

Competition Rules & Design Restrictions

33rd Annual Midwestern Robotics Design Competition – 2020

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1. Competitor Responsibilities

1.1. General

- A. Participants must adhere to the rules of the competition at all times and are responsible for knowing the rules of the competition.
 - i. A warning will be given for minor infractions of the rules.
 - ii. A second warning will consist of either disqualification and/or removal of that team member if s/he is a direct problem.
- B. Participants must follow the verbal instructions of Midwestern Robotics Officials, EOH Officials, and Safety Officials at all times.
- C. Participants are responsible for showing up for all competition times and inspections or any event that requires their participation. Failure to do so could result in disqualification.
- D. Participants are responsible for informing the appropriate Midwestern Robotics Official of problems with radios, robots, or any other factors (especially fire) that could affect a particular match as soon as a problem is discovered.
- E. The Midwestern Robotics Design Competition is a family-oriented event. The use of foul or inappropriate language is strictly prohibited.
- F. Teams are expected to play nice.

1.2. Team Composition

- A. A team may have a maximum of six (6) members, consisting of a single team captain and up to five (5) additional members, henceforth deemed Official Team Members.
- B. To be eligible to compete, each team member must be a registered student at a university level during the semester during which the competition takes place (Spring), the preceding semester (Fall), or both.
- C. Only Official Team Members will be allowed in the pit area during the competition – all others associated with the team will be subject to the same restrictions as regular visitors.
- D. Other persons besides the Official Team Members may aid in the construction of a robot, but only the Official Team Members will be recognized at the competition site.
- E. Optionally, a team may have a faculty sponsor, corporate sponsor or a parent as an advisor in addition to the six Official Team Members. A sponsor is meant to be a sponsor only. If there is suspicion that a team is abusing the sponsor privilege at the competition, the extra person will be asked to leave. The sponsor is not an extra team member. The sponsor is allowed in the pit area during the competition but may not assist in the repair, modification, or construction of the robot.

1.3. Wristbands

- A. All Official Team Members will be issued wristbands upon checking in. All Official Team Members must be present during check-in so that they can receive their wristband.
- B. Wristbands must be worn and clearly visible at all times during the competition.
- C. A maximum of seven (7) wristbands will be distributed to each team: one (1) Team

Captain wristband, up to five (5) Team Member wristbands, and if a sponsor is present, one (1) Team Sponsor wristband. If a team has no sponsor they can only receive at most six (6) wristbands.

- D. Wristbands cannot be interchanged. Note that wristbands are to be worn for both competition days. There will be no reissuing of wristbands on the second day of the competition.
- E. At the beginning of each match, a Midwestern Robotics Official is assigned to each team. Teams must follow all directions issued by their assigned Official.
- F. All instructions given by those officials are final, pending the approval of the Rules Chair or Midwestern Robotics Director(s). The Rules Chair and Director(s) reserve the right to review and/or alter the rulings of other Officials at any time when these rulings are not covered by the printed competition rules.
- G. In the case of an ambiguity in the rules or in a ruling made by a Midwestern Robotics Official, clarification should be sought immediately. The Rules Chair and Midwestern Robotics Director(s) hold sole authority to interpret the competition rules and Officials' rulings in the case of such an ambiguity.

2. Robot Specifications

2.1. General

- A. Each team is allowed to enter one (1) robot into the competition. Robots may not be exchanged during the competition.
- B. Teams are not allowed to bring explosives, acids, bases, flammables, chemicals, liquids, animals, projectiles, combustibles, saws, drills, EMPs, or unstable power supplies. In summary, nothing that will endanger the contestants, spectators, Officials or the course will be allowed. The Midwestern Robotics Officials and Safety Officials have the final judgment on whether a device constitutes as such a danger. Any inquiries on the degree of danger a certain design presents should be directed to a member of the Midwestern Robotics Design Competition Committee.
- C. For public safety and to prevent damage to the course, each robot, whether piloted or autonomous, must have an easily accessible shut-off switch on the robot and be able to stop on remote command.
- D. Officials reserve the right to disqualify airborne or ground robots on any day of competition if they pose a safety threat for any reason.
- E. Any batteries used in the construction of the robots must be fully sealed due to the high probability of robot inversion. If violation of this rule results in damage to the course, the robot in question will be disqualified.
- F. Robots must be able to fit within a 3'x 3'x 3' cube. During operation, a robot may extend beyond this size, but the extension cannot stretch to a length, width, or height greater than six (6) feet. Specifically, the point from where it connects to the robot to the end of the extension cannot measure more than six (6) feet. Robots must be able to return to the 3' cube configuration without physical intervention of an operator.
- G. Robots must weigh no more than 140 lbs. Airborne entries must weigh no more than 30 lbs.
- H. Robots must remain in one piece during normal operation.

- I. Robot weight and dimensions must be certified by MRDC Officials prior to each day's competition.
- J. The MRDC Committee reserves the right to recheck any robot for compliance with all of the above rules (notably the weight and size restrictions) at any time.

2.2. Airborne Entries

- A. Since airborne entries pose a greater safety risk, teams planning on submitting an airborne robot must contact the MRDC Rules Chair and Director by **December 1, 2019** with a description of the expected weight, size, propulsion type, and any other specifications of their robot which will be helpful in determining what kind of risk such an entry might pose to the safety of spectators, competitors, MRDC officials and the game course. In addition, flying entities must submit a video recording of clearly sustained and controlled flight. After the proposal has been received, the Rules Chair and Director will either approve or deny the entry by **January 1, 2020**. The deadline for the submission of the flight stability video is **February 5, 2020**.
- B. Any rotors must be made out of plastic or fiberglass and should not be able to cut through the safety netting which will be suspended over the course.
- C. The same battery rules apply to airborne entries as regular entries.
- D. If an airborne entry in any way escapes the course, it will be immediately disqualified from the tournament.
- E. Airborne entries that are not pre-made must demonstrate stable flight capability at some point during the match to be awarded a 2X multiplier for scored points.
- F. Pre-made airborne entries can still compete, but they will receive a 1.5x multiplier for scored points. The pre-made distinction will be determined by MRDC officials, and teams must contact the Committee about this. **See pre-made under Definitions.**

2.3. Autonomous Robots

- A. Teams planning on submitting an autonomous entry must contact the MRDC Director with intent to enter an autonomous robot no later than **February 12, 2020**. Localization aids for autonomous entries will be allowed inside the course and outside the arena *if and only if* the aids do not interfere with other teams or with the use of the walk-ring by officials and other teams.
- B. Autonomous entries must start the round autonomous, and receive the multiplier for all actions completed while autonomous. Autonomous teams can switch to remote controlled partway through the match, and no more actions will receive the multiplier.
Autonomous teams cannot switch back to autonomous. Teams must clearly communicate this switch to their MRDC Judge.

2.4. Pressurized/Pneumatic Systems Specifications

- A. Any pressurized/pneumatic system needs to have two valves – one for the tank and one for the mechanism.
- B. The mechanism must be able to be purged. The tank is allowed to stay pressurized.
- C. The mechanism can only be pressurized inside the course or outside of the gym.
- D. The mechanism must be purged before leaving the arena after competing. NO

EXCEPTIONS.

- E. If any damage occurs to the tank, it must be replaced prior to being re-pressurized or re-entering the arena.
- F. The mechanism can have a maximum working pressure of 400 psi and a maximum stored pressure of 3000 psi.
- G. Pressurized CO₂ is not allowed.

2.5. R/C Specifications

- A. Teams are responsible for following all FCC laws regarding radio transmission. The MRDC Committee accepts no responsibility for FCC violations. Any violations may result in disqualification.
- B. No intentional signal interference of any kind will be tolerated. Teams found responsible for intentional signal interference will be disqualified. Any unintentional signal interference must be resolved before the beginning of each match.
- C. Please always remember to turn on the transmitter module before turning on the receiver module.
- D. At any time that a robot is active, the transmitter must remain on. The transmitter module must only be turned off after the robot controls are off.
- E. Midwestern Robotics Design Competition will only be responsible for controlling hobby radio frequencies. Any other frequencies including but not limited to Wi-Fi frequencies will be the responsibility of the teams.

2.6. Notes on Wi-Fi

- A. Please note that there are 4 university wireless networks in Kenney Gym and that all will be active during the competition.
- B. The above combined with the number of mobile devices connecting to university wireless networks during MRDC (i.e. audience members) can cause significant congestion in the Wi-Fi frequencies.
- C. As per above section, R/C specifications, Wi-Fi frequencies are not controlled by MRDC.
- D. **When not engaging in competition or in testing of robots, all teams must shut down wireless base stations.**
- E. Multiple control devices are allowed; however, such schemes must adhere to all rules concerning R/C specifications and users of such schemes must adhere to all operator and crew restrictions as given in a later section. A maximum of two controllers may be used.
- F. The MRDC Committee reserves the right to recheck any robot for compliance with all of the above rules (notably the weight and size restrictions) at any time.

2.7. Laser Usage

- A. ANSI and CDRH Class I lasers are allowed on the vehicle provided that documentation is given to the Rules Chair by **February 1, 2020**.
- B. The laser may not be modified.

3. Pit Area Rules

3.1. General

- A. Only Official Team Members and sponsors with wristbands will be allowed access to the pit area.
- B. Each team will have two tables in the pit area. The tables measure approximately 2' x 6' each and will be pushed together along their long edges. The tables must remain pushed together at all times. Therefore, each team will have a 4'x 6' working bench.
- C. Each table will have one power strip. The power switch for the power strip must remain clearly visible and accessible at all times. No additional power strips or extension cords may be added. In other words, each tool/device requiring AC power at the table must be plugged in directly to the provided power strip.
- D. Each team will be given a three (3) foot "halo" of space around the edge of their tables. Each team's robot, building materials and any other items belonging to the team must remain within that halo. Items that are not in use are encouraged to be stored underneath the table or be moved out of the gym.
- E. If a team's robot is on the table, it must be propped up on blocks to prevent the robot from falling off the table from any wheel/tread movement.
- F. All equipment except battery chargers must be turned off and in a stored position when a team's pit area is unattended.
- G. When soldering irons are hot, they must be either in use or in their stand. When soldering irons are not in use they must be powered off.
- H. No open flames are allowed in the pit area at any time. This includes sparks, welding, and angle grinding.
- I. **Again, when not engaging in competition or in testing of robots, all teams must shut down wireless base stations.**
- J. No standing on tables, chairs, or any other furniture at any time.
- K. Non-competing team members will be required to stay out of the walkway surrounding the competition platform.
- L. Teams must maintain a clear walkway through the pit area at all times.

3.2. Checking Out

- A. On the last day, teams must be checked out by an MRDC official before getting their deposit check back.
- B. The pit area around the team's table will be inspected for cleanliness and damage.
- C. Teams failing to check out will forfeit their deposit check.

3.3. Violations

- A. A warning will be given for minor infractions of the pit area rules.
- B. Repeated infractions of the pit area rules will result in disqualification.
- C. Team members must observe the designated no-walk zones on the course.

- D. We appreciate your support in notifying MRDC Officials of individuals in the pit area without wristbands.

4. Match Rules

4.1. The Competition

- A. The competition will be a single elimination bracket on Saturday. Seeding for the bracket will be determined based on the scoring on Friday. Teams MUST compete in at least one match on Friday to be eligible to compete in Saturday's bracket.

4.2. The Game

- A. Each match will consist of four or fewer robots competing to score the most points through various actions outlined in section 4.3.
B. Teams will start with their robot placed entirely within their starting square.
C. Each match will be six (6) minutes long.

4.3. Actions

- A. Break into the Treasury
- There are four (4) treasuries, one for each team.
 - To complete this task, teams must open their treasury door. This can be opened by either pressing the button or pulling the door down.
 - Inside the treasury, there will be a chest and a nursery that will be necessary to score points for the tasks "Stock the Treasury" and "Steal the Dragon Egg" respectively.
 - If any team cannot complete this task within three (3) minutes, the door will be opened automatically for no points.
- B. Stock the Treasury
- Teams can take pit balls from the ball pit and transport them to the chest found within their respective treasury.
 - Teams can also steal or put pit balls into another team's treasury,
 - A team can close their own chest at any time. Doing so will lock in the amount of points within the chest and no more balls can be added or stolen by **any** team.
 - If the door to another team's treasury is not open, another team can open it in order to steal or place pit balls into the other team's chest.
 - There is no limit on the amount of pit balls that can be placed into any team's chest.
- C. Seek the Wizard's Wisdom
- There are four (4) wizard towers on the course with IR receivers mounted 2 feet high.
 - Before every round, each team will be given a magic spell (7-bit per character ASCII code with a max of 9 characters) that they will need to transmit to the wizard tower.
 - The four magic spells will change each round.
 - There is a 1 Watt total power limit on IR transmission since all transmitters sum to less than 1 Watt.
 - Teams can go to any wizard tower and complete this task to maintain

control of the towers.

D. Brew Potions

- i. Teams must place four (4) pit balls in a cauldron in a specific color sequence to craft a potion.
- ii. The recipes are as follows:
 - a) Potion of Healing (Blue, Purple, Red, Blue)
 - b) Potion of Strength (Green, Yellow, Red, Green)
 - c) Potion of Invisibility (Blue, Purple, Red, Green)
- iii. Each type of potion can only be crafted once per team, for a total of three (3) distinct ball combinations per round.
- iv. Teams can only use their own cauldron to score points.
- v. A team must declare to their judge which potion they are brewing so that the judge knows which sequence to look for.

E. Steal the Dragon Egg

- i. There are two (2) Dragon Eggs that will be located on opposite sides of the course between two dungeons.
- ii. There are ramps with rough terrain leading up to the Dragon Egg nests.
- iii. Teams will need to transport the Dragon Egg from its nest to the nursery found in their respective treasury.
- iv. Teams can put both Dragon Eggs (broken or whole) in their nursery, but can only transport one at a time.
- v. Teams can also steal broken (2 or more pieces) Dragon Eggs from other teams.

F. Slay the Dragon

- i. There is one (1) spinning scoring zone (the dragon) found in the center of the course which rotates at 5 +/- 1 rpm.
- ii. Each team will have their own scoring bin that they can shoot pit balls into in order to fight the dragon. The dragon may fire back.

4.4. Scoring

- A. Airborne robots that are not pre-made have a 2x multiplier.
- B. Pre-made airborne robots will have a 1.5x multiplier. **See pre-made under Definitions.**
- C. Autonomous robots have a 4x multiplier when scoring autonomously.
- D. Five (5) points may be awarded for assisting robots stuck in the course (this rule is subject to change).
- E. Action Completion
 - i. Break into the Treasury
 - a) 10 points will be awarded to teams which completely open **their own** door. This can only be completed once.
 - b) Breaking into another team's treasury will not lead to any points. However, this task can be completed to steal or place pit balls into an opposing team's chest.
 - ii. Stock the Treasury
 - a) Pit balls have different positive and negative point values based on their color:

1. Green: +4 points
 2. Blue: +4 points
 3. Red: + 3 points
 4. Purple: +2 points
 5. Yellow: +2 points
 6. Orange: -3 points
 7. Pink: -3 points
- b) At the end of the round, points will be awarded based on the amount of balls **inside** of the chest. Any balls that have fallen out or are near the chest will not be counted.
 - c) There is a 20 ball limit that will be counted within the chest. If there are more than 20 balls within the chest at the end of the round, the 20 balls worth the fewest points will be counted (including negative).
 - d) Since treasury balls are scored at the end of the round, autonomous robots will only receive a multiplier for this task if they remain autonomous until the conclusion of the round. Autonomous robots that switch to manual will receive no multiplier for this challenge.
- iii. Seek the Wizard's Wisdom
 - a) Teams will be awarded 1 point for every nine seconds that a tower is being controlled.
 - b) Teams can control as many towers as they want, but other teams can capture any tower to transfer control.
 - c) The scoring will occur separately for each tower, as the timer for each individual tower will start upon completion of the spell.
 - d) If a team captures an occupied tower, the timer for scoring will reset.
 - e) A team who has had their tower captured can reclaim their tower and the timer will start where it had left off.
 - iv. Brew Potions
 - a) Teams will be awarded 20 points for the first, 30 points for the second, and 40 points for the third correct potion that they craft. and can only create one of each potion.
 - b) If a team puts a wrong color ball into the cauldron they will have to restart the sequence from the beginning. The previous incorrect ball's color will not count for this new sequence.
 - v. Steal the Dragon Egg
 - a) Teams can only be awarded points if the Dragon Egg is successfully resting in the nursery of their respective treasury.
 - b) If the Dragon Egg is intact and in one piece, the team will be awarded 40 points upon placing the egg safely in its nursery.
 - c) If the Dragon Egg is broken (two or more pieces), it can be stolen and put in another team's nursery. The team with the broken egg at the conclusion at the match will be awarded 10 points but all of the egg pieces must be in the nursery.
 - d) Teams can be awarded points for both Dragon Eggs.

- e) **See objective-based contact under Definitions** for specifications on competing for the egg.
- vi. Slay the Dragon
 - a) Balls have different positive and negative point values based off of their color. Notice that these point values are four (4) times greater than the point values given for stocking the treasury:
 1. Green: +16 points
 2. Blue: +16 points
 3. Red: + 12 points
 4. Purple: +8 points
 5. Yellow: +8 points
 6. Orange: -12 points
 7. Pink: -12 points
 - b) Points will be awarded at the end of the round, and only pit balls found within a team's scoring bin will be counted. Balls that have fallen or bounced out of the scoring bins will not be scored.
 - c) There is no point limit on the amount of pit balls found in a team's scoring bin.
 - d) Since the pit balls are scored at the end of the round, autonomous robots will only receive a multiplier for this task if they remain autonomous upon conclusion of the round. An autonomous robot that has switched to manual will not receive a multiplier for this challenge.

4.5. Course Movement Restrictions

A. Contact During a Match

- i. Non-contact zones for this year's competition include the Treasury, the ramp leading to the dragon's nest, and the square reaching from the wizard towers to the center dragon bin.
- ii. Robots may only make contact in designated contact zones.
- iii. Robots may only make contact in contact zones if it is objective-based **See objective-based contact under Definitions.**
- iv. A robot is considered in a contact zone if any part of it is inside a contact zone.
- v. If robots making contact are pushed out of a Contact Zone, they must desist.
- vi. To be in legal contact, both robots making contact must be in the Contact Zone.
- vii. Airborne robots and ground robots may come in contact so long as the ground robot is in a contact zone.
- viii. Non-autonomous robots are not allowed to intentionally initiate contact with autonomous robots for the duration of the match where that robot remains autonomous.
- ix. For contact between two airborne robots, contact zones extend upwards vertically from the boundaries on the floor.

4.6. Fouls

A. Class I – Personal Foul

- i. In the event that two robots accidentally hit, bump, nudge, etc. in a non-contact zone the robot(s) that is/are moving will be assessed a Personal Foul.
- ii. A robot that initiates non-objective based contact in a contact zone will be assessed a Personal Foul.
- iii. Unless stated otherwise, if a team intentionally moves another team's objects, they will be assessed a Personal Foul. This does not, however, mean that objects can be used as a sort of barricade mechanism. If there are many objects in the way of a robot, that robot may sweep other team's objects to the side in a non-harmful way as coordinated with that team's designated MRDC official.
- iv. Manipulating another team's action will result in a Personal Foul and will count as a triggered action for the other team. Points for the triggered action will go to the other team.
- v. A team launching a ball at another team's robot will be assessed a Personal Foul if they are clearly not aiming for the center bin.
- vi. A team will be assessed a foul if they are blocking another team from entering any treasury, as deemed by the judges of the competition.
- vii. If a team commits more than five (5) Personal Fouls, each Personal Foul afterward becomes a Technical Foul.
- viii. Autonomous robots are exempt from Class I fouls.
- ix. The Personal Foul count is reset after every match.

B. Class II – Technical Foul

- i. If a team attacks another team's robot outside of the designated Contact Zones, the assaulting team(s) will be assessed a Technical Foul.
- ii. If a person is found in a team's area during competition hours on Friday and Saturday without a wristband, that team will be assessed a Technical Foul. This includes and is not limited to spectators, team members, and parents.
- iii. A robot that intentionally initiates contact with an autonomous robot will be assessed a Technical Foul.
- iv. Team members that enter an area around the course that has been restricted by the MRDC committee (typically in front of the judges' table) will be assessed a Technical Foul.
- v. Each Technical Foul after the first Technical Foul is committed will be counted as a Flagrant Foul.
- vi. Technical fouls accumulate throughout the competition.
- vii. MRDC reserves a parking spot in the lot outside the North entrance to the Gym Annex (there will be a sign marking the spot). Any team member or individual associated with a team who parks there will result in a technical foul for that team. A vehicle found in the reserved spot will be towed at the owner's expense.

C. Class III – Flagrant Foul

- i. In the event of a robot intentionally ramming another team's robot, which results in the disabling of that robot during a match, the team will be assessed a Flagrant Foul.
- ii. In the event of a robot intentionally attacking a robot specified as "disabled", the team will be assessed a Flagrant Foul.
- iii. If a team intentionally damages the course, they will be assessed a Flagrant Foul. (The wizard towers are especially fragile. Do **not** touch them)

D. Penalties

- i. If a team is assessed a Personal Foul, ten (10) points will be deducted from their score.
- ii. If a team is assessed a Technical Foul, fifty (50) points will be deducted from their score.
- iii. If a team is assessed a Flagrant Foul, they will be disqualified from that particular match and forfeit all of their points. They must immediately deactivate their robot and hand the controller(s) to a MRDC official. If the team is not currently in a match when they receive a Flagrant Foul, they will not be disqualified from their next match.
- iv. If a team is assessed two (2) Flagrant Fouls over the course of the competition, the team will be disqualified from the competition upon receiving the second foul.

5. Operator/Crew Restrictions

5.1. General

- A. At most one operator per team is allowed to be present during each match on the outer course walkway.
- B. One other team member per team is allowed to spot for the operator from the walkway.
- C. Each team may have a maximum of two controllers. If two controllers are used, the team's designated spotter will become the second operator. The operator is the only team member allowed to use a controller. This means that a team may either have an operator and a spotter or two operators during the match. Only designated operators are allowed to use a controller. Violation of this rule will result in disqualification of the robot.
- D. A spotter must always yield to the movement of an operator. If an operator asks a spotter to move, the spotter must move.
- E. Other Official Team Members are allowed to spot for the operator and spotter but must do so from floor level or the spectator balcony without interfering with any actions taking place on the outer course walkway as well as the floor area. Only one (1) spotter is allowed on the upper spectator balcony
- F. There is no running on the outer course walkway, the floor, or any other part of the gymnasium at any time.

- G. No team member is allowed to enter the arena or be inside the arena during a match.
- H. Robot operators or spotters must not physically aide, hinder, or come in contact with any robot in any way during a match (e.g. pushing, pulling, tethers/wires, etc.).
- I. During each match, no team member may interfere with another team member's control of the robot, impede the movement of an Operator/Crew member of any team or distract an opposing team member.
- J. During each match, if an operator/crew member wishes to pass an opposing operator/crew member, s/he must step behind the member that s/he wishes to pass, NOT IN FRONT of that person.

5.2. Violations

- A. First team violation of the operator/crew restrictions will result in a warning to the team.
- B. Second and subsequent violations will each result in a Technical Foul.
- C. If a team abuses the spotting privilege, the team will lose the privilege of having a spotter on the course walkway and on the spectator balcony.

6. Match Reset

- A. The MRDC Committee reserves the right to change the rules during the competition. If such a change is deemed necessary during a competition round, the round will be immediately stopped and reset to starting conditions. All points gained during the match will be considered void. Teams will be allowed five (5) minutes to replace batteries, but no time will be allotted for recharging.

7. Demolition Round (Optional)

- A. Only robots that have competed in at least one round of the bracket may participate.
- B. Contact may occur in any zone at any time during the optional demolition round(s).
- C. Course rules (integrity of the course and pit area rules, as an example) remain unaltered for the optional demolition round.
- D. Provided that all the rules from the standard competition are still met (weight, dimensions, R/C specifications, etc.), robots may be altered for the demolition round. Provided no tactical weapons (i.e. no parts or pieces of the robot may be launched or thrown). Any modifications to the robot must be made safe until it enters the competition arena. **See Tactical weapon under Definitions.**
- E. A half-hour period will be allotted for modifications.

8. Definitions

- A. Autonomous robot: A robot that can perform the competition tasks without any human-controlled action during the round
- B. Cauldron: 16 inch diameter plastic cauldron

- C. Dragon egg: 10 inch tall plastic eggs with a maximum diameter of 7 inches.
- D. Pit ball: 6 cm diameter plastic balls used in the ball pit around the center dragon bin.
- E. Objective-based Contact: Contact that occurs between two robots over control of a certain game element (i.e. Dragon egg). Contact in these scenarios is meant for both teams to be going for the objective and not just ramming into each other.
- F. Tactical weapon: Attachments that shoot/launch projectiles, dispense fire/chemicals, utilize moving blades, and/or damage the course intentionally.
- G. Pre-made: A drone or drone skeleton that is purchased from a store or online provider (such as Amazon) and has its own flight technology.