First-Ever Robotics Aerial Drone Competition For Middle & High School Students

An all-girls team, "Win-E-Mac," won the Racing Champion title.

Students from Lincoln High School in Thief River Falls, Minnesota, won the Package Delivery skills event.

by Chelsea J. Bladow

There's a new buzz growing around the state of Minnesota and the nation. The buzz in this case is not the sound coming from the small drones being used, but it does involve using them. The first-ever Robotics Aerial Drone (RAD) competition recently took place in St. Cloud, Minnesota on January 31, 2020. The top two teams were invited to compete in the first-ever World Championships scheduled for April 26-28, 2020 in Louisville, Kentucky.

For those familiar with VEX Robotics, RAD is a newly-formed drone model ran by the Robotics Education & Competition (REC) Committee, the same organization as VEX. REC is a non-profit educational organization that operates and supports competitions and is primarily responsible for establishing game rules and assisting schools or clubs to get involved and find funding resources to start clubs.

This past summer, the REC Committee took it upon itself to form a national model for a drone competition. Many localized drone competitions exist in different parts of the country, but RAD focuses to standardize the drone competition model and skills required across the board to feed a national level competition. RAD partnered with For The Win (FTW) Robotics, using the Parrot Mambo indoor drone as the baseline competition model. FTW also developed a competition field with set game pieces and events that every drone team must compete in.

The competition this year was based on two events – a visual line-of-sight race consisting of three laps around a set field with six arches and four hoops. This head-to-head race consisted of two teams starting half a lap apart.

The first team to complete three laps and land back on their launch pad won and advanced to the next round. Teams competed until only two teams remained and then went head-to-head for the title of Racing Champion!

The second event was a Package Delivery Competition. Each team was given two attempts to navigate through one-half of the race course and drop their package on the target on the opposite side, then return their drone back to the starting point. The team with the lowest time won! These two events combined determined the overall ACE award winner for the competition.

This year, 13 teams competed for the Minnesota State Championship, which was amazing considering teams had less than 30 days to practice for the tournament. Newfolden High School won the ACE award for "Best Overall Performance," while an all-girls team, Win-E-Mac, won the Racing Champion title. Lincoln High School in Thief River Falls, Minnesota, won the Package Delivery skills event. Both Newfolden and Win-E-Mac received invites to the World Championships in April and will represent the state of Minnesota.

Since this was the first year of the RAD competition, states were rushed to get a tournament put together. Currently,

14 states have held similar state tournaments to qualify for the World Championships. It is expected that this event will grow massively as schools and students learn and see what it's all about. Like VEX, the games will change every year based on REC rules.

The Parrot Mambo drone is programmable, meaning it can be coded for autonomous flight, so we fully expect to see that integrated into competitions in the future. In addition, there is a first-person view (FPV) camera attachment which allows the drone to be raced with virtual reality goggles from the drone point of view. A business pitch will be implemented into the competition next year requiring teams to build a short presentation on how they believe drones impact careers, such as law enforcement and agriculture.

The sky is the limit as the game evolves to include much larger outdoor drones where perhaps thermal imaging and mapping events may be introduced.

RAD is currently limited to middle and high school students, but there are plans to expand to include elementary school students, as well as college divisions. Any teacher or student interested in competing in future RAD tournaments can visit the REC website at **https://www.roboticseducation.org/rad/** for more information and to see the current game manual. The 2020-2021 game manual will be released in late summer 2020, which will allow teams ample time to practice for fall competitions with the state tournament being in January/February 2021.

The National Center for Autonomous Technologies (NCAT) will continue to sponsor the Minnesota State RAD Competition in 2021. As the current event partner for Minnesota RAD, NCAT will train all coaches and teams that are interested in joining.

There will be a three-day Educator Workshop at the Aerospace Campus in Thief River Falls, Minnesota, August 3-5, where educators/coaches will learn the ins-and-outs of starting a drone program at their school, as well as how to get involved with RAD. Registration and details about the workshop can be found at **https://www.ncatech.org/takingyourdronetoschool.** NCAT can also do on-site regional workshops at schools for interested event partners or coaches for RAD. So, if anyone is looking to get RADical this year, drop us a line at **ncat@northlandcollege.edu** or call **(218) 683-8801** and we will help get you started!