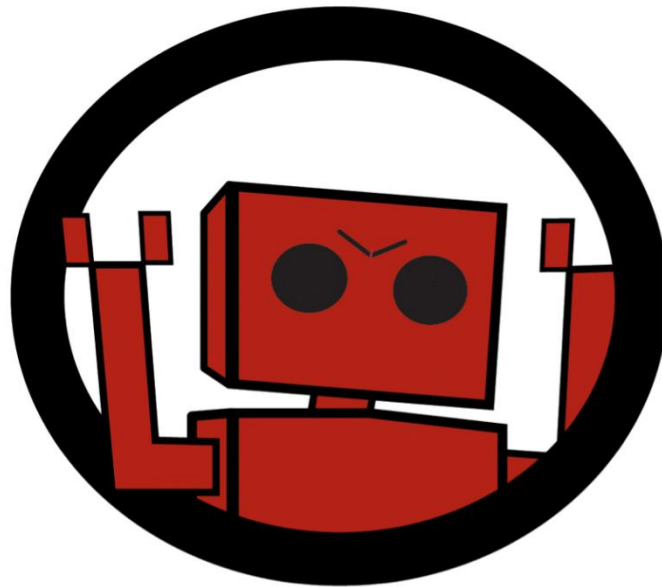


Mountaineer Area Robotics MARS 2614



FY 2015-2016 Business Plan

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1. Executive Summary

Mountaineer Area RoboticS (MARS), FIRST® Team 2614, was founded in 2008 by five student members of a former three-time West Virginia (WV) state champion FIRST LEGO® League (FLL) team to continue the appreciation of Science, Technology, Engineering, and Mathematics (STEM) education after moving on to their high school career. MARS participates in robotics competitions under the umbrella organization For Inspiration and Recognition of Science and Technology (FIRST), which was founded in 1989 to inspire young minds to participate in science and technology, while building professional and life skills, self-confidence and knowledge. FIRST provides programs for youth in grades K through 12. MARS competes in the FIRST Robotics Competition (FRC) division, which serves students in grades 9 -12 and between the ages of 14 - 18. In addition, MARS sponsors and mentors teams in the FIRST LEGO League (FLL) division, which serves students in grades 4 - 8 and between the ages of 9 - 14. In 2015, MARS sponsored and mentored eleven teams in the Jr. FLL division, which runs from grades K-3 and ages 6-9.

The MARS program consists of youth from north-central West Virginia who dedicate themselves to a rapidly expanding, statewide robotics network. Through close partnerships with West Virginia University, NASA, 4-H, local school systems, and numerous corporate sponsors, MARS is providing engaging, educational opportunities and services to those throughout the state. Since inception, MARS members have received many accolades, winning a variety of awards and earning berths to the FIRST World Championship 7 out of 8 years. Using robotics as a foundation, MARS encourages West Virginian students to pursue post-secondary education. Attaining this mission is important because currently only 20% of West Virginia high school students will earn an associate or baccalaureate college degree. This is considerably less than the U.S. national average of 28.5%. The team is extremely proud that 98% of MARS graduates have gone on to pursue college careers on a full or partial scholarship. The following pages will detail the MARS team history, mission and objectives, business strategy and goals, and internal and external risk assessment for the fiscal year period of July 1, 2015 through June 30, 2016.

1.1 Legal Entity

MARS is a 501(c)(3) nonprofit organization offering sponsoring organizations the ability to make tax-deductible contributions to the team. Below is a list of the board members for Mountaineer Area RoboticS (MARS):

Chairman – Dr. Earl Scime, PhD

Vice Chairman – Steve Raque

Secretary/Treasurer – Dr. Ralph Utzman, PhD

Board Member – Herb Baker

Board Member – Mark Lusk

Board Member – Aaron Kitzmiller

Board Member – Mark Tennant

2. Strategic Focus

2.1 Vision

MARS aims to provide a purpose-driven, creative outlet to its students through FRC, while inspiring a change of culture in rural communities through outreach with FIRST and STEM programs.

2.2 Mission

By utilizing STEM programs, it is the mission of MARS to increase participation in post-secondary education in rural and underserved areas in West Virginia and around the world. MARS does this through community outreach and development of technical programs designed to instill superior practical life skills in students, including:

- Gracious Professionalism®
- Teamwork

- Leadership
- Coopertition®

MARS members also develop exceptional personal productivity skills such as:

- a strong work ethic
- superior dedication and commitment to team and community
- highly developed organizational skills

The MARS mission can be summed up as providing students of all ages in West Virginia and around the world with the skills, means, and opportunities to develop their best futures possible.

2.3 Governing Values

The following are the values that form the culture and fabric of MARS. They expect all members and mentors to display these values at all times as representatives of both FIRST and MARS.

- ***Self-Management*** - This is the team's primary governing value: all members (students and mentors alike) are expected to be in the right place, at the right time, with the right equipment, and the right attitude for the activity in question.
- ***Knowledge*** - All MARS team members are expected to be familiar with all aspects of the MARS organization and its operations, including fundraising, community outreach, business planning, technical expertise and all other aspects of the team.
- ***Excellence*** - Team members are expected to complete tasks on time with a superior level of quality and workmanship. Everything the team produces is quality material and contributes to their ability to represent the FIRST community.
- ***Initiative*** - The members cannot only be counted on to stay on task when supervision is absent, they can be relied upon to recognize work that needs to be done and complete it on their own accord.
- ***Bold*** - where self-confidence meets enthusiasm. MARS students gain courage to explore new avenues, take risks, think outside the box and develop new solutions that have not been tried before.

- ***Hard-working*** – Students must have the ability to stay on task until the task is complete.
- ***Driven*** – Team members are often compelled by an inner force to succeed and become the absolute best that they can possibly become.
- ***Dedication*** – Students must have willingness to pledge their time, skills, and their labor to MARS in both easy and hard times.
- ***Gracious Professionalism***® - (a registered trademark of FIRST) Utilizing Gracious Professionalism, MARS encourages high-quality work, emphasizes the value of others, and respects individuals in their community. This is a vital skill in today's workforce.
- ***Coopertition***® - (a registered trademark of FIRST) Coopertition is the concept and philosophy that members of any organization can and should help and cooperate with each other even in the face of competition. MARS excels in this through the utilization of Tucker Teams at competitions, which are explained in Section 3.4.4 on page 16.

2.4 Keys to Success

In order to execute the MARS vision and mission statements, MARS considers the following to be essential keys to success for the program:

- ***Increasing the awareness of FIRST throughout the world*** - Increasing the recognition of FIRST throughout West Virginia and the world is vital to the success of youth. Consequently, it is important that awareness is increased among community businesses and institutions, to build appreciation for FIRST and make it easier for MARS to garner support for its activities.
- ***Cultivating Strong Leadership*** - To manage MARS, the program needs a strong student workforce and adult leadership team to ensure that the group is meeting their mission. By pulling from schools all over North-Central West Virginia, MARS encourages a variety of youth to get involved. MARS also keeps a steady alumni force who are able to mentor younger students and keep them educated on the team's governing values. This is the group's most vital key to success.
- ***Maintaining Adequate Funding*** - Competing in FIRST is an expensive proposition. FRC costs MARS about \$80,000 a year. In addition, MARS provides year-round

teaching for their team members, mentors robotics programs, and attends many community outreach activities. Given these significant costs, adequate funding through sponsors and fundraising activities is equally as important to the group's workforce.

- ***Helping to develop robotics programs throughout the state*** - By sponsoring and mentoring teams from elementary and middle school levels, MARS works to actively encourage and develop promising talent in these students. This allows students to strive for better opportunities after leaving high school.
- ***Being Successful in FRC Competitions*** – MARS gains respect and recognition through its strong competition presence. MARS hopes to uphold this in order to maintain its credibility as mentors to other teams, as well as attract and retain adequate funding and sponsors.
- ***Equipping students in WV with experience*** - MARS teaches youth a variety of technical and personal development skills that provide members with the desire and motivation to seek education past the high school level. In addition, partnerships with many of our sponsors, such as West Virginia University and NASA, recognize the efforts made by these students and often aid them in entering post-secondary education.

2.5 Goals & Objectives

MARS is continually growing and evolving. Each year, the goals and objectives change slightly to reflect the team's transformation. While many of MARS' long term objectives in WV with Jr. FLL and FLL etc. have not changed, MARS is now expanding its commitment to sponsoring and mentoring more high school robotics teams and other STEM programs, e.g., ZERO robotics, VEX robotics, and model rocketry. Additionally, MARS is setting new goals to expand outreach activities on an international scale. To successfully attain these objectives, considerable forethought and preparation are essential. MARS sets its goals and makes adjustments each year. Below is the list of MARS' objectives for the next five years.

Year One Goals (FY Ending in 2016)

- Collaborate with the West Virginia State Board of Education and NASA IV&V to make FIRST Robotics an officially recognized sport.
- Establish at least one new high school robotics team in WV.
- Identify possible grants to increase annual revenue to levels capable of supporting international operations.
- Increase fundraising by 5%.
- Partner with sponsors to maintain current internships and develop one additional internship opportunity.
- Encourage and provide information for participation in the FIRST scholarship application program by December 1st.
- Identify potential international partners to develop new FIRST teams.
- Get Morgantown City Council to attend MARS FLL Qualifier.
- MARS graduates will maintain 95% post-secondary education attendance rate.
- Invite WV legislators and dignitaries to 2016 WVRoX.

Year Two Goals (FY Ending in 2017)

- Identify an additional international community and develop plans to sponsor and organize FIRST programs there.
- Apply for possible grants to increase annual revenue to levels capable of supporting international operations.
- Design and develop curriculum for robotics courses in conjunction with the West Virginia Board of Education.
- Invite West Virginia state legislators to participate in state FLL Tournament.
- Establish at least one new high school robotics team in WV.
- Increase funding by 5%.
- Encourage and provide information for participation in the FIRST scholarship application program by December 1st.

- MARS graduates will maintain 95% post-secondary education attendance rate.
- Partner with sponsors to maintain current internships and develop one additional STEM internship opportunity.
- MARS will identify 3 WV areas lacking FIRST programs and implement outreach to inform about and promote FIRST expansion.

Year Three Goals (FY Ending in 2018)

- Invite West Virginia state governor to participate in State FLL Tournament.
- Continue to develop FIRST programs in an additional international community.
- Identify and apply for possible grants to increase annual revenue to levels capable of supporting international operations.
- MARS will identify 3 WV areas lacking FIRST programs and implement outreach which informs about and promotes FIRST expansion.
- Build a partnership with the West Virginia Board of Education for future opportunities.
- MARS graduates will maintain 95% post-secondary education attendance rate.
- Increase funding by 5%.
- Establish at least one new high school robotics program in WV.
- Encourage and provide information for participation in the FIRST scholarship application program by December 1st.
- Partner with sponsors to maintain current internships and develop one additional internship opportunity.

Year Four Goals (FY Ending in 2019)

- Invite a national figure to participate in State FLL Tournament.
- Identify another possible international community to develop FIRST programs within.
- Identify and apply to possible grants to increase annual revenue to levels capable of supporting international operations.

- MARS will identify 2 WV areas lacking FIRST programs and implement outreach to inform about and promote FIRST expansion.
- Increase funding by 5%.
- Continue West Virginia Board of Education partnership.
- MARS graduates will maintain 95% post-secondary education attendance rate.
- Establish at least one high school robotics program in WV.
- Partner with sponsors to maintain current FIRST internships and develop one additional internship opportunity.

Year Five Goals (FY Ending in 2020)

- Invite nationally recognized public figure to participate in State FLL Tournament.
- Begin communicating with and sponsoring an additional international community.
- Identify and apply to possible grants to increase annual revenue to levels capable of supporting international operations.
- MARS will identify 2 WV areas lacking FIRST programs and implement outreach to inform about and promote FIRST expansion.
- Increase funding by 5%.
- Continue West Virginia Board of Education partnership.
- MARS graduates will maintain 95% post-secondary education attendance rate.
- Establish at least one high school robotics program in WV.
- Partner with sponsors to maintain current FIRST internships and develop one additional internship opportunity.

The MARS Plan

In 2008, MARS began with the mission to expand STEM programs throughout the state of West Virginia under its “MARS Plan,” formerly known as the West Virginia Plan. While the name has changed, the focus is still the same, except now the team is reaching beyond state boundaries to share their vision. The MARS Plan is a fourfold strategy which focuses on partnerships,

sustainability, communities, and barriers. Team members begin by identifying a community that could benefit from increased STEM programs. The team then forms partnerships in the area to help support their endeavor. The situation is then evaluated and any possible barriers that might arise and their potential solutions are discussed. Finally, MARS builds sustainability into each program development effort, thereby enabling new programs to flourish independently. MARS is expanding this model to other rural and underserved communities around the nation and world.

3 Organization and Management Summary

3.1 Outreach History

During the team's first two years, MARS began its outreach efforts by participating in many community events, developing an inclusive marketing plan, and beginning a successful FLL program by starting eight and sponsoring ten teams. To help other FRC teams, MARS developed an informational manual for rookie teams, *SEarching for Rookie Team Inspiration*, which they translated into three languages. MARS also participated as a LabView beta test team.

In MARS' third season (2010), the team grew while also creating the curriculum for a variety of summer camps, and sponsoring eleven and mentoring fourteen FLL teams in three counties. MARS-sponsored FLL teams swept the WV FLL state tournament, including first place overall, first in technical, and first on the field. This was also the year that MARS created their WV Plan (now referred to as the MARS Plan), details of which can be found in Section 7, on page 19.

In MARS' fourth season (2011), the team implemented their WV Plan, and their FLL program expanded dramatically to include teams in more than 15 counties. They also started a rookie FRC team at Winfield High School in Putnam County, WV, FIRST Team 3492, PARTS. MARS-sponsored FLL teams once again swept the WV FLL state tournament. This is also the year that MARS began working with WV 4-H to run youth science summer camps.

In MARS' fifth season (2012), their FLL program spread to over 20 West Virginia counties and one Southwestern Pennsylvania county, widening the impact of their FIRST program with the WV Plan. The team also appeared for the first time at the October Sky festival in southern West Virginia, while continuing their work with summer science camps.

In MARS' sixth season (2013), they continued their outreach throughout the summer and fall, expanding their FLL Program to 63 teams in 22 West Virginia counties and one Southwestern Pennsylvania county. In addition, MARS continued to host its annual FLL scrimmage with 24 FLL teams and over 230 students in attendance. The team worked with NASA and other FRC teams to produce the West Virginia State FLL Tournament. During this year, the team again conducted workshops at 4-H camps and with the Boy Scouts of America[®]. Projects such as these have helped MARS to reinforce the value of STEM education throughout the state.

During MARS' seventh season (2014), the team hosted and volunteered at numerous STEM summer camps for students, such as TekKids and StemPloy. They also continued their work with FLL, hosting their own pre-competition scrimmage and regional qualifier before helping NASA coordinate the FLL State Tournament. The team also added its first international outreach initiatives, officially renaming the WV Plan the "MARS Plan" accordingly. Two different projects were started in India, one by a team member in Jackal, India under the name Technology For All, and one by a team alumnus in Varanasi, India, where he was awarded a Gap year by Princeton University. These two projects began working together to institute FLL teams in rural areas of the country and started gaining funding and sponsoring support both in the United States and in India. The team plans to continue supporting and growing this program and similar programs all over the world.

In MARS' eighth season, the team continued to support FLL, continuing to run a scrimmage, qualifier, and assist in running the state tournament, overall assisting over 100 FLL teams and around 20 Jr. FLL teams. While continuing efforts in India, the team also built connections in Harare, Zimbabwe in order to work through a pre-existing FLL team and start more FLL teams in rural parts of the country. The team also began a relationship with the Children's Museum of

West Virginia and attended 5 STEM nights at local elementary schools, plus 4 more events through local after-school programs.

To date, the team is 36 members and 31 core mentors strong, with the program rapidly expanding. With nearly a 1:1 student-to-mentor ratio, MARS offers a personalized learning experience for their students. Almost all of the graduates have advanced into post-secondary education with either a full or partial scholarship, and many of them are majoring in STEM fields. Local businesses and corporations have offered internship opportunities for many MARS youth, either during or following their high school careers.

3.2 Competitive Award History

In addition to attending many competition events, MARS has seen incredible success on and off the field. While the primary focus of the organization is to build youth into productive members of society, the team also actively works to be the best they possibly can be. The following awards are representations of the hard work and dedication members have contributed to the program.

Award	Regional	Championship
Chairman's	2012, 2014, 2015	
Engineering Inspiration	2010, 2011, 2013	
Event Winner	2008, 2012, 2014, 2015	
Event Finalist	2012, 2014	2015: Hopper Division
Woodie Flowers	2011, 2015	2012
Dean's List	2010, 2013, 2014	2010
Rookie All-Star	2008	

Innovation in Control	2009, 2009, 2010, 2010, 2012	2014
Coopertition ®	2010	
Entrepreneurship	2011, 2013, 2013, 2014	2013
Creativity	2014	
Gracious Professionalism ®	2014, 2014, 2015	

3.3 Management Summary

The management functions associated with MARS are carried out by a talented group of mentors who assist, guide and teach the students in each of the team's activities. Their patience and support is instrumental to the prosperity of the team.

Currently MARS has 31 core mentors, including 15 college mentors. Below is our complete mentor roster divided by the functions they perform for the team.

The two lead mentors that lead MARS are Dr. Earl Scime, PhD and Steve Raque.

<u>Sub-Teams</u>		<u>Mentors</u>
Mechanical	Electronics	Nathan Utzman
	Design	Tim Floyd Dr. Earl Scime, PhD.
	Fabrication and Shop	Dr. Todd Hamrick, PhD. Herb Baker Dr. Earl Scime, PhD.

	Building Management	Mark Tennant Aaron Kitzmiller
Programming	Software	Steve Raque Frank Tate
	Beta Testing	Steve Raque
Outreach and Public Relations	Photography	Kari DeMicco Janet Nurkiewicz
	Video	Trish Vos Alex Stout
	Business Plan	Kari DeMicco Beth Thompson
	Animation	Diane Raque
	Chairman's Award Submission	Trish Vos Diane Raque Kari DeMicco Alex Stout Alex Bonnstetter Beth Thompson Ralph Utzman
	Fundraising	Dr. Earl Scime, PhD. Janet Nurkiewicz
Outreach	FLL	Dr. Earl Scime, PhD. Haley Tucker Mark Tennant
	Recruiting	Rachel Kitzmiller

	Website	Dr. Earl Scime, PhD.
	Workshop Organization	Alex Bonnstetter
	24 Hour Event	Mark Tennant Janet Nurkiewicz
	T-Shirts, Paraphernalia	Kari DeMicco
	MMS/GPM	Dr. Earl Scime, PhD.
Competition	Driver Training	Dr. Earl Scime, PhD.
	Scouting	Steve Raque Jarrod Barfield
	Pit Area Structure	Herb Baker Dr. Earl Scime
	Hotels and Travel	Maggie Sorensen Diane Raque

3.4 Descriptions of Sub-teams

The Mountaineer Area RobotiCS team (MARS) is divided into 3 major sub-teams. They are: the Mechanical team, the Programming team, and the Outreach/Public Relations team. Each sub-team is led by adult and college mentors who help guide students to achieve mutual goals. Each sub-team also has a student leader who helps keep the team on track during the season.

Furthermore, students from all of these sub-teams join together to form “competition teams” at regional events.

Below is a brief description of each of the sub-teams and their functions:

3.4.1 Mechanical Team

Build Crew: This team does the assembly of the mechanical aspects of the robot during the build phase. Student jobs vary depending on the direction of the build mentors and the abilities of the students. All members go through shop training to ensure the safety of all members and mentors.

Electrical Team: The Electrical team does the wiring of the robot. They connect all the components to make the robot operate. The Electrical team develops the robot's sensors to interface mechanical and programming. They must have a good understanding of basic circuitry and robot components.

3.4.2 Programming Team

Robot Programming: This team develops the code for the autonomous and tele-operated functions of the robot. The team learns the LabVIEW programming language (and C++) during the off-season and works on actually programming the robot during the season. This team is also involved in the development and workings of various sensors and electronics.

Computer Aided Design Team: The CAD Team uses Autodesk products and Solidworks to create the CAD drawings used to construct the robot. Team members are expected to attend additional meetings and go through software training. These students will sometimes work at home on projects.

3.4.3 Outreach and Public Relations (OPR) Team

Communications/Public Relations Team: The Communications team often speaks directly to groups, judges and the media. At competitions, they are stationed outside the pit area to greet other team members and present our image to the public. This team submits press releases and articles to the local news on a regular basis.

Media Team: The Media team takes and archives photos and videos of competitions as well as year-round outreach events. They produce the video that complements the Chairman's award submission, as well as others for promotional purposes. They also run the team's social media accounts, including Twitter, Instagram, and Facebook.

Website Team: The Website sub-team creates and maintains the MARS website. The team works year-round to update and improve existing content, both at team meetings and at home.

3.4.4 Competition Teams

Drive Team: The Drive team consists of a driver, a co-pilot, a human player, a back coach, a backup co-pilot, and a backup driver. The drive team is required to stay with the robot a majority of the time at the competitions. This group must interact with the Scouting team and the Pit Crew.

Scouting Team: Students on this team will develop materials and methods to assess teams at competition, providing the Drive team with as much advantage as possible when choosing alliance members. At the competition, this team will make presentations to the drive team on Thursday and Friday evenings.

Tucker Teams: The Tucker teams are comprised of students from different parts of our organization. These students actively work during FRC competitions to provide other teams with help and instruction. They ensure that all teams are playing at their best. They serve as the main outreach team during competitions. This sub-team honors the ideals of our late mentor, Mr. Phil Tucker.

Pit Crew: The Pit Crew is a small group of students involved in the maintenance and creation of the robots, playing field, tools, and other accessories. During the off-season, students are expected to maintain current robots and tools. Once the competition season starts, the crew is

responsible for the creation of a playing field to specific directions. At competitions, their major responsibility is the maintenance of the robot and tools.

4 Products and Services

All of MARS' products and services strive to increase youth involvement in STEM programs, not only in their home state of West Virginia, but also around the globe.

4.1 Products

MARS has multiple programs in use to help fund their endeavors. FIRST Green e-watt saver LED light bulbs and custom LEGO® models of NASA's Magnetospheric Multiscale Satellite spacecraft and NASA's Global Precipitation Measurement space probe are just some of the ways MARS funds their team.

4.2 Services

MARS provides outreach programs that aim to develop youth interest in the STEM fields. These outreach programs include Jr.FLL and FLL programs for the elementary and middle school level. At the high school level, MARS introduces groups to the FRC and VEX programs. Their services include the following:

- Over 100 FLL teams in 35 counties of West Virginia
- “Technology for All” program in India
- 8 Jr. FLL teams started/mentored
- Organizes and Staffs State Qualifiers and Tournaments
- Robotic Demonstrations at:
 - Trans Tech Energy Conference
 - Rocket Boys, October Sky Festival
 - State Fairs
 - Board of Education

- United Way Open House

5 Market Analysis Summary

To stay true to the MARS mission of getting youth in West Virginia as well as youth across the global involved in STEM, MARS has identified the following target markets:

- High School Students
- Middle School Students
- Elementary School Students
- Pre-K Students

5.1 Market Segmentation

High School Students: To extend robotics programs to high school students, MARS has started teams in multiple areas of WV, ensuring team sustainability through local partnerships. MARS also utilizes a feeder system for high school robotics programs to provide an outlet for veteran FLL students, allowing them to stay involved.

Middle School Students: To expand the interest in STEM among those students at the middle school level, MARS assists and/or mentors over 100 FLL teams across West Virginia. In addition to those in WV, MARS has also started FLL teams in India and Zimbabwe. MARS members also assist with a variety of youth summer camps, specifically targeted at this age group.

Elementary School Students: To recruit students at the elementary school level, MARS assisted 17 Jr. FLL teams and funded 8 new Jr. FLL teams. The group also does a variety of outreach events to engage these students in STEM at an early age.

Pre-K Students: MARS aims to spark an interest in STEM in the kid's minds by hosting frequent outreach events. MARS members actively facilitate read-aloud's, robot demonstrations, and fun activities for youth in this age spectrum.

6. Website Marketing Strategy

The MARS website, marsfirst.org, is designed and updated by a few select members of the MARS team. The website is used to supply information to those interested in the MARS program as well as FIRST. The team also uses the website as a way to have new students apply to the team and also provides a calendar to show all upcoming events. For more information on the team website, please visit the website at marsfirst.org.

7. Strategy and Implementation Summary

It is the goal of MARS to develop and promote increased student participation in post-secondary education among West Virginian high school students. MARS' strategy to attain this goal is to start and mentor Jr. FLL and FLL teams, as cultivating and sustaining an interest in science and technology at a very early age will give students the best chance of maintaining that interest through high school and into college. As such, they concentrate the majority of their outreach efforts in the primary through middle school grades.

MARS will continue to develop and promote the above strategy, previously known as the WV Plan, until all counties in the state of West Virginia contain a viable robotics program. MARS now assists in the development of FIRST activities in other states as well, such as Pennsylvania and Maryland. In addition, MARS has a dedicated technical team of both students and mentors at every regional competition to assist rookie teams with problems they may be experiencing in any aspect of the competition (Tucker Teams). In partnership with West Virginia University, the team also hosted the world's first 24-hour FRC event in August of 2014.

However, the team also realizes that West Virginia is not the only area with underserved rural communities. As such, MARS has begun expanding its outreach beyond the borders of West Virginia to an international scale. Thus, the team adapted the WV Plan model to be applicable around the world, renaming it the “MARS Plan.” The team identifies areas that would benefit from implemented STEM programs and develops techniques to help sponsor and mentor FIRST programs in these areas. To date, we have 2 members of our organization on the ground in India, and one helping promote STEM education in Zimbabwe.

7.1 SWOT Analysis

MARS performs an annual SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis to aid in team advancement. The MARS SWOT analysis divides traits into two categories: internal and external environment. The first category, internal environment, defines the team’s Strengths and Weaknesses. The external environment is comprised of Opportunities and Threats that can affect MARS's viability.

The MARS Focus Group identified the following:

	Strengths	Weaknesses
Internal Environment	<ul style="list-style-type: none"> • Funding • Mentors • Alumni • Facilities • Team Character • Team Structure • Team Image 	<ul style="list-style-type: none"> • Disconnect from History • Internal Communication Breakdown
	Opportunities	Threats
	<ul style="list-style-type: none"> • STEM Programs in 	<ul style="list-style-type: none"> • Macroeconomic

External Environment	<p>Schools</p> <ul style="list-style-type: none"> • Rural Communities • Inside West Virginia • Nationally & Internationally • Underserved Areas 	<p>Fluctuations</p> <ul style="list-style-type: none"> • Loss of Core Partners and/or Sponsors • Loss of Key Personnel
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These individual issues will be discussed in detail in the following sections.

7.1.1 Strengths

Funding - Funding was identified as one of the team's keys to success (see section 2.3 on page 4). MARS has been blessed with funding from a variety of sources, as the team is both a good investment for foundations providing grants and for corporations seeking to reinvest in their community through tax deductible donations. Over the years, MARS has developed a close working relationship with many of our sponsoring partners, which has allowed MARS a level of consistency in its funding from year to year.

Mentors - MARS is led by 31 core mentors. These mentors are all highly experienced in their fields, including education, business, and engineering. The level of instruction from these mentors allows students to perform well at competitions and in their academic careers.

Team Alumni - Each year, an average of five to ten students graduate from the program. Many of these students continue volunteering as mentors, returning over college holidays and weekend breaks to assist the team in many aspects. These alumni return whenever possible to set examples for younger members, providing our team with a tremendous range of experience to utilize. The organizational culture of MARS lends itself to a very close-knit, family-like atmosphere. Since the team is comprised of two rival high schools as well as many home school students, the team cannot commit to the organizational culture of any one of its components. As such, MARS has developed its own unique culture. Teammates not only interact at MARS functions, but in non-

FIRST related activities. Due to this bond, when competition time rolls around, MARS naturally transforms into an extremely focused, unified group that is a force to be reckoned with at any competition.

Facilities - MARS has access to extensive facilities to aid them with their mission. West Virginia University graciously provides access to rooms, labs, computers, and workshops. The Monongalia County Board of education provides an entire building for use as a full-sized practice field. This practice facility has benefited not only MARS but many other FRC and FLL teams from the surrounding area, as MARS opens the field to nearby teams during the competition season.

Team Structure – MARS is organized into multiple interweaving sub-teams which work to allocate tasks for more efficient and structured projects. The most responsibility and leadership is naturally bestowed on those who have been on the team longer. Each sub-team has a leader who serves as a sub-team access point and organizes their team’s projects. The main sub-teams are Mechanical (including Manufacturing, Design, and Electrical), Programming, and Outreach/Public Relations. More about each sub-team can be found in section 3.4 on page 14.

Team Image – MARS maintains a cohesive image throughout the community and within FIRST competitions. At all outreach and competitive events, students wear the standard team logo t-shirt, which has become widely recognized in both West Virginia and at FIRST events. On the third day of regional competitions, MARS wears standard white dress shirts with black bottoms and a red “MARS tie.” This year, these uniforms will be fitted with MARS patches bearing the team logo, to maintain uniformity throughout competition.

7.1.2 Weaknesses

Disconnect from History - The original members of MARS formed a set of core values that focused their efforts toward success. However, as students turn over from year to year, this culture can fade if not shared with the new generations. MARS has been taking steps in the past two years to re-establish the core values that were inherent in the original team.

Internal Communication Breakdown – As MARS has grown, sub-teams have become more separate and distinct from each other, as the increase in members allows for specialization. When this occurs, communications weaken between the sub-teams. MARS is combating this by holding regular team meetings where the students interact and connect.

At this point in time, none of these weaknesses have developed into significant issues. Both the students and mentors of the team have recognized these potential weaknesses and are taking steps to mitigate them before they have a dilatory effect on the team's competitiveness.

7.1.3 Opportunities

Rural Communities Inside West Virginia - MARS began with a mission to promote STEM education and increase participation in post-secondary schooling among West Virginia high school graduates. As the team became more ambitious, they developed the West Virginia Plan, now the MARS Plan, which has led to the rapid expansion of FIRST programs throughout the state. A high percentage of graduates in these FIRST programs continue to post-secondary educational venues.

Nationally & Internationally Underserved Areas- MARS knows that rural communities across the United States and around the world face similar problems as those in West Virginia. Given this, MARS, as of the 2013-2014 season, began identifying potential nations which would benefit from having FIRST programs. MARS was able to identify and successfully connect with India and Zimbabwe to develop FLL programs.

STEM Programs in Schools- MARS has always sought to increase the interest for STEM in youth. By starting STEM programs in schools, students have the opportunity to expand their knowledge of STEM fields at an early age so that they are more likely to consider a career in STEM. By utilizing already formed institutions, MARS can expand the opportunities available to students.

7.1.4 Threats

Loss of Core Partners and/or Sponsors- MARS has three core partners that sponsor a majority or their activities: WVU, NASA, and the Monongalia County Board of Education. These three partners provide a majority of the team's facilities, technical, and educational support. While all our sponsors are important to the team, loss of support by any one of these three would severely hamper the team's ability to operate at its current levels. However, since MARS has a variety of sponsors, one loss, while detrimental, would not end the program.

Macroeconomic Fluctuations - In addition to the facility, technical and educational need described above, MARS would be unable to function without the generous funding provided by our corporate sponsors and foundation grants. Unfortunately, fluctuations in the nation's overall economy can negatively affect the availability of funds available to the team.

Loss of Key Personnel- The team's adult mentors provide the ongoing organizational and logistical support that makes the very existence of MARS possible. While all our mentors are valuable to the team, MARS identified two key personnel vital to the team and its ongoing operation, Dr. Earl Scime, PhD. and Mr. Phil Tucker. During this past year, MARS lost Mr. Tucker. While Mr. Tucker's loss was a major hit for the team, due to the leadership of Dr. Scime and the willingness of other mentors to step in and shoulder new responsibilities, the team was able to carry on and move forward honoring Mr. Tucker's memory. Currently, Dr. Scime's expertise, experience, and contacts in the FIRST and business communities are irreplaceable to the team. Should MARS also face the loss of Dr. Scime, it is likely that the team would struggle to survive.

While the above threats are indeed real and must be considered, they are survivable. In the end, there is little MARS can do to mitigate the risks other than to maintain good stewardship of its resources, be watchful, and plan accordingly.

8. Fundraising Strategy

MARS offers fundraising opportunities at a variety of levels to sponsors and grant providers on an annual basis. Sponsoring MARS is a wonderful way to support STEM education throughout West Virginia, while also offering a variety of avenues for promotion for local businesses. 100% of all donations go towards registration fees, robot parts, outreach materials, and student lodging during travel to competitions. All donors are recognized in a variety of ways. Below is a list of the sponsorship levels and their associated benefits:

PLATINUM SPONSOR - \$5,000 and up

Listing in all team literature

Active logo link on the MARS website

Listing on the team T-shirt

Sponsor name on robot

Identification as a primary sponsor in formal team name

GOLD SPONSOR - \$1,000 - \$4,999

Listing in all literature

Active logo link on the MARS website

Listing on the team T-shirt

Sponsor name on robot

SILVER SPONSOR - \$250 - \$999

Listing in all literature

Logo on the MARS website

Listing on t-shirt

BRONZE SPONSOR - \$50 - \$249

Listing in all literature

Logo on the MARS website

8.1 2015-2016 Sponsor List

Below is a list of sponsors for the 2015 - 2016 season.

- Best Buy
- Pratt and Whitney Canada

- WVU Department of Physics and Astronomy
- NASA IV & V Robotics Alliance Project
- Monongalia County Board of Education
- United Way of Monongalia & Preston Counties
- WVU Benjamin M. Statler College of Engineering and Mineral Resources
- WV Space Grant Consortium
- Mylan Pharmaceuticals
- STEM Enterprises, Inc.
- EQT
- Corporate Social Responsibility Club of WVU College of Business & Economics
- WVU Department of Mathematics
- Cheat Lake Rotary
- Sextant Technical Services
- Teaming to Win
- Aurora Flight Sciences
- West Virginia High Tech Consortium Foundation
- Halliburton Energy Services
- KeyLogic
- TransTech Energy Conference
- MedExpress
- The Stick Co.
- M&S Consulting
- Wilson Works
- Compton Metals
- Tanner's Alley
- Industrial Maintenance Solutions
- Starbucks
- Tailpipes
- Animal Medical Center
- Commercial Land Development
- Mountaineer Boys and Girls Club

For more information on the team's sponsors, visit the website at www.marsfirst.org.

8.2 Funding Forecast

To achieve MARS' fundraising goals, MARS receives its funding through four primary avenues:

1. Contributions
2. Grants
3. Fundraising
4. Carryover

8.2.1 Contributions

Sponsorships and donations are the primary funding avenue for MARS. Without the generous support of corporate sponsors and private donors, achieving the MARS mission would be nearly impossible. For the 2015-2016 season, MARS projects \$19,500.00 through this avenue.

8.2.2 Grants

Grants are a vital funding source for MARS. Grants come from programs and organizational foundations. For the 2015-2016 season, the projected funding through this avenue amounts to \$62,000.00.

8.2.3 Fundraising

MARS fundraising activities comprise local and internet sales of LED light bulbs, LEGO MMS models and the new LEGO GPM models. For the 2015-2016 season, the projected funding through these avenues is expected to be \$1,000.00.

8.2.4 Carryover

MARS consistently maintains a positive cash flow. Financing a significant carryover is vital to ensuring a team rainy day fund, since MARS is primarily funded through grants and local donors. In the case of an economic downturn, MARS can still sustain themselves until new funding sources can be procured. We anticipate a carryover amount of \$22,000.00.

9. Financial Plan

MARS needs a funding growth of 5% per annum to achieve its goals and objectives. This growth is expected to be obtained through the retention and renewal of current grants, the continued support of their current sponsors and donors, as well as, the acquisition of new grants, sponsorships, and increased fundraising. At the current time, MARS intends to continue to operate on a cash basis and has no intention to use debt as an instrument to fund its activities. MARS believes that by pursuing this strategy it can continue to grow its operations while still maintaining a surplus without the acquisition of any long-term liabilities. Below are the financial statements for FY 2015 and FY 2016. The team's fiscal year runs from July 1st to June 30th.

9.1 Surplus or Deficit Statement

MARS operates on a cash basis by paying its bills at the time the expense is incurred. As can be seen on the statement below, MARS has no payroll expenses, as they have no paid personnel. All mentors and other support personnel are unpaid volunteers graciously donating their time free of charge. To date, MARS owns no major long-term assets. As such, there are no depreciation expenses recorded. Funding trickles in throughout the duration of the fiscal year, thus supplying funds to maintain a positive cash flow. Carryover from each year has been included in the listed funding amount. Since these statements were created with data up to January 1st, 2016, FY 2016 does not include outflows for additional promotional materials, travel expenses and robot construction, and any potential inflows for the Jan 1st-June 30th time frame.

Surplus and Deficit		
As of January 1st, 2016		
	FY 2015	FY 2016
	7/1-6/30	7/1-12/31
Funding	\$ 102,974.71	\$ 65,565.58
Expenses		
Payroll	\$ -	\$ -
Promotion	\$ 3,431.70	\$ 96.00
Depreciation	\$ -	\$ -
Operations	\$ 2,427.76	\$ 846.77
Equipment	\$ 4,848.58	\$ 1,674.63
Event Registration	\$ 14,000.00	\$ 18,000.00
STEM Support	\$ 13,621.78	\$ 20,084.76
Robot Construction	\$ 15,799.45	\$ 718.80
Travel	\$ 24,937.69	\$ 2,134.08
Total Operating Expenses	\$ 79,066.96	\$ 43,555.04
Surplus Before Interest and Taxes		
EBITDA	\$ 79,066.96	\$ 43,555.04
Interest Expense	\$ -	\$ -
Taxes Incurred	\$ -	\$ -
Net Surplus	\$ 23,907.75	\$ 22,010.54
Net Surplus/Funding %	23%	34%

9.2 Balance Sheet

The balance sheet provides a snapshot of the assets, liabilities, and owner's equity of MARS as of January 1st, 2016. Currently, MARS holds no liabilities or investments, so only the team's assets are included on the statement below.

Balance Sheet	
As of January 1, 2016	
	FY 2016
Assets	
<i>Current Assets</i>	
Cash	\$ 27,275.60
Other Current Assets	\$ -
Total Current Assets	\$ 27,275.60
<i>Long-term Assets</i>	
Long-term Assets	\$ -
Accumulated Depreciation	\$ -
Total Long-term Assets	\$ -
Total Assets	\$ 27,275.60
Liabilities and Capital	
<i>Current Liabilities</i>	
Current Borrowing	\$ -
Other Current Liabilities	\$ -
Subtotal Current Liabilities	\$ -
<i>Long-term Liabilities</i>	\$ -
Total Liabilities	\$ -
Paid-in Capital	\$ -
Accumulated Surplus/Deficit	\$ 5,265.06
Surplus/Deficit	\$ 22,010.54
Total Capital	\$ 27,275.60
Total Liabilities and Capital	\$ 27,275.60
Net Worth	\$ 27,275.60

9.3 Statement of Cash Flows

Since MARS is a 501 (c)(3) non-profit corporation, the team’s Statement of Cash Flows is incredibly similar to the team’s Surplus and Deficit Statement. MARS continuously operates on a cash basis and has no financing or investing initiatives.

Statement of Cash Flows	
	FY 2016
	7/1-12/31
Cash Received	
Operations	
Cash Funding	\$ 65,565.58
Subtotal Cash From Operations	\$ 65,565.58
Additional Cash Received Sales Tax, VAT, HST/GST Received	\$ -
New Current Borrowing	\$ -
New Other Liabilities (interest-free)	\$ -
New Long-term Liabilities	\$ -
Sales of Other Current Assets	\$ -
Sales of Long-term Assets	\$ -
New Investment Received	\$ -
Subtotal Cash Received	\$ 65,565.58
Expenditures	FY 2016
Expenditures from Operations	
Cash Spending	\$ 43,555.04
Subtotal Spent on Operations	\$ 43,555.04
Additional Cash Spent	\$ -
Sales Tax, VAT, HST/GST Paid Out	\$ -
Principal Repayment of Current Borrowing	\$ -
Other Liabilities Principal Repayment	\$ -
Long Term Liabilities Principal Repayment	\$ -
Purchase Other Current Assets	\$ -
Purchase Long-term Assets	\$ -
Dividends	\$ -
Subtotal Cash Spent	\$ 43,555.04
Net Cash Flow	\$ 22,010.54
Cash Balance	\$ 27,275.60