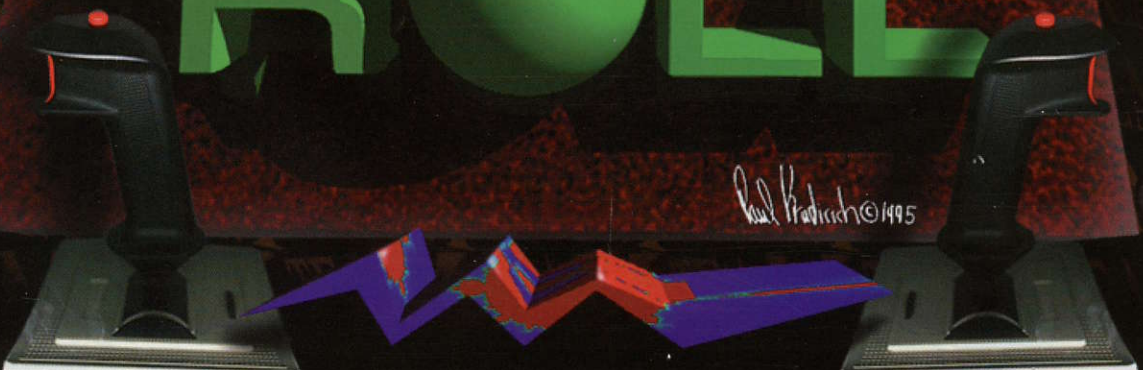


U.S. FIRST COMPUTER NATIONAL CHAMPIONSHIP RAMP

U.S. FIRST
The COMPETITION
1995

ROLL



Paul Krahovich ©1995

Honeywell Procter&Gamble  MOTOROLA

National Championship

Dear Competitors and Guests:

America's young people today inhabit a world of popular television. In that world, lawyers are heroes, recording artists are idols and athletes are superstars. Scientists barely exist. Technological achievement is unknown. It's no wonder that kids today dream of MTV stardom or making millions playing basketball, but not of building a better microchip or winning a Nobel Prize.

Games are fun, and the arts are enriching. But we've got to show that the worlds of science and technology are also worlds of wonder and excitement, richly rewarding and immensely fulfilling. We've got to make the next generation see and feel the challenge of science and the joy and value of mastering its mysteries.

That's what U.S. FIRST is about.

It's about changing the way the kids of America think about science and technology.

One way we do that is through competitions like RUG RAGE, TOWER POWER and RAMP N' ROLL—competitions that present science as a made-for-television sporting event, complete with cheering squads and banners and play-by-play announcers. The competitors learn by doing, but even more important is the excitement they generate in their schools and communities and ultimately all across America.

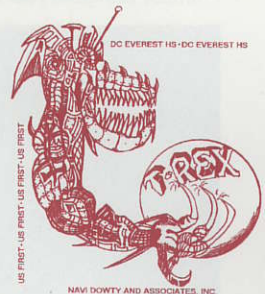
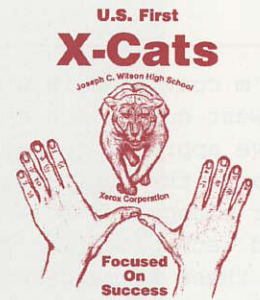
In all that U.S. FIRST does, our corporate participants hold the key to success. This is partly because we are deliberately a private sector organization, even though our franchise includes helping meld together public and private efforts. But more importantly, it is because corporate America is expert at persuasion, and already spends billions of dollars each year on changing the way people think—through advertising, promotion and the sponsorship of sports, cultural and other events.

We are particularly thankful to Walt Disney World for believing that our vision is one that the kids of America will welcome. Walt Disney World's commitment to host the U.S. FIRST Competition at Epcot '95 vastly increases its reach and proves that U.S. FIRST has an important message for our time.

Thank you for being here, and for your essential support.

Dean Kamen

Founder, U.S. FIRST



QUOTES

"I'm convinced it's the lowest cost, most effective approach to really change the attitudes of our youngsters to science and technology...The kids on these teams become heroes in their schools, just like the football players...This peer acceptance is what it takes to make them want to study science."

Gordon F. Brunner

Senior Vice President
The Procter & Gamble
Company

E! BANDITO



"The thrill of the kids participating in this is just unbelievable. They're engaged. They're involved. They're thinking. They're working together as a team."

Dr. Roland Schmitt

President Emeritus
Rensselaer Polytechnic Institute

PULP FRICTION

"The message is clear—the commitment of the world's best engineers to be new role models for our nation's youth can make a difference...No other program has the potential to influence so many young minds while reinforcing the national goal of being a world leader in business and education."

Paul A. Allaire

Chairman & CEO
Xerox Corporation

"Dean came into my office and said, now, if these corporations can sponsor Olympic athletes, why isn't it a great idea that they encourage young scientists in the same way. And he's absolutely right about that."

President George Bush

June 23, 1992

"The competition truly is a fine, creative example of what can be done to excite the next generation about science and technology and motivate young Americans to the pursuit of scientific and technological excellence."

President Bill Clinton

March 27, 1993



THE THRILL OF VICTORY.

THE AGONY OF A SHORT CIRCUIT.

BLOOD. SWEAT. TEARS. AND MAYBE THE OCCASIONAL BLOWN FUSE. IT'S ALL A PART OF THE 1995 U.S. FIRST COMPETITION. AS AN OFFICIAL SUPPLIER AND SPONSOR, THE TORRINGTON COMPANY IS PROUD TO BE A PART OF THIS GREAT EVENT. HERE'S TO A GREAT DAY OF COMPETITION AND, IF NEED BE, REWIRING.

TORRINGTON

Part of worldwide Ingersoll-Rand

TORRINGTON IS A PROUD SPONSOR OF THE 1995 ROBOTICS COMPETITION.

JUDGES AWARDS

The U.S. FIRST Competition list of winners includes the following awards presented by the Judges:

Honeywell Leadership In Control Award

Awarded to the team displaying the most innovative control system or application of control components to provide unique machine functions.

Procter & Gamble Creativity Award

Awarded to the team displaying the most creative design, use of a component or the most creative or unique strategy of play.

Motorola Quality Award

Awarded to the team displaying the most robust design, that is, the project that best exhibits the relationship between quality of design, quality of construction and quality of performance.

Best Play of the Day

Best Offensive Round

Outstanding Defense

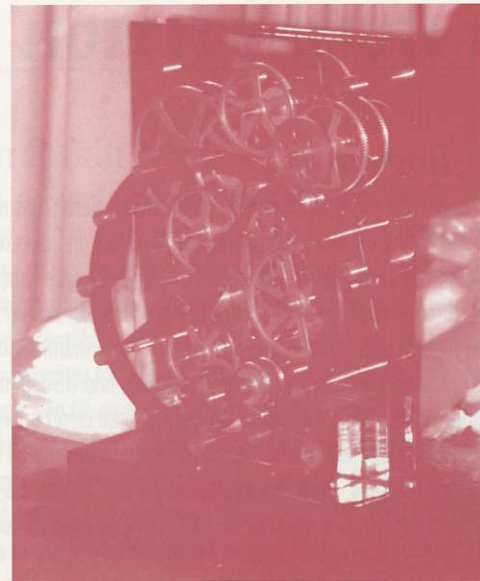
Best Sportsmanship

Best Team Spirit

Number One Seed

Most Photogenic

Rookie All-Star



Chairman's Award

The Chairman's Award is presented to the team which achieves excellence by working well together. Judging criteria include the level of student participation, teamwork, team spirit, creativity of effort and overall cooperation and effectiveness between school and partner. The judging panel reviews materials submitted by teams prior to the National Championship. Documentation may consist of video footage, photos, and written chronicles. The traveling trophy for this prestigious honor is a high-tech, custom crafted Dean Kamen clock, which the *New York Times* called "Art that Ticks."

Founder's Award

The Founder's Award is presented by Dean Kamen to the organization or individual that best promotes the ideals and goals of U.S. FIRST. In 1993, Motorola was presented the Founder's Award for its outstanding contribution to the U.S. FIRST Competition, a custom built control system. In 1994, Honeywell received the Founder's Award for their enthusiastic team recruitment with three Honeywell divisions and two teams from Alliant Techsystems.

1992 1993 1994

Chairman's Award Winner

Xerox Corporation
Wilson Magnet School
Rochester NY

AT&T Bell Labs
Science High School
Newark NJ

Xerox Corporation
Wilson Magnet School
Rochester NY

National Champions

Procter & Gamble
Walnut Hills High School
Cincinnati OH

E-Systems, Inc.
Dallas Christian High School
Mesquite TX

NYPRO, Inc.
Clinton High School
Clinton MA

U.S. FIRST

Executive Board

Paul Allaire
Chairman & CEO
Xerox Corporation
Stamford, CT

Daniel Burton
President
Council on Competitiveness
Washington, DC

Daniel Coolidge, Esq.
Partner
Sheehan, Phinney, Bass & Green
Manchester, NH

Dean Kamen
President
DEKA Research
& Development Corp.
Manchester, NH

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President
Economic Club of New York
New York, NY

Donald Reed
President & Group Executive
NYNEX
Boston, MA

Dr. Roland Schmitt
President Emeritus
Rensselaer
Polytechnic Institute
Troy, NY



National Advisors

Bill Aldridge
Executive Director
National Science
Teachers Association
Washington, DC

Dr. Robert M. Batscha
President
The Museum of
Television and Radio
New York, NY

Lewis Feldstein
President
New Hampshire
Charitable Foundation
Concord, NH

Dr. Woodie Flowers
Pappalardo Professor of Mechanical
Engineering
MIT School of Engineering
Cambridge, MA

David Hartman
Rodman-Downs Inc.
Fairlawn, NJ

Charles R. Hogen Jr.
Executive Vice President
Merck Company
Rahway, NJ

Kent Hughes
Associate Deputy Secretary
for Competitiveness Policy
U.S. Department of Commerce
Washington, DC

Frederick Kfoury Jr.
President
Central Paper Products
Manchester, NH

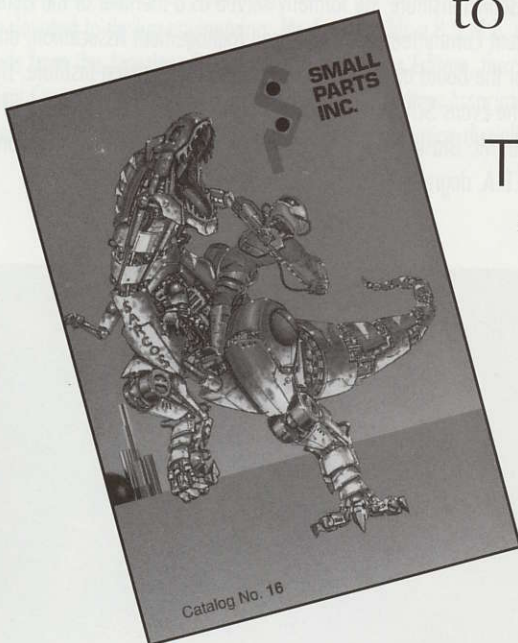
Dr. William P. Murphy, Jr.
Founder
Cordis Corporation
Miami, FL

Bonnie Newman
Coastal Broadcasting Corp.
Hampton, NH

Herbert Stebbins
Founder
ProCon Construction
Bedford, NH

Congratulations!

to all 1995 team members.



Thank you
for making this year's
U.S. First competition
the best ever.



SMALL PARTS INC.
13980 N.W. 58th Court
P.O. Box 4650
Miami Lakes, FL 33014-0650
Tel. 1-800-220-4242

Engineering Findings...Components, Materials and Precision Tools

U.S. FIRST

Advisor

Woodie Flowers

Woodie Flowers is the Pappalardo Professor of Mechanical Engineering at the Massachusetts Institute of Technology. He has held the School of Engineering Professor of Teaching Innovation Chair since 1991, and is Director of M.I.T.'s New Products Program.

He received his S.M., M.E. and Ph.D. degrees from M.I.T. His current research includes work on micro-computer-controlled artificial legs, the creative design process and computer-aided design systems. Teaching engineering design is a major part of his career.

Dr. Flowers has started several new design courses including one of the most famous courses at M.I.T., "Introduction to Design (2.70)." For his teaching he has received The Goodwin Medal, The Baker Award, The Den Hartog Distinguished Educator Award and the MacVicar Faculty Fellow for extraordinary contributions to undergraduate education from M.I.T. He also received The Western Electric Award from The American Society of Engineering Education.

He is currently a member of the board of directors of The General Scanning Corporation, an Overseer for Boston's Museum of Fine Arts, and a national advisor to U.S. FIRST, and recently he was elected to the National Academy of Engineering.



West Ottawa High School
Prince



the machine that changed the world®

U.S. FIRST

Founder

Dean Kamen

Dean Kamen is President and owner of DEKA Research & Development Corporation, a New Hampshire based company specializing in advanced technologies in medical equipment. He is chairman and owner of Teletrol Systems, Inc., a manufacturer of electronic climate control systems for large commercial and industrial buildings.

A physicist, engineer and inventor, he holds more than 30 U.S. patents. In 1976, while an undergraduate at Worcester Polytechnic Institute, he founded Auto Syringe, Inc., to produce the world's first wearable infusion pumps.

In 1988, Dean was named Entrepreneur of the Year by the New Hampshire High Technology Council, and in 1992 received an honorary doctorate in science from Worcester Polytechnic Institute. In 1994, he was named Design News magazine's Engineer of the Year. Most recently, Dean was honored as a 1994 Kilby Award laureate.

Dean is a Fellow with the American Institute for Medical and Biological Engineering (AIMBE), and a member of The Engineering Society for Advanced Mobility: Land, Sea, Air and Space (SAE); the American Society of Mechanical Engineers (ASME); and the Society of Plastics Engineers (SPE).

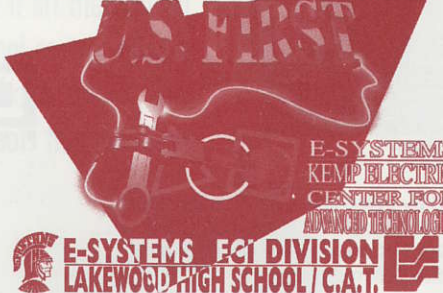
Minnesota's Mighty Millers



ALLIANTECHSYSTEMS

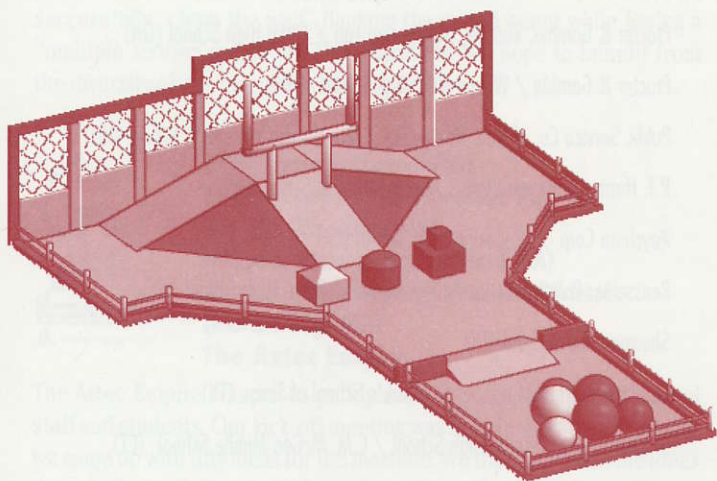
Washburn High

THE POWER TO CREATE



RAMP ROLL 'N

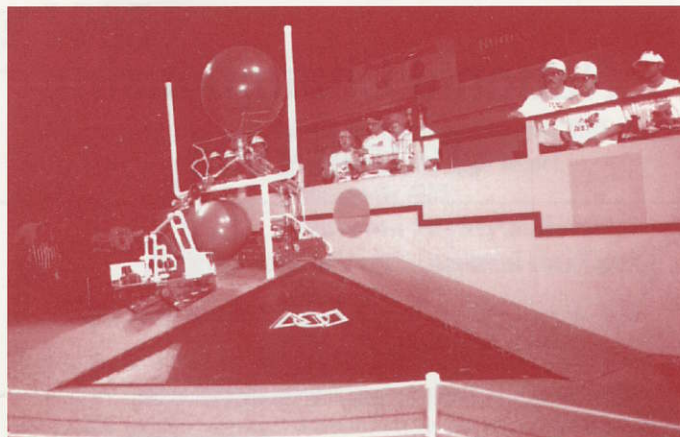
Since January 7th, more than 60 schools and engineering companies from more than 20 states have been building "robo-gladiators" in preparation for the 1995 U.S. FIRST Competition, RAMP N' ROLL.



RAMP 'N ROLL

In two minute matches, three robots race down a 30-foot raceway, over a speed bump just wide enough for two to pass through, to retrieve their 24" and 30" vinyl balls. To score, they must carry the ball(s) back up the raceway and push or shoot the ball over a nine-foot field goal from either the playing floor or a raised platform area, all the while trying to keep their opponents from scoring. Teams may score more than once with each ball—the smaller ball is worth two points and the larger ball is worth three points.

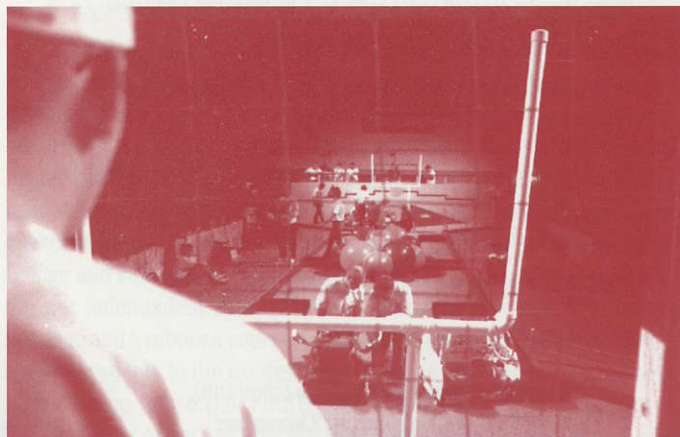
To facilitate scoring, we have given each team five feet of latex tubing for slingshot or catapult projectile mechanisms. In addition, the 1995 Kit of Parts added proportional controls and pneumatics. The pneumatic pumps can drive a lift mechanism for raising captured balls while the proportional control system allows student drivers to moderate their robot's speed. This enhances the design challenge of building robots that move on horizontal and vertical planes.



THE MACHINES

The machines have been designed and built by the school/engineering teams during the past 6 1/2 weeks and are constructed from a wide range of materials including PVC pipe, aluminum, plywood, fiberglass, and structural foam. Each may weigh no more than 70 pounds and measure no more than 36"Ø x 30".

The machines get their power from two 12-volt Milwaukee drill motors and four Delco car seat motors which, through a customized remote control system, are powered by two 12-volt Milwaukee Drill batteries.



National Championship Teams 1995

Aavid Thermal Technologies / Gilford High School (NH)

Adra Systems / Stratus Computer / The Whiz / Millipore Waters Corp. /
Assabet Valley Regional Vocational School (MA)

Alliant Techsystems, Marine Systems / Kamiak High School (WA)

Alliant Techsystems Inc. / Washburn Senior High School (MN)

The Boeing Co. / Lindbergh High School (WA)

Boston Edison Co. / Plymouth North High School (MA)

Dart Container Corp. / Mason Public High School (MI)

Delco Electronics Corp. / Kokomo High School (IN)

E-Systems, ECI Division / Lakewood High School (FL)

E-Systems, Greenville Division / Greenville High School (TX)

Ferrofluidics Corp. / Hampshire Chemical Corp. / Merrimack High School
(NH)

Florida Atlantic Univ. / Hall Fountains / Huron Machine Products / Dillard
High School (FL)

Florida International Univ. / NOVEN Pharmaceuticals and Baptist Hospital /
Mast Academy (FL)

Haworth / Holland Public Schools (MI)

Honeywell, Inc. / Cortez High School (AZ)

Honeywell Technology Center / North Community High School (MN)

Honeywell's MICRO SWITCH Division / Freeport Senior High School (IL)

Johnson & Johnston Associates / Astro Precision Machine / Brooks
Automation / Salem High School (NH)

Lockheed Sanders / Nashua High School (NH)

MARKEM Corp. / Keene High School (NH)

Martin Marietta Manned Space Systems / Northwestern State Univ. /
Louisiana School for Math Science and the Arts (LA)

NASA Lewis Research Center / BP America / Ohio Aerospace Council / East
Technical High School (OH)

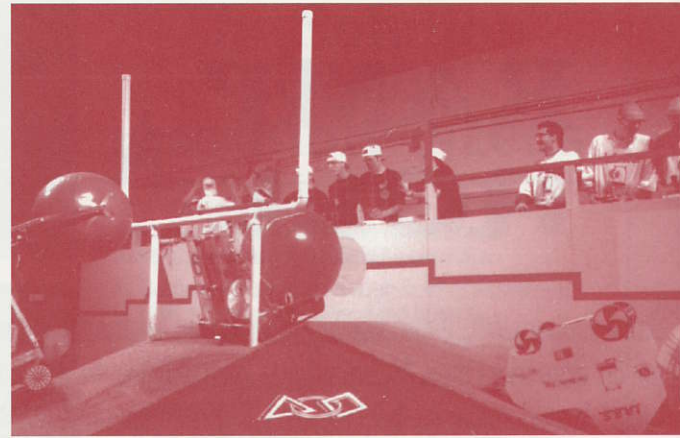
Naval Undersea Warfare Center (NUWC) Division / Raytheon / Raytheon
Corp. / To Improve Math, Engineering and Science Studies (TIMES2) /
Rogers High School (RI)

Navi Dowty & Assoc., Inc. / D.C. Everest High School (WI)

NYPRO Inc. / Clinton High School (MA)

Osrsm Sylvania / Manchester Central High School (NH)

1995 New England Tournament Champions



PATHS/PRISM / Strawberry Mansion High School (PA)

Prince Corp. / West Ottawa High School (MI)

Procter & Gamble, Kemper Engineering Lab / Aiken High School (OH)

Procter & Gamble / Walnut Hills High School (OH)

Public Service Co. of New Hampshire / Manchester West High School (NH)

R.F. Harris Communications / Edison Technical School (NY)

Raychem Corp. / Woodside High School (CA)

Rensselaer Polytechnic Institute / Shenendehowa High School (NY)

Sherman High School (TX)

Southern Methodist Univ. / St. Mark's School of Texas (TX)

Stanley Works / Berlin High School / C.M. McGee Middle School (CT)

Texas Instruments, Inc. / Austin Academy for Excellence (TX)

Texas Instruments, Inc. / Denison High School (TX)

Textron Automotive Co. / Cass Technical High School (MI)

U.S. Naval Academy Alumni / Sandia National Laboratories / Ogden
Corporation / Cibola High School (NM)

United Technologies Corp. Research Center / Hamilton Standard Division /
Pratt & Whitney Aircraft / Hartford Public High School / Bulkeley High School
/ Rockville High School / Praise Power & Prayer Christian School (CT)

Univ. of North Carolina @ Charlotte / William States Lee College of
Engineering / Harding University High School of Mathematics, Science and
Technology (NC)

Univ. of Texas @ Arlington / Automation & Robotics Research Institute /
Richland High School (TX)

Wisconsin Power and Light / Univ. of Wisconsin / Platteville High School (WI)

Womack Machine / Dallas Christian High School (TX)

Worcester Polytechnic Institute, Mechanical Engineering / Mass. Academy of
Math & Science (MA)

Xerox Corp. / Wilson Magnet High School (NY)



**Dart Container Corporation (Mason MI)
Mason High School (Mason MI)
DART VADER**

"The FOAMIN' BuilDAWGS", 12 volunteer Dart employees, 20 students from all grade levels, two parents and 4 faculty members, have worked as a collective team since early December examining previous years' competitions as the basis of brainstorming and team building projects. The entire group brainstormed many prototype designs and competition strategies. Members then chose smaller design groups which focused on separate areas of the machine. By dividing our efforts, we were able to test and evaluate many different prototypes. Individual leaders were chosen to oversee construction and carry out communication between different groups. Students, parents, and Dart employees all served as team leaders throughout the design process. Working within these design teams, each individual learned the importance of trial and error, preparation, safety, and communication. As a result of our efforts, we feel the "DART VADER" will prove a worthy opponent during this competition.



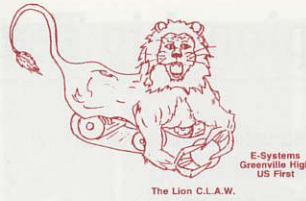
**Delco Electronics Corp. (Kokomo IN)
Kokomo High School (Kokomo IN)
KHS First**

At our first meeting in August the KHS First Club was formed and the Pop Can Regatta was kicked off to recruit members. Six teams of students made vehicles out of pop cans that could collect soccer balls and place them in a goal in a swimming pool. The Photon Fury then taught students to use lathes, mills, and power tools as they created vehicles powered by photo cells and small electric motors. When the U.S. FIRST competition kicked off we were ready with over 25 engineers, 7 teachers and over 50 students. After brainstorming for 2 weeks, we broke into teams and began prototype construction. Building is being done at the school with some parts being made at Delco. The students have learned to weld aluminum, build prototypes, assemble and disassemble. They have learned to work together and appreciate the importance of communication. And we have had fun. Our team looks forward to the Competition and wishes all the other teams good luck.



**E-Systems, ECI Division
(St. Petersburg FL)
Lakewood High School
(St. Petersburg FL)
ESY-CAT**

Approximately 20 students and 12 engineers are organized around 5 major efforts: Transport team, Scoring team, Arena, Chairman's Award, and Requirements. This division of E-Systems became involved with encouragement of the 1993 Champions from Greenville. In July Lakewood High School was selected as our team partner because of their program for Advanced Technology called the "Center for Advanced Technology". In September of 1994 we had the first of several meetings with the school to organize for the 1995 Competition. In December of 1994, the team conducted training sessions, including a mock brainstorming session to prepare for the Competition. In addition to the build of the robot, a complete, portable practice area has been built, fund raising by the high school has been completed, T-shirts have been designed, and travel arrangements to the New England tournament are complete. Our vehicle is designed to hold a ball and pass it back and forth through the goal without dropping it.



**E-Systems, Greenville Division
Greenville High School
(Greenville TX)
The Lion C.L.A.W.
(Can't Lose, Always Win)**

Before "the kit" was ever distributed, we had monthly meetings with 10 engineers to learn brainstorming techniques, participate in group activities and practice team decision-making. An official school organization, the GHS team's 36 students elected officers for its activities. We have taken on the attitude that everything learned is a benefit in life, thus our team machine name and motto. A volunteer group of parents helped build a mock playing field in a Saturday in the school technology shop with materials donated by a local lumber yard and carpet store. This community wide effort led to town recognition with local news articles and feature pages. A unique learning experience, engineers and students developed all functions of the machine and its mechanics are an integration of ideas from paper to product. The intended design is to be able to shoot accurately from any given spot on the playing field and to overpower the other machines by its tank drive and traction.



**Ferrofluidics Corp. (Nashua NH)
Hampshire Chemical Corp. (Nashua NH)
Merrimack High School (Merrimack NH)
Tomahawk-1**

Numerous individual contributors have added to our team of 26 students, 2 teachers and 14 professionals. We are organized with one Project Manager and 11 subteams responsible for all areas of the project. The teams were selected at the beginning of the project during a brainstorming session and most have a student Captain and Planner. Our marketing group has been active raising money to get all students to the Nationals. Our first priority was to get acquainted and expose the students to the 2 companies to draw parallels between this experience and work in the areas of science and technology. This has helped keep our focus on the goals of this Competition. We also expect to be a strong contender for a number of the awards in addition to being a fair but fierce competitor on the field. We wish the best of luck to all of our competitors and we give you fair warning to get out of the way of our Tomahawk or pay the consequences!

**Florida Atlantic Univ. (Boca Raton FL)
Hall Fountains (Ft. Lauderdale FL)
Huron Machine Products (Ft. Lauderdale FL)
Dillard High School (Ft. Lauderdale FL)
U.F.L.E.M. (Understanding Fundamental Leadership in Engineering & Mechanics)/Mixed Nuts**

We have 16 high school students, an instructor, and a core of four engineers/technicians. "Mixed Nuts" is a mix of juniors and seniors, students with a variety of backgrounds. This has allowed the team members to brainstorm a wide range of ideas. Once a design was selected, a prototype robot was built in less than a week giving students plenty of time for testing. When everyone divided into several groups (Design/Construction, Control/Testing, Field Construction, Logo/Animation, Audio/Visual, and Marketing) the final robot was built, a replica of the playing field assembled and the robot fine-tuned with numerous offensive and defensive strategies. Minor problems with the robot were quickly repaired once observed operating on the field. The Marketing team was successful in gaining a large amount of local television and newspaper coverage. It's reliable construction will also allow it to operate as well at the end of the Competition as it did at the beginning.