

## *2017 McQuaid IgKnights FRC 3173 Entrepreneur's Award Submission*

### Team Mission Statement

#### Main

The IgKNIGHTers, a FIRST robotics team, led by students who are “Men and Women for Others,” strives to give its members a positive, real-world learning experience and ignite a passion for STEM.

The IgKNIGHTers’ vision is to be a world class robotics team.

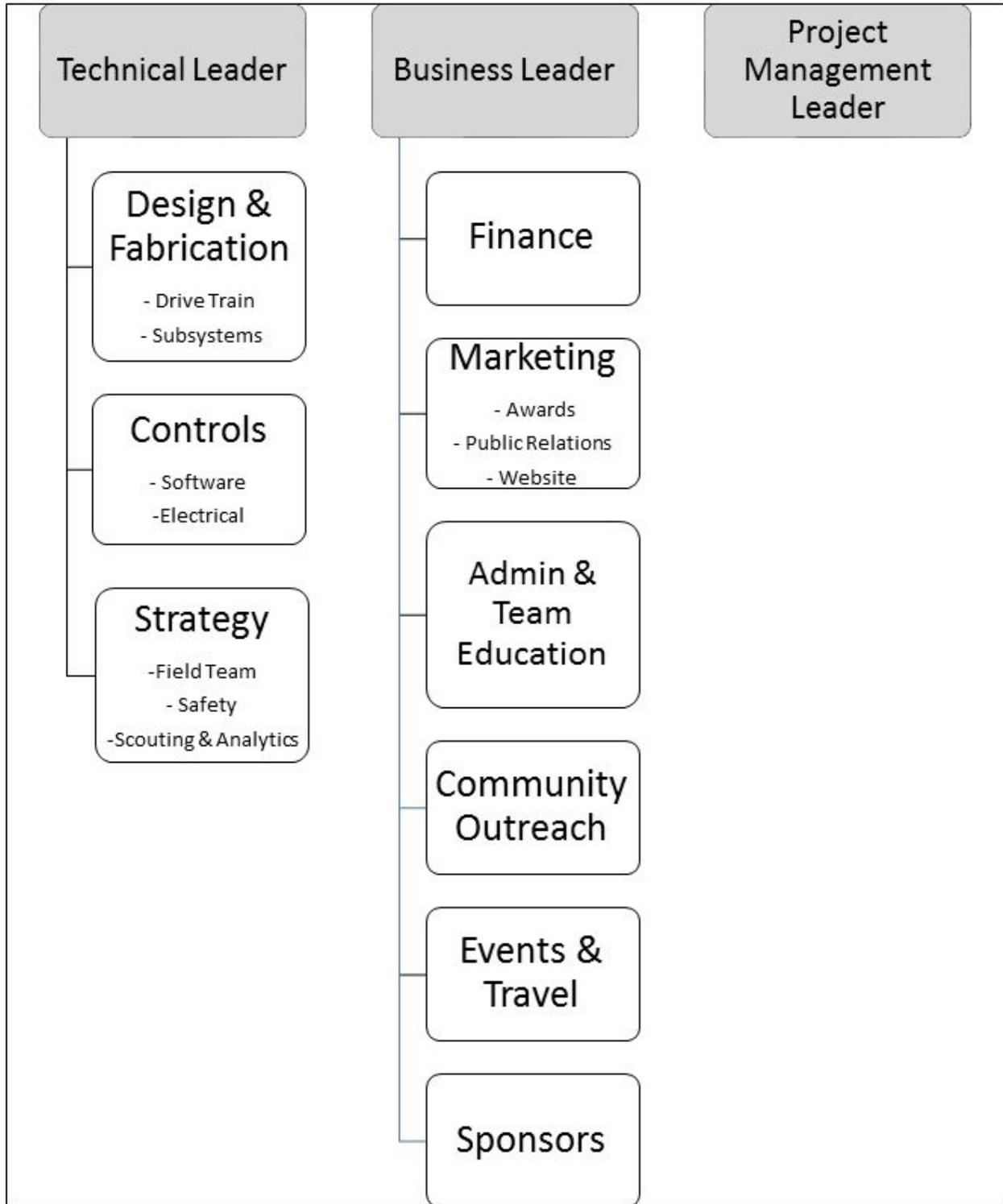
“The IgKNIGHTers are more than a robotics team. The robot is a vehicle for members to learn valuable skills in a team oriented environment. Members come in not knowing what to expect of the team or themselves, and leave with the confidence that they can create their future.”

-Matthew Schiffhauer, team member.

### Team Origin

The IgKNIGHTers were founded by teacher John Maxwell & 2 students in 2009 in the hallways of McQuaid Jesuit High School. They partnered with the experienced Webster SparX Team 1126 mentor, Ralph Hudack, who provided their robot for the McQuaid team to practice with at Ruckus. Despite the team having a mere 20 members & little experience, the IgKNIGHTers won the Highest Rookie Seed award in 2010 at the first competition they participated in, the Finger Lakes Regional Tournament. The team continued to excel & win awards, including the Judge’s, Entrepreneurship, & the Computer Aided Design awards. The IgKNIGHTers have won at least one award every year since their inception. In 2012, the team went to the world championship event. The team expanded greatly in 2014, & has sustained on average 40 members from McQuaid Jesuit High School, Mercy High School, & Brighton High School. The team also has many experienced mentors who greatly assist the students. Throughout the team’s existence, it has had to adapt to major mentor & leadership changes. In 2014, the team lost its 2 lead mentors in the span of a year. This was an enormous challenge for the team, as they were the most experienced mentors. We persevered, and were able to sustain the number of student members on the team, as well as acquire a new lead mentor. The team is constantly struggling with our lack of a machine shop, creating a lack of control over the fabrication process. While other teams have a machine shop, the IgKNIGHTers have hand-crafted parts for their robot or relied on outside suppliers.

Organizational Structure



The IgKNIGHTers have a student-led, well-defined organizational structure with three main parts: Engineering, Project Management, & Business. Each have multiple subteams with distinct leaders who are in constant communication with each other. The mentors act in parallel. The team has long-term, generous sponsors, such as Xylem & Xerox. A goal for the team this year is to create a subteam to present to more sponsors so funding for next year will be guaranteed. The business team has a finance section that ensures that no team is spending more than they are allotted in the budget. Each subteam leader knows their spending limit especially when ordering parts, which makes tracking costs easier. Subteam leaders are required to give a financial report at the end of each meeting. We do several events to show younger kids our robot, including the NY State Fair & our FLL Qualifier, where we show FLL kids our robot to increase excitement in FIRST. We were so effective at the State Fair that multiple parents asked how they could start FIRST teams at their schools. We plan to do more community outreach in the future targeting FLL kids to get them interested in FRC. The team is trained on the values of McQuaid Jesuit, which are honesty, integrity, brotherhood, respect, & justice. FIRST values, which are Gracious Professionalism and Coopertition are in line with McQuaid values. This year, our Safety Captain, Jacob, hosted a safety seminar at RIT for FRC teams in the region. We exemplify Coopertition by helping other teams, such as assisting the Pittsford Panthers with money & equipment.

### Relationships

A high priority of the IgKNIGHTers is to ensure our members & mentors are retained. One of our greatest advantages is the flexible way our members are positioned on subteams. While other teams force their members into one subteam based on their grade or experience level, we allow our members to move into different sub-teams as they wish and even encourage it. We ensure that our members learn & enjoy participating at the meetings to make them want to come back in future seasons. We also promote ourselves through events such as the McQuaid Activity Fair & the FRC Open House to ignite interest in potential members & attract new members to sustain the team. The team excels at inspiring members to pursue STEM careers, as shown by 93% of current seniors planning to enter into a STEM major in college. Many alumni come back to mentor the team and our mentors come from a wide range of careers. Many of our mentors are parents of team members, like many other teams. But unlike other teams, many of these parents come back to help out even after their child is no longer on the team, a tribute to their enjoyment of helping with the team. We run a FLL qualifying tournament & have hosted several other events to ignite interest in STEM fields in the community. We also actively communicate with our sponsors, who are loyal McQuaid supporters and long term donors, by sending them letters to thank them & hosting them at competitions. We plan to present to these sponsors and new potential sponsors to increase their engagement with the team & highlight reasons to sponsor our team.

## Deployment of Resources

The IgKNIGHTers' most valuable resources are the 26 team members & the mentors who teach them. Our team consists of both old & new members. Those who are experienced pass down their knowledge. An important value we pass down is the consistent focus on community outreach. In the past, members have assisted & mentored FLL teams from across the community, including McQuaid's own FLL team. We have been active to promote ourselves & help the community, such as hosting an FRC open house & visiting several other events in the community to showcase our team & allow our members to volunteer. Attending & hosting these events also inspires others to get involved. At our robot showcase at the NY State Fair in 2016, several parents approached our team members & asked how they could start teams at their own schools. We bring in current FLL members by volunteering to help them & by hosting our Qualifier, where we demonstrate our robot & give younger students the chance to operate it. These opportunities excite them because they are shown firsthand the experiences FIRST has in store for them when they graduate from their current programs. We ensure our team members are getting the most out of their experience by modeling our organizational structure around allowing students to join multiple subteams to get the best opportunity to sample fields they are interested in. Members also have volunteer opportunities through events like the UR FLL Tournament. We construct a budget for subteam spending based on previous years, and spending is carefully monitored to ensure money is wisely spent.

## Future Plans

The IgKNIGHTers' has accomplished their goal from last year and fully transitioned into a year-round program. In January of 2018, McQuaid Jesuit will complete the newly constructed 36,000 square foot STEM center, a multi-million dollar building expansion which will become the future home of the IgKNIGHTers. The STEM center is an example of the school's dedication to STEM and ensures the future presence of the IgKNIGHTers at McQuaid. While we have corporate sponsors, we plan to reach out to more local sponsors such as local media outlets, an example being 13WHAM News. We also plan to have more community outreach events in the future, while keeping our current community outreach traditions, such as the FLL Qualifier. McQuaid also implemented a nationally recognized engineering curriculum called Project Lead the Way with RIT in 2015 that continues to this day.

<b>McQuaid IgKnights</b>			
<b>FRC Team 3173</b>			
<b>2017 Budget</b>			
<b>US\$</b>			
<b>Revenue</b>			
Large Sponsors - Xylem, Xerox, McQuaid			25,000
Small Sponsors - Miscellaneous			5,000
Xylem Let's Solve Water Competition Prize			1,000
Miscellaneous Other Revenue - Fundraising and Student Dues			4,000
<b>Total Revenue</b>			<b>35,000</b>
<b>Expenses</b>			
Competition Robot			4,000
Other Build Expenses, Prototypes. Spares			4,000
Tools		1,500	
Safety Gear		500	
Miscellaneous		500	
Reserve		1,000	
			3,500
<b>Subtotal: Robot, Engineering and Support Expenses</b>			<b>11,500</b>
Regional Competition Fees (two competitions)			9,000
Local Competition Fees			500
Travel/Lodging for a Regional Competition			6,500
Marketing/Pit			500
Finger Lakes Lego Qualifying Tournament			1,000
(IgKnights net expense for hosting the event)			
Other Miscellaneous Expense			1,000
<b>Total Expense</b>			<b>30,000</b>
<b>Net Surplus / Deficit</b>			<b>5,000</b>
(Allocate to Reserves, use for special initiatives, partially fnd trip to St. Louis)			

**Financial Statement**

The Finance sub-team works with experienced mentors to ensure that the team has the resources needed to build the robot, has a flexible plan to spend the funds, & proper controls to ensure we do not overrun our budget. Students prepare the budget by subteam and we track their spending. We also have a system to check all packages that come in and ensure every

order is accounted for. We budget each year to have a surplus which is used to build a reserve. The purpose of the reserve is to allow the team to operate for a full year in the event of a loss of income and sponsors. In addition, it allows us flexibility to start new initiatives to expand our community outreach, travel to additional competitions, and embark on a year round program.

### Risk Analysis

#### Strengths:

- Diverse students from different schools with a passion for engineering
- Strong student leadership
- Experienced, long term mentors
- Sustainable- 7 years of experience, success, & major awards
- Committed sponsors. Been to World Championship.

#### Weaknesses:

- No machine shop causes delays in robot build
- Students have limited time available for FIRST outreach due to academic, athletic, & required social outreach
- Build execution can deviate from design strategy

#### Opportunities:

- Expand to year round program. Allows time for training & outreach
- Expand FLL mentoring. Increase contact with potential sponsors; students pitch for support
- Leverage McQuaid STEM extension with machine shop when construction is complete

#### Threats:

- Sponsor attrition.
- Knowledge not transferred successfully to newer generations of the team.

### Risk Mitigation:

-No machine shop: Good planning to avoid delays, including integration meetings. Get support from machine tool shops.

-Outreach opportunities: Focus on signature, impactful events-NY State Fair Demos, FLL Qualifying Tournament, School open house. Year-round team also enables more outreach opportunities.

-Sponsor Attrition: Plan to attract new sponsors with student presentations.

-Knowledge Transfer: recruit new team members through events such as Open House. Off season training now available.