1994 U.S. FIRST COMPETITION

RULES MODIFICATION

We want to make the contest exciting. However, after listening to your comments on Friday, and spending the weekend discussing the options, we realized that one particular strategy dominated over the others. We hope the changes described below ensure that the machines are diverse, and that each round is exciting to the finish.

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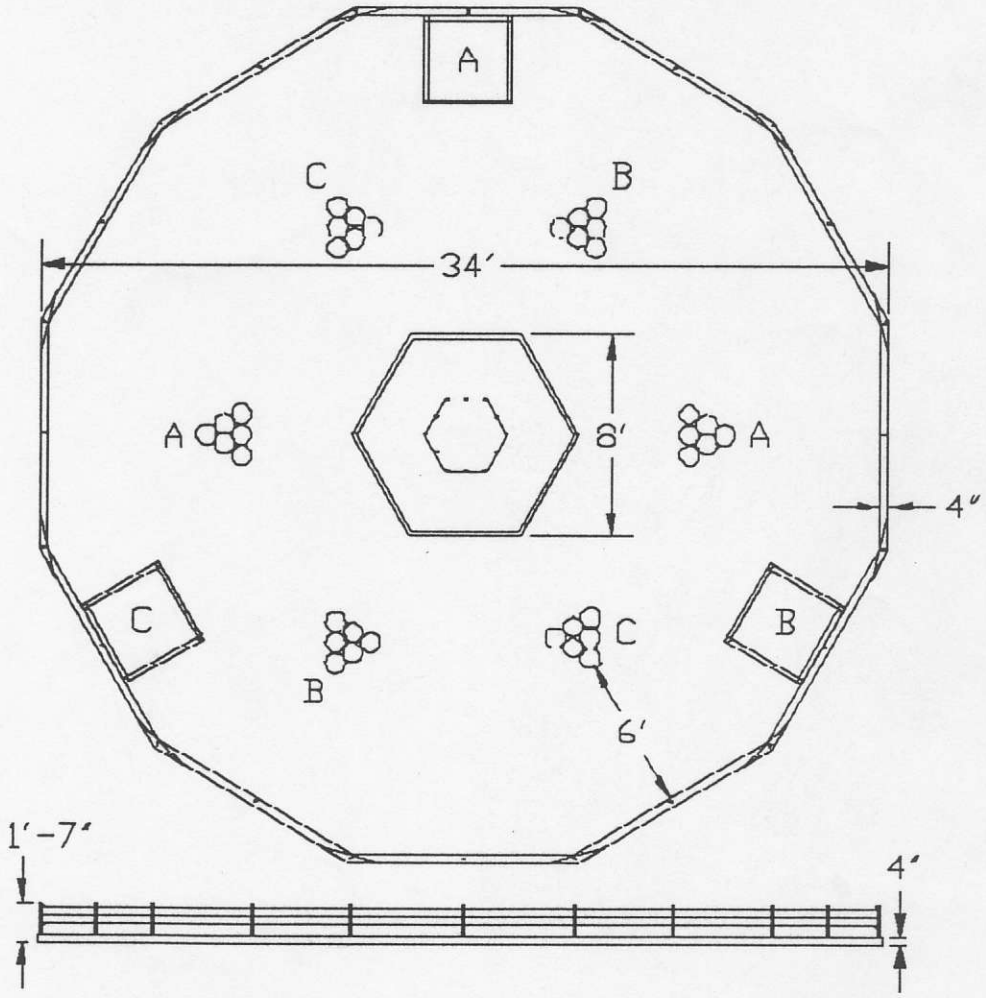
1) **In the Rules, replace Page 2 paragraph 5 with the following:**

   Size At the start of each match the machines must fit, unconstrained, inside a cylinder that is **36 inches** in diameter and **30 inches** long. We suggest using a 36" diameter Sonotube® for sizing. At the start of the competition, your machine may be placed in any orientation within the starting area.

2) **In the Rules, replace page 8, paragraph 2 and the diagram with the following (this change regards ball placement only):**

   There are 36 balls total on the playing field, 12 of each color: pink/black, purple/yellow, pink/green. At the beginning of each match they will be arranged in six piles of six identical balls each. All piles will be placed half-way between the center of the goal and the curb. For a given team, piles of their color will be placed 90° to each side of their starting position. The starting area will be a 42" square, 2" from the curb.



U.S. FIRST UPDATE: 1/18/94

Below are answers to many of the questions that have been asked. Be sure to read this carefully and reference The Rules you received at the Kickoff Workshop. **This will also be posted on the Bulletin Board.**

Reading messages on BBS	Currently, there are only 3 messages addressed to ALL--everyone should be able to read them. There is a glitch in the system preventing us from renumbering the messages; however, this year's messages start with #89. All prior messages have been deleted. You can "cut and paste" messages from the Bulletin Board, if you have the right software.
Small Parts	You may only use up to $300 of SPI parts in your final machine. To build prototypes you may exceed this limit, but you will be billed for any amount over the $300 credit they have provided.
Switch modifications	No internal modifications are allowed for either the rocker or limit switches. These switches are too small to handle the motor currents, therefore they cannot be used on the machine. They can only be used as part of the controller system. The blue boxes should be used in conjunction with the unmodified switches to make a control box. However, the addition of external levers is okay.
Timing belt/chain	See Rule K5, page 6. There are no restrictions regarding pitch or width of the timing belt/chain, but you may use no more than 15' total. "Commercially available" means strictly *off the shelf* only. No custom or special orders.
Use of Power / Drive Train components	See Rule K5, page 6. Timing belt/chain may be used with either motors at any stage of a power train, including the final one (i.e., treads of a Caterpillar-like vehicle). Power train is defined as components transmitting the output of provided motor to any of the vehicles' mechanisms, including propulsion, arms, projectiles, etc.
Netting	See Rule T5, page 6. Nets are allowed, but if they are used to entangle opponents machines, the referees may disallow them.
Removing opponents balls	See Rule T6, page 6. If one team's balls are removed from the playing field by an opposing team, those balls are placed back onto the field near the balls' original exit point.
Disqualification	See Rule T9, page 6. If, in an attempt to remove an opponents balls from the field, a part of your machine drops or is intentionally removed outside of they playing area, then your team's machine is turned off, and any points scored will count. If a machine is disqualified by a referee, any points scored during that match will be forfeited.
Shipping	See CONSTRAINTS, page 2 and Rule Sh2, page 4. The shipping rule stands as written.
Springs	In addition to those provided in The Kit, additional springs may be purchased from Small Parts Inc. You may not fabricate your own. The springs may be pre wound prior to power up.
Fiberglass cloth	You may purchase and use fiberglass cloth, up to 1/8" thick and up to a 4'x4' overall size.
Goal dimensions	See diagram, page 9. The goal dimensions are as stated on the diagram, with a tolerance of + 1/2".
Modifying motors	All motors must be controlled through the transmitter/receiver. The motors cannot connect directly to the battery. The Delco motors may not be modified; however, the drill motors may be modified as long as the electrical connections are not changed.
Design	For anyone interested in trying, flying vehicles are allowed as long as they meet all restrictions outlined in The Rules.
Projectiles	See Rule S4, page 3. Competition soccer balls are considered safe projectiles.
Team Communication at Competition	We must prohibit the use of microphones or hand-held radios for team communication at the Competition to avoid interference with the U.S. FIRST staff and event managers internal communications and the control systems.
Two-part machines	See Rule C9, page 5. Two part machines are okay, however you cannot change the battery holder and you can only use the wires that are provided in the kit to extend power between motors. You MAY NOT use the wires that are in the printer.
Team Box	See Rule F5, page 4. The Team Box is a 6' x 4' marked area adjacent to the 18" high playing field fence.
Internet	We do not have direct access to Internet and not all teams have a subscription, so we are currently posting updates via fax and on the Bulletin Board.

Driving Competition Rules:

1) Each driver gets two runs. The driver gets to choose which run to score. Low times are better.

2) There will be no makeup runs for disqualified runs.

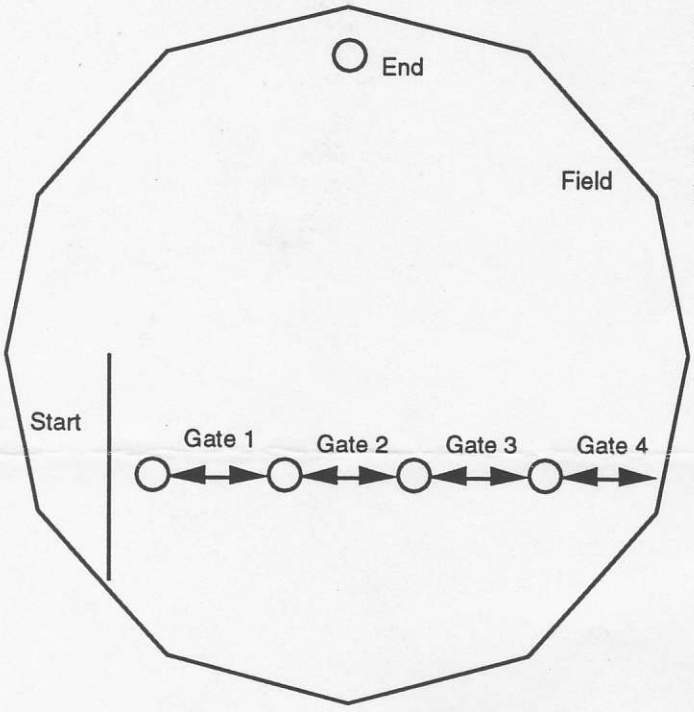
3) The vehicle will be placed behind the start line. The driver may determine how the vehicle is oriented behind the start line. Time starts when the official timer tells the driver to "Go." Time ends when the "End" ball is bumped (see diagram).

4) Each driver is allowed one (1) false start per run. The second false start will disqualify that run.

5) The driver must pass through the all of the gates. A gate is defined as the space between balls, except for the last gate which is the space between the last ball and the edge of the playing field. It doesn't matter which direction you go through the gate.

   Warning: Failure to pass through a gate will disqualify that run.

6) Each gate ball moved will add three (3) seconds to the time of that run. (All of the balls excluding the "End" ball are gate balls.) A ball has been moved if it is rolled off of the mark. (There will be a mark on the carpet under each ball.)



Note: The exact orientation and placement of the Start Line, Gate Balls and End Ball may be different than this diagram. However, it will be the same for all drivers.

U.S. FIRST

AGENDA
1994 U.S. FIRST COMPETITION WORKSHOP
January 7, 1994

9:00 a.m.	Welcome and Introduction	Dean Kamen Founder, U.S. FIRST
	About the Design of Design Contests	Dr. Woodie Flowers Professor of Teaching Innovation MIT
10-10:20 a.m.	Break	
	The Challenge	Dr. Woodie Flowers
	Competition Kit and Preview	
	Program Update	Miriam Dumaine Director of Development U.S. FIRST
	Description of "PVC Insanity" Texas Instruments/Sherman High School competition	Bill Berghauser Sherman High School
	Presentation of 1994 Competition Playing Field	Dean Kamen
12:10 p.m.	Lunch	
12:55 p.m.	Discussion of Controllers, Drills	Tony Norman Principal Engineer E-Systems; Kurt Heinzmann, Bill Ormerod DEKA R&D
	Presentation of Kits	Dr. Woodie Flowers
	Questions and Answers	
	Closing Remarks	Dean Kamen
2:45 p.m.	Adjourn	

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