely on local businesses for capital and services. We partner with local enterprises who are interested in promoting STEM education. Sponsors may provide parts for the robot(s), technical training for students,

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<sup>3</sup> For Inspiration and Recognition of Science and Technology – the organization that puts together the FLL, FTC and FRC competitions.

<sup>4</sup> Marine Advanced Technology Education – the organization that puts together the ROV competitions.



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support for our fundraisers, tours of their facilities, job shadowing, or other services.

## 2. Team Etiquette

Royal Robotics embodies the *FIRST* ideals of Coopertition™<sup>5</sup> and Gracious Professionalism™ on and off the field. We do our best to be polite and helpful to all teams that seek our assistance. We want to be known for our enthusiasm and kindness as well as our efficiency and organization throughout all facets of competition. We encourage our members to acquire the social skills that improve teamwork. We have all members (students and mentors) sign a behavior contract each year.

## 3. Team Philosophy

Our motto is a saying from Gianni Versace: “In the past people were born royal, nowadays royalty comes from what you do.” We believe this helps clarify our team’s philosophy that to be ‘royal’ we need to be choosing worthwhile activities and endeavors.

## C. Programs

### 1. Team Training

We focus on helping our members get ready for a career in a technical field. We strive to make all of our team members excel, providing opportunities in all aspects of the team. We have training programs to help initiate students or hone their preexisting skills. We support our team mates with an extensive network of mentors that help to steer our students in the right direction and develop their skills and abilities. Between our mentors and our training programs we provide support for our members to excel.

- a) Basic: These one-hour classes are required for all rookie members of the team. This series goes over all basic aspects of the team both technical and non-technical. These classes are taught by experienced students. We follow them with a hands-on training project where they can apply the lessons. Topics include teamwork, design process, drawings and sketches, hand tools, mechanics, electrical, pneumatics, programming, CAD, marketing and competition introduction.
- b) Advanced: These classes are recommended for members of the team with an interest in a specific area. They are required for anyone wishing to be program manager or lead for FRC. This series goes into more depth in applied math and physics and shows the parts used in those areas for FRC. These classes are taught by the mentors and some sponsors. Topics include leadership, program management, mechanics, electrical, pneumatics and programming. We have

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<sup>5</sup> Word coined by Dean Kamen, from Cooperation and Competition. Teams are encouraged to compete, but also help each other succeed.



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also added tours and presentations through sponsors and local businesses/schools that team members can attend.

- c) Safety: All members and mentors are required to follow safety rules during shop time or at competitions. Our training program has online quizzes about general shop rules, power tools and basic first aid. We also have machine specific hands-on training and CPR courses each year. We would like to add fire safety training.
- d) Specialty areas: Mentors and sponsors may provide special training for specific projects such as website, animation, video production, administration, marketing, etc. This training is provided on an as needed basis.
- e) Educational tours, events, etc.: As part of our training opportunities we try to schedule opportunities to tour local businesses and educational facilities at least quarterly. We have visited Pacer Mfg. (a sheet metal fabrication firm), the Boeing Payload center, the ITT Technical school open house and UW Engineering school open house. We also pass along to our team members information regarding career fairs or other events that are related to STEM education. We took students to the Scoop on Careers fair at Microsoft and the DaVinci robot demonstration at Swedish Hospital in Edmonds.

## 2. Competitions

Royal Robotics uses competitions as a way to motivate students and measure progress. Our team currently participates in three robotics competitions each year: FRC<sup>6</sup>, FTC<sup>7</sup> and ROV<sup>8</sup>. We also participate in some associated competitions, such as Safety, Safety Animation and Website excellence. Each competition is preceded by a build<sup>9</sup>, the time period required to prepare for the competition. See Section V for more details on each competition.

## 3. Team Presentations and Outreach activities

Our goal is to have a minimum of two outreach activities each month. We may do less during the FRC build, but may do more during the non-build months.

- a) Recruiting: We recruit new members by attending Freshmen Orientation and other school events and by mentoring FLL teams or other tech clubs. We also use our Junior Member programs to encourage transition from middle school programs to our team.
- b) Educational: We visit many local elementary schools and other organizations, sharing our robots and STEM curriculum, as a way to promote STEM education. We have partnered with Alderwood Boys and Girls Club to create a summer day camp program. We encourage our students to mentor or coach

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<sup>6</sup> **FIRST Robotics Competition**

<sup>7</sup> **FIRST Tech Challenge**

<sup>8</sup> **Remotely Operated Vehicle**

<sup>9</sup> **Build**: The period of time prior to a competition where the robot is designed and manufactured and the team prepares materials for judging as required for the competition.



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tech clubs and FLL teams. Students in their senior year work with our FLL teams to fulfill Senior Project requirements.

- c) Community Service: We participate in service opportunities. This helps with team recognition and lets us give back to our community. We have joined with one of our sponsors, Mustangs NW, to support Food Lifeline (a local food bank) and have attended various school sponsored activities.
- d) Community: We seek opportunities within our community to present *FIRST*, *MATE* and STEM education. We have presented to elder care facilities, Rotary and Elks clubs and businesses. We have participated in the Lynnwood public library tech month, parades, museum events, Seafair.

## D. Program support

### 1. School and District

- a) LHS<sup>10</sup>: Our school supports our team by providing a space for us to work. They donate the use of the woodshop and the CTE computer lab. They also allow us to work extended hours and use the staff room for meals. Some staff members help with the program.
- b) ESD<sup>11</sup>: The Edmonds School District, at many levels, supports *FIRST* robotics teams. The Career and Technical Education (CTE) department helps support robotics teams as part of their STEM education. The CTE department has helped us by funding a milling machine at the woodshop at LHS. The District Superintendent sponsored petition to Washington Interscholastic Activities Association (WIAA) to make *FIRST* Robotics a recognized sanctioned activity with a State Championship event. The School Board publicly celebrated the accomplishment of our team and dedication of our coaches.
- c) OSPI<sup>12</sup>: This state organization has helped our program in several ways. First they have provided grants to our team and many others in the state. They also have provided some of the material we use for our online safety tests. They help promote STEM education within the state.

### 2. Robotics Organizations

- a) FIRST: This non-profit organization sets up and runs the competitions for various age ranges. They organize sponsors and may provide a *KOP*<sup>13</sup> or company discounts. They recruit volunteers and provide training. They have created programs to help teams fundraise.
- b) MATE: This non-profit organization sets up and runs the ROV competitions. They organize sponsors and provide company discounts. They recruit volunteers and provide training.

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<sup>10</sup> Lynnwood High School

<sup>11</sup> Edmonds School District

<sup>12</sup> Office of Superintendent of Public Instruction

<sup>13</sup> Kit of Parts



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## 3. Mentors

Our mentors are our biggest source of support. They are there to guide us and give us support in all facets of our program. We have mentors that have been with us since the beginning and some that are new to the team this year. We value our mentors for everything they do and we hope that they continue to support our team.

## 4. Sponsors

Our sponsors offer us service and capital that we need to continue running our team. Boeing and Microsoft supplies mentors and funding via matching volunteer hours grants. Sponsors are an integral part of our team with their constant support and willingness to help our team improve.

## III. Team Organization and Leadership

The Royal Robotics team is a student-led program. Coaches and Mentors guide and train the student leaders. This team is hosted by Lynnwood H.S. and the Edmonds School District.

### A. Adult Leadership

#### 1. Coaches

The team is guided by a coach who is connected to Lynnwood High School and approved by the Edmonds School District. There are two assistant coaches, an engineering coach that helps guide the work in the shop and a non-engineering coach that guides the work in the lab.

#### 2. Mentors

Adult mentors work with the students in a variety of engineering and non-engineering roles. All mentors are required to be registered as volunteers with Lynnwood High School prior to working with students. Mentors come from parents of members, sponsoring businesses and other organizations.

### B. Student Leadership

Our team's student leadership is organized into two levels. There is the team leadership level which is responsible for the functioning of all aspects of the team throughout the year. There is the build/competition sub-level, which is responsible for one build/competition. Student members may hold more than one position.

#### 1. Team leadership

a) Executive Committee: Students must have one season's experience of FRC to be eligible for these positions. The term of these positions is one year. Officers are chosen by team vote in May. If any member cannot complete their term, another vote may be taken at a planning meeting for a replacement.

(1) *President*: Reviews all reports from other committee members with VP and makes sure the team is keeping to its plan and goals. Conducts meetings according to agenda.



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- (2) *Vice President*: Reviews all reports from other committee members with President and makes sure the team is keeping to its plan and goals. Conducts meetings according to agenda when President is not there.
  - (3) *Treasurer*: Keeps financial records. Creates the team budget. Makes Financial reports at team meetings. Helps with fundraising.
  - (4) *Secretary*: Keeps minutes of team planning meetings. Keeps team manuals up to date. Handles correspondence and phone calling as needed. Makes informational postings on the website and Yahoo group site.
  - (5) *Marketing Director*: Supervises creation of presentation and. Supervises work on team branding. Helps with fundraising advertising. Submits articles to school and community newspapers. Submits material to webmaster and Media Manager for posting. Advisor to the Video Production crew. Trains and organizes team ambassadors. Supervises the Spirit leads.
- b) Specialists: The term of these positions is one year. Officers are chosen by team vote in May. If any member cannot complete their term, another vote may be taken for a replacement. These positions can be shared or have an assistant when needed.
- (1) *ASB Liaison*: The Liaison works to establish a connection between the Lynnwood High School ASB and the robotics team. Processes information that may be beneficial to the team, including the dates and times of important assemblies, fundraisers, or ASB sponsored events. Help organize ways of spreading the name of the team throughout the school in conjunction with the ASB.
  - (2) *Shop Manager*: Helps organize shop tools and equipment and storage. Trains team on proper tool use and storage. Keeps an inventory of team equipment/tools. Maintains tools and makes suggestions for replacements and new acquisitions.
  - (3) *Safety Officer*: Leads online and hands-on safety training and organizes first aid/CPR and fire safety training. Maintains safety manuals. Supervises team safety during build and competition. Acquires and maintains safety materials such as MSDS sheets, First Aid kit, glasses and fire extinguishers. Creates safety presentation for competition.
  - (4) *Animation/Video Production lead*: Leads team that designs and creates animation for Autodesk competition and the FIRST Safety animation award. Submits finished product. Leads Video Production team that creates Chairman's or other team videos.
  - (5) *Webmaster*: Leads team that designs, creates and updates team website. Works closely with Secretary and Marketing lead for site content.
  - (6) *Volunteer Coordinator*: Gets volunteer forms to students, parents and mentors as needed. Keeps team records and turns forms in to the school as needed. Provides and coordinates assistance to parents handling food, transportation or housing. Makes volunteer postings to yahoo and website. Helps with special events such as dinner auction and FLL competition where volunteers need organizing



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- (7) *Inventory control*: Handles inventory control of robot parts. Helps track orders. Organizes parts storage. Creates BOM. Handles spare parts needed for competition. Works with Pit Boss on transportation.
- (8) *Media Manager*: Responsible for getting photos and videos at all team functions throughout the year and gets them to webmaster, marketing director, video lead, etc. as needed. Media Crew Representative with FIRSTWA and handles postings to flicker and youtube. Creates and Maintains team Youtube, facebook, twitter or other social networking internet sites. May assist with team website. Gets pictures and information to LHS yearbook staff. May helps create team presentation materials for school assemblies, sponsor presentations, school newspaper, etc.
- (9) *Team Ambassador*: Helps plan and organize team outreach efforts. Helps team with presentations. May be spokesperson at events. May help lead tours at competitions. May prepare and hand-out team info materials

## 2. Build and Competition Leadership

- a) **Build**: Term is for the duration of one build and competition. We currently have up to three builds: FRC, FTC and ROV. Program managers and FRC leads are required to have one season's experience of FRC to be eligible. Leads may have one or more assistants.
  - (1) *Project Manager*: Creates build schedule with assistance from leads and revises as needed. Informs mentors, leads, and team about schedule changes. Provides a status summary report at least weekly during a build. Creates and maintains reference materials which include reviews of our robots, pictures of ideas from other teams, industry ideas. Participates in the end of season review process, evaluating team performance.
  - (2) *Robot Production lead*: Supervises robot design and production . May be designated by function: CAD, Mechanical, Electrical, and Pneumatics/Hydraulics, or by features: drive system, manipulator, lift, etc. Helps create the project schedule. Helps determine needed parts/tools. Keeps records of steps needed to complete the robot, may help create documents for competition (such as CAD drawings, Electrical schematics, etc). Helps with team training.
  - (3) *Programming lead*: Supervises programming for the robot. May create test equipment. Helps create the project schedule. Helps with bench testing of control system. Helps with team training.
  - (4) *Field/Pit lead*: Supervises production of field parts for testing robot. Helps with making practice field. May supervise work on pit fixtures or robot cart as needed.
  - (5) *Inspector*: Makes sure that the robot is ready to pass inspection on the first try. Knows all the rules regarding production, and works with the production team to meet those requirements. Also this person will be part of the crew that uncrates the robot at competition and preps it for inspection. This position may be filled by the Project Manager.



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- (6) *Administrative Asst.*: The Administrative assistant handles team registration and paperwork. They may help the presentation lead by creating documentation for competition. They also handle any team communications required, such as phone calling, posting to yahoo, or website content. The team secretary is the FRC Admin. Asst.
  - (7) *Presentation lead*: The presentation lead is in charge of judge presentations at competitions. They need to know the requirements of the presentation, help the team prepare materials, make assignments, help the team practice the presentation, and lead the presentation at the competition. The Marketing Director is the Presentation lead for FRC.
  - (8) *Research and Development (ROV only)*: Directs research for both robot design and presentation materials. helps with build schedule. Keeps records and helps create presentation materials.
- b) Competition: These positions are filled during a build and lasts through the competition.
- (1) *Captain*: Oversees the Competition by organizing team members, assigning job positions and tasks and helping with troubleshooting and strategy. The captain is the team representative at any meetings and with the media. Team President is Captain for FRC, Captains for FTC and ROV are voted in by members of those groups.
  - (2) *Strategist*: The strategist is familiar with the competition and award guidelines. They track the competition results at *FIRST* events. They create the scouting<sup>14</sup> method. They organize team members to gather this information. They advise the Captain and drive team regarding potential alliance choices if team enters final rounds.
  - (3) *Pit Boss*: The pit boss is responsible for the pit area. They help plan what will be needed, pack/unpack it and care for it while at the competition. The pit boss also leads the team that ships and uncrates the robot and sets up the pit at the competition.
  - (4) *Spirit lead*: The spirit lead is in charge of team spirit at competitions. They may help prepare items to pass out during the build. They may make decorations & presentation materials for the pit area. They are responsible for maintaining items such as mascot costumes, flag, banners, songs, pom-poms, crowns, etc. They lead cheers and may be the mascot at competition.
  - (5) *Drive Team*: for ROV and FTC consists of three people – a coach and two driver/operators. FRC adds a fourth person called a specialist.
    - (a) *Coach*: The coach assists the driver and operator during the round by watching the whole field and offering suggestions on strategy. They will also provide feedback on how the round went for future strategy. Contacts other teams in round alliances to discuss strategy between rounds.

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<sup>14</sup> Scouting is the process of gathering statistics on other teams performance in order to work out game strategies for alliances. Significant to selecting alliance partners if get into the elimination rounds.



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- (b) *Driver*: Drivers are in charge of the RC controls which move the robot around the field.
- (c) *Operator*: Operators do the RC controls which move the task parts of the robot, such as lifts or grippers.
- (d) *Specialist (FRC only)*: This is a position that changes each year depending on the FRC challenge. It is usually an aspect of the game that is not directly controlling the robot.

## IV. Team Marketing

### A. Current Strategies

#### 1. Branding

When we go to competitions or other events, we want people to notice us and quickly recognize who we are as a team. Team branding helps us be easily recognized by the judges, other teams and the audience. Ways we brand our team include making t-shirt designs, logos, buttons, banners, flags, pit decorations, crowns with LEDs, tabards for our drive team, etc. that all match our team's "royal" theme, which is centered around our crown with a paw-print logo.

#### 2. Advertising

We use a variety of methods for advertising our team, including school and community newspaper articles, Team videos and Internet venues such as our website, Yahoo group, Facebook, Flickr, Twitter and YouTube.

#### 3. Presentations

Throughout the season and pre-season we prepare materials and lead presentations for students, sponsors, and community members describing our team and what robotics has done for us.

#### 4. Spokespersons

Our entire team is expected to be able to be a spokesperson for our team. We teach all members the basics of FIRST, MATE and Royal Robotics. On top of that, we have members who are assigned as Team Ambassadors. These students prepare materials to talk with judges and visitors in the pit. Our Team Ambassadors may also volunteer for the VIP tours at the FRC competitions.

### B. Growth

Our membership decreased this year due to a large number of seniors graduating. We also currently have a high percentage of members who will be graduating after this year. Therefore, our efforts this spring will be on recruiting 8<sup>th</sup> graders via our Junior Member program. We also need to introduce FIRST robotics to local electrical and mechanical engineers to complement our mentor base. Our current plan is to try to maintain membership at around 30-40 members.



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## C. Distribution

Most of our marketing strategies are aimed at our school and school district. Our secondary target is our local community and businesses. Our main method is to use robot presentations. Another method is the use of Internet venues such as our website and YouTube. We have also made occasional use of print media, such as news articles and ask letters.

## D. Communications

### 1. Students

Our main methods of communication are the team website and yahoo group. We have made school announcements and posted on the ASB reader board. We have also used texts, phone calls and printed notes. We have used Powerpoints and videos in our recruiting efforts.

Website: [RoyalRobotics.org](http://RoyalRobotics.org)

### 2. Sponsors

All current sponsors receive a thank you letter each year. We also offer to do team presentations for both current and potential sponsors. We have done “Ask” letters to try and get local businesses to consider sponsoring our team.

### 3. Community

We incorporated the internet in promoting our team by making our own website and using Facebook, Flickr, Twitter and YouTube to connect to the general public. We’ve been interviewed for news articles and written letters to legislature. We make frequent presentations with displays and posters, speaking to people and showing them our robots

## E. Marketing Activities

Our goal is to have a minimum of one marketing activity each month (as part of our outreach program). We may do less during the FRC build, but may do more during the non-build months.

### 1. Recruiting Presentations

We recruit new members by attending Freshmen Orientation and other school events and by peer mentoring at other schools and with our Junior members program. We may seek sponsors or mentors through visits to local businesses.

### 2. Educational Presentations

We present at many local elementary schools and other organizations as a way to promote STEM education. We have partnered with Alderwood Boys and Girls Club to create a day camp program. We encourage our students to mentor or coach tech clubs and FLL teams.



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## 3. Community Service

We participate in service opportunities. This helps with team recognition and lets us give back to our community. We have joined with one of our sponsors, Mustangs NW, to support Food Lifeline (a local food bank) and have attended various school sponsored activities as a team in our t-shirts.

## 4. Community and Sponsor Presentations

We seek opportunities within our community to present FIRST, MATE and STEM education. We have attended sponsor events, such as Boeing Engineering Week or Public School Foundation's Street Strut. Some sponsors have provided tours or training opportunities. We have presented to elder care facilities, Rotary and Elks clubs and local businesses. We have participated in the Lynnwood public library tech month, Lynnwood 4th of July parade, Everett Children's museum /i-engineers classes, Seafair and more. We are constantly seeking more locations and events that we can participate in, within our community.

## 5. Competition Volunteering

Our team helps promote the FIRST program by hosting an event each year at our school, usually an FLL competition. We have also volunteered each year at FRC competitions, providing inspectors, running tours, safety glasses stations and running the practice field. For two years we and two other teams have helped set up a north end practice field for local FRC teams to use.

## V. Competitions

### A. FIRST Robotics Competition (FRC)

Students design, build, program and test a robot capable of completing a complex task within six weeks. Robots are built from industry standard materials and fabricated by students. Students also learn to prepare marketing and presentation materials in order to merchandise their team for judges at competition. Teams also need to learn business and administrative skills comparable to those required within careers. This competition happens in March/April.

### B. FIRST Tech Challenge (FTC)

FTC acts as an intermediate step between *FIRST* LEGO League and the *FIRST* Robotics Competition. Teams design, build, program and test an 18 inch robot built mainly of pre-made Tetrax and LEGO parts. FTC teaches crucial basic engineering concepts, as well as encourages students to work in a team environment to achieve a common goal. This competition happens in November/December.

### C. MATE ROV

Students design and build underwater ROV's and use them to complete tasks several meters underwater. They also have to prepare and present materials to judges about their design choices as if they were a company that is trying to sell their design for use in industry. This competition happens in May.



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## D. Safety Animation

The Safety Animation uses Autodesk 3ds Max program to create a short animated video about safety. This competition happens in December.

## E. Website excellence

The team website is submitted for review in February. Website is judged for content and organization at the FRC Regionals.

## F. Safety

The team's safety program is reviewed at the FRC Regionals.

## VI. Financial Strategy and Implementation

### A. Objectives

#### 1. Current

Our current objective for funding is to continue to gather enough financial resources to maintain our team's infrastructure and to continue to compete in the four competitions.

#### 2. Growth

We would like to increase our funding to the point that we could create more student support for those that require assistance. We would also like to be able to set aside funds to build a reserve to cover competition costs if we should ever be able to attend an international competition for FIRST or MATE.

### B. Methods

#### 1. Student Fundraising

Every year we run a spaghetti feed and auction with other teams in our school district as our main source of student produced revenue. We also currently hold some smaller fundraisers, including video game competitions and car washes.

#### 2. Sponsors, grants, donations and mentor volunteer hours

The largest amount of our funding comes from our highly valued sponsors, in the form of matching hours, donations and grants. We encourage our mentors to spend time with us during the build period by providing them with meals. Our parents, coming from a many different cultures, prepare delicious food and sometimes even create themed meals (ex. Zombie Fest, Fowl Meal, Valentine's, Chinese New Year). We also get local businesses to donate cash or as goods for the auction fundraiser.

#### 3. Member Contributions

Students and mentors are expected to cover certain costs as part of their membership expectations. One is to pay for team shirts and clothing. Another is to help provide



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snacks and meals. A third is to provide or acquire donations for the auction fundraiser. Members may be asked to help defray travel costs. There are resources available for members that can prove financial hardship, such as the LHS booster club.

#### 4. Cash Flow Management

We follow a simple but effective cash flow cycle. Our cycle includes reserving any matching volunteer hours funding from companies such as Boeing and Microsoft earned during a FRC build season (ex. Early 2012) to fund the next season (early 2013). Also, any income received after April 30<sup>th</sup> is used for the next year.

We review the cash on hand at the beginning of the year and establish an expenditure budget to match our income. At certain check points, we make adjustments to maintain a positive fund.

#### 5. Budget Tracking

This year we consolidated all of our accounting information into one online system (BudgetTracker). This system allows us to keep track of various accounts and get a real-time picture of how our spending compares to the budget we established.

We have also documented where various accounts are, what is needed to access the funds, how to get periodic statements and who to contact to resolve any problems.



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## VII. Financial Statements

### A. Balance Sheet

<b>Royal Robotics</b>		<b>Balance Sheet</b>
		<b>16-Feb-13</b>
		<b>Amount</b>
<b>Income:</b>		
Accounts:		
Dinner Auction	\$	4,835.00
Student Contributions		3,375.00
Donations		5,000.00
Grants		9,299.00
Corporate Sponsor		600.00
Matching Funds		12,669.00
<b>Total Income</b>		<b>\$ 35,778.00</b>
<b>Expense:</b>		
Accounts:		
Administrator: Coach Pay	\$	1,500.00
Administrator: Supplies & Copies		500.00
Fundraising Costs		1,400.00
FTC		2,190.00
FRC		23,310.00
ROV		2,300.00
Marketing		2,530.00
Safety		200.00
Training		100.00
Tools & Equipment		1,500.00
Contingency		248.00
<b>Total Expenses</b>		<b>\$ 35,778.00</b>

Note 1: FRC costs based on 2 Regionals, would raise or lower by \$6,000, if add or remove one regional.

Note 2: FRC Championships would add \$37,000 to costs, and would require additional fundraising.



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## B. Cash Flow Statement

Cash Flow Statement		Royal Robotics				
		Dec - Feb 2011-12	Mar-May 2012	Jun-Aug 2012	Sep-Nov 2012	Dec-Feb 2012-13
<b>Opening Fund Balance</b>	\$ 19,765.38	\$ 20,928.05	\$ 7,125.78	\$ 19,959.05	\$ 30,785.82	\$ 18,766.48
<b>Income</b>						
Dinner Auction				\$ 4,714.00		
Student Contributions	\$ 680.00	\$ 9,773.91		\$ 1,079.00	\$ 1,606.00	
Donations	\$ 66.00	\$ 17,952.00	\$ 289.00	\$ 4,718.25	\$ 923.96	
Grants	\$ 1,917.26		\$ 2,257.74	\$ 8,899.00	\$ 400.00	
Corporate Sponsor	\$ 500.00			\$ 500.00	\$ 100.00	
Matching Funds	\$ 1,626.00	\$ 3,550.00	\$ 17,401.00		\$ 2,000.00	
<b>TOTAL CASH RECEIPTS</b>	\$ 4,789.26	\$ 31,275.91	\$ 19,947.74	\$ 19,910.25	\$ 5,029.96	\$ -
<b>Expenses</b>						
Administrator: Coach Pay	\$ 354.76	\$ 368.80	\$ 445.17	\$ 70.82		
Administrator: Supplies & Copies					\$ 149.03	
Fundraising Costs	\$ 347.58			\$ 907.02		
FTC				\$ 1,665.71	\$ 221.43	
FRC	\$ 1,132.42	\$ 44,709.38	\$ 4,792.56	\$ 5,000.00	\$ 15,328.21	
ROV						
Marketing			\$ 1,876.74	\$ 1,439.93	\$ 916.40	
Safety					\$ 60.88	
Training					\$ 29.93	
Tools & Equipment	\$ 1,791.83				\$ 343.42	
<b>TOTAL CASH PAID OUT</b>	\$ 3,626.59	\$ 45,078.18	\$ 7,114.47	\$ 9,083.48	\$ 17,049.30	\$ -
<b>Net Cash In/(Out)</b>	\$ 1,162.67	\$ (13,802.27)	\$ 12,833.27	\$ 10,826.77	\$ (12,019.34)	\$ -
<b>Closing Fund Balance</b>	\$ 20,928.05	\$ 7,125.78	\$ 19,959.05	\$ 30,785.82	\$ 18,766.48	\$ 18,766.48



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## VIII. Appendix – Year in Review



**I Engineers**



**UW Engineer Dept  
Open House**



**ROV**



**Hilltop Elem.  
(5 classes)**



**Alumni Picnic**



**Get Movin' Fair**



**ESD volunteer award  
coaches**



**Hoopfest  
Spokane**



**Alderwood Boys and Girls Club  
Camp grades 4-6**



**Camp grades 1-3**



**Tour de Terrace  
Parade**



**Royal Rallies**



**WASHJAM**



**Space Elevator  
Museum of Flight**



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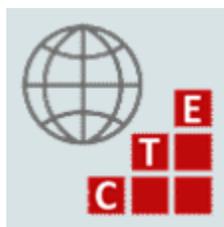


**RedDot  
Presentation**

**Day of Service**

**CPR-FLL**

**Homecoming  
Assembly**

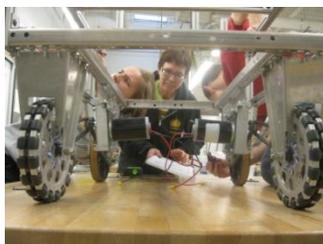


**Fun Run  
Edmonds Public School Foundation**

**CTE Dinner  
Presentation**

**Dinner Auction**

**Haunted STEM Lab  
EdCC**



**Food Lifeline**

**Tech Training**

**FTC**

**Animation**



**Basketball halftimes  
Boys and Girls games**

**Webelos Den  
Engineer pin**

**Sherwood Elem.  
5<sup>th</sup> grade classes**

**Westgate Elem.  
Science Night**