FIRST
GAME CHANGERS
SM
POWERED BY
STAR WARS
FORCE FOR CHANGE
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FIRST TECH CHALLENGE

PRESENTED BY

Qualcomm

極限達陣

FTC 教練會議 2021.03.12

FIRST GAME CHANGERS powered by STAR WARS

EROBOT 台灣玉山機器人協會

社團法人台灣玉山機器人協會
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Robot Design

<RG02> Maximum Starting Size - The maximum size of the Robot for starting a Match is 18 inches (45.72 cm) wide by 18 inches (45.72 cm) long by 18 inches (45.72 cm) high.

Mechanical (power-OFF) - Any restraints used to maintain starting size (that is, zip ties, rubber bands, string, etc.) must remain attached to the *Robot* for the entire *Match*.

Initialization Routine - in the Autonomous *Op Mode* that may pre-position the servo motors, with the *Robot* powered on, to the desired stationary position.

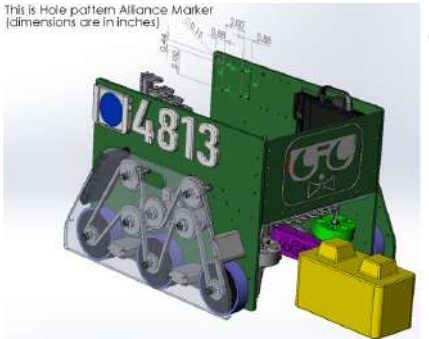
Main power switch
1 in x 2.63 in (2.54 cm x 6.68 cm, Avery Label # 5160)

Team Number & Alliance Marker

<RG04> ***Team*** **Number Display** - *Robot*s must prominently display their *Team* number (numerals only, for example “12345”) on two separate signs.

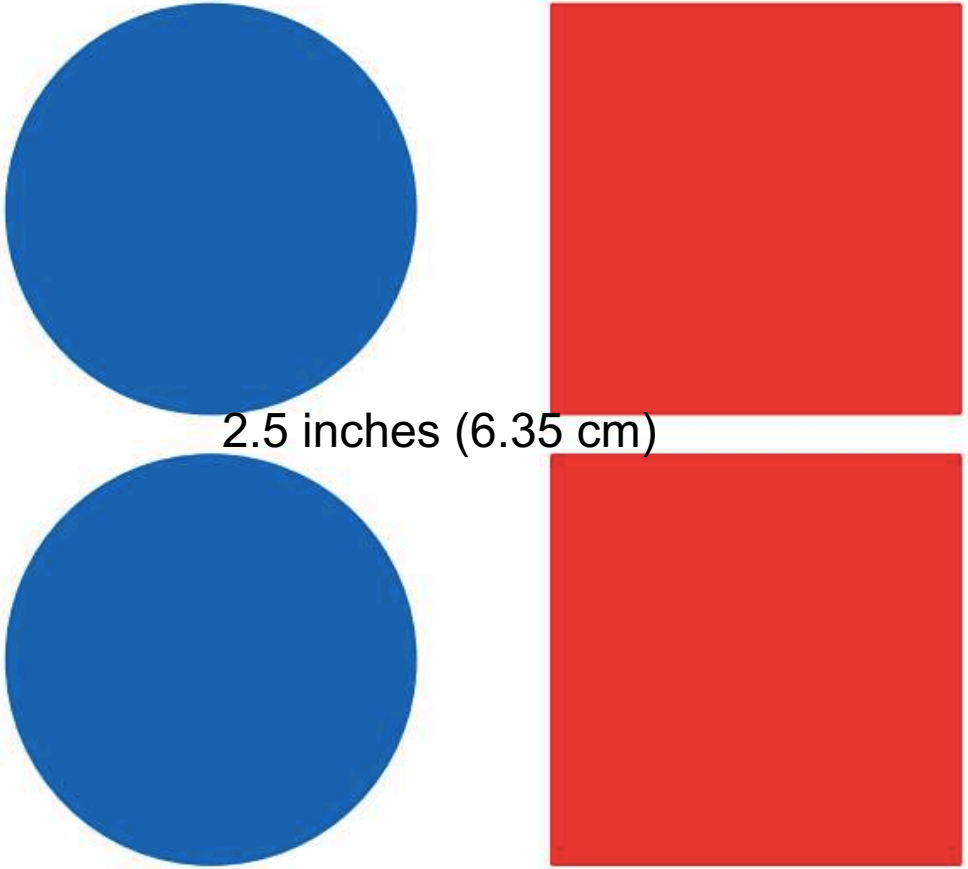
- **two** opposite
- numerals must each be at least 2.5 inches (6.35 cm) high

<RG05> Alliance Marker – *Robots* must include a *Team* supplied, *Alliance* specific marker on two opposite sides of the *Robot* to easily identify which *Alliance* a *Robot* is assigned to. The *Alliance* marker must be displayed on the same side of the *Robot* as the *Team* number, within a 3” distance of the number. The *Alliance* marker must be visible to the referees during a *Match*



Alliance Marker Template

Teams can use this template to print Alliance Markers to the correct size. These can be laminated and attached to the robot using Velcro, dual lock, etc. Make sure they can withstand gameplay and follow the rules outlined in Game Manual Part 1, Rule (RG05)



Main Power Switch

<RE01> Main Power Switch -A Main *Robot* Power label must be placed near the Main Power Switch of the *Robot*

at least 1 in x 2.63 in (2.54 cm x 6.68 cm, Avery Label # 5160)

Control Module Quantities

<RE08> Control Module Quantities - The Control Module consists of one of the following:

a. A *REV Control Hub*; or

b. An allowed *Android Device* connected to a *REV Expansion Hub*

a

In addition to “a” or “b” above, you may add:

c. No more than one additional REV Expansion Hub

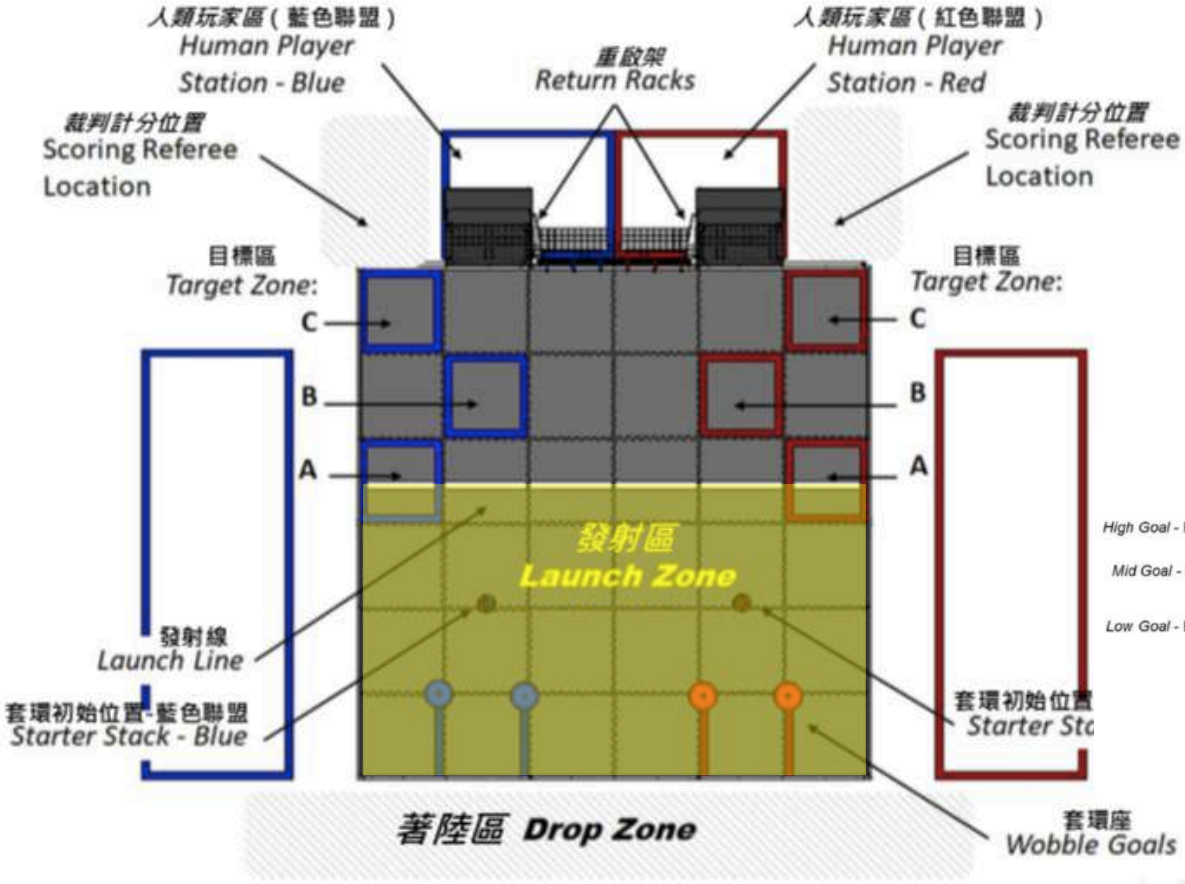
d. Any quantity of *REV SPARK Mini Motor Controllers*

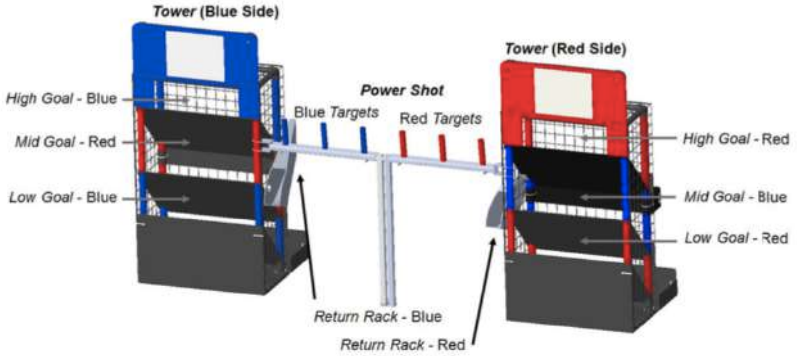
e. Any quantity of *REV Servo Power Modules*

+

b

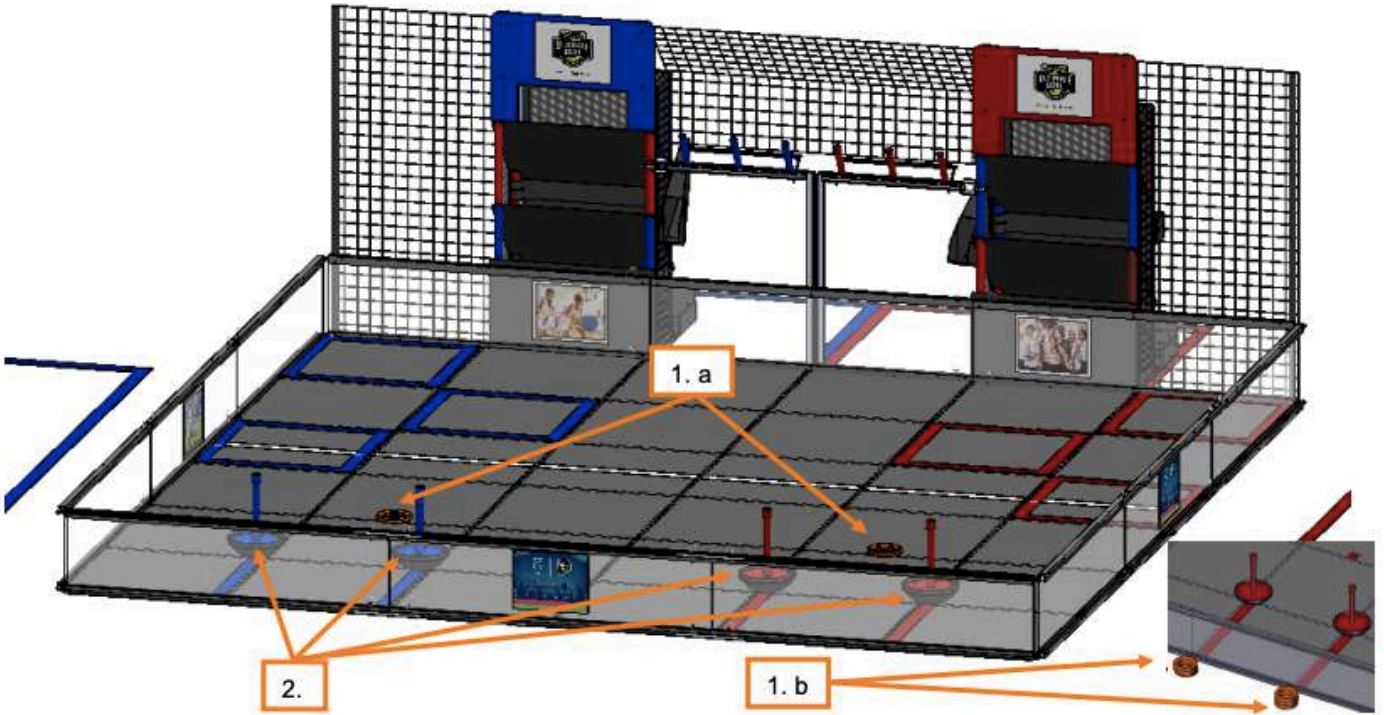
Play field


人類玩家區（藍色聯盟）
Human Player Station - Blue
重啟架
Return Racks
人類玩家區（紅色聯盟）
Human Player Station - Red
裁判計分位置
Scoring Referee Location
裁判計分位置
Scoring Referee Location
目標區
Target Zone:
C
B
A
目標區
Target Zone:
C
B
A
發射區
Launch Zone
發射線
Launch Line
套環初始位置-藍色聯盟
Starter Stack - Blue
套環初始位置
Starter Sta
著陸區 Drop Zone
套環座
Wobble Goals


Tower (Blue Side)
Tower (Red Side)
Power Shot
High Goal - Blue
Mid Goal - Red
Low Goal - Blue
Blue Targets
Red Targets
High Goal - Red
Mid Goal - Blue
Low Goal - Red
Return Rack - Blue
Return Rack - Red

Play field Reset

Field Reset Guide



Drive Team

Drive Team – Up to four representatives; two (2) *Drivers,* one (1) *Coach,* and one (1) *Human Player* from the same *Team*. Only one (1) *Human Player* represents an entire *Alliance* in a *Match*

Pre-Match Robot Placement

Qualification *Matches*, the blue *Alliance Robots* are set up on the *Playing Field* first

Elimination *Matches*, the 3rd and 4th seeded *Alliance Robots* are set up on the *Playing Field* first

Pre-Match

Starting Location

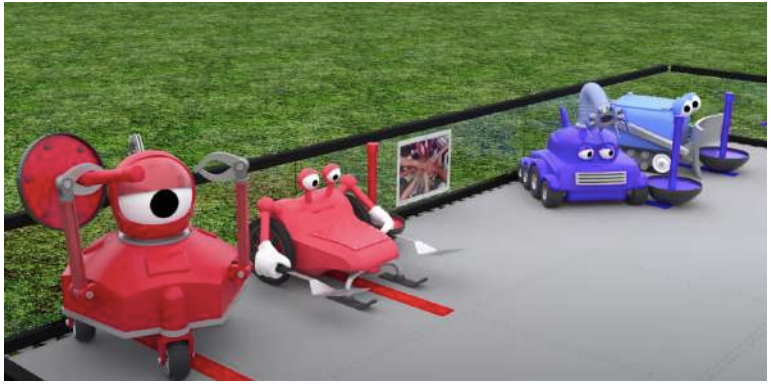
a) *Robots* and *Possessed Scoring Elements,* in any orientation, *Completely Inside* the *Playing Field Perimeter.*

b) Touch the front facing (i.e. closest to the audience) *Playing Field Wall*.

c) *Parked In* their *Alliance Specific Start Line*. Only one (1) *Robot* per *Start Lin*

Robot Contact

A *Robot may not* contact another *Robot* or anything *Pre-Loaded* onto another *Robot*.



Pre-Match

Wobble Goal

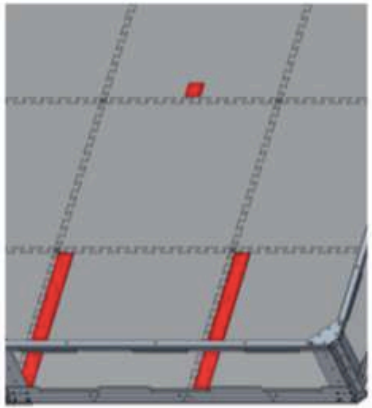
a) A *Robot* is required to *Pre-Load* exactly one (1) of their respective *Alliance Specific Wobble Goals*. *Drive Teams* may move the *Wobble Goals* from their initial *Field Set-up* position.

b) A *Robot* may not touch an opposing *Alliance's Wobble Goal*.

Pre-Load Rings

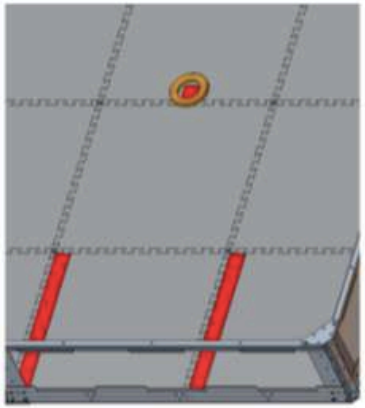
A *Robot* may *Pre-Load* up to three (3) *Rings*. *Rings* that are not *Pre-Loaded* have no *Score* value for the *Autonomous Period. Rings* cannot be loaded onto the *Wobble Goal*

Starter Stack Randomization



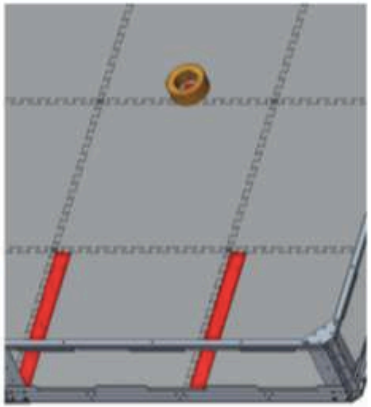
0 *Rings* = Target Zone A

Dice Roll



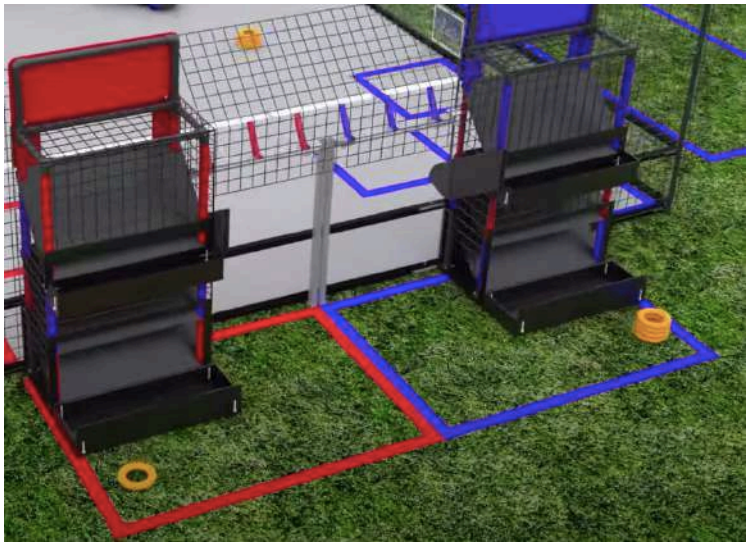
1 *Ring* = Target Zone B

Dice Roll



4 *Rings* = Target Zone C

Dice Roll



Qualification Match

<C07> *Teams* competing in a meet, league *Tournament*, qualifying *Tournament*, and championship *Tournament* will compete in no fewer than five (5) *Qualification Matches*, and no more than six (6) *Qualification Matches*

Teams may be required to play a *Surrogate Match,* which is an extra *Match* marked by an asterisk on *a Team's Match* schedule. The added *Surrogate Match* does not count towards their standings during the *Tournament*.

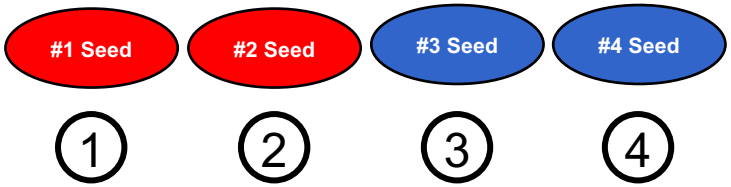
Alliance Selection

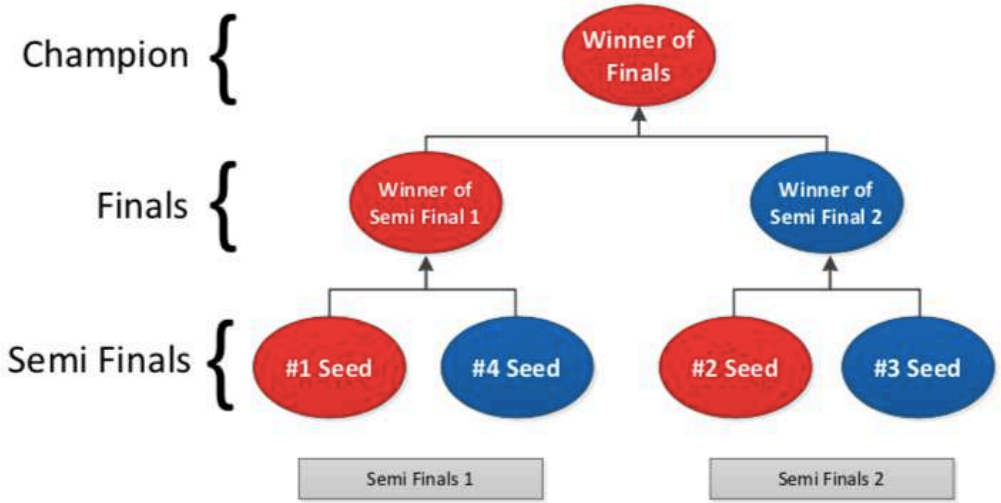
Alliance – Each *FIRST* Tech Challenge *Match* consists of two, two-*Team Alliances*. These two *Teams* compete against an opposing *Alliance* (also made up of two *Teams*) to complete the game challenges and to earn the highest *Score*. For qualifying and championship tournaments with more than 20 *Teams*, the semi-final and final round *Alliances* consist of three *Teams* each. **However, only two of those *Teams* compete during any one *Match*. (27 Teams this year)**

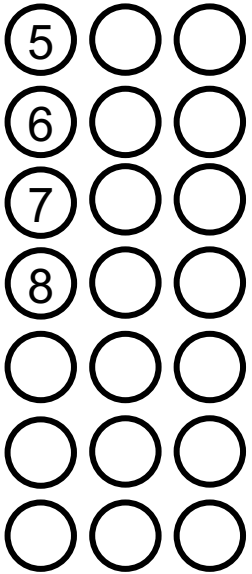
The *Team* that sits out the first *Match* must play in the second *Match*

If the *Alliances* play more than two *Matches* in any bracket, any combination of two *Alliance Robots* may be used.

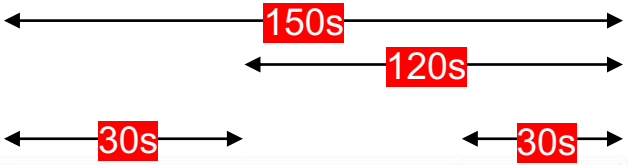
Alliance Selection





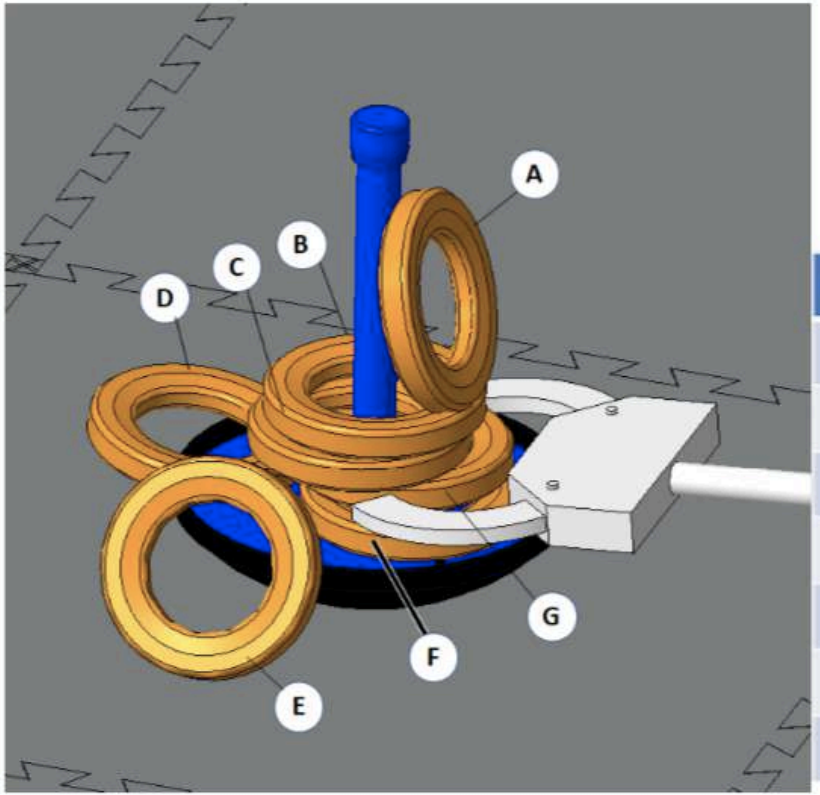


Scoring Summary



Scoring Achievement	Autonomous Points	Driver-Controlled Points	End Game Points	Reference	When Scored
Wobble Goals Delivered (each) • *Target Zone* • *Start Line* • *Drop Zone*	 15 - -	 - - -	 - 5 20	 4.5.2.1 4.5.4.1	*End of Period*
Robot Navigating (each)	5	-	-	4.5.2.2	*End of Period*
Rings Scored In Tower Goal (each) • Low • Mid • High	 3 6 12	 2 4 6		 4.5.2.3 4.5.3	*Scored Live*
Power Shot • *Target* moved from *Forward* to *Back* (each)	15	-	15	4.5.2.4 4.5.4.3	*Scored at Rest*
Wobble Goal Rings (each)	-	-	5	4.5.4.2	*End of Period*

Wobble Goal Ring Scoring Examples



Ring	Points	
A	5	
B	5	
C	5	
D	5	
E	0	Not Completely Supported
F	5	
G	0	In contact with Robot

Penalty-Rings

After a referee issued warning：
Rings should be returned to the *Playing Field* as quickly as practical to prevent *Alliances* from gaining a strategic advantage. *Penalties* will be assessed per *Ring* with additional *Penalties* per *Ring* for every five seconds the violation continues (GS4)

Penalty Scoring

Penalty points are subtracted from the offending *Alliance's Score* at the *End of the Match*. *Minor Penalties* subtract ten (10) points per occurrence. *Major Penalties* subtract thirty (30) points per occurrence.

Disable / Disabled

Disable / Disabled – A *Robot* that is no longer active for the remainder of the *Match* due to a *Robot* failure or by the request of a referee. *Drive Teams* may not *Disable* a *Robot* without the permission of a Field Technical Advisor or referee. If a referee *Disables* a *Robot* during a *Match*, they may ask the *Team* to drive their *Robot* to a neutral position on the *Playing Field*, issue a stop command with the *Driver Station*, and place their *Driver Station* in a hands-off location on a tournament-provided structure or the *Alliance Station* floor

De-scoring

<GS14> *De-scoring* - *Robots* may not cause (directly or indirectly) an *Opposing Alliance's Power Shot Targets* to move from a *Back* to a *Forward* state. A double *Major Penalty* will be assessed for each *Power Shot Target* that is de-scored

教練會議 Q & A

Q1 : 今年是否有重量限制？

A : 今年規則沒有提到重量限制，機器人設計需考量避免對場地造成損害，如果審查過程胎面測試未通過則無法參加比賽(I07)。

Q2 : 機器人出發前預載套環座時有大小限制嗎？

A : 機器人須以審查時的大小及動作於起始位置做準備，聯盟識別標誌和預載的得分物件可以延伸到長、寬、高18英吋（457.2公厘）形成的立方體積之外。

教練會議 Q & A

Q3 : 今年是否辦理實體國際賽？

A : 受疫情影響，今年不會有實體的國際賽。

Q4 : Android裝置的規定？

A :出賽國際賽機器人及周邊裝備皆須符合規章，由於賽事指定的Android裝置在台灣通路不易取得，總部開放各地主辦單位以該區實際情況做調整，故今年允許隊伍若無法取得官方指定型號的Android裝置自行嘗試其他平台。

教練會議 Q & A

Q5 : 彈射得分物件的速度？

A :以過快的速度彈射物件可能會對其他隊伍和現場人員造成安全隱患。如果裁判認為機器人正以超 乎尋常的速度彈射得分物件，則必須重新審查機器人。然後，機器人必須證明彈射的得分物件不能在空中移動超 過 16 英尺(4.88 米)的距離或超過 5 英尺(1.52 米)的高度

Q6 : 干擾套環？

A :機器人可以有延伸機構，但機器人不允許干擾對方機器人發射高18英吋(45.7公分)以上的套環，每一次干擾將會祭出大懲罰，持續違規將會快速收到黃牌。