



2015 Chairman's Award

The central graphic features a 3D globe with a blue and yellow color scheme, overlaid with a stylized robot head. The word "IMPACT" is written across the globe in a large, bold, italicized font, with "IMP" in yellow and "ACT" in blue. Surrounding the globe are several terms in a light gray, italicized font: "Problem Solvers", "Futures", "Mentors", "Innovators", "Hope", "Fabricators", "Bridges", "Relationships", "Leaders", and "Competitors".

IMPACT

 **FIRST Team 2137- TORC**

WE BUILD MORE THAN ROBOTS!



Table of Contents

Chairman’s Award Executive Summary	2
Team 2137 – TORC Mission Statement	2
Chairman’s Award Short Essays	3
Describe the impact of the <i>FIRST</i> program on team participants	3
Describe the impact of the <i>FIRST</i> program on your community	3
Describe the team’s innovative or creative method to spread the <i>FIRST</i> message	4
Describe examples of how your team members act as role models and inspire other <i>FIRST</i> team members to emulate	4
Describe the team’s initiatives to help start or form other FRC teams	4
Describe the team’s initiatives to help start or form other <i>FIRST</i> teams	5
Describe the team’s initiatives on assisting other <i>FIRST</i> teams with progressing through the <i>FIRST</i> program	5
Describe how your team works with other <i>FIRST</i> teams to serve as mentors to younger or less experienced <i>FIRST</i> teams	5
Describe your Corporate/University Sponsors	6
Describe the strength of your partnership with your sponsors	6
Describe how your team would explain what <i>FIRST</i> is to someone who has never heard of it	7
Briefly describe other matters of interest to the <i>FIRST</i> Judges, if any	7
Chairman’s Award Large Essay	8
Students.....	8
Philosophy, Leadership, Skills	8
Community	9
Students.....	9
Oxford <i>FIRST</i> Family	9
GO PRO	9
Sponsors, Volunteers, Businesses	10
Brick It Up	10
Competitors	10
Gracious Professionalism	10
Week 0 Practice Event	11
Mentoring	11



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2015 Chairman’s Award
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Executive Summary

Team Number: 2137

Regional Selection: Michigan

Team Name: TORC

Corporate/University Sponsors:

FCA Foundation, NASA, Oxford Community Schools, Michigan Department of Education, Kawasaki Robotics (USA), DÜRR Systems, Dynamic Robotic Solutions, Kettering University, Patti Engineering, CEC Controls Co., Faurecia, Dessault Systemes (SOLIDWORKS), InaComp TSG, ORBIS

Team 2137 - TORC Mission Statement

Use the education, programs and opportunities provided through Oxford Community Schools and *FIRST* to impact OCS (students, teachers, administration), the community (citizens, businesses, organizations, government), and sponsors (local, county, state, foreign) in a manner that inspires greater respect for and an interest in pursuing careers in science, technology, engineering and math, while developing team members (students, mentors) as innovators, problem solvers and leaders.



Chairman's Award Short Essays

Describe the impact of the *FIRST* program on team participants

"We Build" problem solvers, innovators, leaders & futures.

- Gain Engineering, Fabrication, Presentation, Business, Media & Leadership Skills
- Global Experience: 15 Chinese Exchange Members, Since 2011
- Training to Build Self Confidence
 - Fabrication
 - Programming
 - CAD
 - Resumes, Interviews, Applications, Scholarships
- Alumni Report:
 - Scholarships: \$1M + \$127,500 *FIRST*
 - Internships: 50%
 - College Enrollment: 100%
 - Pursuing Engineering Degrees: 84%
 - Inspired to Start Businesses: 2 Mentors & 1 Student

Describe the impact of the *FIRST* program on your community

"We Build" relationships & impact our community through education & charity events to change the culture.

- Grew the OHS Academy of Engineering & Technology to 15 STEM courses by implementing 3 Pre-engineering courses at OMS to inspire students earlier
- Partnered with Brick It Up to create/teach basic design/programming classes in/around Oakland County using LEGO's
- Recorded ½ hour TORC FRC segment with OCTV to educate community
- Demonstrated robot at 20 parades/events
- Served over 15 Charities



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

TORC spreads the message of *FIRST* by inspiring others to join us.

- Presentations
 - MI. State PLTW/STEM Conference: 500 educators
 - Gov. Snyder’s Call to Action STEM Seminar: 500 educators & politicians
 - MI. School Expo at Oakland Mall: Channel 4 News, Detroit, 2000+ people
- GO PRO: Record Pop culture endorsements for STEM careers & *FIRST*
 - Detroit Lions
 - SRT Racing
 - Detroit Piston’s Flight Crew
 - Manchester United Soccer
- Team trailer is a mobile billboard and features team sponsors and robots

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

“We Build” leaders who model and inspire safety, spirit & Gracious Professionalism.

- Sharing TORC’s 4 level certification system for safe machine use
- Demonstrating team unity through TORC branding
- Displaying team spirit actively at competition
- Assisting competitors on and off the field
- Sustaining *FIRST* in our district via TORC’s “mentor cycle”
- Implementing leadership & decision making through student captains
- Ensuring maximum student involvement
- Creating relationships among *FIRST* teams

Describe the team’s initiatives to help start or form other FRC teams

As featured speakers, we inspire educators, government officials and businesses, statewide, to help form FRC teams.

- MI. State PLTW/STEM Conference, Lansing: 500 educators
- Gov. Snyder’s Call to Action STEM Seminar, Henry Ford Museum: 500 educators & politicians
- MI. School Expo: Channel 4 News: 2000+ people
- Proposal/petition seeking funds for FRC teams presented to Senator Marleau & State Representative Jacobsen leading to Michigan Department of Education Grants in 2014: 80 new teams formed



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

TORC created the Oxford *FIRST* Family, ensuring *FIRST* opportunities in all 7 of our schools. Since 2011, TORC collaborated to:

- Expose 2000 students to *FIRST*
- Donate \$3000 to teams
- Build FLL practice tables, provide NXT kits, laptops, and access to machinery
- Secure sponsors
- Provide 45 Student Judges: 3 annual JrFLL Expos for 51 teams
- Recruit and train adult mentors for JrFLL, FLL & FTC teams
- Mentor 20 JrFLL, 10 FLL & host 1 FTC team
- Present Engineering Workshops & Robot Demos in 7 schools

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

Members of Team 2137:

- Serve as Mentors & Judges for JrFLL, FLL & FTC teams & events
- Established a feeder system for *FIRST* in our district, Oxford *FIRST* Family
- Host annual Week 0 Practice Event for FRC teams: Help teams complete robot
- Long-distance mentor rookie teams
- Provide aid:
 - Donation of thousands of dollars in materials
 - Assistance in rewiring and resizing robots to pass inspection
 - Pre-season strategy discussion with multiple teams
- Conduct scholarship workshops for FRC teams

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).

By partnering with other *FIRST* teams, "We Build" mentors.

Since 2012:

- Co-hosted 3 Week 0 Events to help younger teams complete their robots with FRC 302
- Present TORC's machine certification system with Kettering University *FIRST* Center
- Share organization documents & sponsorship training with FRC 4776 & 302
- Met with superintendents & principals from Howell & Corunna with FRC 4776 & 5084 to promote STEM coursework & gain school support
- Assisted FRC 3536 by supplying judges at 2 FTC events



Describe your Corporate/University Sponsors

TORC's Sponsors are individuals and organizations who have partnered with us to reach the goal of achieving the *FIRST* mission. They assist us with funds, materials, and services. More importantly, they extend to us their name and reputation. We have 88 Sponsorship sources from 2010–current:

• Automotive	\$88,000+
• School District	\$29,000+
• Universities	\$20,000+
• Foreign	\$10,000+
• Small Businesses	\$10,500+
• Government	\$17,000+
• Alumni/Family	\$5,200+
• Computer	\$12,000+
• Retail	\$1,500+

Describe the strength of your partnership with your sponsors

TORC and its sponsors have a strong partnership. Together, “We Build” futures as we change the culture.

Since 2011:

- Sponsors
 - Continued support for 4+ years
 - Provided 6 Student Recognition Awards
 - Awarded 10 scholarships
 - Supplied 6 internships
 - Painted 2 TORC robots
- TORC
 - Hosted 3 Sponsor Appreciation BBQ's
 - Created the team newsletter, IMPACT to provide regular updates
 - Provided tours of our facility and robot demo's
 - Toured sponsor facilities and gave presentations
 - Supported sponsor events



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2015 Chairman's Award
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Describe how your team would explain what *FIRST* is to someone who has never heard of it

Whether it's a student led PowerPoint presentation, guided tours, or one on one conversation, TORC students are proficient at explaining *FIRST*.

We:

- Explain *FIRST*'s history and mission
- Explain how *FIRST* prepares students for STEM based careers
- Describe the future benefits of being on a *FIRST* team
- Share our "We Build" philosophy
- Include video/photos of our students gaining *FIRST* experience
- Show previous game release video
- Play video of past competition matches
- Demonstrate robot

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

- TORC Student Diversity: special education, international, virtual, homeschooled & traditional
- TORC Membership: application, resume, interview process to develop soft skills in students
- TORC Safety: machine certification program to ensure safety & develop skills
- TORC Scouting: app developed as innovative method to use texting to collect & sort data at competition
- TORC Robot:
 - Qualified for World Competition 5 out of 8 years
 - Received 6 robot focused awards over 8 years for quality & design



Chairman’s Award Large Essay

FIRST Team 2137 TORC is proud to be part of the global *FIRST* organization that works toward a common goal, “spread the message of *FIRST*...change the culture.” This goal resonates within TORC and as a result we have created a system in which “We Build” more than robots: leaders, innovators, problem-solvers, futures and more. We achieve this by engaging students, community and competitors.

STUDENTS

TORC’s philosophy seeks to engage members through maximum student involvement. The majority of team decisions are made by students. TORC seeks all members’ input regardless of experience to allow the team to grow as a whole. Strategy, robot design and build, and team projects are also predominantly student implemented. Since adopting this philosophy in late 2011, our membership grew from 15 to 40 students and from 8 to 26 mentors.

Our mentors (engineers, teachers and family members) select student captains who will lead various groups within the team org chart: robot design and build, competition and communication/logistics. The mentors and student captains ensure adherence to timelines, engineering processes and facilitate group meetings. The captains mentor assistant captains in order to ensure leadership sustainability. Since 2013, TORC has developed 22 student captains and 11 assistant captains. Our adult mentors are guided by an “eyes in, hands out” approach to build self-confident leaders.

The team is driven to ensure that members gain long term benefits from their experiences ranging from technical to soft skills. Our team offers various forms of training to enrich each student’s skill set. In fabrication and CAD they become familiar with machinery such as TIG welders and lathes. Students are able to prepare for programming by learning LabVIEW and C++. Through hands on experience, we build innovators and problem solvers as students gain knowledge in the areas required for the construction of a robot.

Students are also given exposure to the communication skills required to secure scholarships, attain sponsorships, and spread the message of *FIRST*. For example, members have received guidance concerning resumes, scholarship applications, interviewing skills and public speaking. Additionally, by creating our team newsletter IMPACT, PowerPoint presentations, team brochures and videos, students develop written, media and oral presentation skills.



Using these skills, students invited a Michigan State Senator and Representative to observe TORC students in action while sharing information about *FIRST*. TORC presented a proposal to provide each Michigan FRC team with \$5000. At the state championship in 2012 we gathered 400 signatures in support of this request. Along with other teams' efforts, TORC impacted our government, leading to the Michigan Department of Education offering \$3M in grants to *FIRST* teams in 2014. The next year, TORC was invited to speak at Governor Snyder's Call to Action STEM Seminar and the Michigan State PLTW/STEM Conference, giving us the ability to inspire hundreds of educators at all levels. The following comments were recorded in the post presentation survey: "Had a really good grasp and understanding of the philosophy of *FIRST*, why it was started and the expected outcomes for students who participate in the competition" and "Great job and inspired me to get a team started in my school."

COMMUNITY

TORC exceeds being strictly robot focused by engaging with the community and serving as a role model. We interact with younger students, sponsors, charities and businesses by building relationships. TORC reaches out to schools by working with kindergarten through eighth grade students offering robot demonstrations, workshops and engineering classes in 6 schools, reaching over 3,000 students with the goal of sparking an interest in STEM. Over the past 5 years, our efforts have increased interest in STEM and led Oxford Schools to implement 3 pre-engineering classes at the middle school and 15 new STEM-related courses at the high school. More than 1,800 students are enrolled in STEM courses a year, with over 40% being female.

In 2012, TORC established the Oxford *FIRST* Family, as a feeder system for *FIRST*. By fostering closer bonds with our JrFLL, FLL and FTC teams, we hope to encourage a long lasting excitement for STEM and facilitate sustainability of *FIRST* in our district. Teams are now present in all 7 of our district schools and the number of JrFLL and FLL teams quadrupled.

TORC's unique "GO PRO" initiative, created in 2012, conveys that 100% of all *FIRST* participants can turn their experience with *FIRST* into a career. "GO PRO" was recognized by Dean Kamen and Walt Havenstein as an innovative way to spread the message of *FIRST*. With assistance from pop culture figures affiliated with the Detroit Lions, SRT Racing, Manchester United and others, we hope to change the culture toward one that participation in *FIRST* inspires students to consider careers in avenues other than sports and entertainment like STEM careers. We expanded the initiative by creating a "GO PRO" mascot and t-shirts to kick start STEM related dialogue. This year we will be sharing "GO PRO" in the elementary schools to excite them at an early age about the opportunities available to them as we help build their future.



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Deepening the relationship with our sponsors is critical and therefore we have hosted sponsor appreciation barbeques and luncheons where the students provide a presentation and robot demonstration. As a result, Chrysler requested to conduct an appreciation event with the teams they sponsor. They arranged for hundreds of the teams' students to participate in a small competition and provide demonstrations for their employees. Six TORC students have benefited by receiving access to internships with several of our sponsors. For example, a third-year TORC member interned at Relume Technologies. Alumni TORC members have interned at Valeo and Faurecia, as well.

Another way TORC engages with the community is through volunteer service. TORC regularly takes part in No Haz Days where we have collected and recycled hazardous materials and over 5000 pounds of electronics and metal. Historically, we not only serve the local community but extend our service to broader areas. Members have collected thousands of greeting cards which are recycled and sold to benefit St. Jude's Ranch. One of our most meaningful causes involved raising awareness about child abuse. One of our sponsors faced tragedy when her granddaughter, Lily, died as a result of child abuse. We supported the campaign, Justice for Lily, by distributing flyers to raise awareness and support the grieving family.

This year, we helped start a STEM focused business, Brick It Up. TORC secured media coverage, met with Brick It Up and Kettering University to access programming curriculum, and established relationships within Oxford Schools for Brick It Up to offer after school classes. TORC members have further developed the curriculum used at Brick It Up's interactive learning center. As a result, Brick It Up has hired 3 TORC members who have introduced more than 1,500 students to robotics, engineering and animation-based programs in less than a year. Combining STEM related activities and service, we strive to strengthen current relationships and build new ones.

COMPETITORS

TORC embraces competitors by displaying gracious professionalism. TORC is more than willing to foster the growth of other teams and have therefore been approached by competitors for assistance. Competition is what leads to advancements and allows for individuals' ingenuity to be challenged and strengthened. Our team has dedicated hundreds of hours to assist in the formation and growth of many rookie and veteran teams. During build season, TORC has assisted teams such as: 5084, 4776, 3536, 5155, and 302 with the fabrication of robot components, refinement of programming, access to machinery, and donation of supplies.



*FIRST Team 2137 – TORC
2015 Chairman’s Award
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Since 2013, we have hosted annual Week Zero practice events just prior to bag day, in which we give each team a pit to work from, access to our machine shop, and have a field set up for testing and mock matches. Since the start of the Week Zero practice events, TORC helped ten rookie teams complete their robot. Last year alone, of the 8 teams who attended the event, they went on to earn 13 awards with 6 ranking in the top 5 and 1 team winning their event. In addition, 2 were state qualifiers and 1 qualified for the World Championship and placed 4th on its field.

In 2014, we put a strong emphasis on assisting rookie Team 5155. On multiple Sundays, members of TORC drove a few hours to mentor them with programming, electronic and pneumatic issues. We also assist teams at competitions. We enabled teams to compete in 2013 and 2014 by helping them pass inspection. We helped Team 2676 rewire their robot and Team 5155 to downsize the pick-up mechanism of their robot.

During the off season in 2014, we assisted Team 4776 by sharing all of our organizational material and team documents, giving them the tools to reformat their team. In addition, we visited their local businesses with them to help them obtain sponsorships. As a result, they were able to purchase a team trailer, have been recognized in their local newspaper and are now assisting other teams. Whether in season or during off season, on the field or off the field, TORC supports other teams, while simultaneously enhancing our experiences and abilities.

Overall, TORC inspires people young and old by offering them exposure to activities that incorporate the fields of science, technology, engineering and math. Building relationships with those on our team, in our community and within *FIRST*, we have helped form other teams, become a role model and broadened student knowledge and skills. We continue to implement our “We Build” philosophy by instilling skills into each team member that will not only help spread the message of *FIRST* but will benefit them in their future.