



PRESENTED BY Qualcomm

# FIRST Tech Challenge 2020/21

## 比賽發佈會

主辦機構  
Organizer :



香港青年協會  
the hongkong federation of youth groups

合辦機構  
Co-organizer :



贊助機構  
Sponsor :

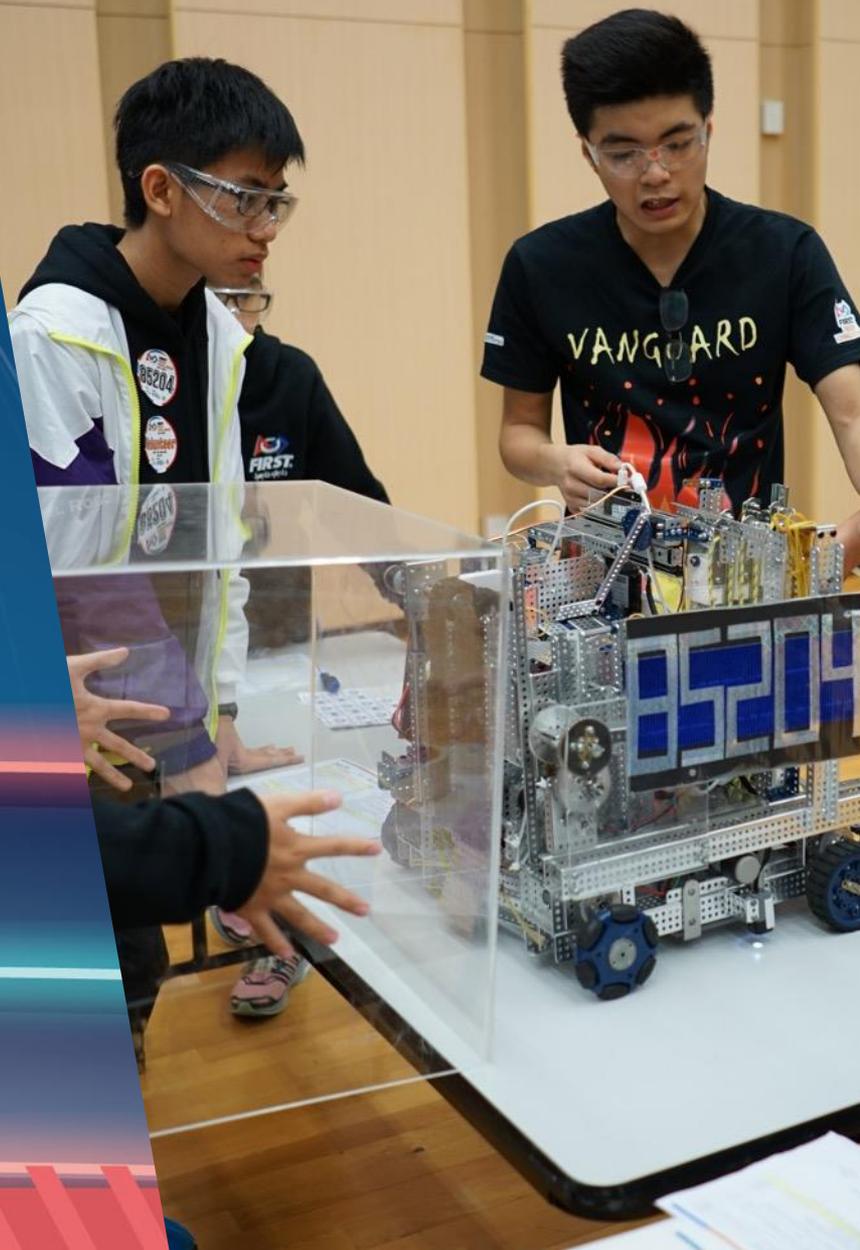


# 流程

- FIRST Tech Challenge (FTC) 簡介
- 2020-21主題介紹：Ultimate Goal
  - 競賽模式介紹
  - 本年度賽規簡介
- 器材介紹：REV, MATRIX
  - 1) 控制系統 2) 硬件
- 獎項

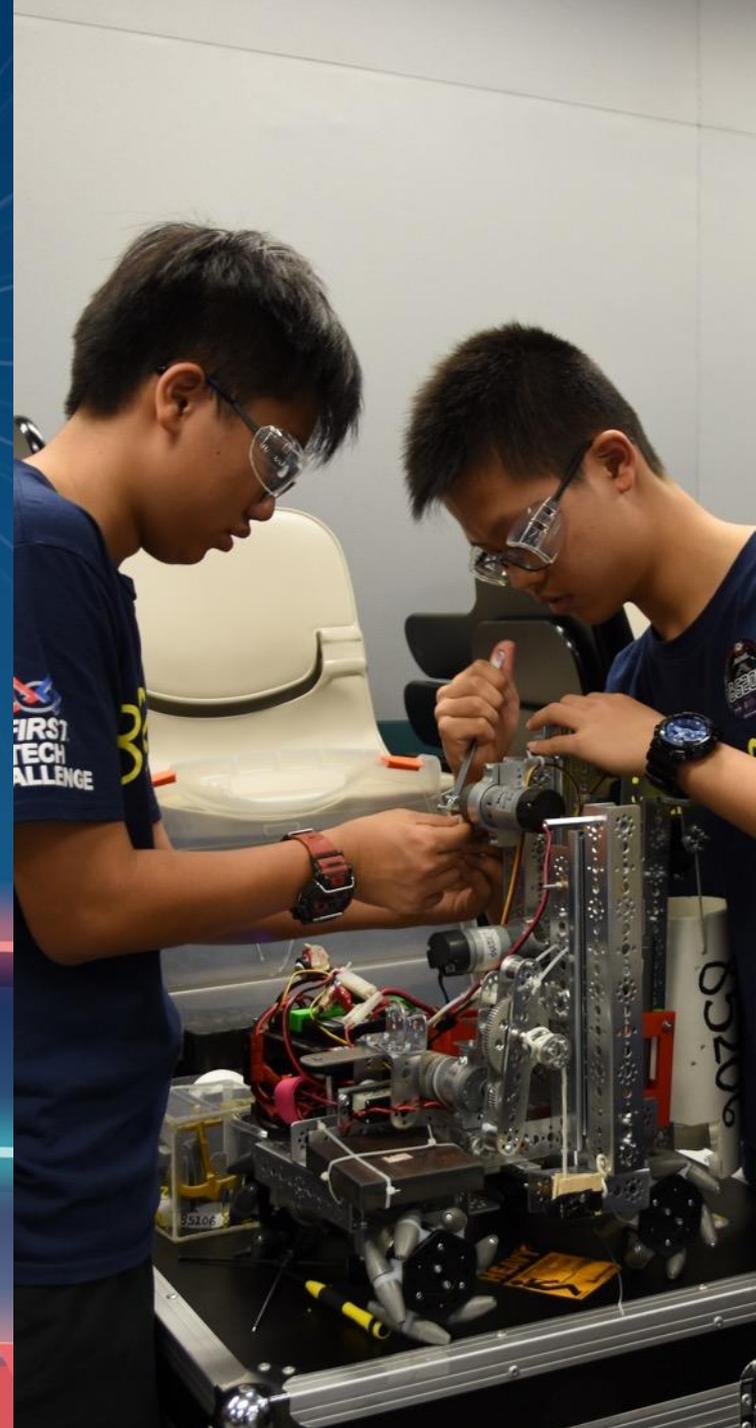
# FTC 背景

- FIRST 競賽平台中的第三個賽事
  - 每年有不同的機械人任務
  - 考驗隊伍經營、對外宣傳、  
機械人設計等
  - 記錄整個賽季
- 對象：12-18歲中學生
  - 3-15個學生組成一隊
  - 教練帶領學生完成賽季中的不同挑戰



# FTC 背景

- 一個讓學生實踐科學、工程及數學等知識的比賽
  - 以原型(Prototype)測試設計的可行性
  - 以不同原材料配合其他機械人套件及硬件完成機械人
  - 學習編寫手動操作及自動化的機械人程式
  - 工程設計流程
  - 策略及解難能力訓練
  - 於社區或社群推廣及分享



# 以往FTC賽制

## 機械人競賽

- 資格賽
- 盟友選擇
- 淘汰賽

## 評審環節

- 工程筆記本
- 展示如何經營及推廣隊伍
- 展示機械人及程式設計

# 本年度遙距FTC賽制

## 機械人競賽

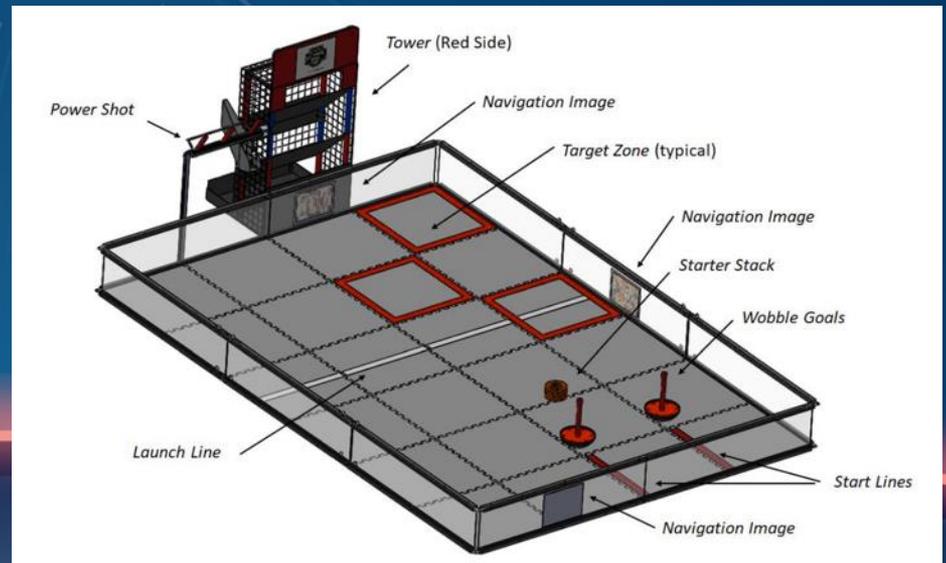
- 資格賽
- 盟友選擇
- 淘汰賽
- 排位賽 (每隊獨立形式作賽)

## 網上評審環節

- 工程筆記本
- 展示如何經營及推廣隊伍
- 展示機械人及程式設計

# 機械人競賽

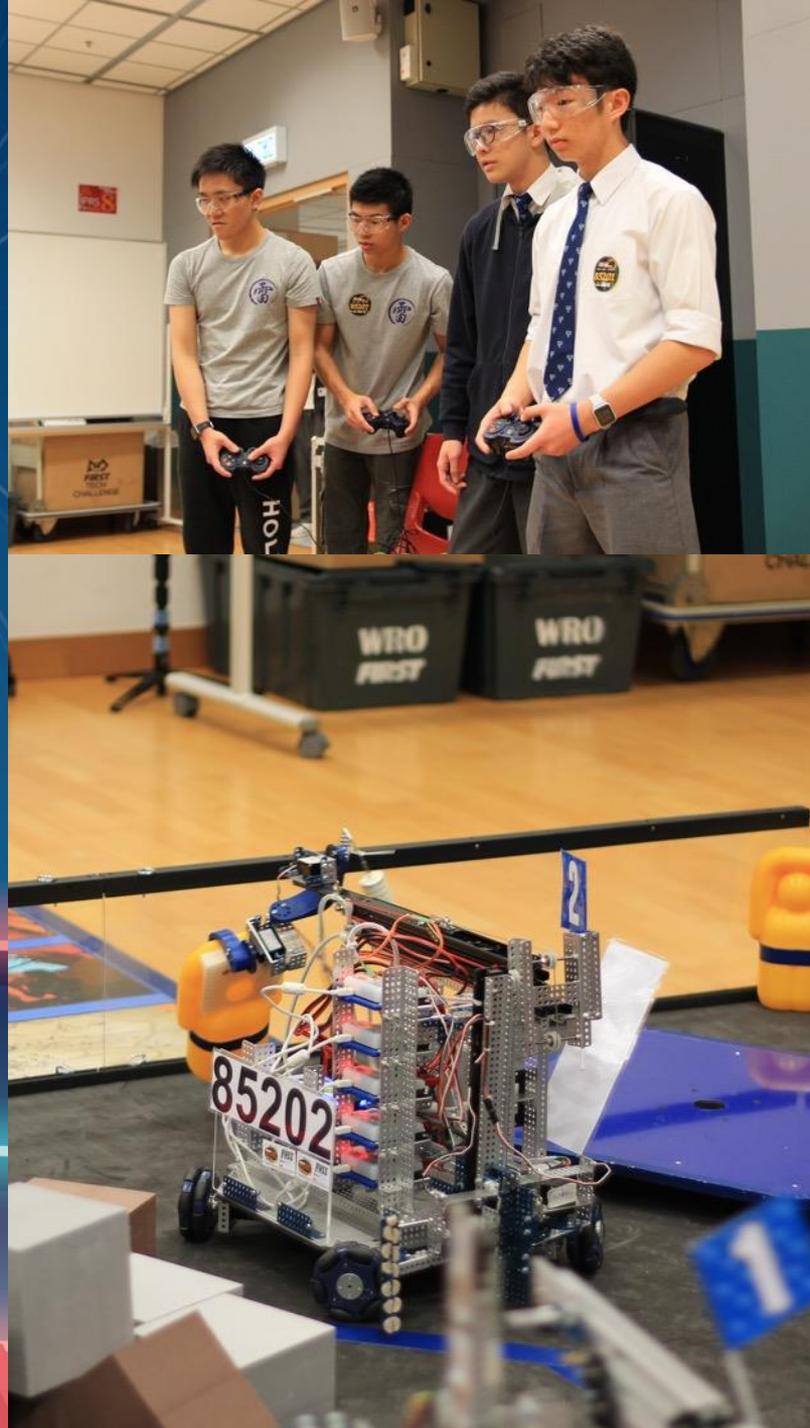
- 排位賽：
  - 每隊獨立作賽
  - 爭取較高分數
  - 於8尺\*12尺場地上完成不同任務
  - 錄影整場比賽過程，隊伍提交分數後由大會進行核實



# 機械人競賽

- 比賽

- 一場比賽共有2分30秒
- 自動階段：30秒
- 手動階段：2分鐘
  - 最後30秒為完結時間





# 網上評審環節

- 2-3位評審，過程中不限匯報方法，評審有機會中途發問
- 轉為網上評審，隊伍會預先知道評審時段，於網上匯報
- 時間：10-15分鐘
  - 首5分鐘評審不會中途發問
  - 5分鐘後評審會示意，有機會在餘下的評審中發問
- 預備物品：機械人、工程筆記本、其他所需物資

# 網上評審環節

- 工程筆記本 (Engineering Notebook)
  - 隊伍需製作工程筆記本，記錄隊伍的工作、機械人設計等的項目
  - 評判或會在評審其間要求隊伍展示工程筆記本
  - 隊伍若希望競逐啟迪獎 (Inspire Award)，必須於網上評審環節前呈交工程筆記本選輯(Engineering Notebook Portfolio)
    - 工程筆記本選輯是一份工程筆記本的摘要
    - 要求詳情可參考Game Manual Part 1

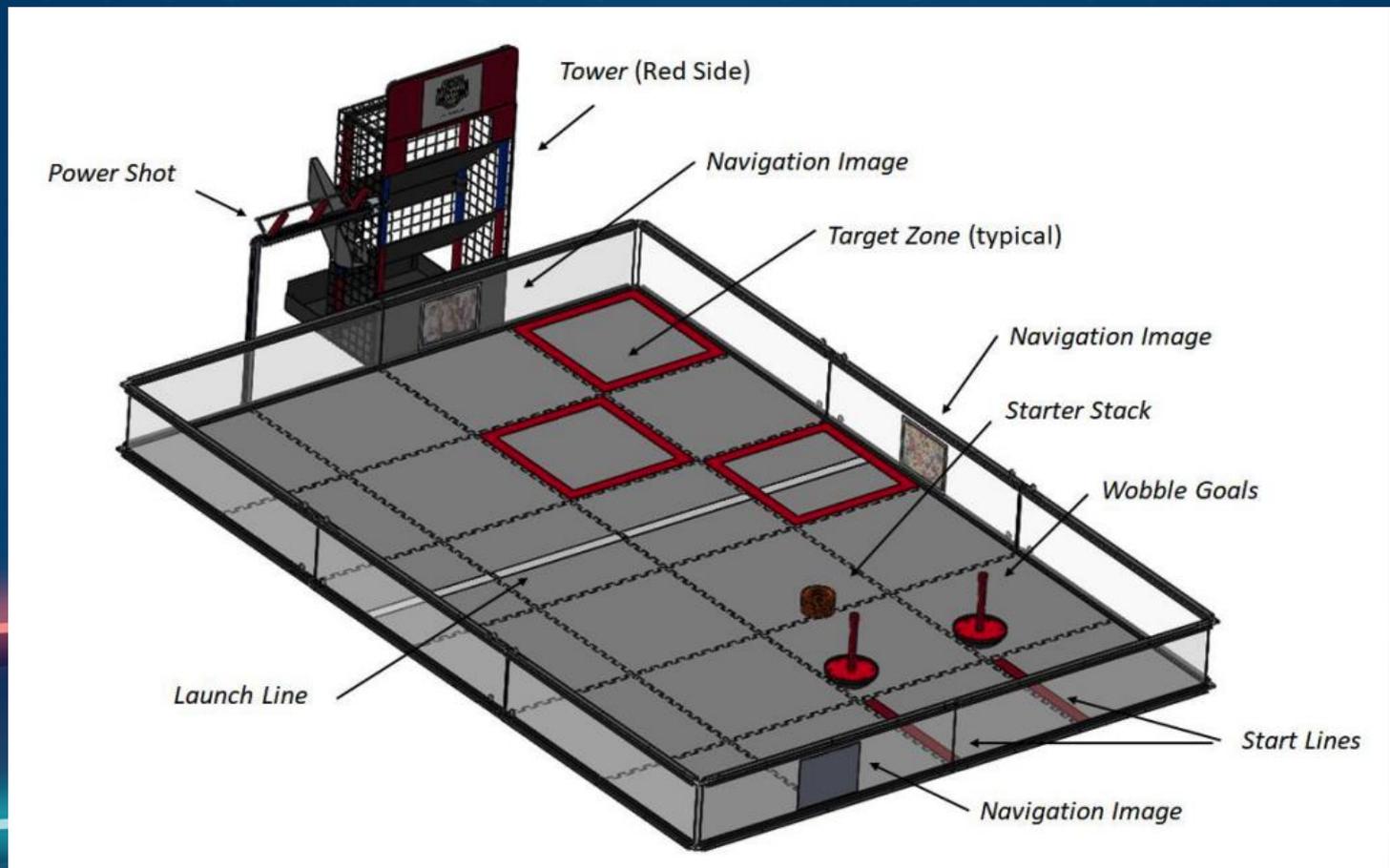
# 工程筆記本

- 需包含：隊伍的機械人設計、研究、活動推廣、隊伍會議記錄等
- 評審通過工程筆記本，可更了解隊伍整個賽季的經歷及團隊本身
- 沒有既定格式，但必需是印刷本
- 可參考大會評審要求，完成工程筆記本

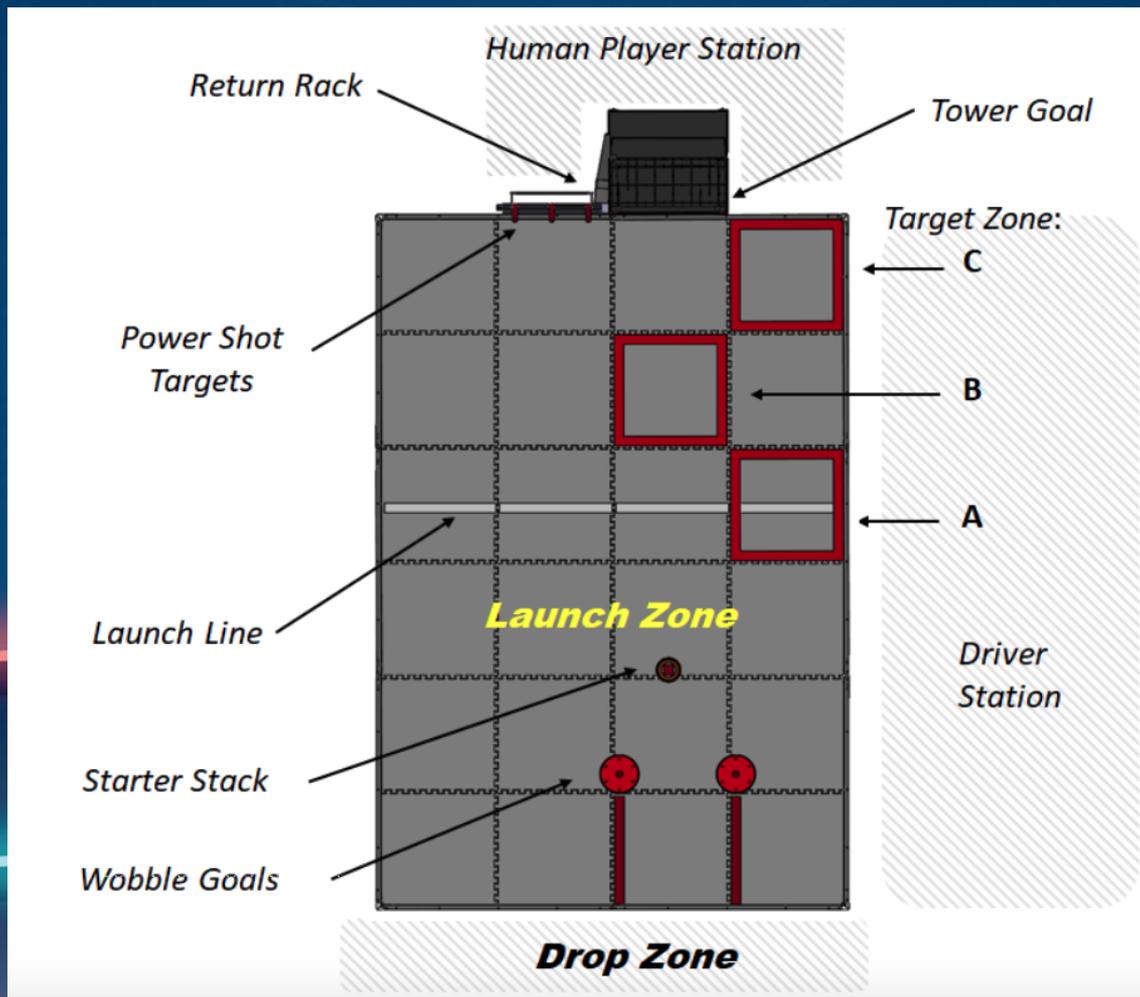
# Ultimate Goal 任務簡介



# 場地概覽



# 場地概覽



# 自動階段

1. 把Wobble Goal 傳送到 Target Zone (15)
2. 機械人於自動時間完成時停泊在 Launch Line (5)
3. 圓環成功於Tower Goal得分:
  - 下層目標: 每個 (3) (機械人可在場上任何地方得分)
  - 中層目標: 每個 (6) (機械人得分時需完全在發射區)
  - 高層目標: 每個 (12) (機械人得分時需完全在發射區)
4. 每個由圓環而改變方向的Power Shot (由向前變成向後): (15)

# 手動階段

圓環成功於Tower Goal得分:

- 下層目標: 每個 (2) (機械人可在場上任何地方得分)
- 中層目標: 每個 (4) (機械人得分時需完全在發射區)
- 高層目標: 每個 (6) (機械人得分時需完全在發射區)

# 完結時間(手動階段最後30秒)

## 1. 把Wobble Goal 傳送至:

- Start Line: 每個 (5)
- Drop Zone: 每個(20)
- Wobble Goal在完結時間開始時必需在Target Zone 或 不在 Launch Area

## 2. 每個由Wobble Goal完全支撐的圓環: (5)

## 3. 每個由圓環而改變方向的Power Shot (由向前變成向後): (15)

- 完結時間開始後有最多10秒的寬限時間讓隊伍工作人員(Human Player)重設Power Shot
- 在完結時間開始時, 已向後的Power Shot不能得分

# 總結

<b>Scoring Achievement</b>	<b>Autonomous Points</b>	<b>Driver-Controlled Points</b>	<b>End Game Points</b>	<b>Reference</b>	<b>When Scored</b>
<b>Wobble Goals Delivered (each)</b> <ul style="list-style-type: none"> <li>• Target Zone</li> <li>• Start Line</li> <li>• Drop Zone</li> </ul>	15	-	-	4.5.2.1	<i>End of Period</i>
	-	-	5	4.5.4.1	
	-	-	20		
<b>Robot Navigating (each)</b>	5	-	-	4.5.2.2	<i>End of Period</i>
<b>Rings Scored In Tower Goal (each)</b> <ul style="list-style-type: none"> <li>• Low</li> <li>• Mid</li> <li>• High</li> </ul>	3	2		4.5.2.3	<i>Scored Live</i>
	6	4		4.5.3	
	12	6			
<b>Power Shot</b> <ul style="list-style-type: none"> <li>• Target moved from Forward to Back (each)</li> </ul>	15	-	15	4.5.2.4 4.5.4.3	<i>Scored at Rest</i>
<b>Wobble Goal Rings (each)</b>	-	-	5	4.5.4.2	<i>End of Period</i>

# 比賽器材及硬件介紹



# FTC比賽器材

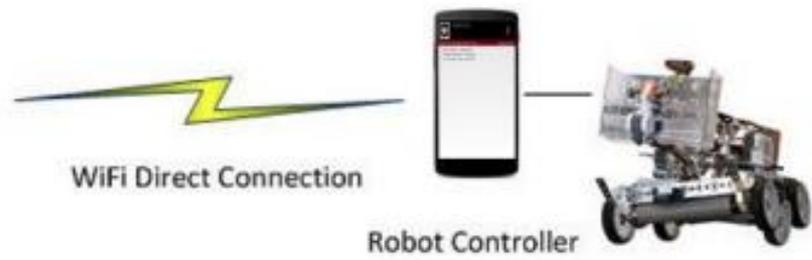
- 機械人部份 (Robot Controller)
  - 一個Android手機 / 一個REV主控制器 (Control Hub)
  - 配合REV延伸控制器 (Expansion Hub) / Modern Robotics 控制器模組，連接機械人的電子零件
- 控制台部份 (Driver Station)
  - 一個Android手機
  - 連接最多兩個手制



# FTC比賽器材

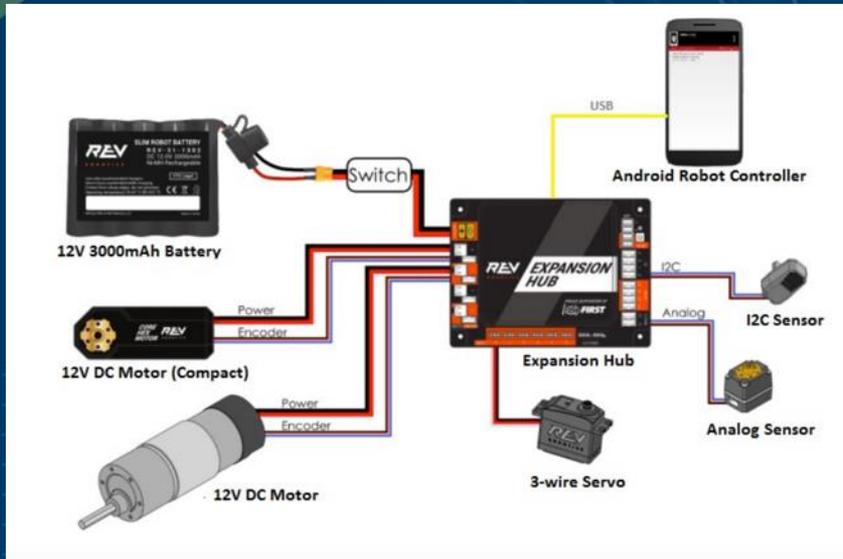
- 指定型號馬達
  - AndyMark
  - Matrix
  - REV
  - Tetrix





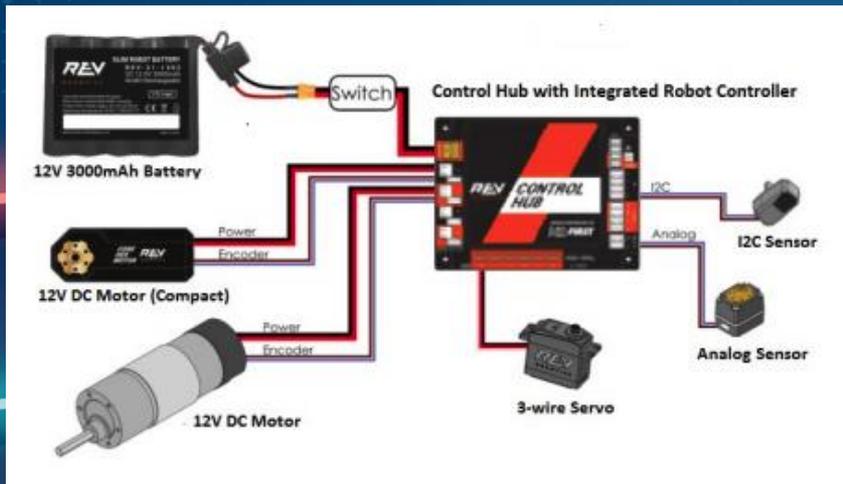
# REV 主控制器 (Control Hub)





## 使用Android裝置的配置

- 一個Android裝置連接最多兩個 REV Expansion Hub



## 使用REV Control Hub的配置

- 一個REV Control Hub連接最多一個 REV Expansion Hub

# 軟件



Laptop



WiFi Connection



Robot Controller



Laptop



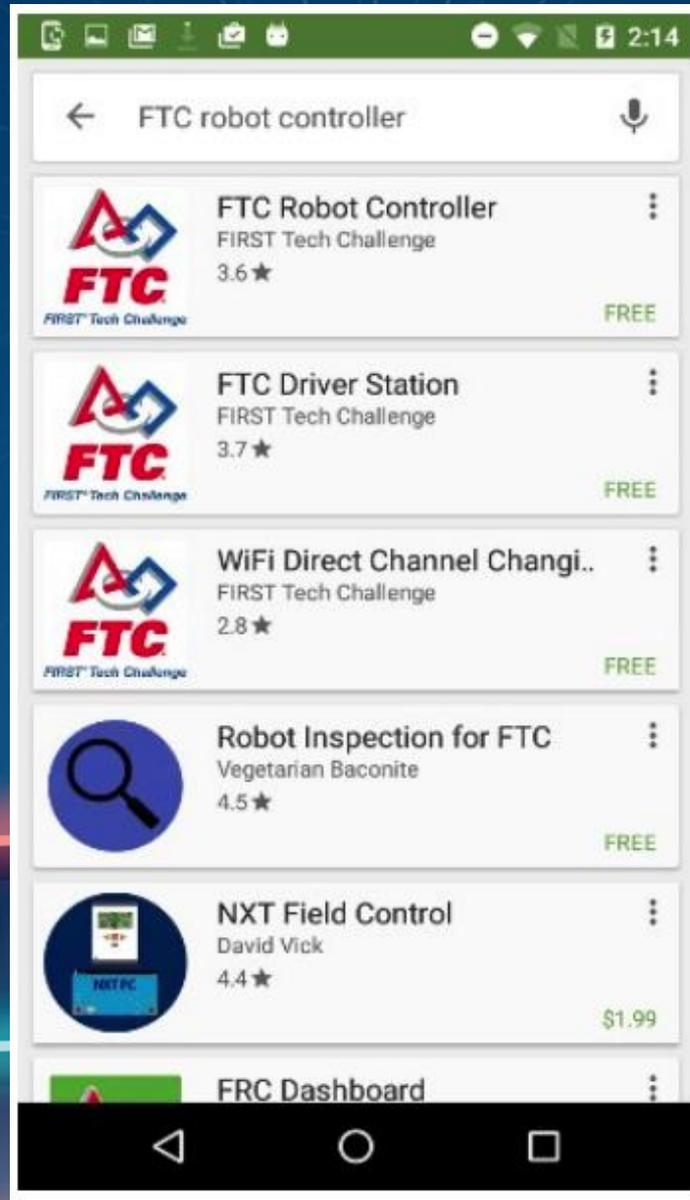
WiFi Connection



Control Hub

# 軟件

- Blocks Programming Tool (App Inventor)
- OnBot Java Programming Tool
- Android Studio



# 機械人要求

- 尺寸：不需按壓情況下放入18 inch<sup>3</sup>的正方型箱子內；開始後尺寸沒有限制
- 製作物料不限，但需要以原材料或商用現成品製作
  - 現成機械人套裝 (MATRIX/REV/TERIX 等)
  - 板材，擠壓型材，金屬、塑膠、木材，橡膠等
  - 已加工的材料，如：沖孔薄板和花鋼板、注塑成型製品、3D打印零件、電纜、繩子、線、細線等，各種彈簧，包括壓縮、拉伸、扭曲、醫用橡皮管等

# 現成機械人套件



# 獎項

## 啟迪獎 (Inspire Award)

- 冠軍 (Winner)
- 準冠軍(Finalist)

## 機械人競賽排名獎 (Top Ranked Team Award)

- 於排位賽名列前4的隊伍

# 注意事項

- 賽規詳情參考大會Game Manual Part 1 & 2 (for remote event)
- FTC比賽著重隊伍的經歷及預備過程，善用工程筆記本記錄整個賽季的點滴
- 遙距比賽要求隊伍準備競賽場地，以便錄影及計分
- 有關場地/機械人配件訂購，可聯絡SUMMIT Inspiration Limited  
([info@summitinspiration.com.hk](mailto:info@summitinspiration.com.hk))

# 相關連結

- <https://www.firstinspires.org/resource-library/ftc/game-and-season-info>

The screenshot shows the website's navigation bar with links for PROGRAMS, COMMUNITY, WAYS TO HELP, ABOUT, DONATE, and FIND FIRST NEAR YOU. Below the navigation is a search bar with a 'Back To Search' button. The main content area features the 'FIRST TECH CHALLENGE' logo, the title 'ULTIMATE GOAL Presented By Qualcomm Game & Season Materials', and a 'Content Type' of 'FIRST Tech Challenge'. It also lists tags and a link to 'FIRST Tech Challenge 2020-2021 Game & Season Materials - ULTIMATE GOAL<sup>SM</sup> presented By Qualcomm'. A 'See also' section lists 'Programming Resources' and 'Robot Building Resources'. The 'Game Manuals' section contains a list of links, with three items highlighted in red boxes: 'ULTIMATE GOAL Game Manual Part 1 - updated 11/24/20', 'ULTIMATE GOAL Game Manual Part 1 - Remote Events- updated 11/24/20', and 'ULTIMATE GOAL Game Manual Part 2 - Remote Events - updated 11/24/20'. Other sections include 'Playing Field Materials and Manuals', 'Remote Team Resources', and 'Videos and Promotional Materials'.

**FIRST TECH CHALLENGE**

## ULTIMATE GOAL Presented By Qualcomm Game & Season Materials

Nov. 24 2020 | | 0 KB

**Content Type:** FIRST Tech Challenge

**Tags:** Awards, Events, Game/Challenge

[FIRST Tech Challenge 2020-2021 Game & Season Materials - ULTIMATE GOAL<sup>SM</sup> presented By Qualcomm](#)

See also: [Programming Resources](#) and [Robot Building Resources](#)

**Game Manuals**

- [ULTIMATE GOAL Game Manual Part 1 - updated 11/24/20](#)
- [ULTIMATE GOAL Game Manual Part 1 - Remote Events- updated 11/24/20](#)
- [ULTIMATE GOAL Game Manual Part 2 - updated 11/24/20](#)
- [ULTIMATE GOAL Game Manual Part 2 - Remote Events - updated 11/24/20](#)
- [One Page Game Description](#)

**Playing Field Materials and Manuals**

- [Purchase Playing Fields and Elements from AndyMark](#)
- [AndyMark Field Assembly Guide - updated 10/28/20](#)
- [AndyMark Field Setup Guide - updated 10/28/20](#)
- [Field Reset Guide - updated 9/12/20](#)
- [Navigation Targets U.S.](#)
- [Navigation Targets International](#)
- [Tower Goal Logo U.S.](#)
- [Tower Goal Logo International](#)
- [Remote Field Requirements](#)

**Remote Team Resources**

- [Remote Team Resources Overview Blog](#)
- [Remote Team Resources Videos](#)
- [Remote Event Scoring for Teams Videos](#)
- [Scoring System - Team Guide](#)
- [Team Webinar Recordings](#)

**Videos and Promotional Materials**

- [ULTIMATE GOAL Presented By Qualcomm Season Teaser](#)
- [ULTIMATE GOAL Presented By Qualcomm Game Animation](#)
  - [Can't access YouTube? Download the Game Animation. Right-click to save.](#)
- [ULTIMATE GOAL Presented By Qualcomm Game Logo \(.zip\)](#)

# 相關連結

- <https://www.firstinspires.org/resource-library/ftc/game-and-season-info>

Remote Team Resources	<ul style="list-style-type: none"><li>• <a href="#">Remote Team Resources Overview Blog</a></li><li>• <a href="#">Remote Team Resources Videos</a></li><li>• <a href="#">Remote Event Scoring for Teams Videos</a></li><li>• <a href="#">Scoring System - Team Guide</a></li><li>• <a href="#">Team Webinar Recordings</a></li></ul>
Videos and Promotional Materials	<ul style="list-style-type: none"><li>• <a href="#">ULTIMATE GOAL Presented By Qualcomm Season Teaser</a></li><li>• <a href="#">ULTIMATE GOAL Presented By Qualcomm Game Animation</a><ul style="list-style-type: none"><li>◦ <a href="#">Can't access YouTube? Download the Game Animation. Right-click to save.</a></li></ul></li><li>• <a href="#">ULTIMATE GOAL Presented By Qualcomm Game Logo (.zip)</a></li></ul>
Q&A Forum Documentation	<ul style="list-style-type: none"><li>• <a href="#">FIRST Tech Challenge Forum</a></li><li>• <a href="#">Team Forum Registration Instructions</a></li><li>• <a href="#">Volunteer Forum Registration Instructions</a></li><li>• <a href="#">Game Q&amp;A Specific Forum Instructions</a></li><li>• <a href="#">Forum Answered Questions - Traditional Events: pdf   Epub   Mobi</a></li><li>• <a href="#">Forum Answered Questions - Remote Events: pdf   Epub   Mobi</a></li></ul>
DIY Resources	<ul style="list-style-type: none"><li>• <a href="#">Low-Cost Field Perimeter Build Guide</a></li><li>• <a href="#">DIY Return Rack Template</a></li><li>• <a href="#">DIY Field Element Guide</a></li><li>• <a href="#">Alliance Marker Template</a></li></ul>
Season Results	<ul style="list-style-type: none"><li>• <a href="#">FIRST Tech Challenge Official Event Results</a></li><li>• <a href="#">Remote Scoresheets</a></li></ul>
Team Materials	<ul style="list-style-type: none"><li>• <a href="#">Control Award Instructions</a></li><li>• <a href="#">Control Award Submission Form</a></li><li>• <a href="#">Control Award Submission Form - Remote updated 10/7/20</a></li><li>• <a href="#">Robot Self-Inspection Checklist</a></li><li>• <a href="#">Field Self-Inspection Checklist</a></li><li>• <a href="#">Using Computer Vision (Vuforia and TensorFlow)</a></li></ul>
Stay Connected	<ul style="list-style-type: none"><li>• <a href="#">Email</a>   <a href="#">Blog</a>   <a href="#">Facebook</a>   <a href="#">Twitter</a>   <a href="#">YouTube</a></li></ul>

# 相關連結

- <https://www.firstinspires.org/resource-library/ftc/robot-building-resources>

**FIRST** PROGRAMS COMMUNITY WAYS TO HELP ABOUT  DONATE FIND FIRST NEAR YOU

← Back To Search

## Robot Building Resources

Nov. 6 2020 | 10 KB

**FIRST TECH CHALLENGE**

**Content Type:** FIRST Tech Challenge

**Tags:** Robot Build/Assembly, Robot Kit, Team, Technical

♥ (221)

This section contains resources for FIRST Tech Challenge teams specific to designing and building the robot.

Build Guides	<ul style="list-style-type: none"><li>• <a href="#">Basic Bot Guide - REV</a></li><li>• <a href="#">Game Specific Basic Bot Guide - REV</a></li><li>• <a href="#">Basic Bot Guide - TETRIX</a></li><li>• <a href="#">Game Specific Basic Bot Guide - TETRIX</a></li><li>• <a href="#">Hardware Video Tutorials</a></li><li>• <a href="#">Rev Electronics Video Tutorials</a></li></ul>
Design Resources	<ul style="list-style-type: none"><li>• <a href="#">3D Printing for FIRST Teams Blog Series by PTC</a></li><li>• <a href="#">PTC Software and Training Resources</a></li><li>• <a href="#">SOLIDWORKS Resources</a></li><li>• <a href="#">XYZ Design Brief</a></li></ul>
Programming Resources	<ul style="list-style-type: none"><li>• <a href="#">Programming Resources Page</a></li><li>• <a href="#">App Inventor Download and Resources</a></li><li>• <a href="#">Software Development Kit Download and Resources</a></li></ul>
Technology Resources	<ul style="list-style-type: none"><li>• <a href="#">Robot Reliability Checklist</a></li></ul>
Wiring Resources	<ul style="list-style-type: none"><li>• <a href="#">Robot Wiring Guide</a></li><li>• <a href="#">Robot Wiring Video</a></li></ul>
Stay Connected	<ul style="list-style-type: none"><li>• <a href="#">Email</a>   <a href="#">Blog</a>   <a href="#">Facebook</a>   <a href="#">Forum</a>   <a href="#">Twitter</a>   <a href="#">YouTube</a></li></ul>

# 相關連結

- <https://www.firstinspires.org/resource-library/ftc/technology-information-and-resources>

The screenshot shows the FIRST Tech Challenge website's resource library. The page is titled "Programming Resources" and includes a navigation bar with links for PROGRAMS, COMMUNITY, WAYS TO HELP, ABOUT, DONATE, and FIND FIRST NEAR YOU. A search bar is also present. The main content area is titled "Programming Resources" and includes a date (Sep. 28 2020) and a file size (0 KB). The content type is "FIRST Tech Challenge" and the tags are "Robot Build/Assembly, Robot Kit, Team, Technical". A heart icon indicates that 69 items are liked. The main content is a list of resources, including "Blocks Programming Tool", "OnBot Java Programming Tool", and "Android Studio Download and Resources". A red box highlights the "Programming Resources" section, which contains the following text and links:

**Programming Resources**

Blocks Programming Tool - A user friendly, graphical tool for programming a competition robot. The Blocks Programming tool is the fastest and easiest way to get started with programming.

- [Blocks Programming Manual](#)
- [Blocks Programming Autonomous Mode](#)
- [Blocks Video Tutorials](#)

OnBot Java Programming Tool - An easy-to-use, browser-based Java development tool. OnBot Java lets users program in Java without the need for installing Android Studio.

- [OnBot Java Guide](#)

Android Studio Download and Resources - Android Studio is an integrated development tool that lets teams create Java (text-based) programs for their competition robots. Android Studio offers great flexibility when writing a program for a competition robot.

- [Android Studio Guide](#)
- [Android Studio Project Download and Resources](#)
- [Java Video Tutorials](#)

Managing Your Control System Resources

- [Managing Your Control System](#)
- [Connecting Your Control Hub](#)

Support & Troubleshooting

- [FIRST Tech Challenge Technology Forum](#)
- [Forum Registration Instructions](#)
- [Game Q&A Specific Forum Instructions](#)
- [Updating your FIRST Tech Challenge Software](#)

Additional Resources

- [Robot Building Resources](#)
- [Team Management Resources](#)

Stay Connected

- [Email](#) | [Blog](#) | [Facebook](#) | [Forum](#) | [Twitter](#) | [YouTube](#)

# 時間表

活動	日期
簡介會（網上）	2020年11月25日
工程師工作坊（一）	2020年12月16日
評審面試工作坊	2020年12月19日
工程師工作坊（二）	2021年1月13日
報名截止日期	2021年1月29日
工程師工作坊（三）	2021年3月10日
大賽日期	2021年4月24日

# 報名方法

- 填寫網上表格  
<https://form.jotform.com/203240904193448>
- 自動回覆電郵（回條）
- 簽名及蓋印於回條，再以電郵遞交 [hkrt@hkfyg.org.hk](mailto:hkrt@hkfyg.org.hk)
- 郵寄報名費（HKD\$1,800 支票）到 **SUMMIT Inspiration Limited**
- 購買器材及場地模型
- 如需要：改動隊伍資料



# 網站

香港青年協會（創意教育組）：

<http://ce.hkfyg.org.hk/>

SUMMIT Inspiration Limited:

<https://www.summitinspiration.com.hk/>

美國大會：

<https://www.firstinspires.org>