

**Describe the impact of the FIRST program on team participants with special emphasis on the current season and the preceding two to five years:**

- 100% of 2014 team graduates went into STEM majors, up 25% from previous years.
- 100+ team members/year develops strong FIRST family network. Alumni continue to volunteer & mentor FIRST teams.
- Increased opportunities for internships & summer programs in engineering/business (Princeton Plasma Physics Lab, Wharton at UPenn, Black Rock).
- "MidKnightU": Hands-on experience in electrical, mechanical & programming skills plus non-technical subjects. Shared with other teams & on YouTube and website.

**Describe the impact of the FIRST program on your community with special emphasis on the current season and the preceding two to five years:**

- Team reaches 4000+ people per year
- Increased robotics & engineering classes in school curriculum
- Directly started/mentored 4 Jr. FLL, 16 FLL, 3 FTC & 12 FRC teams
- FRC program showcased through 350+ tours of our build site, annual Open House, science fairs & other community demos.
- Host official FLL qualifier & unofficial scrimmages at every FIRST program level
- Teach classes in STEM subjects at local libraries & YWCA
- Partner with community groups & other non-profits to benefit the local area.

**Describe the team's innovative or creative method to spread the *FIRST* message:**

- MKI Global Initiative: Traveling to India, Switzerland, & South Africa to present FIRST programs and start new teams.
- Offer build site tours; public build site in community shopping center for past three years.
- Drive robots in Plainsboro Founder's Day Parade.
- "Robot Race" demos with younger children
- Partner with other community groups for events & showcases, increased visibility for all
- Jump Start Program: introducing FIRST programs to help form new teams

**Describe examples of how your team members act as role models and inspire other FIRST team members to emulate:**

- Responsibility: Team serves as mentors for all other levels of FIRST: Jr. FLL, FLL, FTC and FRC.
- Leadership: 2014 Championship Dean's List Winner.
- Cycle of Mentorship: FRC students serve as junior mentors & coaches for our rookie FTC team & FLL teams.
- Teaching Others: Prepare and deliver MidKnightU seminars. Share knowledge with other FIRST teams.
- Continuity: Adopt at least 1 FRC rookie team/year and assist throughout team's lifespan.

**Describe the team's initiatives to help start or form other FRC teams:**

- MidKnight U classes posted online as a reference tool for all FRC teams, aimed towards rookie team support.
- Offer free registration & practice robots to rookie and pre-rookie teams at our off-season event.
- JumpStart Program & MKI Global Initiative presentations to groups interested in forming a team
- Coach future FRC rookies in our best practices & share build resources
- Adopt newly-formed FRC teams throughout their first build season, open our build site to them & collaborate on ideas

**Describe the team's initiatives to help start or form other *FIRST* teams (including Jr. FLL, FLL, & FTC):**

- JumpStart Program: Presentations to schools & community groups introducing all FIRST programs, offering support throughout their first season.
- MKI Global Initiative: FIRST education & assistance forming teams in India, Switzerland & South Africa.
- CONNECT: Find access to a team for any local K-12 student interested in FIRST.
- Annual Open House: Showcase FIRST programs; access to Jump Start Program.
- 2 Jr.FLL, 4 FLL (1 in India) and 1 FTC team directly started by our team this season.

**Describe the team's initiatives on assisting other *FIRST* teams (including Jr. FLL, FLL, FTC & FRC) with progressing through the *FIRST* program:**

- Developed JumpStart presentation on how to advance a pre-existing team to the next level. Continue to offer mentoring & support during transition.
- Provide student mentors to community teams, assist with "next steps."
- Offer MidKnightU presentations, tool certification, scrimmages, and outreach to other FTC & FRC teams to foster their sustainability
- Recruited FLL students into rookie FTC team MidKnight Magic, encourage members to progress into FRC.

**Describe how your team works with other *FIRST* teams to serve as mentors to younger or less experienced *FIRST* teams (includes Jr. FLL, FLL, FTC & FRC teams):**

- MidKnight Inventor students mentor each of our Jr. FLL, FLL & FTC teams
- Host annual FLL scrimmage, selected to host official NJ State Qualifier for 2014-15 season.
- Organize FTC scrimmage (Cookie Carnage) in partnership with FTC 6037.
- Girl Scout Fair: Shared resources & robot designs w/ FTC and FLL teams.
- Weekly Skype conference with MKI Global Initiative team "Sherlock Ohms" from Hyderabad, India.
- Share resources, mentor & support 4 Jr. FLL, 16 FLL, 3 FTC and 12 FRC teams across our region.

**Describe your Corporate/University Sponsors:**

- Corporate Sponsors: Bloomberg, Goldman Sachs, Bristol Myers Squibb, United Therapeutics, Merrill Lynch.
- STEM/Research Sponsors: Princeton Plasma Physics Lab (PPPL), SRI International.
- University Sponsors: Princeton University, Rutgers University, Stevens Institute of Technology.
- Sponsors give money, mentors, or in-kind resources to the team, and have chosen 1923 students as interns.
- MidKnight Inventors give back with outreach, demos, and sponsor recognition.

**Describe the strength of your partnership with your sponsors with special emphasis on the 2013/2014 year and the preceding two to five years:**

- Sponsor Recognition: stacking tiers of benefits, VIP invitations to 1923's events.
- United Therapeutics uses MidKnightU & Jump Start workshops to educate their sponsored teams. Reaches an additional 28 FLL, 11 FTC & 25 FRC teams.
- 1923 presents & demonstrates at PPPL STEM events throughout the year. PPPL donates generators for FRC off-season & provides internship opportunities for 1923.
- Universities support & accommodate team alumni/mentors through course credit for FIRST.

**Describe how your team would explain what *FIRST* is to someone who has never heard of it:**

FIRST is a unique family of robotics programs that helps students tap into interests they never knew they had. Engaging students side-by-side with mentors to tackle real-world challenges, FIRST creates an environment where participants become universal problem solvers. Students work with industry professionals to hone their skills, and realize that it's possible to 'go pro' with the talents they're passionate about. FIRST strives to create a culture that encourages rather than discourages STEM.

**Briefly describe other matters of interest to the *FIRST* Judges, if any:**

In past years, the team had to use donated retail space as a temporary build site. While this gave the team wonderful visibility, with over 350 tours of the site annually during build season, it was difficult for the team to remain fully active beyond the competition season without a place to work. As a part of the strengthening relationship with the school district, construction on a permanent, in-school space has begun, for a Summer 2015 completion.

## **Team 1923: The MidKnight Inventors - 2015 Chairman's Essay**

"Culture does not change because we desire to change it. Culture changes when the organization is transformed; the culture reflects the realities of people working together every day." -Frances Hesselbein

Team 1923: The MidKnight Inventors from the West Windsor Plainsboro, NJ school district are proud of the changes made in their community. The mission of our team is to create a culture where students want to become leaders in the field of science, technology, engineering, and math (STEM). As Team 1923 celebrates its 10th anniversary, we reaffirm our dedication to spread the mission of FIRST to our team members, school district, local, and global communities.

Founded in the fall of 2005, Team 1923 had 4 student members & worked in a parent's garage with little recognition from school or community. Today The MidKnight Inventors have grown to a membership of more than 100 with strong school & community support! The support we have gained is a direct result of the team's effort to change the perception of STEM education. Within our team, we recognize the importance of STEM education for the future: 100% of our graduates in 2014 enrolled in universities and chose to pursue STEM majors, an increase of 25% from previous years. The team is proud to have brought FIRST programs to all 10 schools in our district. Locally, we have started & mentored FIRST teams at every level including 4 Jr. FLL, 16 FLL, 3 FTC, and 12 FRC teams and this year we are proud to include our first international team in India.

Our team goal is to reach as many students as possible both locally & globally to help us start at least 4-5 new FIRST teams each year. Our programs are a major team effort in order to give all students the opportunity to experience the joy of STEM learning through FIRST. We have introduced FIRST to potential coaches and mentors from our school and professional communities through our JumpStart program. JumpStart provides them with the necessary tools & information to start their own FIRST rookie teams. The MKI Global Initiative is a workshop that we take to schools in Europe & Asia that do not have FIRST programs. We work closely with interested teachers and students to introduce and establish FIRST teams. The India STEM Foundation and the GeoMap Society have helped us to identify schools for us to visit and work with. Through JumpStart and MKI Global Initiative, we have reached 46 schools in 4 countries & more than 2000 students & teachers.

Rounding out our outreach family of programs is 1923 CONNECT, a program committed to finding any student/teacher/parent, anywhere, a FIRST team. Anyone interested in joining a team can contact us via email, our Google phone number or through our social media and we will apply our resources to find them a team. We have a data bank from our outreach events of local families who are interested in robotics, as well as Jr. FLL and FLL coaches to help match the students with a team.

Once a team is formed, the MidKnight Inventors follow up by helping with new team registrations both financially & with the process, providing student mentors or mentoring our global teams through Skype, help with fundraising, outreach, and of course, technical expertise. Team 1923 has a family of "MidKnight" teams which are directly mentored & administrated by The MidKnight Inventors: The MidKnight Minis (Jr. FLL), MidKnight Ninjango (Jr. FLL), The MidKnight Minions (FLL), The MidKnight Minions Too (FLL), The Mystical Minions (FLL), The MidKnight Magic (FTC), and our MKI Global Initiative FLL team, The Sherlock Ohms.

Team 1923 has also been key in changing the STEM curriculum in our school district. Our school district now recognizes us as a co-curricular activity, in line with the school's vision and mission. As a result of our efforts, robotics/programming classes & instructors have been added at both high schools (Intro to Programming I, Advanced Topics in Computer Science, Artificial Intelligence & Robotics Honors). Our STEM educational efforts, however, do not stop with the formal classroom.

Student leaders and mentors have developed MidKnightU, a series of interactive, hands-on workshops in CAD, programming, electrical, mechanical, and business and media skills. All FRC team members attend the classes during the fall to prepare for the new season. Our workshops are also available through our YouTube channel & website in order to help other teams. We also offer a Tool Certification program for teams to learn the basic use & safety rules of power tools. Team members & mentors tool certified 130 MidKnight Inventors and members from other FRC & FTC teams just this year! During the winter and spring months, MidKnight Inventors can be found teaching Mindstorm classes at the library and in the summer months at the YWCA.

The team has developed a solid business plan to support the large growth of FIRST in our community and sustain all of our programs. As part of the plan, the team hosts many FIRST community events including an annual FLL scrimmage for 18 local FLL teams, an official State FLL qualifier known as Minion Mayhem for 24 teams & an FRC off-season event aptly named MidKnight Mayhem that attracts 34 teams from 6 East coast states. At the FTC level we co-host with the WAGS Girl Scouts an official FTC meet called Cookie Carnage & this year we added FTC to our FRC off-season event MidKnight Mayhem III. We also place focus on bringing the FIRST Family of Programs together to learn from each other at our annual Open House: a large public showcase which features FRC robots as well as the MidKnight Family teams.

Our outreach efforts are in line with our mission to change the way society views STEM. We make outreach events fun & creative, inspiring students to actively seek participation. At school demonstrations, science fairs & camps, the kids "race" against our robots & catch balls or Frisbees shot from our robots. The local Founders Day finds the team marching in the parade and teaching visitors how to drive and operate our robots. Through events such as these, we reach over 4000 people per year from our community with a combined total of more than 6000 outreach hours. Additionally, 1923 reaches another 8000 people through social and news media platforms, with over 1400 Twitter and 500 Facebook followers. Our YouTube videos and website add more than 2000 views to our numbers. We love talking with other FIRST teams around the world and sharing news about FIRST & Team 1923!

The MidKnight Inventors have clearly made a large impact in our community & the key to our success has been our corporate & community sponsors. This year alone we have worked to triple our corporate & community support. We thank our sponsors with a tiered incentive system & with highlights in the sponsor booklets that we produce for our hosted events. We strengthen our sponsor relationships with VIP tours of our build site & pit, invitations to all of our events, and quarterly updates or newsletters. Some of our sponsors have been with the team during its entire 10-year history. One such sponsor is the Princeton Plasma Physics Lab (PPPL), which has provided mentors & in-kind support to the team. In return, 1923 supports PPPL by developing robotics workshops for their Boy and Girl Scout STEM Fairs & exhibiting our FIRST team at their Young Women's Exhibition, an event that encourages high school age women to pursue STEM careers. One of our newest partners, United Therapeutics (UTC), awarded grants to both our FRC and FTC teams. Team 1923 shared our MidKnightU workshops with UTC who in turn shared the knowledge with an additional 25 FLL, 11 FTC and 24 FRC teams. Team 1923 also partners with local groups to give back to the community that supports us. This year we have again supported the Plainsboro food pantry and the Trenton Soup Kitchen with over 1200 lbs donated food and highlighted Attitudes in Reverse (suicide prevention) and the Municipal Alliance for Drug & Alcohol Abuse at our FIRST hosted events.

At the core of 1923's sustainability is the group of dedicated mentors & volunteers, many of who have been with the team between 5-10 years. They come from many disciplines including engineering & other scientific areas as well as marketing, communications, business & finance. Our community has many outstanding universities & our team has worked with Princeton, Rutgers, Drexel, Stevens and IEEE to add mentors in additional STEM areas. This year alone, we have added mentors from Princeton University in areas of CAD, Mechanical Engineering & Civil Engineering to our returning mentors from Rutgers, PPPL, Cognizant Tech. Solutions, and Johnson & Johnson.

Our goals for the future are to continue to expand our MidKnight family by enhancing our sustainability and enabling more FIRST growth. In past years, the team had to use donated retail space as a temporary build site. While this gave the team wonderful visibility with over 350 tours of the site annually during build season, it was difficult for the team to remain fully active beyond the competition season without a place to work. As a result of our strengthened relationship with our school district and in recognition of the importance of our team and FIRST to STEM education, we were granted team space in one of our elementary schools as a build site and "home". Furthermore, this is a only a temporary home while our permanent home in our founding high school is being constructed for a summer 2015 completion, fulfilling one of our major goals. Now that 1923 has a permanent site, our largest goal & fondest hope is to have a year-round practice space plus a machine shop hosted by our MidKnight family for any team at any level to use.

We are passionate and inspired to change our STEM culture locally & globally. Team 1923 has been proud to embrace the FIRST mission for the past ten years and we will strive to reach even greater heights for another ten years and beyond!