



FIRST™

**For Inspiration and Recognition of Science and Technology
Celebrating 11 Years of Culture-Changing Success**

The FIRST Robotics Competition has succeeded not only in inspiring and recognizing thousands of our nation's youth through the design, production, troubleshooting and "courteous competition" of mobile robotic machinery, but has also created a demand among a growing number of students and teachers for more math, science, technology—and Fluid Power!

Each team has an average of 25 students per team, with 925 teams anticipated in 2004, that's over 23,000 high school students involved in FIRST this year alone. Approximately 70% of FIRST Robotics teams utilize pneumatics in their robot design, in any given year. This translates to over 16,000 high school students that will be exposed to Fluid Power, with the majority having hands-on pneumatics experience, due to the fact that several students participate on a team for all 4 years in various capacities.

Of course this doesn't include the thousands of teachers, instructors and mentors, many of them Fluid Power customers, (mentors are potential users of fluid power as well) which will also be exposed to the technology through involvement with FIRST teams.

The enthusiasm to compete in the FIRST Robotics Competition has translated into broader activities than the roughly three-month competition period itself. Now, year-round activities, including extra classroom instruction in pneumatics, are being arranged. Off-season "invitational" events are springing up all over the country,

with teams partnering up to get a jump on learning prior to the competition kickoff each January.

Bob Hammond, Director of the FIRST Robotics Competition, in an interview said, "Our customers are high school students and teachers, and our mission is to expose them to the possibilities that science and engineering can hold for their futures." Mr. Hammond is one of 30 people employed by the nonprofit FIRST, founded by Dean Kamen, innovator and inventor of the Segway Human Transporter and champion of science and engineering. Headquartered in Manchester, NH, FIRST has seen the number of Robotics Competition teams quadruple in the last several years with the same staff size.

The FIRST staff has just one inventory turn per year--which processes over 80 tons of material to get the kit of parts out to all the teams for the regional kickoff events. Mr. Hammond's engineering staff works from May to October, designing the new "game," soliciting donations, and securing parts. From an outsider's perspective, the whole operation seems like a logistical nightmare, but the FIRST team make it look easy.

Over the last several years the Fluid Power industry has donated over \$2.4 million in components for the FIRST Pneumatics Parts Kit through joint industry efforts. Some of these donors include: (see sidebar, right)

In addition, led by the Fluid Power Education Foundation, several fluid power distributors, manufacturers and individuals have donated countless thousands of dollars in donations, products and time. They are too numerous to list, however, their generosity has been very much appreciated.

The Fluid Power industry, led by a task force comprised of pneumatics industry leaders, has initiated several joint programs in support of the FIRST Robotics Competition. For 2004, a pneumatic resources website (www.pneumaticsFIRST.org) has been developed specifically to match FIRST teams' needs with available pneumatic industry resources. Efforts are also underway to connect more industry representatives with FIRST teams by offering VIP invitations to the 2004 regional competitions (see sidebar).

This joint industry task force, guided by FPEF, NFPA, FPDA and FPS, is comprised

of the following:

Don Caputo, Northeast Regional Manager, Industrial Hydraulics Group
Kathy DeMarco, Executive Director, Fluid Power Distributors Association
Fred Hord, President, HPE Automation
Paul Gant, Clippard Instrument Laboratory
John Groot, President, Fluid Power Educational Foundation
Mike Joyce, Advance Industrial Products
Bill Kokum, Director of Marketing, Bimba Manufacturing Corporation
Shelley Morgan, Training Manager, Eaton Corporation
John Naghosian, Education Coordinator, Fluid Power Educational Foundation
Paul Prass, Executive Director, Fluid Power Society
Ralph Rivera, Group President, Fluid Power Products, Gates Corporation
Don Spradlin, Chairman / CEO, PIAB Vacuum Products
Carrie Tatman Schwartz, Fluid Power Educational Foundation
Terry Weeber, Director of Marketing, Communications, Norgren
Linda Western, Executive Director, National Fluid Power Association

"Only one partnership has caused a fundamental change in both our institution and the young people it serves. FIRST has inspired and revitalized the Wilson teachers. The effect on our young people has been a profound one. Never in my long experience as a high school principal have students been so totally absorbed in a project."

Suzanne Johnston, Principal
 Joseph C. Wilson High School
 Rochester NY

The FIRST Robotics Competition: Redefining "Winning"

The FIRST Robotics Competition challenges teams of high school students and their mentors to master a specific set of tasks (the GAME) in a six-week timeframe, using a standard "kit of parts" and a common set of rules. The game is unveiled to all on January 10th, which means no one knows the task at hand until that day. The teams then design and construct robots and enter them in a series of regional competitions, culminating

in a championship not unlike a major sporting event in terms of venue size (and decibel level). The competitions are high-tech, high-energy spectator sporting events, the result of lots of focused brainstorming, real-world teamwork, dedicated mentoring, and demanding project timelines.

In 2004, the competition will reach high school students in Canada, Brazil, Great Britain, and almost every U.S. state. FIRST redefines winning for these students. Teams are rewarded for excellence in design, demonstrated team spirit, gracious professionalism and maturity, and ability to overcome obstacles. Scoring the most points is a secondary goal; winning means building partnerships that last.

Some Component **Providers** for the 2004 **FIRST Competition** are:





Colleges, universities, corporations, businesses, and individuals provide scholarships to FIRST participants. Engineers that are involved, experience renewed excitement in their profession through the competition. The companies they work for contribute to their communities in addition to creating their future workforce. The competition shows students that the technological fields hold many opportunities and that the basic concepts of science, math, engineering, and invention are exciting and interesting.

Growth of FIRST

From its beginning in 1992, with 28 teams in a New Hampshire high school gym, FIRST has grown exponentially and projects that the 2004 competition will involve more than 900 teams. FIRST's goal is 25% annual growth in the number of teams participating. (see graph at top, next page)

What Is It About FIRST?

It is very difficult to understand the excitement surrounding a FIRST Robotics competition unless you have actually experienced it for yourself. It is very different from a science fair or other

robotic design competitions. Although the pressure and excitement is intense, the rules and awards designed by FIRST make the event a "co-opetition," meaning players are motivated to know their competitors, make friends with them and even help them out.

"First isn't just about robots, it's about developing life skills. The partnership between academia, community and industry...will build future employees and future citizens."

Steve Sanghi, President and CEO
Microchip Technology

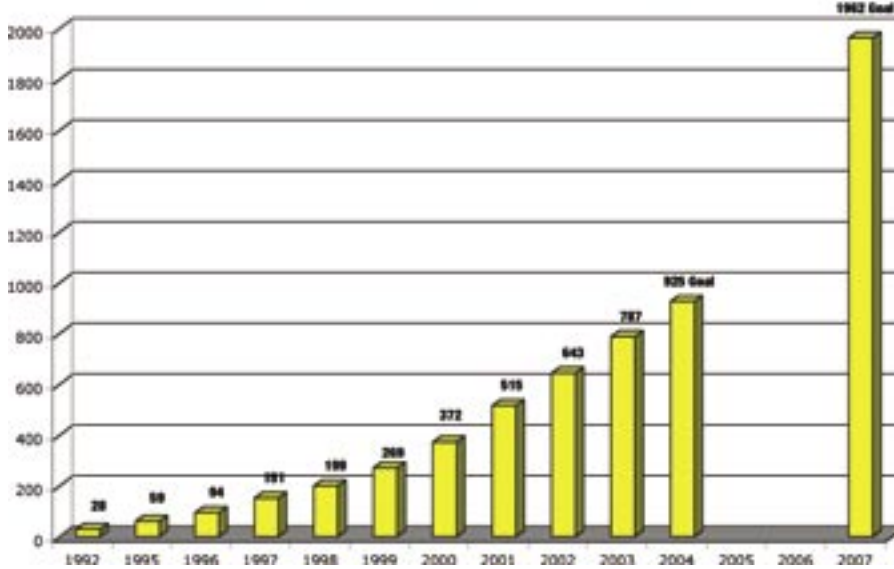
FIRST creates an environment of gracious professionalism. Because of this environment there's no booing or intentionally damaging another's robot. Also, your competitor in one game may be your partner in the next. The game is new every year and its painstaking design makes it exciting for both experts and novices. It's part rock concert, part basketball, part auto race (the pits), and part awards night at the Oscars.

The volunteerism is extraordinary. There are thousands of engineers, teachers, parents, college engineering students, FIRST alumni and others who act as mentors and coaches, referees and stagehands. And every competition has a large group of corporate and community leaders who act as judges. They not only determine the awards, but also interact with all of the kids with attention and support.

In addition to the fun, excitement and life long friendships, some of the major benefits for high the high school students include a marked increase in self-esteem - participants realize that they can do anything they set their mind to; a great understanding of teamwork and team concepts; the ability to "play with the pros" by working alongside professional engineers; and the opportunity to earn a spot at the championships or to qualify for over \$4.5 million in scholarship funds. The FIRST experience raises the bar in their life, and has a great impact on their decision to go on and attend a college or university. You've got to see it to believe it!

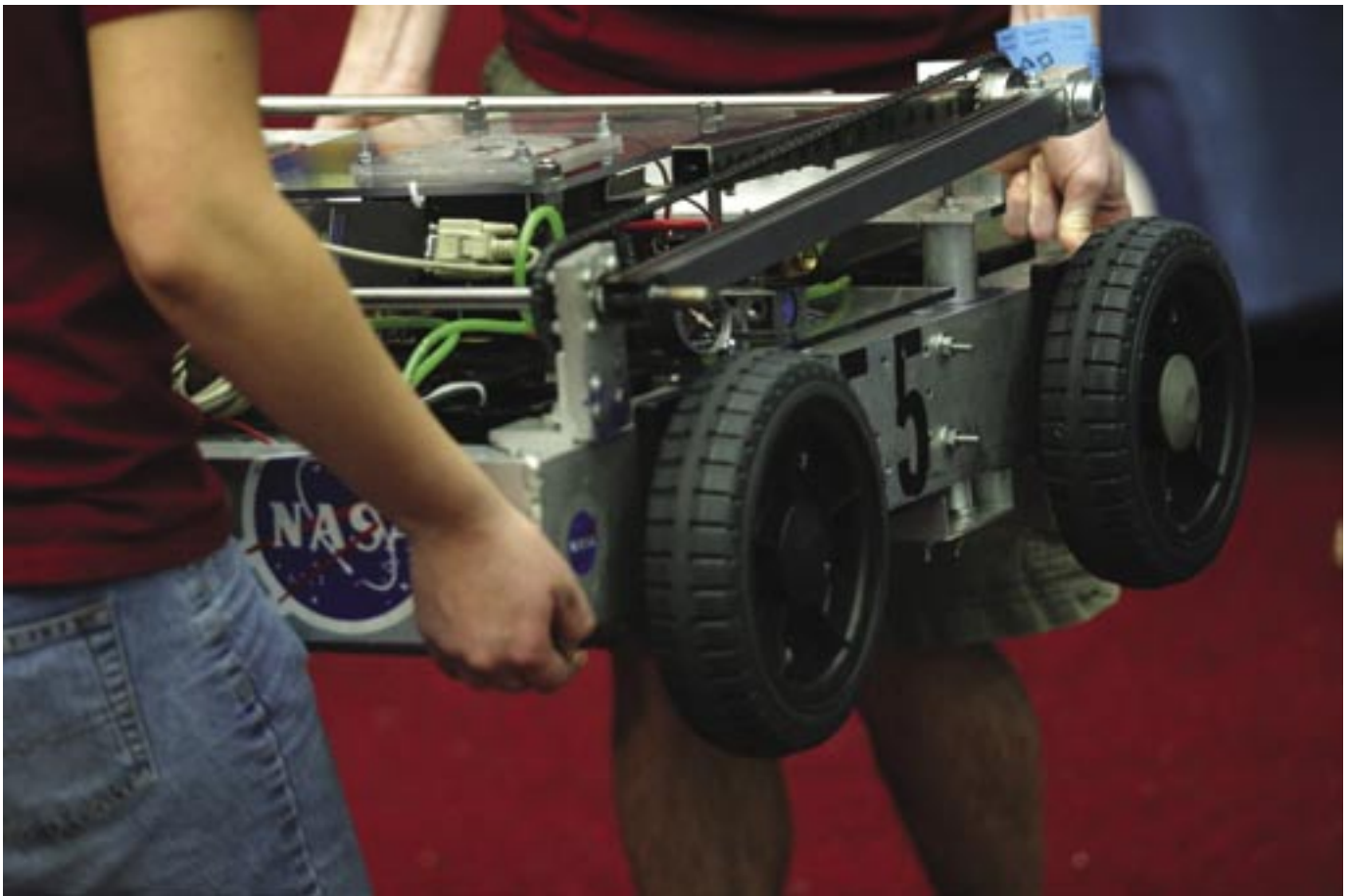
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FIRST Robotics Competition Team Growth and Goals



This year the stats are as follows:

- One Identical Kit of Parts
- 925 Teams Participating
- 25 Students and 6 Adult Mentors per Team on Average
- Approximately 225 of the 925 Teams are Rookie Teams
- 650 Teams are likely to use pneumatics in their robot design
- 4,500 Volunteers are Anticipated
- 26 Regionals (see sidebar)
- 140 College & University Engineering Programs Supporting Teams as mentors
- 5 Countries (40 Teams in Canada)
- 27 Regional Kick-off Sites (see sidebar)
- Pneumatic Workshops at selected Kickoff events
- \$4.5 Million in Scholarships
- 1 Championship
- Hardest 6 Weeks of Fun Ever!



National Fluid Power Association
50th Anniversary: 1953 - 2003



2004 FIRST Kickoff Events

The 2004 FIRST Robotics Competition Kickoff will be held on January 10, 2004 in Manchester, NH and will be simulcast broadcast live to 27 Remote Kickoff Sites. This is a day of unveiling the parameters for the competition (The Game), rules, strategy, etc. All teams receive their standard kit of parts and have the opportunity to attend workshops on pneumatics, control systems, etc.

The Kickoff simulcast will air from 10:00 a.m. EST until 12:00 p.m. EST on Saturday, January 10, 2004. The public may view the broadcast via NASA television via cable television or satellite (Satellite coordinates are as follows; NTV broadcast on GE-2 - transponder 9C - C-band - located 85 degrees west longitude - frequency is 38880.0 MHz - polarization is vertical and audio is monaural at 6.8 MHz.)



Following is a list of sites for the remote kickoff events.

AK, Anchorage

(To Be Determined)

AZ, Tempe

Arizona State University

CA, Los Angeles

University of Southern CA

CA, San Jose

San Jose State University

CANADA, Toronto, Ontario

Ontario Science Centre

CO, Denver

East High School

FL, Orlando

Gaylord Palms Resort and Convention Center

FL, Plantation

Motorola

GA, Atlanta

Georgia Tech

IL, Chicago

Illinois Institute of Technology

IN, Kokomo

Ivy Tech State College

MD, College Park

University of Maryland

MI, Northville

Northville High School

MO, St. Louis

St. Louis Science Center

NJ - Performing Arts Center

Middlesex County College

NY, NYC

Polytechnic University

NY, Rochester

Rochester Institute of Technology,

OH, Columbus

Ohio State University

OR - Corvallis

Oregon State University

PA, Philadelphia

Upper Darby High School

PA, Pittsburgh

To Be Determined

SC, Columbia

Swearingen Engineering Building

SD, Brookings

South Dakota State University

TX, Houston

University of Houston-Clear Lake

VA, Richmond

Virginia Commonwealth University

WA, Seattle

University of Washington

WI, Waukesha

GE Medical Systems

For more information on regional kickoff events (registration, directions, capacity, workshops, etc.) visit <http://www.usfirst.org>

Research Shows

- Over 90% of mentors rated FIRST very successful in increasing students' interest and enjoyment of science, math, engineering and technology.
- 92% of team leaders rated FIRST as very effective in improving student self-confidence.
- 92% of team leaders rated FIRST as very effective in having students translate science & technology theories into real world applications.
- 1 of 2 corporate sponsors employed one of more FIRST Robotics students in summer internships.
- 2 of 3 FIRST students were interested in working for their corporate sponsor after graduating.
- 95% believe company's involvement with FIRST benefits firm's reputation.
- 77% indicate their firm's support of FIRST made them feel more positive about their employer.
- 66% believe support of FIRST would help attract and retain good employees.
- 77% of team leaders rated FIRST as effective in influencing schools to include more instruction in science and technology.
- 66% of team leaders rated FIRST as effective in improving students' school attendance.

Sources:
Goodman Research Group November 2000 and
White Mountain Research Associates 2002.

“ The most memorable and important part of my life in high school...being on the team proved to me the importance of teamwork in a very real and concrete way...the team provides an opportunity to apply the knowledge learned in school from many subject areas.”

Ian McKenzie
Woburn Robotics Team alumnus
University of Waterloo in Systems Design
Engineering (Canada)



2004 FIRST Robotics Competition Regional Event Locations

All FIRST Robotics Competitions (Regional & Championship) events are open to the public, free of charge, and are, in the words of FIRST teams, “full of passion, excitement, joy, and sorrow...the thrill of success and the agony of defeat.” The FIRST Robotics Competition has grown to 26 regional events and one Championship event. If you would like to attend an event to better understand FIRST, sign up for your VIP ticket and program at <http://www.pneumaticsFirst.org>

AZ, Phoenix	Arizona Regional	3/11/04-3/13/04
CA, Los Angeles	Southern California Regional	3/25/04-3/27/04
CA, Mississauga, ON	Canadian Regional	4/1/04-4/3/04
CA, Sacramento	Sacramento Regional	3/18/04-3/20/04
CA, San Jose, CA	Silicon Valley Regional	4/1/04-4/3/04
CO, Denver	Colorado Regional	3/25/04-3/27/04
CT, Hartford	UTC New England Regional	3/18/04-3/20/04
FL, Orlando	Central Florida Regional	3/11/04-3/13/04
GA, Duluth	Peachtree Regional	3/18/04-3/20/04
IL, Evanston	Midwest Regional	3/25/04-3/27/04
MD, Annapolis	Chesapeake Regional	3/18/04-3/20/04
MI, Detroit	Detroit Regional	3/18/04-3/20/04
MI, Grand Rapids	West Michigan Regional	4/1/04-4/3/04
MI, Ypsilanti	Great Lakes Regional	3/11/04-3/13/04
MO, St. Charles	St. Louis Regional	3/11/04-3/13/04
NH, Manchester	BAE SYSTEMS Granite State Regional	3/4/04-3/6/04
NJ, Trenton	J&J Mid-Atlantic Regional	3/4/04-3/6/04
NY, Brentwood	SBPLI Long Island Regional	3/18/04-3/20/04
NY, New York	New York City Regional	3/25/04-3/27/04
OH, Cleveland	Buckeye Regional	3/25/04-3/27/04
OR, Portland	Pacific Northwest Regional	3/4/04-3/6/04
PA, Philadelphia	Philadelphia Regional	3/25/04-3/27/04
PA, Pittsburgh	Pittsburgh Regional	3/11/04-3/13/04
SC, Columbia	Palmetto Regional	4/1/04-4/3/04
TX, Houston	Lone Star Regional	4/1/04-4/3/04
VA, Richmond	NASA / VCU Regional	3/4/04-3/6/04

Championship Event

The Championship is the final and largest event of the Competition.

GA, Atlanta	Georgia Dome	4/15/04-4/17/04
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