



The Nuts and Bolts

FIRST Robotics Competition

Carmel High School -
Rolls-Royce -
TechHOUNDS

Team 868

Issue 2.2

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Upcoming Events:

- End of Build Season:
Feb. 17, 2009
- Buckeye Regional:
Feb. 26–28, 2009
- Boilermaker Regional:
Mar. 19–21, 2009
- Atlanta Championships:
Apr. 16–18, 2009

What's FIRST?

The **FIRST** Robotics Competition is part of **FIRST** (For the Inspiration and Recognition of Science and Technology), an organization that, according to founder Dean Kamen, strives to “transform our culture by creating a world where science and technology are celebrated and where young people dream of becoming science and technology heroes.” For more information, please visit www.usfirst.org.

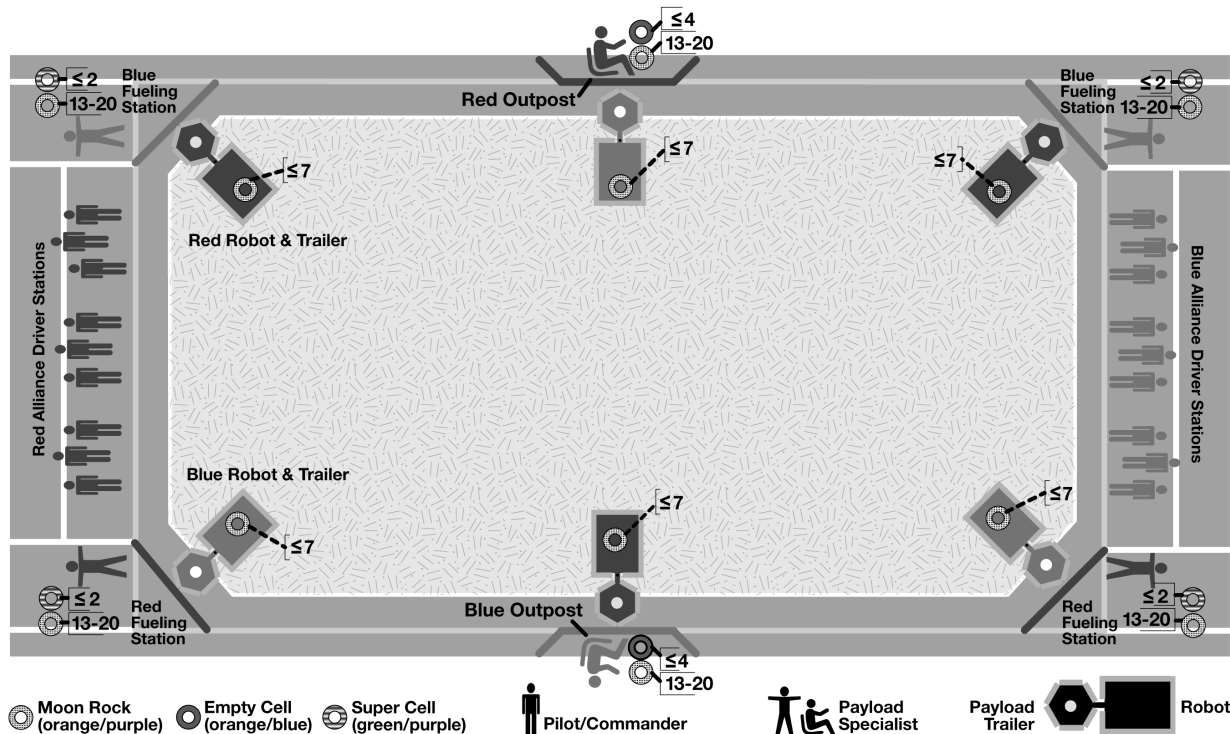




Introducing... LUNACY!

On January 3, 2009, *FIRST* unveiled its annual challenge to thousands of teams worldwide. Drawing inspiration from the 40th anniversary of the Apollo 11 landing, this game features aspects of space exploration, presenting new hurdles never faced before by *FRC* competitors!

Here is what the field looks like:



Whereas in years past the field was made of carpet, this game is played on a 54' x 27' low friction field made from special fiberglass. Robots must be driven on hardened plastic wheels that, when on the “**crater**”, simulate the driving of rovers on the moon in one-sixth gravity! The robots will also have “scoring containers” attached on the back called **trailers**. Robots are **autonomous** (meaning self-operated) during the first 15 seconds of play, and **teleoperated** (driver-controlled) for the remaining 2 minutes.

LUNACY game pieces are “Orbit Balls” designated as **Moon Rocks**, **Empty Cells**, or **Super Cells**. Two three-team robot alliances collect and score Orbit Balls in **trailers** attached to the opposing teams’ robots, and human players are positioned around the perimeter of the arena to score from their stations. **Trailers** begin empty each match, and robots may be loaded with up to 7 **Moon Rocks** by their team prior to the start of the match. Human players are equipped with 20 **Moon Rocks**, minus the number they load into their robot, and a quantity of **Empty Cells** and **Super Cells**. When scored in the trailers, **Moon Rocks** and **Empty Cells** are worth two points each; however, **Empty Cells** can be taken from the outpost to a fueling station in exchange for a **Super Cell**, which is worth 15 points.

The object of the game is to score the most points, which would be the sum total of all game pieces in the opponents’ trailers.

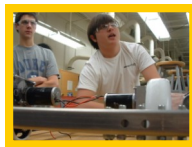
If you would like to see an animation of Lunacy, [visit http://robotics.nasa.gov/events/2009_frcwebcasts.php](http://robotics.nasa.gov/events/2009_frcwebcasts.php). More details about the game can be seen in the Competition Manual, found on www.usfirst.org.

Our 2009 Build Season

During Week One of six, the TechHOUNDS were quite busy, planning for the remainder of the season. Over the first few days, we brainstormed strategies on how to play the game during each phase (autonomous, teleoperated, and end game) and ultimately formulated a robot design, which is now being prototyped.

This year, there are **sixty** student members on the team, **thirty-two** of which are new members! Not everyone works with the robot—there are several divisions of TechHOUNDS, all having unique goals and tasks. In this issue you will learn of the activities of each branch for the first week!

Along with gaining new student members, numerous **adult volunteers** have joined us, bringing with them engineering, management, programming/electrical, and public relations skills! They have all been extremely helpful in their respective areas, further encouraging the team to keep its clockwork pace.



Robot Operations Update

"The first week has certainly been productive for the Robot Operations division—stage one of the design process is complete, and we are beginning stage two. Here is a breakdown of what we did each day:

Monday: *Discuss Strategy*

The entire team studied the game in detail and sought all possible strategies for each period of the match. We wrote all of these ideas out on a huge board to compare our collection of thoughts.

Tuesday: *Finalize Strategy*

We debated heavily and took the best strategy of each phase and combined them to create final game plan.

Wednesday: *Discuss Design*

Keeping the basic strategy in mind, we started making multiple sketches and designs of our robot.

Thursday: *Start Prototype*

After choosing a final design to prototype, we bought parts such as PVC pipes, rope, tubing, bearings, and fasteners to help simulate our design.

Friday: *Continue Working on Prototype*

Today we began to cut and assemble parts of our prototype!

Next week, we will finish the prototype and continue with the design process of our robot. All members of our division are actively working in the machine shop, and with the help of our mentors, we are progressing very well!"

— Charles Nepomuceno
Robot Operations Lead



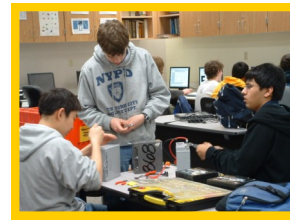
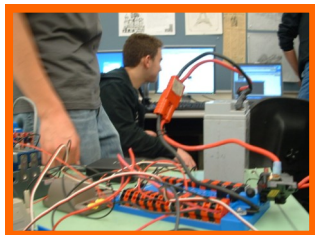
Programming/Electrical Update

"With the beginning of the new build season, the Programming and Electrical Division (P&E) has been meeting the challenge of working with an entirely new control system from FIRST. This new [National Instruments Compact Reconfigurable I/O](#) (or for our purposes NI cRIO) has proven to be quite "interesting" to say the very least. As Dean Kamen said at Kickoff, 'going from the old system to this new system is like going from playing a kazoo to playing a violin.'

Although the new system is definitely more complex, the basic programming concepts and some of the control devices from the old system have been retained. One of the most promising aspects of the new system is the ability for the robot to communicate using [802.11n wireless networking](#), instead of using radio communication, which exponentially increases just how much data we can transfer. We already are looking forward to using the new FIRST-provided camera to target our opponent's trailers in the game. All of this will be accomplished using [National Instruments LabVIEW](#) (a programming environment) through dataflow programming.

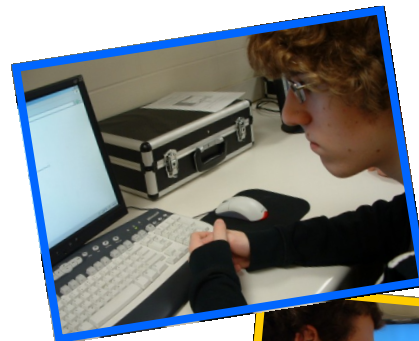
However, the most important story in P&E is our [new crop of programmers](#), which could well be the largest this team has ever seen. This new group, many of whom have no programming experience, will be well prepared by season's end to lead the team as we continue to discover new aspects of the control system with the help of several parents specializing in programming this year.

— Matt Johnston
Programming/Electrical Lead



Website Update

"Last year, the website team created a new version of www.techhounds.com, and it received an award for excellence from FIRST judges! We have now been working on updating the website for content. We have also been renovating the code behind the website, making the website cross-browser compatible. Currently, we are designing a sponsor tour, a flash interactive tour made to introduce the TechHOUNDS to potential and current sponsors. Our goal is to make our website more content driven, as well as spruce up a few design elements in the process."



— Brian Bauman
Webmaster

Animation Update

"Our first week has been critical for the whole of TechHOUNDS, the Animation team being no exception. This year the Animation team has taken the **Autodesk Visualization Challenge**, which is to create a 30-second animation on a particular topic using a software called 3DStudio Max, and has hit the ground running. Our theme for the animation is all about a concept called "**biomimicry**". This term refers to the application and implementation of a natural concept or process into a manmade mechanism.

Imagine a natural disaster that has mutilated a dense cityscape. Conventional means of rescuing those trapped inside downed buildings are ineffective at most. Firefighters risk their own lives to save these people yet often times end up trapped in the rubble as well. We need a more **efficient and safe** way to give aid after natural disasters in an urban environment!

Our idea this year takes inspiration from the **humble ant colony**. The animation will revolve around small to large **ant-like robots**. Small and nimble ants will enter fallen buildings and search for those trapped. As survivors are found, larger ants go in to clear out safe exits for the people. The robots work together as a colony to accomplish their common goal. This **teamwork** that is naturally present in all ant colonies is what we wish to emulate and is our take on biomimicry.

As the build season speeds along we will begin to mold our ideas and **storyboard** into visible models with 3DStudio Max. Check back with us as we continue to progress!"

— Joey Broerman
Animation Lead



Construction Update

"Finally, the build season has begun for the Construction team, and things are running on "all cylinders". In order to practice for the new game this year, a new playing field has to be built. Along with the slick-surfaced field, robot **trailers**, **reloading stations**, and **outposts** have to be constructed. Also, we are working on a design for our **pit**, a 10-by-10 foot area we receive during competitions to modify our robot. Other ideas that are being transferred from paper to real life including a pegboard **tool rack**, a more spacious **battery box**, and drawers for our robot closet. Truly, the construction team has dived in head first this year, and we are working hard to complete all of our goals."

— Andrew Johnston
Construction Lead



A Special Thank You to...

All parents and supporters who have provided dinner for us so far this build season, or have helped us out in any other way, along with our skilled teachers and set of new, enthusiastic mentors...

We sincerely appreciate all of your contributions and are eager for the rest of the build season!



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For more sponsorship information, please contact
Mr. George Giltner or visit www.techhounds.com.