



Zebra MotionWorks™ for FRC at FIRST Mid-Atlantic Off-Seasons

Zebra Technologies & FIRST Mid-Atlantic are excited to announce that, thanks to the generosity and dedication of many people, the MotionWorks system will be available to all 2022 Off-Season using FIRST Mid-Atlantic's Rapid React field. The complete list of events is below. We would like to thank the Local Event Committees, FIRST Mid-Atlantic, & Zebra for allowing us to run the system throughout the fall.

- 9/24: Girl Power, Flourtown, PA
- 10/15: Duel on the Delaware, Carney's Point, NJ
- 10/22: HAVOC, Horsham, PA
- 10/29: Mustang Robot Rodeo, Clifton, NJ
- 11/5: Ramp Riot, Ambler, PA
- 11/12: Brunswick Eruption, North Brunswick, NJ

What is Zebra MotionWorks™ for FRC?

If you know what Next Gen Stats are in the NFL, then this is the FRC equivalent. Zebra is the technology provider to the NFL that gathers and generates the Next Gen Stats. The hardware that is used for that is called UWB. UWB devices are an ultra-wideband active RFID locationing solution; In short, we attach inconspicuous 'tags' to the left and right side of the robot, and the MotionWorks system can read and locate those tags on the FRC field in real time (Actually, we do it 12 times a second for each tag!).

What kind of data does it collect?

MotionWorks uses interconnected and time synchronized receivers to report when they hear an active RFID tag 'ping'. Sending this information to the UWB Hub allows it to determine at a point in time, where that RFID tag is on the field to within ± 4 inches of accuracy.

That sounds cool, what does that tell you?

Since we continuously collect this data, we can determine where a specific robot is at any time during a match. From this, we can determine robot velocity, heading, acceleration, kinetic energy, and much more. Since there are left and right tags on the robots, we also know their orientations. This data is recorded for all robots during each match and stored for access later. After the competition, you can examine all these statistics for your match or download the raw data. You will be able to examine the statistics for all robots on a match-by-match basis, or on a robot-by-robot basis. If we collected data across all competitions, we could compare a robot from one competition and compare it to another. The possibilities are endless - which is the fastest robot, which robot travelled the furthest on the field, where did that robot travel on the field, where did they start, where did they climb at the end, are there any chokepoints on the field that can easily be blocked, how did gameplay change from Qualifications to Playoffs? Just to name a few.

What does a team need to do to participate?

We will loan you two RFID tags- one for the left side, and one for the right side. You just mount those on your robot, and we will take care of the rest! They will already have been activated and logged to your team number. Then, checkout The Blue Alliance for this event and see MotionWorks for FRC in action!

Zebra Technologies thanks you for participating in this exciting opportunity!!!



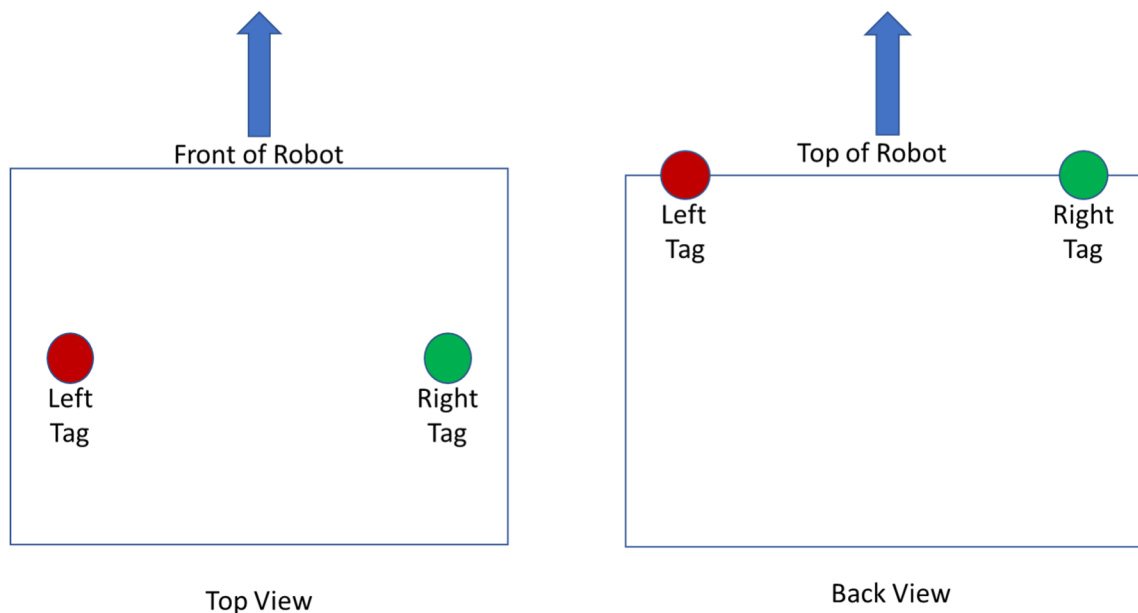
Installation Instructions

When installing your tags, please be sure to put the tag with the green dot on the right side of your robot and the tag with the red dot on the left side of your robot (right and left defined as if you are the robot. DOT SIDE FACES UP!). Otherwise, you will appear to be driving backwards and your orientation will be off by 180 degrees!

Please use either double-sided tape or plastic cable ties to attach the tags, it will make removal easier. Make sure they are securely mounted so they don't come off during the competition.

Please try and place the tags as high up on your robot as possible, not barricaded by any metal. Think about where you need to install your radio, then look for that type of spot for these tags.

Please keep the tags lined up from left to right; draw an imaginary line connecting your two tags, and that line should be perpendicular to the direction of your robot's forward motion.



At the end of the competition, please return all the tags to pit administration or the scoring table so we can re-use them during our continuing development of this system.

Thank you and good luck in the competition!