

First Robotics Q&A 2021

INFINITE RECHARGE



Q1 Innovation Challenge

Q: (section 4.2), states "identify a problem or opportunity and design a solution to help people (or community of people) keep, regain, or achieve optimum physical and mental health and fitness through active play or movement. It then goes on to provide a criteria for the bare bones of a submission, and never discusses active play and movement in qualification for a solution in the judging aspects. As a team, we were wondering if our solution must incorporate an "active play or movement"?"

A: Section 4.2 of the At Home Challenges Manual - states that teams are identifying a problem or opportunity through active play or movement. Section 4.4.3.1 shows that the Problem or Opportunity is one of the criteria of the submission and includes the judging guidelines that will be utilized when evaluating submissions. Teams who want to be successful in this criteria should incorporate active play or movement.

(Asked by **85** answered Jan 14th 21)

Q2 Power Port Challenge and Reintroduction Zone

Q: In the Power Port Challenge, does the robot need to be in the Reintroduction Zone in order to receive more power cells from human players? This is in reference to 2.4.10.2 Rules PPC6. What we are trying to determine is if the human players can roll power cells from the Reintroduction Zone to the robot located in the Shooting Zone directly.

A: Yes, Rule PPC6 which requires that humans "only introduce POWER CELLS in the Reintroduction Zone" intends that the POWER CELLS remain in the Reintroduction Zone until influenced by the ROBOT.

(Asked by **226** answered Jan 14th 21)

Q3 PPC1 3 Ball Limit

Q: For the Power Port Challenge, we would like clarification on if PPC1 applies only to the number of POWER CELLS in the Challenge Space at any given time ,or if the limit is on the total number of unique POWER CELLS that can be introduced for the duration of the challenge run?

A: Per PPC1, teams may not use more than three (3) POWER CELLS. This means that a total of no more than 3 POWER CELLS may be used to complete the Challenge.

(Asked by **4911** answered Jan 14th 21)

Q4 Multiple Challenge Spaces

Q: Does the same physical space need to be used as the Challenge Space for all Skills Challenge runs submitted? If not, can the Challenge Space used for different challenges be of slightly different sizes, as the minimum space requirements for vary between challenges?

A: There is no requirement that the same Challenge Space be used for each Challenge or that all spaces be the same size provided each is no larger than the 15 ft. x 30 ft. space described in 2.4.4.

(Asked by **4911** answered Jan 14th 21)

Q5 Does the same robot need to be used for the Judged and Skills Challenge?

Q: I can see two scenarios where a team may want to use different robots: 1) A team designs a robot for the judged awards, and intends to build it for the skills challenge - but due to covid restrictions is never able to build it. However, they have access to a suitable 2020 robot that can complete the skills and they'd like to submit that 2) A team would like their 2020 robot design to be judged for an award. However, they want to build a new robot optimized for the skills challenge only

A: There are no rules requiring the use of the same ROBOT for the two components of INFINITE RECHARGE at Home

(Asked by 5414 answered Jan 14th 21)

Q6 Timeline for interviews and group assignments

Q: For students planning to submit for the judged and skills challenge - when do they find out their group and when their interview is scheduled for? Are interviewed going to be bounded as no earlier or no later than certain dates?

A: Please see [Team Update 02](<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate02.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by 5414 answered Jan 15th 21)

Q7 What is included in the Innovation Challenge 500-word submission?

Q: We have questions concerning our Innovation Award submission. The rules state that we will have 500 words divided into three areas. Will there be a way to include references? If so, will those references be counted against the 500 words? Also, will there be a way to include images (figures) and/or tables?

A: Please see the update to the Submission Information sections in [Team Update 02] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate02.pdf>). As described in Section 4.3 of the [At Home Challenges Manual] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/2021AtHomeChallengesManual.pdf>), there are three fields that teams have to answer each with their own word limit, and the three limits sum to 500 words total. Only words typed in these fields are subject to the limit. Supplemental materials will not be collected in the initial submission. Teams are encouraged to show references, images, etc. during their interview with the Judges as described in Section 4.5.

(Asked by 2530 answered Jan 15th 21)

Q9 Can Robot Loading System be Separate from Firing System?

Q: Does a given robot need to have its loading system connected to its firing system?" In the robot challenge, there is one event where power cells need to be picked up, and two events where power cells need to be fired at the power port. Do these two systems need to be connected, or can a robot have two separate systems to the point where it would not pick up and fire a power cell unless it is manually inserted by a team member?

A: We cannot rule absolutely on hypothetical ROBOT designs. GSC6 requires that the ROBOT is in CONTROL of all three (3) POWER CELLS to complete the challenge, but does not specify any requirements for how this is accomplished. Provided the same ROBOT in the same configuration is used, per SC8, and team members do not contact the robot during the challenges, per SC3, no rules specifically prohibit this.

(Asked by 2530 answered Jan 14th 21)

Q10 Order of operations for Galactic Search Challenge

Q: GSC2 has text that clarifies the randomization for red or blue paths, my question is what order do we do this? and also, can we change which autonomous program we queue up based on the coin flip? I interpreted the rules to mean: set the robot down > turn robot on > flip the coin > set the game pieces in the correct places > enable robot > autonomous program runs and robot completes instructions. Could you clarify more about the order of operations?

A: Good question! Our apologies for the ambiguity. Please see [Team Update 02] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate02.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **3487** answered Jan 15th 21)

Q11 What is the required STARTING CONFIGURATION for the Skills Challenge?

Q: Rule R2 of the 2020 Game and Season Manual specifies the STARTING CONFIGURATION of the ROBOT at the beginning of a MATCH. Does Rule R2 apply for the Skills Challenges? In particular, may a part of the ROBOT extend outside the vertical projection of the FRAME PERIMETER before the robot is enabled and the timer started?

A: Thanks for pointing that out. Please see [Team Update 02] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate02.pdf>). If that doesn't answer your question, please rephrase and resubmit. Please note the 2020 Game and Season Manual is replaced by the [2021 Game Manual] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/2021FRCGameManual.pdf>).

(Asked by **6829** answered Jan 15th 21)

Q12 field elements

Q: What field elements are needed and can we get more points if we use field elements that are not required?

A: This answer assumes the question refers to INFINITE RECHARGE at Home as implied by the tag. For the Skills Challenge portion of INFINITE RECHARGE at Home, as described in Section 2.4.1 no wooden field elements are required. Teams will need a Challenge Space and MARKERS as described in Sections 2.4.1 and 2.4.4. Additionally, two of the challenges require a representation of the POWER PORT, simplified options for this are provided in the [INFINITE RECHARGE at Home Challenge Space Layout document]

(<https://firstfrc.blob.core.windows.net/frc2021/Manual/AtHomeChallengesSupplements/2021INFINITERECHARGEatHomeChallenge-SpaceLayout.pdf>). Each challenge has specific scoring criteria detailed in the manual and no additional points are awarded for completing tasks not described. For the Infinite Recharge at Home Judged Awards, judges will be judging based on the guidelines described on the [Award Guidelines page](<https://www.firstinspires.org/robotics/frc/awards/at-home-challenge-award-guidelines>) and will not favor either ROBOTS designed for INFINITE RECHARGE or INFINITE RECHARGE at Home. If that doesn't answer your question, please rephrase and resubmit.

(Asked by **5431** answered Jan 15th 21)

Q13 Field reset

Q: what considerations should we have for field reset in our game design? is there a set amount of time?

A: The only consideration for field reset that is listed in Section 3.3 Design Considerations of the [At Home Challenges Manual] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/2021AtHomeChallengesManual.pdf>) is that top Game Design Concepts will be safe for field crew. That list however, is not intended to be complete; the full list of consideration used by FRC Game Design teams wasn't published because we opted to focus on just higher priorities (to prevent overwhelming a creative process with a large number of important, but not primary concerns). Additionally, the thought is that any games that end up being used in the future could be tweaked to meet criteria if it's to be implemented in reality. Regarding reset time, there's no specified limit, however if a game requires reset timing that's dramatically different from precedent (which is a few minutes per match), they should look closely at the tradeoffs they're making and determine if/how those tradeoffs should be mitigated (tradeoff is that 50 field reset volunteers would be needed? tradeoff is that events are longer to accommodate the number of plays a team gets? teams get fewer matches? etc.).

(Asked by **5431** answered Jan 19th 21)

Q14 mini bot or sim for the Judged Autonomous award

Q: Hello, We are aware of Rule 1 and the blue box associated with it, but are still wondering, and possibly an extension of Q5, If a team does not have access to their robot before March, are they able to use a mini-bot (vmx-pi based 12v or Romi), or the simulator to apply for the Autonomous Award sponsored by Ford?

A: No, the machine used in Award Submissions must be a ROBOT (not any "robot"). Please refer to the Blue Box in Section 2.1 of the [At Home Challenges Manual](<https://firstfrc.blob.core.windows.net/frc2021/Manual/2021AtHomeChallengesManual.pdf>).

(Asked by **6762** answered Jan 19th 21)

Q15 SC7: Which rules are ROBOT rules?

Q: For the purposes of SC7, does the "all ROBOT rules" apply only to those rules marked R## in the 2021 Game Manual? It seems to, given that the only rules excepted are R rules. If not, what rules are actually included?

A: Yes, the SC7 reference to "all ROBOT rules" refers specifically the R## rules in [Section 9] (https://firstfrc.blob.core.windows.net/frc2021/Manual/HTML/2021FRCGameManual.htm#_Toc61375663) of the [2021 Game Manual](<https://firstfrc.blob.core.windows.net/frc2021/Manual/2021FRCGameManual.pdf>) However, please see [Team Update 02] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate02.pdf>) for additional restrictions that reference rules outside [Section 9](https://firstfrc.blob.core.windows.net/frc2021/Manual/HTML/2021FRCGameManual.htm#_Toc61375663).

(Asked by **6995** answered Jan 15th 21)

Q16 Digital Animation Award Deadline

Q: <https://www.firstinspires.org/resource-library/frc/digital-animation-award-sponsored-automationdirect> (deadline looks like 23 January 2020) when we check this link and Calendar we are not able to see the updated deadline for Digital Animation Award. Is it only a type error of writing 2020 ? Thanks

A: The Digital Animation Award sponsored by AutomationDirect.com has just been released and announced for the 2021 Season. Please check out [this page](<https://www.firstinspires.org/resource-library/frc/digital-animation-award-sponsored-automationdirect>) for full details and deadlines.

(Asked by **6064** answered Jan 19th 21)

Q17 Robot Communications for Galactic Search

Q: The text box for question GSC2 implies no communication is permitted to the robot after the red/blue path choice has been made. Can you confirm this? In particular, is the use of a path selector (e.g. a switch on the robot, a selection on the Driver Station, or the use of the Field Message API) prohibited by GSC2 after the red/blue choice has been made?

A: Please see [Team Update 02](<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate02.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **281** answered Jan 15th 21)

Q18 Clarification on Robot Placement and Signaling per GSC2-1

Q: Per GSC2-1, placement of the robot is not considered signaling the choice of Path A or B. Are teams allowed to choose the robot's starting placement after Path A or B has been chosen, but prior to the color determination per GSC2? If so, is it considered "signaling" if the robot makes a determination of Path A or B based on its sensed starting location, with no indications or signals to the robot other than its placement on the field?

A: There are no rules that prohibit ROBOT placement between Path selection and color determination. The second part of this inquiry is tougher as it requires your honest assessment of your intent. Are you using the placement of the ROBOT to signal to the robot its path? If "yes," it's a violation of GSC2. If your answer is no (because your ROBOT placement to better position the robot in executing the task), then it's likely it's within the letter and intent of GSC2.

(Asked by **4911** answered Jan 17th 21)

Q19 Power Port Challenge PPC5 Intent

Q: Is PPC5 intended as a restriction only on the number of humans entering Power Cells into the reintroduction zone. Is it legal to have more humans involved in retrieving scored Power Cells and transferring them to the two humans putting them in the reintroduction zone?

A: Good question. Please see [Team Update 03] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate03.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **4911** answered Jan 19th 21)

Q20 PPC1 Using no more than 3 balls during the Power Port Challenge

Q: In the answer to Question 3 you stated that in the Power Port Challenge "no more than 3 POWER CELLS may be used to complete the challenge". Does this mean that the same 3 balls that the robot is preloaded with must be the ONLY balls used throughout the challenge? If a ball strikes the goal and bounces out of the challenge space, is it only that specific ball that can be reintroduced, or can any ball be reintroduced from the reintroduction zone?

A: Yes, the same three (3) POWER CELLS must be used throughout the challenge. Other POWER CELLS may not be substituted during a challenge.

(Asked by 4774 answered Jan 17th 21)

Q21 PPC6 Loop Clarification

Q: What "allowance" is being referred to by this clarifying text under 2.4.10.2 - PPC6: "The intent of this allowance is to avoid forcing humans to field POWER CELLS in close proximity to the ROBOT. Teams should not use this allowance to attempt to create a "loop" with minimal ROBOT movement." Are we trying to avoid looping with robot intake or human reintroduction? Can you provide an example of a loop that should be avoided?

A: Please see [Team Update 03](<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate03.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by 4611 answered Jan 19th 21)

Q22 GPS Assisted Autonomous

Q: We are considering the use of an indoor GPS kit to aid us in our Autonomous by giving our robot live position tracking. Are we allowed to use this in accordance with team update 02 which states "Other static elements may be used outside the Challenge space... provided the robot does not physically interact with them."?

A: !R63 prohibits use of a GPS.

(Asked by 2102 answered Jan 19th 21)

Q23 Power Port Ball Return

Q: Are we allowed the use of mechanisms (i.e. 3D power port with ramp/chute) in order to aid the humans in automatically returning the balls onto the Challenge space? If allowed, are these balls able to be directly fielded by the robot in accordance with PPC6?

A: There are no rules that prohibit use of mechanisms to aid humans, however please see [Team Update 03](<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate03.pdf>) for additional context.

(Asked by 2102 answered Jan 19th 21)

Q24 Innovation Challenge Joint Submission (Collaborative Project)

Q: Hello! We have an interest in working along another FRC team for the Innovation Challenge, as we seek to collaborate to generate a project that could impact communities in two different regions from our country. We would love to generate a single project, as in having a joint submission for this year's Innovation Challenge (only for this challenge, as we would compete separately for the rest of the challenges). We would like to know if this is possible. Thank you!

A: We love, appreciate, and applaud your cooperative approach. While there aren't any rules that outright prohibit joint proposals, a single submission cannot be tied to two or more teams in the submission portal. Each team will have to submit their own submission through the portal and have their own interview in which Judges will likely seek further information about your team's contribution to the project. Please note that the Judging process is subjective and Judge groups vary, so evaluation of two similar projects may result in different recognition.

(Asked by 6832 answered Jan 21st 21)

Q25 PPC6 Power Port Ball Return - is throwing over the shooting zone allowed?

Q: After retrieving a power cell near the Power Port, can that person throw the power cell over the vertical space above the shooting zone to another person stationed near the re-introduction zone without the ball touching the ground surface?

A: There are no rules that explicitly prohibit this.

(Asked by 226 answered Jan 20th 21)

Q26 Markers with Reflective Tape

Q: For the MARKERS, is it legal to have reflective tape on the MARKERS? In the manual, it states "Some examples of MARKERS include but are not limited to 4" x 4" lumber, 2 Liter bottles, small cones, etc." It does specify if we can include reflective tape or not.

A: There are no rules that prohibit MARKERS with reflective tape on them.

(Asked by 5480 answered Jan 20th 21)

Q27 2 Robots: at home vs in person

Q: This year can we build a robot specifically designed for the at Home Challenges to save some money and still give our kids the challenge of building a "new" robot designed for a specific set of rules/tasks. Then reuse our 2020 Robot for any live in person Competitions if they are opened up? One for each type of competition or do they have to be the same robot ?

A: Yes, !C5 requires that "each registered *FIRST* Robotics Competition team may enter only one (1) ROBOT (or 'Robot', a ROBOT-like assembly equipped with most of its drive base, i.e. its MAJOR MECHANISM that enables it to move around a FIELD) into a 2021 *FIRST* Robotics Competition Event." At Home Challenges are different events from each other **(though not particularly relevant because !C5 doesn't apply to At Home Challenges)** and are different events from an in-person event, which means different ROBOTS may be used for these different events. **There are no rules that require that the same ROBOT be used for each of the three At Home Challenges, and specifically, no rule requiring the same ROBOT be used for the INFINITE RECHARGE at Home Skills Competition *and* Judged Awards. Please see edits made in [Team Update 05] (<http://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate05.pdf>).** *(edited 1/26/21)*

(Asked by 1501 answered Jan 20th 21)

Q28 Modifying robot in between challenges.

Q: Is it possible to change and remove parts of the robot in between home challenges to improve the robot's performance?

A: It depends on the scale of the change. Per SC8 of the [At Home Challenges Manual] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/2021AtHomeChallengesManual.pdf>), a team must use the same ROBOT in the same configuration for all Skills Challenge runs. However, as noted in the blue box teams are able to make minor upgrades or enhancements to their ROBOT.

(Asked by 2264 answered Jan 21st 21)

Q29 Interstellar Accuracy Order of Shots Per Zone

Q: Per IAC2, teams must attempt at least 3 power cells per zone and the remaining 3 power cells may be shot from any zone. Do the "remaining 3" power cells need to be shot after all other power cells, or can they be shot along the way? For example, would it be legal to initially shoot 6 power cells in one zone?

A: There is no required order for shooting from zones provided teams follow IAC2 and shoot at least three (3) POWER CELLS from each zone. A team may choose to shoot the extra 3 POWER CELLS at any time as long as they follow IAC6.

(Asked by 694 answered Jan 21st 21)

Q30 Galactic Search Violations of "No Signalling"

Q: Per team update 02 GSC2-1, "Teams may signal neither the path (A or B) nor the GSC2 determination (red or blue) to the ROBOT." After randomizing, can teams indicate which path was chosen to the robot in FRC Driver Station or Shuffleboard/SmartDashboard?

A: Nope, that's a team signaling the selected path to the ROBOT.

(Asked by **694** answered Jan 21st 21)

Q31 Galactic Search Physical Robot Manipulation Timing

Q: Per Team Update 02 GSC2-1, "Placement of the ROBOT is not considered signaling." What is the intended order of actions in setting up the robot? Is it: place robot > randomization > set up balls > run path 1 > place robot > run path 2? When is it legal to manipulate the robot before and between paths?

A: Placement of the ROBOT may happen before or after path selection (red vs blue, A vs B), provided that placement isn't a way to signal to the ROBOT which path it's to follow. There are no rules that prescribe the order, however POWER CELL placement can only be done after the red/blue determination. Teams may position/reposition the ROBOT between path attempts.

(Asked by **694** answered Jan 21st 21)

Q32 Galactic Search Randomization of Path Color Timing

Q: Per GSC2, "teams must make a single random determination and then run the same color on both paths," and per GSC7 teams must record completion separately for each of the 2 paths. Is it legal for teams to optimize only one autonomous routine for the color they intend to submit scores for, either before or after randomizing?

A: Writing code to complete only one of the colored paths and discarding all attempts at the other path does not match the intent of the challenge and violates SC5.

(Asked by **694** answered Jan 21st 21)

Q33 In person skills competition

Q: Are the skills competition awards dependent on the robot's potential performance in the regular in-person competition (should we get to a point of live competitions), or the robot's potential performance in the at home challenge?

A: No, Skills Competition award assessment is independent of ROBOT performance at an in-person event. The only Skills Competition awards are the Skills Competition Winner & Finalist and they are solely based on the team's performance in the Skills Competition component of INFINITE RECHARGE at Home.

(Asked by **6933** answered Jan 21st 21)

Q34 Can we use the Arduino microcontroller for our INFINITE RECHARGE robot?

Q: Can we use the Arduino microcontroller for our INFINITE RECHARGE robot? (the intention is to use it as a coprocessor for vision processing, like RaspberryPI, for example).

A: We cannot comment on part/design legality, previous calls of Head REFEREES or LRIs, or questions that are overly broad, vague, and/or include no rule references. If you have a specific question about how an Arduino microcontroller may or may not comply with one or more ROBOT rules, please submit a new question.

(Asked by **7566** answered Jan 21st 21)

Q35 For SC7, how do references to the ARENA apply to infinite recharge at home?

Q: With regard to SC7, how do references to the ARENA in Section 9 of the Game Manual apply to Infinite Recharge at Home?

A: Thank you for the question. Please see [Team Update 05] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate05.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **8332** answered Jan 26th 21)

Q36 Using PixyCam with Arduino

Q: We want to connect our PixyCam to an Arduino and connect it to the roboRIO, so that we can better explore the camera's capabilities in our challenges (such as providing useful data on the location of the POWER CELLS, among others). However, we did not find anything in the Manual on the legality of its use. So, if there is nothing saying it is illegal, can we use it?

A: Per the response to !Q34, we won't provide a green light to a part or declare a part illegal, as much of that determination is dependent on its implementation. There are no rules which overtly declare a PixyCam or Arduino illegal, however the manner in which the items are employed may not be permitted. Please consult [Section 9.8](https://frc-qa.firstinspires.org/manual/_Toc61375671) of the [2021 Game Manual](<https://frc-qa.firstinspires.org/manual>), and if there are rules that are unclear regarding implementation of either device, please resubmit citing the rules and describe the clarity you seek.

(Asked by 7566 answered Jan 25th 21)

Q37 Robot for Judged Autonomous Award

Q: Based on Q5, the robot for judged awards and the skills challenge can be different. Since the Judged Autonomous Award requires a video of an ROBOT (Q14), can 2 different robots be submitted for the judged awards. One robot for Engineering, Industrial Design, & Quality Award based on CAD and a Second robot for the Autonomous Award (a built & functional robot)? Potential three different robot designs could be used in this scenario to complete the various judged and skills tasks.

A: Please see [Team Update 05](<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate05.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by 955 answered Jan 26th 21)

Q38 Human players entering the Reintroduction Zone

Q: For Interstellar Accuracy or POWER PORT challenges, may human players enter the Reintroduction Zone for the purpose of introducing power cells to the robot? We've specifically considered IAC8, IAC9, PPC5, PPC6, and SC2, and their respective blue boxes, but are unable to answer this. The SC2 blue box indicates human players may enter the Challenge Space. We intend to ensure player safety, but would like to understand the requirement.

A: There are no rules that prohibit a human from being in the Reintroduction Zone during a challenge attempt. You're right, please make sure if done, it's done so in a way that mitigates any risk to the safety of your human!

(Asked by 3103 answered Jan 25th 21)

Q39 Interstellar Accuracy Challenge for robots incapable of scoring from zones

Q: If a robot is incapable of scoring from certain zones in the Interstellar Accuracy Challenge (for example, a robot that can only score in the low port or that was designed to shoot from the target zone), does the video need to show the robot making the obvious airballs from the other zones? IAC1 seems to say no, but IAC2 seems to say yes.

A: Sorry for the confusion, and thank you for the question. Please see [Team Update 05](<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate05.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by 1293 answered Jan 26th 21)

Q40 Galactic Search Challenge Markers

Q: Figures 2-3 and 2-4 show markers at B1, D1, B11, and D11. However, there does not seem to be a penalty for contacting these markers in section 2.4.6. What is their purpose?

A: Per Section 2.4.6.1 these markers are used to define the Start and End Zones for the ROBOT.

(Asked by 4242 answered Jan 25th 21)

Q41 Limitations of driver assistance for the Hyperdrive Challenge

Q: For the Hyperdrive Challenge, are there any restrictions for the on-board processing of control inputs for driver assistance, provided the robot is not driving a pre-programmed path? If so, what are those restrictions?

A: The combination of language in HDC1 and the introduction to [Section 2.4.8] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/AtHomeManualSections/2021AtHomeChallengesManualSection02.pdf>), "teams drive their ROBOTS remotely, without the assistance of pre-programmed navigation," is intended to invite competition among drivers of different teams. There's no clear line between where assistive sensors/code becomes pre-programmed navigation (e.g. closed loop control of motors to help make sure that "drive straight" really drives straight would be on the "ok" end of the spectrum vs holding a joystick forward means "navigate this course" is in the "not ok" end of the spectrum). This is a great example of where we invite teams to make their own, good faith judgements applying the principles offered in the note that opens [Team Update 02] (<http://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate02.pdf>).

(Asked by **900** answered Jan 25th 21)

Q42 Additional Multi-Robot question for clarity.

Q: Answer from previous Multiple Robot question: At Home Challenges are different events from each other and are different events from an in-person event, which means different ROBOTS may be used for these different events." My Q: so each At Home Challenge is unique to themselves thus allowing a team to submit one robot to each challenge IF they decide to build a robot for the 2021 season and use their 2020 robot as well? Or do all of the At Home Challenges have to be done with the SAME robot.

A: Per SC8, Skills Competition challenges must be completed with the same ROBOT. This does not need to be the same ROBOT used for the Judged Awards (hopefully that's clarified in [Team Update 05] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate05.pdf>) and the updated answer to !Q27).

(Asked by **7056** answered Jan 26th 21)

Q43 Are we allowed to use a pulley from something else on an FRC robot?

Q: Are we able to use a pulley system from a different machine on our robot? We did not design or manufacture the item. We would not know the cost or information on the specific piece.

A: We cannot comment on part/design legality, previous calls of Head REFEREES or LRIs, or questions that are overly broad, vague, and/or include no rule references. Please consult [Section 1.8] (<https://frc-qa.firstinspires.org/frcathome>) and, if needed, resubmit a different question.

(Asked by **7531** answered Jan 25th 21)

Q44 Can separate robots be used to complete different skills challenges?

Q: Per the GDC Admin response to Q27, "At Home Challenges are different events from each other and are different events from an in-person event, which means different ROBOTS may be used for these different events." This answer is contradictory to SC8, which states "All Skills Challenge runs should be completed with the same ROBOT in the same configuration." Could a clarification be made? Can we use a different robot for each skills challenge? (e.g. one robot for racing, one robot for shooting.)

A: Please see the updated answer to !Q27, the answer to !Q42, and [Team Update 05] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate05.pdf>). If those don't answer your question, please rephrase and resubmit.

(Asked by **4295** answered Jan 26th 21)

Q45 Can an APP be part of our challenge?

Q: Would my team be able to develop an app as a possible project and main focus for the global innovation challenge?

A: There are no prohibitions on creating a tool of that nature. Good luck!

(Asked by **7692** answered Jan 27th 21)

Q46 Control Scheme for Interstellar Accuracy Challenge

Q: While the Power Port challenge explicitly mentions that the robot will “emulate the teleoperated portion of INFINITE RECHARGE,” there is no explicit definition of Auton vs Teleop for the Interstellar Accuracy Challenge. Could we get clarification on what control scheme the Interstellar Accuracy Challenge is intended to be in?

A: Good question, the intent of the language you cite was not to prohibit autonomy. Please see [Team Update 06] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate06.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **41** answered Jan 29th 21)

Q47 Marker Customization

Q: A previous question, question 26, asked if markers could be customized using reflective tape as there are no rules against it. Does this apply to any form of customization such as aruco codes?

A: Correct, there are no rules that prevent customization of markers.

(Asked by **41** answered Jan 27th 21)

Q48 SC11 Marker Clarification

Q: SC11 says that markers for the Infinite Recharge at Home Skills Challenges must have a minimal cross-section of 2.5" by 2.5". Must a marker meeting the minimum size requirements fully occupy this 2.5" x 2.5" boundary (corners and all)? To clarify, would a 2.5" diameter, 5" tall cylinder meet the minimum size requirements for a marker? ie. a pool noodle or 2.5" od pipe?

A: No, the cross section is not required to completely cover a 2.5 in. x 2.5 in. square. A 2.5 in diameter cylinder 5+ in. tall would meet the size requirements for a MARKER.

(Asked by **2386** answered Jan 27th 21)

Q49 Use of Steel Floors and Magnets - A Safety Hazard

Q: Section 2.4.1 indicates that "Carpet is not needed, any surface on which the ROBOT can safely drive is permitted". Could FIRST explicitly, perhaps via Blue Box, indicate that using steel or other metal flooring, in conjunction with magnets on the FRC robot, in attempt to increase downforce, does not meet the requirement to "safely drive"? Otherwise, teams may consider use of dangerous neodymium magnets to gain a competitive edge in the 2021 At-Home Skills Challenges. This is a safety hazard.

A: This seems to be a suggestion for a manual change rather than a question, and we'd like to remind everyone that the Q&A system is for rules questions, and we ask that suggestions for manual changes are directed to [FIRSTRoboticsCompetition@firstinspires.org] (<mailto:firstroboticscompetition@firstinspires.org>). We encourage all teams to read and apply !R8 in everything they do. We also would like to refer to you to [Team Update 06] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate06.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **1678** answered Jan 29th 21)

Q50 Maximum MARKER Size

Q: Is there a maximum allowed MARKER size? There is incentive to increase the size of the starred MARKER in the Bounce path to reduce the path length the robot must travel. Could FIRST provide a MARKER size upper limit or other guidance?

A: Good point. Thank you. Please see [Team Update 06] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate06.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **1678** answered Jan 29th 21)

Q51 MARKER Placement on NAV POINTS

Q: Section 2.4.4 states "For each challenge, a layout diagram indicates which NAV POINTS are used and the placement of MARKERS". There is no indication of how a MARKER must be placed on a NAV POINT. Should MARKERS be "centered" on a

NAV POINT, or merely "in contact" with the NAV POINT. We recommend that teams be asked to have their MARKERS centered on each NAV POINT, in order to avoid incentivizing a MARKER shape with a lower skirt which avoids robots bumpers but contacts the NAV POINT. Thank you.

A: Please see [Team Update 06](<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate06.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **1678** answered Jan 29th 21)

Q52 ARENA DESIGN

Q: Can we use a FIRST official CAD model for our arena computer-aided design for the game design challenge?

A: There are no rules prohibiting the use of *FIRST* official CAD models in a Game Design Challenge concept, and the [Evergreen Field CAD package](<https://www.firstinspires.org/robotics/frc/playing-field#CADModels>) is provided for that purpose (but note that a complete copy of any existing game contrasts with [Section 3.2] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/AtHomeManualSections/2021AtHomeChallengesManualSection03.pdf>)).

(Asked by **6694** answered Jan 28th 21)

Q53 Word Count

Q: Are words included in visuals or words included in tables counted in the overall word count in the section?

A: Submission sections with word-count limits are text only; tables, images, etc. can not be included in those fields.

(Asked by **3138** answered Jan 28th 21)

Q54 Game Piece Product Links

Q: Should we include COTS links in our game design essay?

A: No, per Section 3.2: "Do not include links or redirects to additional content outside the bullets described above (e.g. include a link to webpage with additional images or content); such references will not be reviewed." This would include links to COTS products.

(Asked by **3138** answered Jan 28th 21)

Q55 Infinite Recharge at home autonomous award

Q: "For the Judged Autonomous Award there is a video that we are required to turn in. In the manual it says "an autonomous program" but we were interested in imputing multiple autonomous videos stitched together to show our autonomous' programs consistency. Would this be authorized by the judges? Thank you."

A: Please see [Team Update 06](<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate06.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **85** answered Jan 29th 21)

Q56 Galactic Search Challenge: Number of Balls on Field

Q: While the robot is actively autonomous, are both the red and blue balls on the field (6 balls), or is it red or blue balls depending on the coin toss? (3 balls)

A: [Section 2.4.1] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/AtHomeManualSections/2021AtHomeChallengesManualSection02.pdf>) states that only three POWER CELLS are required, and GSC3 states "Place POWER CELLS only on the corresponding red or blue NAV POINTS." POWER CELLS should only be placed on the path color that is selected by the random determination for the Galactic Search challenge.

(Asked by **4141** answered Jan 29th 21)

Q57 Limelight usage

Q: During the skills competition is it legal to use a Limelight camera in the autonomous and full skills part of the program?

A: We cannot comment on part/design legality, previous calls of Head REFEREES or LRIs, or questions that are overly broad, vague, and/or include no rule references. Please consult [Section 1.8] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/HTML/2021FRCGameSeasonManual.htm>) and, if needed, resubmit a different question.

(Asked by 7287 answered Feb 1st 21)

Q58 At home skills scoring- ball bounces out

Q: When shooting a power cell in the at home skills using a wood field build (2020 build instructions), what defines scored? If the ball goes into the outer port then bounces out of the outer is this scored? In the game manual per section per section 4.4.1 this would not count (...To be considered scored, the POWER CELL must pass through the BOTTOM, OUTER or INNER PORTS and exit through the respective scoring sensors...).

A: Good question. Please see [Team Update 07] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate07.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by 3802 answered Feb 2nd 21)

Q59 Galactic Search Markers - Are they movable without penalty?

Q: For the IR at Home Galactic Search Challenge, Figures 2-3 and 2-4 show markers at B1, D1, B11, and D11. However, there does not seem to be a penalty for contacting these markers in section 2.4.6. As noted in the answer to Question 40, the purpose of those markers is to mark the start and stop zones. The start zone is the full plane defined by column 1 and is not limited by rows B and D. Therefore, is it allowable to move the B1, D1, B11 and/or D11 markers to a different location along the edge

A: There are no rules that require MARKERS be placed on NAV POINTS. [Team Update 07] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate07.pdf>) adds language that encourages use of MARKERS along the boundary lines.

(Asked by 4905 answered Feb 2nd 21)

Q60 Judged Awards - meaning of "image"

Q: For the judged awards submission portion of the Infinite Recharge At Home challenge, we are allowed to submit up to 3 "images" of the robot. May a single "image" include, for example, several different views of the robot, such as front, side, and oblique CAD images on a single 'page'? Or may the robot appear only once in each "image"?

A: Thanks for the question. Please see [Team Update 07] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate07.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by 2465 answered Feb 2nd 21)

Q61 Ok to power 4 CUSTOM CIRCUITs from 1 pair of 12V 500mA terminals on the VRM?

Q: Does it violate any rule to power *multiple* CUSTOM CIRCUITs from a single pair of 12V 500mA terminals on the VRM that supplies power to the radio, assuming the total current draw from said terminals is below 500mA? By way of example, we have 4 CANcoders that are rated at 12V 60mA that we would like to power this way because we do not have a free PDP slot. My understanding is that each CANCoder would be considered a separate CUSTOM CIRCUIT because they are separate COMPONENTS.

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with your teams good-faith assessment of legality. There are no rules that explicitly prohibit multiple CUSTOMER CIRCUITS sourcing

power from a single pair of VRM terminals, however if there's a specific rule or set of rules that cause concern, please rephrase and resubmit.

(Asked by **199** answered Feb 2nd 21)

Q62 Match Defined

Q: For the purposes of interpreting rule R2, are at-home skills challenges, either individually or in aggregate, considered a MATCH?

A: At Home Challenges aren't considered MATCHES in any way; MATCHES only happen at in-person events. For the purposes of !R2, the STARTING CONFIGURATION is the ROBOT'S state if it were about to start a hypothetical MATCH. Per SC10, a ROBOT attempting each challenge must do so in a way that complies with SC10 (which requires compliance with !G1-C), and is not in compliance if it's only in its STARTING CONFIGURATION at the start of a series of challenge attempts.

(Asked by **6933** answered Feb 2nd 21)

Q63 Going beyond Layout edge during skills competition

Q: During the various skills competitions on the Challenge Space layout, is there a penalty for any part of the robot going beyond the field edge of the Challenge Space Layout as it navigates around the Markers?

A: There are no rules that prohibit exiting the Challenge Space and thus no penalties.

(Asked by **876** answered Feb 2nd 21)

Q64 Limitations on Mechanisms used to assist human players?

Q: The Answer to Q23 states "There are no rules that prohibit use of mechanisms to aid humans" in returning balls back to the reintroduction zone. Are there any limitations to these mechanisms? - Can a team build a passive feeder ramp that returns balls back to a human near the Reintroduction Zone? - Can a team build a motorized launcher to throw balls back to a human near the reintroduction zone? - Can a team use a 2nd robot to bring or launch balls back to a human near the reintroduction zone?

A: There are no rules that prohibit use of mechanisms to aid humans.

(Asked by **3847** answered Feb 3rd 21)

Q65 Limitations on ball return assist mechanisms and robot interactions?

Q: Are there any limitations on the way a competing robot may interact with ball return mechanisms? - For example, if a human is being assisted by an automated return mechanism may the robot retrieve the balls directly from said mechanism? - Do the humans need to physically touch or manipulate the balls in any way or can the mechanism do all of the work and fully assist a human?

A: No, there are no requirements that a human interact with the POWER CELLS during the POWER PORT Challenge.

(Asked by **3847** answered Feb 4th 21)

Q66 Skill Competition Field Parameter Boundary

Q: Can the robot go outside the field parameters while accomplishing a skills task (particularly 2.4.7.1 and 2.8.1)?

A: We believe !Q63 answers your question. If it does not, please rephrase your question and resubmit. Please use the Search Q&A button on the navigation bar before posing a new question.

(Asked by **1511** answered Feb 4th 21)

Q67 Pre-staging Power Cells in Interstellar Accuracy Challenge

Q: For the Interstellar Accuracy challenge, can we pre-stage power cells in a zone, for instance the "yellow" zone to improve or streamline the time / intaking process and still be within IAC9 rules (robot can only be in the reintroduction zone to receive power cells from humans). If no human is involved, can we stage balls in zones?

A: Yes, POWER CELLS can be staged in zones. There are no rules prohibiting the ROBOT from acquiring POWER CELLS from the floor in any location.

(Asked by 1511 answered Feb 4th 21)

Q68 Spirit of Absence of Rule

Q: There are no rules limiting gameplay concepts featuring ball-return assist mechanisms. Relating to this, is the intent to deter exploration of these concepts (perhaps in the interest of leveling the playing field, limiting the challenge's resource requirements, and producing more homogenous solutions) or to prompt exploration of these concepts (perhaps in the interest of encouraging innovation and fun)?

A: Thank you for approaching the rule set in the spirit in which it's meant; we know it's different from the norm. The intent was neither deterrence nor encouragement, but instead to only implement specific rules where absolutely necessary. This approach attempts to appeal to and be approachable by a variety of teams with a variety of interests, capabilities, and resources. A ball-return mechanism would not be outside the spirit of the rules.

(Asked by 2363 answered Feb 5th 21)

Q69 Pictures for the Presentation

Q: In the presentation for the 3 pictures, can there be 3 different collages (that contain multiple photos) ?

A: We believe !Q60 answers your question. As referenced in that answer, please see [Team Update 07] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate07.pdf>). If that doesn't answer your question, please rephrase and resubmit. Please use the Search Q&A button on the navigation bar before posing a new question.

(Asked by 5411 answered Feb 5th 21)

Q70 Can an autonomous routine contain more than a single demonstration?

Q: In Team Update 06 it was stated that "a video, consisting of a continuous single shot, of the ROBOT performing an autonomous routine". Can an autonomous routine contain more than a single demonstration in the same shot? For example, 3 different galactic search paths, or more than one AutoNav paths.

A: There's no formal definition of "routine," however the term was used assuming that a team would not include multiple challenge attempts in a single autonomous routine. The video may be of the ROBOT'S traditional autonomous routine for INFINITE RECHARGE or an autonomous routine from one of the Skills Competitions. If you have additional routines that you'd like Judges to see, consider sharing that additional content during your interview.

(Asked by 3316 answered Feb 8th 21)

Q71 Human Players Removing Power Cells from the Field to Reintroduce

Q: During the Power Port and Accuracy challenges are human players allowed to enter the challenge space to remove power cells from the challenge space in order to reintroduce them to the robot in the reintroduction zone?

A: There are no rules that prohibit humans from entering the Challenge Space during the POWER PORT or Interstellar Accuracy Challenges. Please make sure that any humans entering the Challenge Space are doing so safely.

(Asked by 623 answered Feb 8th 21)

Q72 Power Port Challenge 3D Field Element

Q: If using a non-flat power port field element for the Power Port and Accuracy challenges can a non flat outer port, as in an outer port which the power cell can pass through, and a flat inner port, as in an inner port which a power cell cannot pass through, be used in the same field element? Or must they both be flat or both be non-flat?

A: There is no prohibition against using a combination of 2D and 3D field elements.

(Asked by 623 answered Feb 8th 21)

Q73 Power Cell Color

Q: Can we use orange power cells for the galactic search challenge?<https://www.andymark.com/products/infinite-recharge-power-cell>

A: An orange ball does not meet the definition of POWER CELL and is thus not permitted for use where a POWER CELL is specified.

(Asked by 6933 answered Feb 8th 21)

Q74 Detection Devices on DS Laptop for Galactic Search

Q: Is using a team-programmed electronic detection device directly connected to the driver station laptop, to recognize outcome of the pattern prescribed as a result of GSC2, a violation of GSC2-1?

A: Yes. Signaling the outcome to GSC2 to the ROBOT, regardless of how the team sends the signals (i.e. the degree of technical solution) is a violation of GSC2-1.

(Asked by 1425 answered Feb 8th 21)

Q75 In the game design challenge are we allowed to have technology in the field

Q: In the game design challenge are we allowed to have technology in the field?

A: There are no rules that prohibit integration of technology into a game design field. Please review [Section 3.3] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/AtHomeManualSections/2021AtHomeChallengesManualSection03.pdf>) of the manual and [What Makes a Game Good?] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/2021GameDesignChallengeActivities.pdf>) in the activities document for more information.

(Asked by 2264 answered Feb 10th 21)

Q76 Kit First Lego League 2015 for FRC 2021

Q: We would like to know what the purpose of having sent us the First Lego League 2015 components that came in this year's kit. Should we use it or is it optional?

A: There are no rules that require use of *FIRST* Lego League Challenge Sets in any 2021 challenge or ROBOT. Please see the "Sizing & Contents" section of [this December, 2020 FRC blog](<https://www.firstinspires.org/robotics/frc/blog/2021-its-the-most-wonderful-time-of-the-year>) for more on how FLL Challenge Sets ended up in FRC Kickoff Kits.

(Asked by 7566 answered Feb 10th 21)

Q77 Image size and submission of the images

Q: May we include type on the robot image files (such as labels and captions)? Will the judges be viewing the images and the flyer together? We would like to coordinate our content. What is the page size/aspect ratio of the robot images? Are they 8.5x14 inches like the flyer? Also, why is the flyer a pdf and the robot images are a raster format? May we submit the images and the flyer in one pdf? Thank you!

A: The technical requirements are listed in the corresponding Submission section of the [At Home Challenges Manual] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/2021AtHomeChallengesManual.pdf>). There are no rules that prohibit labels/text as part of images, nor rules that require specific aspect ratios. Judges *may* view content simultaneously, however we can't guarantee that to be the case. Submissions for INFINITE RECHARGE at Home are required to have at least one image whereas the flyer about the ROBOT is optional.

(Asked by 2877 answered Feb 10th 21)

Q78 Clarification on Skills Challenge Submission Deadline

Q: To clarify, on March 4, 2021, teams do NOT need to submit any Skills Challenge scores/runs to be eligible to compete in the Skills Challenge. They only need to submit for the Judged Robot Awards AND be opted in for the Skills Challenge on that date, correct? Submission of Skills Challenges can then occur 3/8/21 until 4/8/21 after the team is in a group and the portal reopens. Really want to make sure this is the exact protocol so we do not miss anything needing to be submitted.

A: Correct

(Asked by **1684** answered Feb 11th 21)

Q79 Clarification on meaning of gif.

Q: On page 13, section 2.2 the manual lists the acceptable file formats, of those one is a gif format. Can teams submit animated gifs as long as it is under the 10mb file size cap, or is a static gif the only acceptable gif format.

A: The technical requirements are listed in the corresponding Submission section of the [At Home Challenges Manual] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/2021AtHomeChallengesManual.pdf>). There are no rules that prohibit a static versus animated gif format. Judges view images within the Entry Submission System where teams should have no expectation a judge will see anything other than the first frame.

(Asked by **3452** answered Feb 15th 21)

Q80 Using FIRST intellectual property or its likeness in the Game Design Challenge

Q: Are we allowed to use FIRST logos or themed modifications of FIRST logos for the field art in the Game Design Challenge?

A: Yes, you may use official *FIRST* logos in your submission, provided use complies with the [branding guidelines] (https://www.firstinspires.org/sites/default/files/uploads/resource_library/brand/first-brand-guidelines-2020.pdf). We believe [Team Update 10] (<http://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate10.pdf>) answers your question about modifying logos for your Game Design Challenge concept. Any other use of a modified logo must be approved by [*FIRST* Marketing] (<mailto:marketing@firstinspires.org>).

(Asked by **4669** answered Feb 23rd 21)

Q81 Audio in submitted videos - fma FRC-Team8079-IRH

Q: Can we add sound(audio or music) and subtitle to the uploaded video of our ROBOT performing an autonomous routine?

A: There are no rules that prohibit audio or text as part of a team's video.

(Asked by **8079** answered Feb 18th 21)

Q82 FRC_robRIO_2021_f1 image will not show up on roboRIO Imaging Tool

Q: On the NI Package Manager, FRC Game Tools version 2021 f1 is shown as being installed, but the 2021 f1 image version will not show up on the roboRIO Imaging Tool. Older image versions such as 2021 v3 are showing up on the Imaging Tool. I have followed the instructions to uninstall older versions and am still having issues. Thank you!

A: The purpose of this Q&A is to answer questions regarding the rules of INFINITE RECHARGE and FRC at Home. For technical assistance, please visit the [*FIRST* Forums] (<https://forums.firstinspires.org/forum/general-discussions/first-programs/first-robotics-competition>).

(Asked by **3242** answered Feb 22nd 21)

Q83 INNOVATION CHALLENGE

Q: According to 4.2.1, we have to make a business plan, however, in 4.3 we have submission information about an executive summary, is the executive summary what the business plan must contain? or is the executive summary independent from the business plan?

A: The executive summary is designed to give judges a high-level summary of your work in order for them to better prepare their questions for judging and is not intended to be the place comprehensive details on the business model or other elements are shared. The 2-min required business pitch and the 3-min uninterrupted presentation each team gives during judging is the place to ensure all details on your business model are provided.

(Asked by **6694** answered Feb 22nd 21)

Q84 Power Port Colors

Q: Is there any issue if the team paints the 2d power port in team colors?

A: There are no rules that prevent custom coloring of the POWER PORT used in Skills Competitions.

(Asked by **6344** answered Feb 22nd 21)

Q85 Galactic Search Initial Robot Placement Rules asking for a GSC4 Clarification

Q: GSC4 states "The ROBOT must start in the Start Zone with any part of its BUMPERS breaking the plane defined by B1/D1." Is this meant to say that a robot must be "in the Start Zone" AND its bumpers must be breaking the plane or is "bumpers breaking the plane" what constitutes being "in"? Assuming the former how much of the robot must be "in": the entire frame perimeter? just the part touching the carpet? Are the bumpers the only thing that can be breaking the plane defined by B1/D1?

A: A ROBOT with any part of its BUMPERS breaking the plane defined by B1/D1 is considered "in" the Start Zone and thus compliant with GSC4.

(Asked by **6391** answered Feb 22nd 21)

Q86 For the Game Design Challenge what defines a "complete game?"

Q: In 3.1 of the At Home Challenges Manual it says "Teams are expected to develop as complete a game as possible." In this context what criteria would define "complete?" For example would you need rules catered to the specific game? The point values of all the actions in the game? All the precise measurements of the specific zones on the field? Or would just hitting all the things mentioned in section 3.3 count as a "complete" game?

A: The criteria is not intended to state that a game must be "complete" in order for review and consideration upon submission. Instead, it's meant to convey the expectation that a game concept has been thoroughly fleshed out to the best of that team's capabilities. The criteria listed in [Section 3.2 Submission Information] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/AtHomeManualSections/2021AtHomeChallengesManualSection03.pdf>) are the only requirements for the Game Design Challenge.

(Asked by **2655** answered Feb 22nd 21)

Q87 Presentation for Global Innovation

Q: Is it mandatory for FIRST teams participating in the global innovation challenge to present a physical prototype of their innovative solution, or is it just an advantage to present a prototype?

A: There is no requirement that teams submitting for the *FIRST* Innovation Challenge present a physical prototype. Please refer to [Section 4.4.3.4 Design] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/2021AtHomeChallengesManual.pdf>), which states that "The design must be shown to the judges, but how it is shown is at the team's discretion. Teams may draw or use software to show a 2D or 3D representation of their design. A physical model is not required. If built, a photograph or video of it in use will fulfill the showing of the design." A team that has a physical prototype will not necessarily have an advantage over a team that does not have a physical prototype.

(Asked by **7692** answered Feb 25th 21)

Q88 Bumper numbers & bumper colors

Q: As per R22 we see the specs for white 4" bumper numbers, but would like to know if these numbers are required or optional for the Judged awards & At Home Skills Challenge? We can only find (4) sets of such numbers at 1 source for \$40. Also, can we use blue

fabric bumper covers for all challenges, and not change to red. Thank you.

A: Per SC7 in the [At Home Challenges Manual](<https://frc-qa.firstinspires.org/frcathome>), a ROBOT attempting a challenge does not need to comply with !R21 and !R22 (i.e. BUMPER fabric may be any color and contain any markings).

(Asked by **8567** answered Feb 25th 21)

Q89 Automation Direct relay part number typo

Q: R29 B ii. sites AD-SSR6M45-DC-200D as a legal relay. Please clarify whether the *6M45* should actually be *6M40* as per a similar reference, in R52, to a 40A relay and in light of the fact that Automation Direct does not currently list a AD-SSR6M45-DC-200D relay as an offered product.

A: Good catch! The correct part number is AD-SSR6M40-DC-200D. This will be corrected in [Team Update 11] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate11.pdf>).

(Asked by **4131** answered Mar 2nd 21)

Q90 Are we required to include human players in our game design?

Q: Is including a human player role a requirement for the game design challenge? As our game stands currently, there is not much, if any, of a role for human players to fulfill. We would please like some clarification on this.

A: There is no requirement to use human players in a Game Design submission.

(Asked by **4186** answered Mar 1st 21)

Q91 Word count

Q: How are words being counted in submissions, as WORD counts or are letters being counted? Thank you for the clarification!

A: The word count on the Entry Submission System will count the number of words present, not the number of letters.

(Asked by **3336** answered Mar 1st 21)

Q92 Clarification on Infinite Recharge at Home Autonomous Award video submission

Q: The manual says that the "video may be of the ROBOT'S traditional autonomous routine for INFINITE RECHARGE or an autonomous routine from the Skills Competition" Our workspace cannot accommodate a regulation Infinite Recharge at Home field (we have a 15' x 15' x 9' practice field). Given this, we plan to submit a custom routine that demonstrates: • Power cell detection & capture • Shooting into a 6' high upper power port • odometry box test Is this acceptable for the judged Autonomous Award?

A: Videos demonstrating a ROBOT's autonomous routine that addresses INFINITE RECHARGE or INFINITE RECHARGE at Home activities are appropriate. There is no requirement that the full Challenge Space be used.

(Asked by **1073** answered Mar 1st 21)

Q93 For the FRC At Home Submission Time Zone

Q: On March 4 when the submissions are due, our team is in the Eastern Standard Time zone (EST), UTC-5. However on March 14, our jurisdiction moves to Eastern Daylight Savings Time (EDT), which is UTC-4. Since you want us to enter the timezone in UTC notation, which one should I use? I assume that our judging will happen after March 14, so does UTC-4 make sense? Thanks in advance.

A: The Timezone field is read by the judging panel, so they will be aware of the possibility that it was submitted before Daylight Savings Time. Since they'll work with your team to arrange an interview time entering either value is fine. At Home Challenges interviews begin on March 15th per [this recent blog](<https://www.firstinspires.org/robotics/frc/blog/2021-2021-judging-and-interview-process-frequently-asked-questions>).

(Asked by 1325 answered Mar 1st 21)

Q94 At Home Skills Challenge Drive Station

Q: With an understanding that this season is different than any other, we have a question about this year's drive station. To gain a better vantage point in visualizing the field and separation between the robot and the field, can a drive station be on a stationary raised platform with hand rails?

A: There are no rules that dictate the position of a team's OPERATOR CONSOLE used in the Skills Competition. Please just make sure the humans are safe.

(Asked by 5420 answered Mar 1st 21)

Q95 Skills Video Submission?

Q: For the skills submission, I see where to submit the scores but nothing appears to show where to submit the videos? I'm using chrome.

A: The Entry Submission System uses logic so once a score is entered, it will then ask for the video to accompany that score. If you are in need of technical assistance with the system, please contact frcathome@firstinspires.org.

(Asked by 5492 answered Mar 1st 21)

Q96 Innovation Challenge Presentation/Pitch Order

Q: During the interview with judges, is it permissible for a team to do their Innovation Challenge "presentation" first and then their "business pitch" after the presentation?

A: Teams can present in any order they choose, but Judges will expect teams to follow the order described in [Section 4.4.5 of the At Home Challenges Manual](<https://firstfrc.blob.core.windows.net/frc2021/Manual/2021AtHomeChallengesManual.pdf>) which states the business pitch is first (2 minutes) followed by the presentation (3 minutes) and then the remaining time is used for Q&A (at least 10 minutes).

(Asked by 3928 answered Mar 1st 21)

Q97 Innovation Challenge Pitch "Ask"

Q: The Innovation Challenge criteria asks team to deliver an "ask" to the judges as external stakeholders. If that "ask" cannot be monetary, what should our "ask" be to the judges/external stakeholders, and how should we address judges as external stakeholders?

A: An ask may be for whatever the team feels they most need help with, as long as the ask is not for funding, capital, or investment. For example, it could be for connections or further expertise, i.e. "In order to reach our goals, we seek connections to web developers." Treating the judges as external stakeholders means rather than designing those 2 minutes as if from a *FIRST* team to judges, the pitch is designed as if the judges were a potential partner or customer for example.

(Asked by 3928 answered Mar 1st 21)

Q98 Is the AutoNav Challenge one routine or three?

Q: The optional autonomous video is for one 'routine', but the AutoNav Challenge has three paths with different start/stop areas. Does choosing this routine mean only one of the three should be in the video, or should it be all three? If all three, can there be a break for resetting the field and robot start location?

A: The series of actions/routes covered by the single routine captured in the team's video is up to the team. A reasonable interpretation of the "single routine" language is that if the ROBOT requires human intervention for a reset between actions, it's likely separate routines.

(Asked by 2199 answered Mar 1st 21)

Q99 Autonomous Award Footage - Power Port Clarification

Q: In section 2.2 of "At Home Challenges Manual" pertaining to the video submission for the Autonomous Award, it states that, "video may be of the ROBOT'S traditional autonomous routine for INFINITE RECHARGE or an autonomous routine from the Skills Competition." Does this imply that footage including scoring into a POWER PORT requires the POWER PORT to be of legal height, per Figure 3-15 POWER PORT dimensions in "Infinite Recharge Game Manual," to be counted for the footage?

A: There is no requirement that the field setup for demonstrating an autonomous routine for the Judged Awards portion of Infinite Recharge at Home be absolutely representative of the real field element dimensions. Teams are encouraged to match dimensions where possible.

(Asked by 1073 answered Mar 2nd 21)

Q100 Innovation Business Model

Q: Does the business plan for the Innovation Challenge have to be a model that makes a profit?

A: There is no requirement that the business plan uses a model of a for-profit company. Per Section 4.4.3.2 of the [At Home Challenges Manual](<https://firstfrc.blob.core.windows.net/frc2021/Manual/2021AtHomeChallengesManual.pdf>), the feasibility of the model should be included in the business model, so teams should consider the sustainability of the business plan regardless of their revenue structure.

(Asked by 8 answered Mar 2nd 21)

Q101 Are we supposed to submit one image of our game field or can we submit multiple?

Q: In section "3.2 Submission Information" of the game manual it states "four images of the field, saved as a single file, is considered a single image." The game manual also says "files must be no larger than 10 MB" when referring to the image submission requirements. Does this mean that when submitting an image of our game field there needs to be a single image composed of multiple images, or does this mean that multiple images can be submitted, but together they must be less than 10 MB?

A: A team may only upload one (1) image file, but the image file may be comprised of a collage of pictures. Judges will view images within the Entry Submission System, so the image file should be clear and easy to see without relying on the viewer to download or zoom. Note that images may also be included in the optional supplementary pdf.

(Asked by 2550 answered Mar 2nd 21)

Q102 Judge Award: RSL (Autonomous award)

Q: Hello, we're the Nióbio 7566! We are going to record an autonomous routine video for the judge award, so we would like to know if the robot signal light (RSL) must be connected (and working) on the robot for the video. Thank you for the attention!

A: Per the blue box in Section 2.1 of the [At Home Challenges Manual] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/2021AtHomeChallengesManual.pdf>), "the Judged Awards component does not require any ROBOT inspection, submitted ROBOTS should generally comply with the 2021 INFINITE RECHARGE ROBOT rules (i.e. no major, obvious violations)." A lack of a functioning robot signal is not considered a major and obvious violation.

(Asked by 7566 answered Mar 3rd 21)

Q103 Marker dimension clarification

Q: In section 2.4.4 it says a minimal cross-section of 2.5 in wide by 2.5 in deep and at least 5 in tall. Does this mean that the marker needs to be at least 2.5" by 2.5" for at least 5" of height of the marker or does the cross-section of the marker need to be at least 2.5" x 2.5" at one point and may be smaller in cross section in other areas? The example in the blue box includes a small cone, which gives a possibility to interpreting it as not needed for the entire height.

A: There is no requirement that the 2.5 in. by 2.5 in. cross-section be present at every portion of the MARKER'S height. Please remember that SC5 dictates that teams follow the intent of the rules. Creating a MARKER where this cross-section exists for only an extremely small, imperceptible portion of this height profile is outside the intent.

(Asked by 5414 answered Mar 3rd 21)

Q104 Power Port Challenge Scoring Zone Clarification

Q: Section 2.4.10.2, rule PPC4 states "The ROBOT may only attempt a shot if its BUMPERS are fully contained within the Scoring Zone which extends 17ft. 6 in (~533 cm) from the face of the POWER PORT representation". This contradicts figures 2-12 and 2-13 which show the scoring zone extending 15 ft from the face of the POWER PORT. Can you clarify the correct Scoring Zone dimension?

A: Good catch! We're so sorry about that discrepancy. We'll fix the error in Team Update 12 (scheduled to be published on March 9, 2021) by updating the Shooting Zone depth in Figures 2-12 and 2-13 to match the dimension stated in PPC4 (the more permissive 17 ft. 6 in. dimension). Consider this a heads up. Thank you for making us aware of this.

(Asked by 4907 answered Mar 4th 21)

Q105 Can the robot leave the Challenge Space during hyperdrive?

Q: Are there penalties for a robot leaving the Challenge Space? In particular, during Hyperdrive runs, can the robot briefly leave the challenge if it is still following the same intended path? In other words, if it leaves the space incidentally will going around a corner, not in order to skip the intended path is there a time penalty or similar?

A: We believe !Q63 answers your question. If it does not, please rephrase your question and resubmit. Please use the Search Q&A button on the navigation bar before posing a new question.

(Asked by 5434 answered Mar 3rd 21)

Q106 Motor running at start of Power Port challenge.

Q: Can a robot have a motor running at speed at the start of the Power Port challenge? In particular, could a ball launching motor be at speed (robot at rest) at the start of the 60 second timer?

A: There are no rules that require the ROBOT is disabled at the start of a POWER PORT Challenge attempt.

(Asked by 5434 answered Mar 3rd 21)

Q107 Shooting zone size in Power Port

Q: The shooting zone size seems inconsistent in figures 2-12 and 2-13 compared to rule PPC4. The figures imply the shooter should be within 15' but the rule seems to imply that the shooter needs to be with 17' 6". Please clarify.

A: We believe !Q104 answers your question. If it does not, please rephrase your question and resubmit. Please use the Search Q&A button on the navigation bar before posing a new question.

(Asked by 5434 answered Mar 4th 21)

Q108 Innovation Challenge business model

Q: Does the Innovation Challenge business model has to be submitted somewhere or it is going to be presented at the interview with the judges?

A: Good Question. For the Innovation Challenge, teams are only required to submit the executive summary. This is done in 3 questions within the submission portal. Per [Section 4.5.1] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/2021AtHomeChallengesManual.pdf>), the business model should be communicated with the judges during the 2 minute business pitch part of your judging session.

(Asked by 6694 answered Mar 4th 21)

Q109 @Home Challenge extension

Q: Hello, We are wondering whether the extension for the @ home submissions apply to all 3 at home challenges, IR@Home, Game Design, and Innovation, or just IR @ Home?

A: Yes, the extension for submissions applies to all challenges with the due date of March 4th. This includes Game Design Challenge, INFINITE RECHARGE at Home (judging), and the *FIRST* Innovation Challenge. This also allows teams who have not opted into the INFINITE RECHARGE at Home (skills) to still opt in by the new deadline of Friday, March 5th at 3pm ET.

(Asked by 6762 answered Mar 4th 21)

Q110 Do Human Players for Skill Challenges need to be pre-college students?

Q: Because of COVID restrictions, we may not be able to get more than one student together for the skills challenges. However, it is possible to gather adults in the same household for the Power Port and Accuracy challenge to assist with the loading of the power cell. The driver would still be a student. Do Human Players for Skill Challenges need to be pre-college students?

A: No, SC4 only requires operators of the ROBOT to be pre-college students. Any other humans may be of any age.

(Asked by 5507 answered Mar 5th 21)

Q111 In reference to Q104: Power Port Challenge Scoring Zone Clarification

Q: The answer given in response to Q104 is confusing. In figure 2-12 and 2-13 both scoring zones extend 15' from the face of the goal. Will the "Heads up" response (Changing the dimensions to match the wording of PPC4) affect the parameters/dimensions of the rest of the field. If so, wouldn't it be less disruptive to change PPC4 to read "15' from face of goal." not 17'-6". Some teams may have already filmed runs and may face restrictions to re-filming due to Covid protocols.

A: No other dimensions will be modified, the Scoring Zone will just extend further from the face of the goal. Changing PPC4 as suggested may make a team who has completed and submitted their challenge per the existing PPC4 (17ft 6in.) illegal, changing the images instead maintains any existing runs filmed according to either standard as legal.

(Asked by 870 answered Mar 8th 21)

Q113 Hyperdrive Penalties After the Timer Stops

Q: Referencing rules HDC6 and HDC9, is "navigating the path" complete when the timer is stopped? If a robot continues to be driven or if its momentum carries it further after its bumper breaks the plane of the end line and it contacts a non-starred marker the answer to this question will clarify whether a penalty is incurred.

A: The path completion and the timer being stopped are coincident with the parameters set in HDC9 (i.e. any part of the ROBOT's BUMPERS breaks the plane defined by the red dashed line on the path's layout diagram"). Anything that happens after the ROBOT's BUMPERS break the plane is not relevant to the path attempt.

(Asked by 6146 answered Mar 8th 21)

Q114 Innovation Challenge and number of slides

Q: In Section 4.4.3.5 Business Pitch it says that the 2 minute pitch can only have 8 slides. Can additional slides be used for the remaining 3 minute presentation piece?

A: There are no rules restricting use of additional slides during the team's presentation.

(Asked by 2502 answered Mar 8th 21)

Q115 Recording robot time for AutoNav challenge

Q: Can the time from the video recording be used for the score or do you specifically have to have a stopwatch or timer in the video as the robot is running?

A: There is no requirement that a stopwatch (or timer) be in the frame when the video is being recorded, however, it should be possible to validate the time/score entered by auditing the accompanying video.

(Asked by 7121 answered Mar 10th 21)

Q116 Dates for the Interviews/Judging sessions

Q: The dates shown on <https://frc-events.firstinspires.org/> - are those relevant? The manuals seem to indicate that the interviews will take place between March 15th and April 11th but the dates in the group announcements are not within the above time period.

A: Please see [this blog post](<https://www.firstinspires.org/robotics/frc/blog/2021-2021-judging-and-interview-process-frequently-asked-questions>) (which matches the manual) for more information on the dates for interviews and additional information. Given the nature of the season, it isn't possible to pick a single date that accurately represents all phases of the process (like opt-in deadline, judging dates, award winner reveal dates, etc) so instead event dates were selected to group events of the same type together.

(Asked by 1899 answered Mar 10th 21)

Q117 Interstellar Accuracy and Power Port Challenge Zone Sizes

Q: We are requesting clarification of the WIDTH of the zones for the Interstellar Accuracy and Power Port Challenges. The colored zones in section 2.4.9.1 are shown between grid lines A and E whereas the colored zones in section 2.4.10.1 are shown extending the full width of the Challenge Space. Both sections require placing markers between A and E (e.g. A7-E7) to define zone boundaries which does not define the width. Are the zones infinitely wide or are there specific widths for each challenge?

A: The width of these zones is defined in the images. Per Figure 2-9 and Figure 2-10, zones for the Interstellar Accuracy Challenge are 10' wide. Per Figure 2-12 and Figure 2-13, zones for the POWER PORT Challenge are 15' wide.

(Asked by 45 answered Mar 11th 21)

Q118 At home Challenge submission

Q: I see on the first at home portal we will be able to see other teams scores. When are those scores made available to us? The submission portal looks like we have to submit all entrees at the same time. In the spirit of competition, if we submit a score, and find we are able to achieve a better score later in the season, or see a team with a better score, can we update our score after it has been submitted before the deadline? Is First asking us to wait until the last minute to submit everything?

A: Teams can go into the Entry Submission System and enter scores and save them as much as they wish. Saving them will update the scores on the frc-events webpage (scores are updated a few times per day, not instantly). Teams must click the submit & lock button before the deadline on April 8th at 3pm ET for their scores to be finalized and to be eligible for awards.

(Asked by 5420 answered Mar 12th 21)

Q119 One presenter - Two devices for judging interview sessions

Q: Would it be acceptable for a presenter to join on two devices, one to display their video and one to screen share a visual presentation from?

A: There are no rules that prohibit joining an interview from more than one device.

(Asked by 3928 answered Mar 12th 21)

Q120 Interstellar Accuracy Challenge - All boundary markers visible in video?

Q: For the Interstellar Accuracy Challenge - Do all markers along the zone boundaries need to be visible in the submitted video?

A: Per [Section 2.4.5 Filming] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/AtHomeManualSections/2021AtHomeChallengesManualSection02.pdf>), "it's recommended that the camera always have a full-frame view of the operating space if possible." Additionally, per the blue box in Section 2.2.1, "scores which cannot be verified may be discarded." The video capturing at least one MARKER per zone boundary is recommended to ensure it is clear which zone the ROBOT is in while performing the Interstellar Accuracy Challenge.

(Asked by 4096 answered Mar 12th 21)

Q121 Power Port Challenge return mechanism location and LOADING BAY location?

Q: (Ref Q23, Q64, Q65) Section 2.4.4 of the manual states "No other physical elements may be added within the Challenge Space for the purpose of aiding ROBOT or DRIVE TEAM performance. Other static elements outside the Challenge Space may be placed to aid robot navigation, provided the robot does not physically interact with them." Can return mechanisms be inside the challenge space? Since a LOADING BAY is recommended (PPC6) can a robot interact with it? Can it be inside the challenge space?

A: Good question! We'll clarify that in [Team Update 13] (<http://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate13.pdf>). The intent is that a LOADING BAY (or LOADING BAY mockup) is permitted in the Challenge Space and an exception to the language cited from [Section 2.4.4] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/AtHomeManualSections/2021AtHomeChallengesManualSection02.pdf>).

(Asked by **4907** answered Mar 15th 21)

Q122 Adult Team Mentor as Translator for Interviews

Q: 2021 At Home Challenges Manual sections 2.3.4, 3.4.4, and 4.4.5 state that teams "may include an additional person to act as that translator/interpreter" for the INFINITE RECHARGE at Home, Game Design Challenge, and FIRST Innovation Challenge interviews. If the role of translator/interpreter is performed by an adult team mentor, does that mentor also fulfill the requirement "At least one (1) adult team mentor must attend the interview," or would a second adult team mentor be required to attend?

A: Yes, the "one (1) adult team mentor" may certainly act as a translator if the team does not wish to have an additional person. It is expected that this translator, whether Mentor or otherwise, translates directly what the students are communicating and does not add additional context or clarification.

(Asked by **6909** answered Mar 15th 21)

Q123 Is there an interview for innovation challenge teams before April 21?

Q: Is it correct that innovation challenge teams will be contacted about whether they become semifinalists based on the executive summary, then teams will submit all the additional requirements for semifinalists outlined in 4.3.1 by April 21, and then the teams will be contacted about an interview date taking place sometime after April 21? Is it correct that there are no innovation challenge interviews taking place before April 21? Thanks for your help!

A: No, all teams who submitted an Innovation Challenge entry will receive an interview between Monday, March 15th and Sunday, April 11th as described in Sections 4.4.5. Based on the submission and these interviews, Semi-Finalists will be chosen from each group as indicated in the table in Section 4.6. These Semi-Finalists will be contacted by *FIRST* must then submit additional information (as described in Section 4.3.1) by April 21st.

(Asked by **2783** answered Mar 15th 21)

Q124 What should be included in the team description?

Q: The additional requirements for semi-finalists include a 150-word team description. What should be included in that description? Thank you for your help!

A: How a team decides to describe itself is completely up to the team (as long as it's presented in no more than 150 words). There are no specific data being sought for that field, just a way for judges to learn about the team.

(Asked by **2783** answered Mar 15th 21)

Q125 What should be included in the public project description?

Q: The additional requirements for semi-finalists include a 150-word public project description. What should be included in that description? Thank you for your help!

A: How a team decides to describe its project is completely up to the team (as long as it's presented in no more than 150 words). There are no specific data being sought for that field, just an overview of the project.

(Asked by 2783 answered Mar 15th 21)

Q126 Does submitting the optional requirements for semi-finalists provide an advantage?

Q: In the additional requirements for semi-finalists, there is a list of optional requirements (refining the executive summary, supplemental documentation, etc). Does including items from these optional requirements give teams an advantage in the innovation challenge? Thank you for your help!

A: Judges are not expected or instructed to give priority to submissions where additional optional content was provided over those that omitted optional content. That being said, the additional content may give a team an advantage (or a disadvantage); it depends on the additional content provided.

(Asked by 2783 answered Mar 15th 21)

Q127 Video of business pitch and live business pitch

Q: Section 4.3.1 mentions a video of the team's business pitch as one of the additional requirements for semi-finalists. Section 4.4.3.5 also mentions a 2-minute live business pitch. Do teams submit the video of the business pitch and then repeat what was covered in the business pitch video live for the judges?

A: Teams must present their live pitch as part of the initial interview as described in Section 4.4.3.5 and Section 4.4.5. As there is no interview at the Semi-Finalist stage, these teams must submit a video of their pitch for the judges to review.

(Asked by 2783 answered Mar 15th 21)

Q128 Specifics on the innovation impact

Q: Section 4.4.3.3 discusses the innovation impact. Could more specifics be provided on what should be included in the innovation impact? What makes the innovation impact unique from the value proposition and other elements in the business model and pitch deck? One bullet point under 4.4.3.3 says, "Teams tangibly demonstrate the expected impact of their innovation and how it adds value, either by volume, degree of impact, or both." What is meant by "volume, degree of impact, or both"? Thank you!

A: How teams present the impact of their innovation varies by team and by innovation. The value proposition in the business model is intended to convey the benefit of the innovation to potential customers. While that may also be part of the impact the innovation has, the "Innovation Impact" content should address all ways the innovation impacts society. For example, consider including how it impacts stakeholders, users, the environment, the market, etc. The "volume of impact" could be considered the amount of impact the innovation has. The "degree of impact" could be considered the breadth and depth of the impact. For example, an innovation may have significant and important impact that's limited to a small group - it's volume could be considered high and the degree to which it impacts would be considered limited to those directly affected.

(Asked by 2783 answered Mar 15th 21)

Q129 Business model requirements clarification

Q: Section 4.4.3.2 states, "The business model includes... the feasibility of the model, and a description of factors/resources for implementation." What is meant by "feasibility of the model"? What is meant by "factors/resources for implementation"? What should be included in the business model to meet those two criteria? Additionally, Section 4.4.3.2 mentions a "full cost and revenue structure." What is meant by this? What should be included to meet this requirement? Thank you for your help!

A: "Feasibility of the model" is intended to request the team's assessment of how realistic implementation of the model proposed is. The factors/resources for implementation are meant to be the existing parameters (e.g. one factor needed for implementation might be change to legislation or a funded grant). The resources needed for implementation can be considered the implementations ingredients, i.e. what's needed for implementation. Implementation may require a minimum number of people, a basic level of capital, building space, etc. A "full cost and revenue structure" is a complete description of the accounting of the proposed business with all costs (labor, space, marketing, materials, etc.) and revenues (sales, licensing, etc.) documented.

(Asked by 2783 answered Mar 15th 21)

Q130 Access to Infinite Recharge at Home Skills Component

Q: Team 101 Striker is trying to opt in to the skill components and it is not allowing up to opt in. We know that the deadline is April 8, we want to know when will we be allowed to opt in?

A: Per the Blue Box in [Section 1.11]

(<https://firstfrc.blob.core.windows.net/frc2021/Manual/AtHomeManualSections/2021AtHomeChallengesManualSection01.pdf>), teams must have completed and submitted the INFINITE RECHARGE at Home Judged Component by March 4th to be officially eligible to also participate in the Skills Component. Meanwhile, there will still be a way to report unofficial scores; please see this [FRC Blog] (<https://www.firstinspires.org/robotics/frc/blog/2021-submission-statistics-and-unofficial-score-reporting>) for more.

(Asked by **101** answered Mar 16th 21)

Q131 Power port challenge

Q: We are using a flat port mounted on the wall. When we shoot the balls bounce back everywhere. 1. Sometimes they are caught in the air in the re-introduction zone by the human player then inserted in the robot. 2. Other times they roll or bounce into the zone then the hp loads them. Are both of this legal

A: Yes, POWER CELLS that bounce off a 2D POWER PORT may be fielded anywhere by either a human or the ROBOT as long as the POWER CELL enters the Reintroduction Zone prior to be scored again per Section 2.4.10.3.

(Asked by **1599** answered Mar 15th 21)

Q132 Skills Challenge Video Submissions

Q: For Skills Challenge run video submissions, can the videos that will be uploaded with our scores, be post processed to add a timer, text boxes, images, or spliced with team logo entry or exit video's?

A: Yes, the video may be post-processed provided that the video is still clearly a single continuous shot (i.e. no cuts), the additions do not impact the ability to verify the score using the video, and the video remains below the maximum time limit for each challenge.

(Asked by **302** answered Mar 15th 21)

Q133 Power cells counting in mid air at T=0?

Q: In the Power Port Challenge, Do power cells count if they are clear of the robot but have not reached the power port at T=0?

A: Per [Section 2.4.10.3 Scoring]

(<https://firstfrc.blob.core.windows.net/frc2021/Manual/AtHomeManualSections/2021AtHomeChallengesManualSection02.pdf>), "Any POWER CELLS released by the ROBOT within the 1-minute time period and are subsequently scored after the timer expires will count."

(Asked by **5847** answered Mar 17th 21)

Q134 Do all MARKERS on the Challenge Space have to be the same size?

Q: Under Section 2.4.4 Challenge Space Layout, there is no specification on whether the MARKERS must be the same size. Are teams permitted to have differently sized MARKERS on the Challenge Space or must all MARKERS be required to be approximately the same size? For example, can a MARKER on NAV POINT A1 have the maximum cross-section while a MARKER on B1 have the minimum?

A: Correct, there are no requirements that MARKERS be the same (size, shape, color, etc.).

(Asked by **1468** answered Mar 18th 21)

Q135 Specification on Directly Introducing POWER CELLS to the ROBOT

Q: In the blue box under Rule IAC9 and PPC6, it is stated that "POWER CELLS may be introduced directly to the ROBOT." Does this mean a human may extend any body part inside the vertical extension of the ROBOT's FRAME PERIMETER to place POWER

CELLS inside the ROBOT during the challenge as long as he or she is not violating SC3 (team members may not contact the ROBOT)?

A: There are no rules that explicitly prohibit a human from reaching inside the FRAME PERIMETER of an enabled ROBOT (assuming compliance with SC3, as you note). Far be it from us to assume that reaching inside an enabled ROBOT is always a safety hazard, but generally, it's precarious and strongly discouraged. If this is a method you plan to implement, please *please* mitigate the risk to your human.

(Asked by **1468** answered Mar 18th 21)

Q136 Use Video Edited Timer or Physical Timer?

Q: Adhering to Rule GSC5 and GSC6, a team uses a physical timer to record their ROBOT's time for the challenge and, for example, records a time of 10.23 seconds. After editing the video they recorded and using the video editing software's timer, they found that the time is really 10.14 seconds. Which time should the team use?

A: GSC5 and GSC6 do not require the use of a physical timer, as such, superimposing a timer using video editing software is an acceptable way to record an official time to be submitted. Please note that it must be possible for the time to be independently verified by HQ using the submitted video, and the submitted video must be compliant with all other rules (such as free of "cuts").

(Asked by **1468** answered Mar 18th 21)

Q137 Raising Bot to Change Angle of Shooter

Q: We designed our bot last year to make goals from the initiation line and further (inside the trench zone). We cannot make a goal in the green accuracy challenge zone because our shooter angle is not great enough. Can we add a mechanism to lift the front of our bot to increase the angle of our shooter so we can make goals in the green zone?

A: There are no rules that specifically prohibit angling the ROBOT, however note that the ROBOT BUMPERS must remain in the BUMPER ZONE per !R18.

(Asked by **5913** answered Mar 18th 21)

Q138 Can we choose which Galactic Search results to lock in?

Q: With regard to Q32 and GSC2, if a robot has been programmed to be capable of doing either color, can a team choose whether or not to update their score with the result of a later attempt where a different color was randomly selected. Updating scores seems to be allowed by the blue box added to Section 2.2.1 in Team Update 13, but doing so would seem to bias the resulting scores toward the score for the color that a team performs best on.

A: Yes, updating scores to reflect a more recent run that complies with all rules is permitted.

(Asked by **199** answered Mar 18th 21)

Q139 Exactly when does Power Port timer start?

Q: Not seeing the exact answer for this in the Rules or Scoring for the Power Port Challenge. Does the one minute timing period begin when the first Powercell is shot from the robot or other?

A: There aren't a specific set of circumstances defined for when a team starts the timer for the POWER PORT Challenge. Instead, the score relies on the number of POWER CELLS scored during that window. The team may decide at which point to start the timer, and the assumption is that they'll select the most advantageous instant to begin the 1-minute window.

(Asked by **1684** answered Mar 18th 21)

Q140 Will teams be notified of Skills Challenge video discarded by judges?

Q: If uploaded Skills Challenge videos are for some reason deemed unacceptable to verify a score by judges after the final submission, would the team be notified so they are aware? Would they be able to upload another or would they just lose all scoring for that Challenge?

A: *(edited 3/23/21 as a result of [Team Update 14] (<http://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate14.pdf>))* If a video is deemed unacceptable for verification of a score, or the video results appear to conflict with the submitted data *(unless the video shows a more favorable score than what was reported)*, the team will not receive any score for that Challenge. Lead Mentors from affected teams will be notified, but will not have an opportunity to submit an alternate video as the review will happen after the April 8th deadline. Please note that a Blue Box in [Section 2.2.1 Additional Requirements for the Skills Competition] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/AtHomeManualSections/2021AtHomeChallengesManualSection02.pdf>)*, as updated in [Team Update 14] (<http://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate14.pdf>),* states that "Submitted video may be used to check the accuracy of a reported score or for marketing purposes and will not be made publicly available. Teams are encouraged to make sure that the recorded score is clearly represented in the video, scores which cannot be verified *(except where the reported score is less favorable than the score indicated in the video)* may be discarded."

(Asked by **1684** answered Mar 18th 21)

Q141 Are funnel systems adjacent to the Power Port legal?

Q: in the POWER PORT Challenge, there are many examples of people using a funneling system adjacent to the Power Port in order to return power cells faster. In regards to Team Update 13, would these systems count as loading bay mock ups? if not, are the only physical elements allowed in the 15' x 30' challenge space a Power Port without a funneling system, a Loading Bay or Loading Bay mockup, and markers?

A: We can't rule absolutely on legality for a general class of structures. Generally, there's no defined design for a LOADING BAY mockup, but [PPC6's Blue Box] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/AtHomeManualSections/2021AtHomeChallengesManualSection02.pdf>) describes it as something used "to minimize risk of human injury by a POWER CELL receiving ROBOT" and it's expected that the mockup have some relation to a formal LOADING BAY (i.e. it's used to feed POWER CELLS and it's not a second ROBOT). There are no rules prohibiting the structure from having other functions, features, capabilities, or benefits. As such, the team is expected to make a good faith assessment as to whether the structure they're using to cycle POWER CELLS is a LOADING BAY mockup. [Section 2.4.4] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/AtHomeManualSections/2021AtHomeChallengesManualSection02.pdf>) requires that "No other physical elements may be added within the Challenge Space for the purpose of aiding ROBOT or DRIVE TEAM performance except for a LOADING BAY or LOADING BAY mockup used in the Interstellar Accuracy and POWER PORT Challenges."

(Asked by **5126** answered Mar 22nd 21)

Q142 Does any score discrepancy mean the Challenge score goes to zero?

Q: Going off the answer to Q140, to clarify, if a score is deemed incorrect via the video submission, the entire Challenge is given a ZERO score? For example, a team submits a score of 66 for Power Port, but the judges view the video and get a score of 65, the team score is not adjusted but COMPLETELY discarded for that Challenge? What if the judges found the score to be higher? (same for timing, if was a little bit off)

A: Thank you for your questions. We are modifying our approach to cases in which a video review shows the team actually scored higher than they reported in the system. In these cases, the team's originally submitted score will be retained rather than zeroed. We apologize for the concern this caused. To answer your other question, yes, if a video review indicates the team scored lower than reported, it will be zeroed, regardless of the amount of the difference. While the benefit of the doubt will be given to teams during video reviews, it is important that the scores they are reporting are clearly showing in the video. Please see the modified answer to !Q140 and [Team Update 14] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate14.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **1684** answered Mar 23rd 21)

Q143 Video okay in GDC Interview

Q: In GDC judging we would like to play our animation video for 1-2 min. Can we add audio ; a voice of describing our game? just like previous FRC game animation videos.

A: Teams may do as they wish with their presentation time with judges (7 minutes) - though any videos are included in the team's total presentation time (i.e. it does not result in an extension). We highly suggest that teams practice doing this before their interview. Teams can reference the [Using Microsoft guide] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/AtHomeChallengesSupplements/UsingMicrosoftTeams.pdf>) we put together

for instructions on how to do this.

(Asked by **8079** answered Mar 22nd 21)

Q144 If a marker is contacted more than once, does it incur more than one penalty?

Q: In rules ANC5 and HDC6, it is stated that if a marker is contacted there is a 5 second penalty. In the event that a marker is knocked over into the designated path and the robot runs into this knocked-over marker again, does it incur a second penalty? For example, if a robot knocks over a marker in the first lap of the Lightspeed Circuit Path and runs over it in the second lap, does it incur a second penalty?

A: Correct, it does

(Asked by **342** answered Mar 22nd 21)

Q145 Interstellar Accuracy Challenge IAC7 Stationary

Q: Rule IAC7. Shots must be taken with the ROBOT stationary and its BUMPERS completely within the zone. Is this specific to forward, rearward motion or all motion? For the first zone, our robot lifts in the front to achieve the correct angle for the target. Is this acceptable motion?

A: The intent of IAC7 is to restrict the translational movement of the ROBOT. Movement within the ROBOT is expected (however please note that BUMPERS must remain in the BUMPER ZONE per !R18/SC7).

(Asked by **6344** answered Mar 22nd 21)

Q146 Vacuum Under Robot

Q: Is generating a sub-atmospheric pressure volume under a ROBOT permitted, provided the ROBOT can still roll and drive freely? Q277 and Q295 in 2020 prohibited this action, but we would appreciate confirmation as to whether or not this prohibition also applies to a 2021 Skills Competition ROBOT, as rule G26 for 2020 and 2021 are the same.

A: !G26 does not apply to the Skills Competition. Please note the Blue Box in [Section 2.4.1 Overview] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/AtHomeManualSections/2021AtHomeChallengesManualSection02.pdf>); the intent of not requiring specific flooring was not to open up the scope of the solution space to include the Competition Space surface, but rather accommodate the wide range of flooring readily available to teams.

(Asked by **1619** answered Mar 22nd 21)

Q147 Uninterrupted presentation vs pitch deck

Q: The Innovation Challenge game manual explains that the interview consists of an "uninterrupted presentation" and a "business pitch" presentation. Does this mean that judges can interrupt the presenters during the business pitch? Thanks!

A: No, Judges should not interrupt the presenters during the business pitch.

(Asked by **2783** answered Mar 22nd 21)

Q148 Interstellar Accuracy Scoring

Q: In Interstellar accuracy challenge, if the power cell goes into the Outer port but it bounces out, does it still count as 2 points (similar to Power Port Challenge)?

A: Good catch! Please see [Team Update 14] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate14.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **201** answered Mar 23rd 21)

Q149 Will award winners receive plaques/trophies/blue banners?

Q: I haven't been able to find any details about expectations regarding winning any award in the At Home challenges. Do any of the awards in any of the challenges (Game Design, Innovation Challenge, Judged, Skills, Chairmans, or Deans list) come with plaques, trophies, or blue banners?

A: We're sorry for not making this clearer, but yes all team awards this season will come with a plaque + trophy. Some Awards will also come with banners and other materials but it does vary by award. After award winners are announced, teams will be contacted to provide the best shipping address to receive these items.

(Asked by **5414** answered Mar 22nd 21)

Q150 Do we need to record a a video for random selection of the path for Galactic Search

Q: Do we need to record a a video for random selection of the path for Galactic Search

A: No, the selection of the path does not need to be included in the video. Teams are expected to comply with the random selection and associated rules on the honor system.

(Asked by **6064** answered Mar 22nd 21)

Q151 Plane Confusion

Q: Galactic Search Challenge rules state "The ROBOT must start in the Start Zone with any part of its BUMPERS breaking the plane defined by B1/D1." According to Merriam-Webster, planes are uniquely defined by 3 points. Is there any constraint on the 3rd point used to define the plane the robot BUMPERS must break?

A: Good catch. Please see [Team Update 14] (<http://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate14.pdf>), which specifies that it's the *vertical* plane defined by those points.

(Asked by **900** answered Mar 23rd 21)

Q152 Q146 follow-up: G26 applicability and SC7 clarification

Q: As a follow-up to Q146, we would appreciate you clarifying how G26 does not apply to the Skills Competition. SC7 indicates "Rules that reference the ARENA should be interpreted as referencing the Challenge Space for the At Home Challenges", and G26 references the FIELD, which is an element of the ARENA. Is that ARENA-related statement in SC7 only applicable to ROBOT Construction Rules (Section 9 in the Game Manual)?

A: The only rules from the [Infinite Recharge Game Manual] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/2021FRCGameManual.pdf>) that apply to the Skills Competition are those called out directly in SC7, SC9, SC10, and SC11. There is no Skills Competition rule that enforces following G26. The referenced clause in SC7 is instructing how to interpret rules already called out by SC7 (ROBOT rules, with some exceptions).

(Asked by **1619** answered Mar 23rd 21)

Q153 Innovation Challenge Interview

Q: Hello, the business pitch and uninterrupted presentation have different durations (2 min for the BP and 3 for the UP). Are those the limit durations or is it strongly recommended to be exactly 2 and 3 minutes long?

A: Judges are trained to stop each team after the 2 minutes for the business pitch have passed and let the team know to move on to the presentation. They will do the same thing for the 3 minutes of presentation so they can move on to the Q&A. If a team chooses not to use the full 5 minutes they are allotted, more time will be added to the Q&A period; however, the Q&A must be at least 10 minutes.

(Asked by **6694** answered Mar 23rd 21)

Q154 Deadlines- did we miss submission dates? Are we eligible for extensions?

Q: Hello! I was reviewing our submissions this morning, and the dashboard is showing that we missed the at Home Judging Component and we are not eligible to submit this and the skills Component? We were under the impression that we could submit before April 8. Did we misunderstand the requirements? Is this something that we could receive an extension on? We are juggling FTC too, and the different dates for both competitions are proving challenging to keep up with. Thank you for your time.

A: We know, it's a lot to keep track of, and we'll continue to try to clarify where ever and whenever we can. We can't comment on your team's specific circumstances (for questions about your account, please contact [Team Support] (<https://www.firstinspires.org/about/contact-us>)). The first deadline, which had to be met by teams in order to be eligible for interviews, judging, and awards, was March 5th (originally March 4th and then postponed one day due to technical issues). This deadline required that teams opt-in to their selected At Home Challenges (including the INFINITE RECHARGE at Home Skills Competition component) and submit for the *FIRST* Innovation Challenge presented by Qualcomm, the Game Design Challenge, and INFINITE RECHARGE at Home (Judged Award component, required to also compete official in the Skills Competition). The second deadline, April 8th, is the deadline by which Skills Competition teams must submit their scores/videos. If a team did not opt in to the Skills Competition by the March 5th deadline, they're ineligible for the official leaderboard and awards, however they may still submit their scores and videos and be included in the [Samarium GROUP](<https://frc-events.firstinspires.org/2021/IRHSM>), which will publicly display their unofficial scores (read more about this in [this blog](<https://www.firstinspires.org/robotics/frc/blog/2021-submission-statistics-and-unofficial-score-reporting>), [this blog](<https://www.firstinspires.org/robotics/frc/blog/2021-update-on-unofficial-score-reporting>), and [this blog](<https://www.firstinspires.org/robotics/frc/blog/2021-kit-of-parts-survey-public-leaderboard-and-score-calculator>)). Stay tuned to [FRC Email Blasts](<https://www.firstinspires.org/resource-library/frc/email-blast-archive>) and the [FRC blog](<https://www.firstinspires.org/robotics/frc/blog/>) for more information.

(Asked by **8292** answered Mar 23rd 21)

Q155 Scoring for combination 3D and 2D port

Q: We are using a 3D outer port and a 2D inner port, as described in Q72. We had previously assumed that we would score the outer port according to the 3D rules and the inner port according to the 2D rules. Team Update 14 seemed to say that balls must pass through the inner port in order to be scored, but that is not possible with our 2D inner port. Can we score our inner port according to the 2D rules and our outer port according to the 3D rules?

A: Absolutely. POWER CELLS must pass through a *3D* INNER PORT to be scored, but if using a 2D INNER PORT, the POWER CELL must meet the 50% requirement described. The intent is to be permissive about how teams construct the POWER PORT, but still describe scoring in a way that mimics what would be done in a regular season MATCH. A POWER CELL cannot be scored in both INNER and OUTER PORTS in the same shot. So, if a POWER CELL goes through a 3D OUTER PORT, more than 50% of it hits a 2D INNER PORT, and the POWER CELL bounces out, it counts as having scored in only the INNER PORT.

(Asked by **3175** answered Mar 24th 21)

Q156 Can a team combine the business pitch and presentation to make a 5 minute presentation

Q: Does the 8-slide limit pertain just to the slideshow for the 3-minute "Uninterrupted Presentation" portion or does it also pertain to the slideshow for the 2-minute "Business Pitch"? Also, can teams combine the slideshow for the business pitch and "Uninterrupted Presentation" to create a single continuous 5-minute presentation (with a max slide count of 16)?

A: There is no hard requirement on the exact number of slides used in either presentation. Section 4.4.3.5 of the [At Home Challenges Manual](<https://firstfrc.blob.core.windows.net/frc2021/Manual/2021AtHomeChallengesManual.pdf>) notes that "We recommend no more than eight (8) slides" for the business pitch, and Section 4.5.1 states "teams should not use more than eight (8) slides" for the business pitch. Both of these are strong recommendations for the business pitch as a result of the amount of time available to present this information. There are no such recommendations given for the "Uninterrupted Presentation," but the same concerns about the time constraint apply. Teams may manage their slide decks however they would like, but their must be a clear division between the business pitch and uninterrupted presentation. They are two separate elements with two separate time limits applied.

(Asked by **7692** answered Mar 24th 21)

Q157 Are power cells static elements?

Q: For the purposes of the third blue box under 2.4.4, are power cells are considered "static elements"?

A: This blue box is referring to the preceding statement "Other static elements outside the Challenge Space may be placed to aid robot navigation, provided the robot does not physically interact with them." POWER CELLS placed outside the Challenge Space that will not move would be considered "static elements" for the interpretation of this blue box.

(Asked by **3928** answered Mar 25th 21)

Q158 Galactic Search premade paths

Q: For the Galactic Search challenge, can the robot utilize sensors that determine the placement of power cells to choose between premade paths for each of the four configurations?

A: POWER CELLS placed as required by GSC3 may be used by the ROBOT to determine the path. Static POWER CELLS outside the scope of GSC3 may not be used to signal the path per GSC2-1.

(Asked by **3928** answered Mar 24th 21)

Q159 Should Drivers and Driver Station be visible in videos?

Q: Do the human drivers and the driver station, computer/dashboard, and controls need to be visible in the submitted videos for human-operated challenges, or can we place our camera to have the clearest view of the field and robot for the judges? Similarly, do we need to make sure that the driver station is visible in autonomous challenges, or can we place our camera in the best locations for capturing the robot, field markers, and Power Cells?

A: There is no requirement that humans be visible in the video. The intent is that the video captures the actions that result in scores.

(Asked by **2603** answered Mar 25th 21)

Q160 Innovation Challenge Semi-Finalist Additional Information

Q: In section 4.3.1, when specifying additional information to be submitted by Innovation Challenge semifinalists, it lists a “team description” with a 150 word limit. Do judges want a description of the full team, of the Innovation Challenge submission team, or something else?

A: Great question. The team description is not a judged element. The team description section gives teams the opportunity to describe their FRC team, who they are and how they want to appear/be referred to publicly.

(Asked by **1678** answered Mar 25th 21)

Q161 Where are videos uploaded for at-home skills?

Q: I see where to enter a time for the challenge run. Where do we upload the video? It states to separately record time and video

A: After entering a score, the field will appear to upload the corresponding video.

(Asked by **6753** answered Mar 25th 21)

Q162 Galactic Search Path Detection Prior to Enabling

Q: Per GSC5, it states that the game timer is started when the robot is enabled. However (in correspondence to Q158), is there any rule violations in the Galactic Search Challenge for using a path detection system that doesn't require any “static elements” or communication from the driver station before the robot is enabled? GSC2-1 seems to imply that the robot would have to be receiving human communication in order to warrant a violation, which does not apply to our system. Thank you!

A: There are no rules prohibiting a ROBOT from determining the path to run prior to being enabled, however to clarify, the intent of GSC2-1 is to prohibit any signaling by the team to the ROBOT (of its the path) regardless of how it's done, i.e. whether it's via human or object or any other means, the intent is that the ROBOT determine its path itself from the set up and is not taking queues from its team.

(Asked by **862** answered Mar 29th 21)

Q163 Interstellar Accuracy Challenge preload

Q: If you start with 3 preloaded, are those the 3 that are allocated to the green zone since that is where we start or is that your extra 3 that are allocated anywhere in the field? We can only shoot from yellow and blue zones, so we are trying to maximize our shots. Our understanding is that in this case, we would only have the ability to shoot the 3 allocated in the blue, 3 allocated in the yellow, and the 3 that are preloaded, for a total of 9. Is that interpretation accurate? Thanks!

A: Per the blue box of IAC2 [Section 2.4.9.2] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/2021AtHomeChallengesManual.pdf>), "allocate means to assign the only zone from which the POWER CELL may be shot." The preloaded POWER CELLS are not required to be allocated to the Green Zone. Your interpretation is correct. A ROBOT that only shoots from the Blue and Yellow Zones during an attempt must not shoot more than 9 POWER CELLS, as 3 must be allocated to the Green Zone, and 3 must be allocated to the Red Zone.

(Asked by **8005** answered Mar 26th 21)

Q164 Use of a Guard Rail in 2021

Q: In the Interstellar Accuracy & PowerPort Challenges, can a team legally use a guardrail at the perimeter of the field to keep rolling power cells on the field / in the Challenge Space?

A: There are no rules prohibiting this.

(Asked by **744** answered Mar 26th 21)

Q165 Marker hit after robot reaches Finish Zone in AutoNav and Hyperdrive

Q: In AutoNav or Hyperdrive, after a robot's bumper breaks the Finish Zone plane as defined by the Finish Zone markers, if the robot's subsequent movement hits a marker, will that marker incur a time penalty?

A: We believe **1Q113** answers your question regarding the Hyperdrive Challenge specifically; we confirm it applies to the AutoNav Challenge too.

(Asked by **226** answered Mar 27th 21)

Q166 Can we place a full grid on the field for the IRaH skills Challenges.

Q: Are we permitted to mark off a full grid with paint or tape on the play field? We would like to connect all of the NAV POINTs and surround the field with 2 inch wide tape to create a detailed rectangular grid on the play field. We would leave each NAV POINT visible and place MARKERS at the NAV POINTS specified by each skills challenge. Q64 allows the use of technology aids on the field but it is not clear that a tape grid would qualify as technology aid.

A: Yes, per [Section 2.4.4 Challenge Space Layout] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/AtHomeManualSections/2021AtHomeChallengesManualSection02.pdf>), "Additional markings may be added on the floor or POWER PORT at team discretion."

(Asked by **2607** answered Mar 29th 21)

Q167 Power Port Challenge clarification to PPC6

Q: PPC6 states that "Humans may only introduce POWER CELLS in the Reintroduction Zone...". What, specifically, needs to be in the Reintroduction Zone (RI Zone)? It seems like the intent is that the bumpers of the robot must be fully in the RI Zone when humans load it. However, the phrase could be interpreted as meaning that humans can only introduce power cells to the robot if the human is in the RI Zone. Can humans be outside the RI Zone and load the robot which is in the RI Zone?

A: PPC6 has no bearing on where the ROBOT or Human is if/when a POWER CELL is introduced; it only requires that the POWER CELL be fed in to the Reintroduction Zone vs anywhere else in the Challenge Space.

(Asked by **4020** answered Mar 29th 21)

Q168 Power Port Challenge starting configuration on video?

Q: The answer to Q139 indicates that the one minute timer may begin at the most advantageous instant to maximize the score in the Power Port Challenge. Is it required that the video documenting the score show the robot in the starting configuration in a disabled

condition with the shooter not running before beginning any shooting, or may the video start slightly before the advantageous instant while the shooter is running and the robot is not in the starting configuration?

A: There is no requirement that the video show that the ROBOT was in legal STARTING CONFIGURATION at the start of the challenge attempt (i.e. when the ROBOT was enabled, started moving, etc., which does not necessarily coincide with the start of the timer/video for the POWER PORT Challenge), even though that is a requirement per SC10. The purpose of the video is to confirm scores not to confirm absolute rule compliance.

(Asked by **4020** answered Mar 29th 21)

Q169 Will the Skills Competition Winner of each group receive a Blue Banner?

Q: Will the Skills Competition Winner of each group receive a Blue Banner?

A: Yes! The INFINITE RECHARGE at Home Skills Challenge Winner in each group will receive a blue banner, as will all Chairman's Award winners and all Woodie Flowers Finalist Award winners. Teams will be contacted to provide shipping addresses after it's been announced that they have won.

(Asked by **364** answered Mar 29th 21)

Q170 GDC advancement clarification

Q: The advancement clause states: "All submissions from teams who received either the Designer's Award or the Concept Award will advance to a second round of judging." How many awards are allocated ? Is it one of each in every GROUP ?

A: Good question! There will be one winner of each Award detailed in Section 3.4.1 for each GROUP with the exceptions of the Engineering Design Award (which will have two winners per GROUP) and the Rookie Design Award (which is optional for Judges to award and may not be given out for all GROUPS). We will add this detail to the manual in [Team Update 16] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate16.pdf>).

(Asked by **5554** answered Mar 31st 21)

Q171 2-D Bottom Port Representation

Q: In the Infinite Recharge at Home Challenge Space Manual, it is stated that "For teams utilizing the BOTTOM PORT, it is not recommended to use a 2-D representation." To clarify, is it legal to use a 2-D representation for the bottom port, as long as it is clear when a score occurs (such as using paper rather than a rigid surface to indicate an impact)? We are asking in the context of the Interstellar Accuracy Challenge, in which our robot can only score in the bottom port from the Green Zone.

A: Yes, it's legal. There aren't rules that prohibit use of a 2-D bottom port representation if all scoring criteria and rules for the challenge are met. The recommendation cited is based on the expectation that most ROBOTS scoring in the BOTTOM PORT would have difficulty clearly meeting the "not in contact with a ROBOT" scoring criteria for the POWER PORT Challenge in [Section 2.4.10.3] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/AtHomeManualSections/2021AtHomeChallengesManualSection02.pdf>).

(Asked by **7660** answered Apr 2nd 21)

Q172 Robot Inspector

Q: Good morning! I'm looking at the At Home Inspection Checklist, and I see that in addition to the spaces for the Team Captain and Team Mentor to sign off, there is also a space for an Inspector to sign off as well. Who would that be? Thank you! Team 5130

A: The [Self-Inspection Checklist](<https://firstfrc.blob.core.windows.net/frc2021/Manual/2021-inspection-checklist.pdf>), while strongly encouraged and helpful in complying with SC9 (glad to hear you're using it!), isn't required. As such, the "Inspector" field can be signed by the person responsible for checking your team's ROBOT, anyone else, or left blank.

(Asked by **5130** answered Apr 2nd 21)

Q173 Communication Between Robot Operators and Other Humans

Q: During the Interstellar Accuracy Challenge and the POWER PORT Challenge, can operators of the robot receive any sort of verbal and/or nonverbal communication from other humans (e.g. human players, adult team mentor) to aid in the navigation of the robot?

A: There are no rules that prohibit communication to ROBOT operators during a challenge attempt.

(Asked by **1468** answered Apr 2nd 21)

Q174 Penalty for Contacting MARKERS in IAC and PPC?

Q: During the Interstellar Accuracy Challenge and the POWER PORT Challenge, are there any penalties if the ROBOT contacts the MARKERS that mark the zone boundaries?

A: No, no penalties are assigned for contacting MARKERS.

(Asked by **1468** answered Apr 2nd 21)

Q175 Power Port Markers

Q: If our best video for Power Port does not have markers in it but there is tape on the ground that is clearly visible and identifies the zones, will it be accepted?

A: Videos that depict non-compliant Challenge Space setup may result in the corresponding scores being discarded.

(Asked by **3620** answered Apr 2nd 21)

Q176 Interview times

Q: In the interview of the innovation challenge, does the business pitch and uninterrupted presentation has to be presented without a break one after the other or the teams have time between presentations to change screen content and prepare?

A: The time given to teams to complete the entire interview includes any transition time needed between presentations. Teams are expected to transition relatively quickly, though not instantly.

(Asked by **6694** answered Apr 2nd 21)

Q177 Hyperdrive - Can you go outside the 15 by 30 ft field?

Q: Our field is a 12ft by 30ft carpet plus a 1.5 ft area on each side. We do not have walls. Can we go outside of the 30 ft by 15 ft area?

A: We believe !Q63 answers your question. If it does not, please rephrase your question and resubmit. Please use the Search Q&A button on the navigation bar before posing a new question.

(Asked by **8033** answered Apr 5th 21)

Q178 We are confused about "remotely". In 2.4.8, 2.4.9 and 2.4.10

Q: In 2.4.8, ...Teams drive their ROBOT remotely... In 2.4.9 and 2.4.10 ...either autonomous and/or remotely controlled. We interpret that to mean the driver cannot be physically in the same area the playing field is in and is not able to view it. Q94 seems to indicate the driver can be in the same area as the playing field, and Q173 indicates non-drivers can communicate information to the driver, also indicating they are in the same space. Can you let us know what "remotely" means? Thanks!

A: "Remotely" indicates that drivers are operating the robot without being physically located on board. Drivers may be located in the same space as the ROBOT.

(Asked by **4455** answered Apr 5th 21)

Q179 Galactic Search Challenge: Ending partially out of the End Zone

Q: Q63 says there is no restriction or penalty on exiting the Challenge Space during a challenge. For clarification, in the Galactic Search Challenge, is it legal if the robot is partially outside of the field edge of the Challenge Space at the end of the attempt when its bumpers break the plane of the End Zone?

A: Yes, that is consistent with !Q63.

(Asked by **846** answered Apr 5th 21)

Q180 Bounce Path

Q: Both 2.4.7.2 and 2.4.8.2 state "In the Bounce Path, the ROBOT must contact each starred MARKER as it navigates the path." It doesn't state anywhere that we can find that the bumpers must contact the Starred Marker. Is it permissible for the robot to extend the intake out to make contact with the starred marker sooner, provided the intake doesn't extend past the 12 inches allowed from the frame perimeter? (R4 of Game manual)

A: There are no requirements that ROBOTS contact MARKERS with their BUMPERS; any part of the ROBOT that contacts a MARKER meets that requirement of each corresponding challenge.

(Asked by **364** answered Apr 5th 21)

Q181 What is the exact definition of robot is "enabled"?

Q: Several rules, such as GSC5, says to start the timer as soon as the robot is enabled. Does that only mean when someone pressed the "Enable" button on the Driver Station? Or can that mean when pilot start to input commands?

A: "Enabled" is the state in which a ROBOT is commanded to activate all outputs rendering the ROBOT operable (i.e. enabled on the Driver Station); it is not related to when a human begins to manipulate the controls. Note: "enabled" only appears in rules for challenges where the ROBOT is operated autonomously.

(Asked by **3986** answered Apr 5th 21)

Q182 Distance of camera away from the operating space

Q: In 2.4.5 Filming, it states "The exact distance away from the operating space will depend on the height and orientation of the camera to the field, but it's recommended that the camera always have a full-frame view of the operating space if possible. This may require a distance of up to 6 feet away from the operating space." Does this mean the camera cannot be more than 6 feet away from the operating space?

A: Nope, positioning the camera more than 6 ft. away is permitted.

(Asked by **7858** answered Apr 6th 21)

Q183 Innovation Challenge Business Model Assumptions

Q: In sections 4.3.1 and 4.4.3.2, the rules state that teams advancing to the semifinals of the Innovation Challenge must provide a description of the business model. Should the team's business model be based around the idea that it was a true company bringing the idea to market, or should it be what the team actually plans to do moving forward given the resources accessible to them?

A: The business model needs to include a distinct value proposition for the innovation and the model needed to support the innovation. A business model may include factors for implementation that are outside the scope of a team's resources due to cost, infrastructure, availability, time, resources, or other factors. As stated in bullet three of 4.4.3.2, we recommend considering the wide variety of factors necessary for what a full business model for the innovation would be.

(Asked by **1678** answered Apr 13th 21)

Q184 Galactic Search Challenge GSC4 Plane Boundaries

Q: GSC4 states "The ROBOT must start in the Start Zone with any part of its BUMPERS breaking the vertical plane defined by B1/D1." Does this plane extend all the way to the boundaries of the Challenge Space, or does it stop at the points B1/D1? So can a robot start with its bumpers intersecting anywhere along the 1 column of points (for example intersecting A1 or E1) or does the robot need to explicitly start between points B1 and D1?

A: The vertical plane extends infinitely, so provided the ROBOT's BUMPERS break the plane at any point, it's in compliance with GSC4 (i.e. the location of the plane break does not have to be between B1 and D1).

(Asked by **1983** answered Apr 7th 21)

Q185 How to name videos for Galactic Search/AutoNav

Q: The rules state that the videos for the Skills Challenge should be named in the format of "Team0001-InterstellarAccuracyChallenge". For Galactic Search and AutoNav, the rules say that each path should be recorded in separate videos. Can an identifier be added to the end of the file name to differentiate between them so not all video files for that challenge have the same name? Example: "Team0001-AutoNavChallengeSlalom" rather than just "Team0001-AutoNavChallenge"

A: Yes, a path name, a number, or any other means of differentiating the videos is permitted.

(Asked by **11** answered Apr 8th 21)

Q186 2.4.11 Overall Score part 4 blue box and Raw Scores

Q: In the blue box accompanying part 4 of 2.4.11 in the IRaH manual, there is a statement "Teams that don't report a Raw Score, while they may appear in list of ranked teams on FIRST Robotics Competition Events page, are not eligible for Winner or Finalist titles." Does this mean that teams which did not submit a Raw Score for one or more of the 5 challenges are not eligible to be group Winner or Finalist, or does it mean that teams which submitted no Raw Scores are not eligible to win?

A: The latter, that text was included in case there were any GROUPS where no teams, or only a single team, submitted any raw scores.

(Asked by **4020** answered Apr 9th 21)

Q187 Why is my raw score different than what I entered in Hyperdrive

Q: Hello Why is the raw Scoring amounts different than what I enter when I uploaded my videos for Hyperdrive.. Barrel 19 Seconds Bounce 18 Seconds Light Speed 40.7 Seconds Slalom 14.3 seconds A total of 91 seconds the raw Score shows 260.9. Is there a formula you use. This is on the FRC Events website.

A: The purpose of this Q&A is to answer questions regarding the rules of INFINITE RECHARGE. For questions about your team's entry, please email [Team Support](mailto:FIRSTroboticscompetition@firstinspires.org).

(Asked by **4290** answered Apr 9th 21)

Q188 infinite recharge forget to submit for skills competition

Q: After my team submitted our skills competition raw score and videos, we found that we are ranked in the unofficial group, is there a possibility for us to join a official team now?

A: Teams that did not complete the Infinite Recharge at Home judged component submission and/or did not opt into the Skills Challenge by the March 5th deadline are placed in the Samarium GROUP as detailed in the blogs [here] (<https://www.firstinspires.org/robotics/frc/blog/2021-submission-statistics-and-unofficial-score-reporting>) and [here] (<https://www.firstinspires.org/robotics/frc/blog/2021-update-on-unofficial-score-reporting>).

(Asked by **7497** answered Apr 9th 21)

Q189 Will all scores in a group be verified?

Q: The scoring algorithms were designed in a way that all scores in a given group affect all other scores. Due to this, it appears like it was intended that all scores in a given group will be verified, since all scores can affect who wins. Can you confirm that this will be the case?

A: Verification of all scores by video is not necessarily the case. Per [Section 2.2.1] (<https://firstfrc.blob.core.windows.net/frc2021/Manual/2021AtHomeChallengesManual.pdf>), "Submitted video *may* be used to check the accuracy of a reported score." (emphasis added for clarity). There is no published specification on how many videos HQ will review or how the videos for review will be selected.

(Asked by **1610** answered Apr 9th 21)

Q190 Will top scores in each challenge be reviewed?

Q: There are multiple groups where individually high challenge scores submitted by teams ranked below #2 in their group that are affecting the rankings sort of positions 1 and 2 or more. Will the top few submissions in each challenge be reviewed, or only the submissions from the top few ranked teams?

A: Maybe. We believe !Q189 answers your question. If it does not, please rephrase your question and resubmit.

(Asked by **3940** answered Apr 9th 21)

Q191 Review of out-of-contention teams' videos

Q: While our team is utterly out of contention for the challenge winner and finalist slots, we saw how our scores and rankings bobbed up and down when other teams submitted scores. Will all teams' videos be reviewed since they can all impact the scores for the rest of the group, or will there be some cutoff point where the reviewers say "who would fudge the numbers for an Interstellar Accuracy Challenge score of 6?"

A: Maybe. We believe !Q189 answers your question. If it does not, please rephrase your question and resubmit.

(Asked by **1293** answered Apr 9th 21)

Q192 Image of the innovation rules and submitted logo

Q: We know that for the At Home challenge there was no limit on the number of photos and amount of text and labels in the 3 submitted images. Is this the same for the image of our innovation for the semi-finals submission? We are trying to find the difference between the type of content that should go on the supplement versus the image of the innovation. Also, what is the purpose of the submitted logo? Would you like our team logo or the specialized logo we made for this challenge? Thank you!

A: The optional image of the innovation should be single image of the innovation. This image can be a sketch, photo of a physical model, a CAD image, etc. Teams also have the option up upload up to 1 page (8.5 x 11 or A4) of supplemental documentation; we recommend this is used to illustrate any data, drawings, photographs to help show the design. The requirement for the logo should be your team logo. The logo may be used for marketing purposes such as announcements or innovation highlights. Teams will have the option to upload their invention logo however, this logo will not be judged.

(Asked by **2877** answered Apr 15th 21)

Q193 Where do Innovation Challenge semifinalists submit the 150 word public project description

Q: In section 4.3.1, one of the semi-finalist requirements is: public project description (150-word limit). We do not see where that information is to be entered in the submission portal. Can you advise?

A: This non-judged question appears on the "Team Details" tab in the submission portal.

(Asked by **2607** answered Apr 19th 21)

Q194 For 4.3.1, can of the single image of the innovation be a collage?

Q: This question is in reference to one of the optional items: an image of the innovation. We may be "begging the question here" but we keep going over the "single image" answer to Q192. Can this image be a collage; for example if we are developing an app, we would like to show several screens demonstrating various aspects of the app. Is this allowed?

A: We believe !Q192 answers your question. If it does not, please rephrase your question and resubmit. Please use the Search Q&A button on the navigation bar before posing a new question.

(Asked by **2607** answered Apr 19th 21)

Q195 Section 4.3.1 and the portal requirements don't agree. What do we follow?

Q: Section 4.3.1 requires (a) a 500-word limited description of the design and (b) a separate 500-word limited description of the business model. However, the submission portal separates each of these requirements into two parts and each part has very specific content requirements, as well as, separate word limits. This is confusing in that we're not sure what the actual requirements are. Do we follow the manual or the portal or try to follow both?

A: Sorry for the confusion. The portal and manual will be updated (in [Team Update 18] (<http://firstfrc.blob.core.windows.net/frc2021/Manual/TeamUpdates/2021TeamUpdate18.pdf>)) to reflect that, for the design and business model sections of the form, the 500-word limit applies to the first question, and the 2nd question is optional (skipping these optional parts of the form will have no ill effect on the team's submission).

(Asked by 2607 answered Apr 19th 21)

Q196 The Executive Summary is Locked. How can we update information on the technology we used?

Q: Section 4.3.1 provides the option to update or refine the answers to the three questions asked in the Executive Summary that was part of the IC's original submission. However, the question on the technology used by the team is locked on the portal so that we cannot update or refine it. Is there a way to modify this section of the Executive summary?

A: Apologies, the technology portion of the Executive Summary is locked (and will not be used for semi-finalist judging), and published language that states that teams may update their Executive Summary was incorrect (and will be corrected). Please use the Design section to describe your use of technology. Because judges will be evaluating the use of technology under the Design guidelines, we are directing teams to outline their technology in that section.

(Asked by 2607 answered Apr 19th 21)

Q197 We need further clarification on Q193 related to section 4.3.1 of the IC manual

Q: In our original Q193 we were asking where we could enter our 150 word IC Public Project Description. The answer to Q193 suggested that the Public Project Description is found on the "Team Details" tab. This tab has a field for the "Team Description" but none for "Project Description". In section 4.3.1 of the manual, those are two separate items. Can you please tell us where we can enter our IC Public Project Description. Thank you.

A: Apologies for the confusion. The question was not mapped correctly but should be showing up on the Team Details page now. For additional technical assistance with the Entry Portal for Innovation Challenge, please send a message to globalinnovation@firstinspires.org(<mailto:globalinnovation@firstinspires.org>).

(Asked by 2607 answered Apr 20th 21)

Q198 Dean's List nominee review process

Q: After a Dean's List nominee is selected as a District Semi-Finalist and has a 2nd interview, what is the next step in the Dean's List process?

A: Students will be made aware if they were chosen as a Finalist during Local Award Shows being held remotely. For more information on when your Region/District's Award Show is, please visit our [2021 Award Shows Webpage] (<https://www.firstinspires.org/resource-library/frc/2021-award-shows>). Finalists will not receive another interview. Judges will review submissions to decide who our 10 Dean's List Award Winners are. Winners will be announced at a later, to be determined, date.

(Asked by 8567 answered Apr 20th 21)

Q199 How to contest our Overall Score or report a miscalculation?

Q: In reviewing the rankings for the Chromium Group, it appears that the Overall Score is the sum of the scores for each of the 5 challenges (computed scores). If so, our team's Overall Score appears to be missing the PowerPort challenge score. Galactic Search: 0 Auto-Nav: 98.44 Hyperdrive: 92.64 Interstellar Accuracy: 85.90 PowerPort: 72.22 Overall Score: 276.98 --> this should be 349.2

A: Per bullet 3 of [Section 2.4.11](<https://firstfrc.blob.core.windows.net/frc2021/Manual/2021AtHomeChallengesManual.pdf>) the

Overall Score is the sum of a team's three (3) highest Computed Scores, not all five (5) scores.

(Asked by **2783** answered Apr 26th 21)

Q200 Clarification on intersectionality of R40 and R56

Q: Per R40, "no additional devices or modifications" are allowed between the battery, main breaker, and power distribution system. However, R56 states that high impedance monitoring that is non-consequential is acceptable in the electrical system. If a team desires to monitor their main power, does R56 take precedence over R40? Can this be clarified to enable monitoring of the main power source?

A: Doing something permitted by one rule in a way that violates another rule is not permitted, unless that 2nd rule calls out the something as an exception to the rule. That is the case here. Doing something permitted by !R56 in a way that !R40 prohibits is still a violation of !R40 and not permitted. For suggestions, recommendation, and feedback, please reach out to [FRC Team Support] (<mailto:firstroboticscompetition@firstinspires.org>).

(Asked by **900** answered Apr 29th 21)