Control System Advisor (CSA) Manual

Revision History	
Revision	**Description**
V26-27.1	Initial 2026-27 Season Release

Overview 2
- Job Description 2
- Time Commitment 2
- Attire 2
- Training and Certification 2

Roles and Responsibilities 3
- Core Responsibilities 3
- Core Skills 3
- Prerequisites for Control System Advisors 3
- Reporting Structure 4

Before the Event 5
- Pre-Event Training 5
- Pre-Event Preparation Work 5

Event Day 5
- Report Time 5
- Suggested Event Day Equipment & Document List 6
- Set-up 6
- During the Event 6
- Team Interaction and Support 7
- Safety 8
- End of the Day 8

After the Event 8

Important Tools 9
- Public Schedule 9
- Match Schedule 10
- Pit Map 10

Useful Links and Information 12
- On-Call Support Numbers 12
- Pre-Event Support 12
- Program Resources 12
- Feedback 12

Overview

Roles Covered: Control System Advisor

Job Description

The Control System Advisor (CSA) is a volunteer who helps teams with robot control system related issues. The CSA works in collaboration with the *FIRST* Technical Advisor (FTA), Technical Director (TD) (if staffed), Lead Robot Inspector, and Robot Inspectors who may direct teams experiencing issues, on the field or in the pits, to the CSA for help. This position requires a high level of technical knowledge and people skills and is a major contributor towards assuring that all teams have a successful event. While some smaller events combine the Control System Advisor and *FIRST* Technical Advisor responsibilities, having separate volunteers for each role is recommended to keep the workload manageable.

Requirements	
Technical	High
Physical	Medium
Administrative	Medium
Communication	Medium
Pre-event Training	Medium

Time Commitment

A CSA should expect to spend 6-8 hours at a full day event and 4-5 hours at a league meet. Approximately 4-8 hours of pre-event training and planning is required.

Attire

- Comfortable closed-toe, closed-heel shoes, much of the day will involve standing and walking.
- ANSI Z87.1 certified safety glasses are required in the competition area and other areas as specified.
- As one of the event leaders, comfortable professional wear is encouraged.

Training and Certification

Read and complete all tasks listed in the `Pre-Event Training` section.

Any volunteer who applies to a role will be able to get into the Learning Management System (LMS) using the *FIRST* Training button. Roles with the training required will appear in the 'roles missing certification' area. For more help, you can read more about how to access your training.

If you have applied for a role but have not received access to the training, please email training@firstinspires.org. A separate confirmation of the role assignment will come later.

Control System Advisors should speak to the *FIRST* Technical Advisor to learn about additional requirements, such as meetings before the event or run-throughs of the space before the event.

All Volunteers are expected to read and comply with the Volunteer Handbook.

Roles and Responsibilities

FIRST is fun for all. The most important role of a volunteer is to provide a safe, fun, and welcoming environment to all FIRST participants. When executing the duties of your role, always make decisions with the team experience in mind. Ask for help from event leadership if you feel your required duties conflict with the best team experience.

Core Responsibilities

The Control System Advisor role is primarily responsible for the following:

- Together with the FTA, ensure *FIRST* Tech Challenge events provide exceptional team experience where participants feel safe and supported.
- Assist the FTA with the completion of the wireless environment survey within the competition area and practice area.
- The CSA might be consulted to troubleshoot potential wireless issues, such as wireless interference or possible malicious activity on the wireless spectrum.
- Assist teams and mentors by providing in-depth technical support through troubleshooting robot mechanical, electrical, software, and wireless issues.
- Help teams in the pits or in the Field queue preparing for their match, or those who have technical issues that cannot be resolved by an FTA.
- Serve as a model for Gracious Professionalism®.

Note: Even though the CSA's role is to provide more in-depth support to teams and mentors than other roles, the CSA should still prioritize issues to make sure they are addressing the most critical issues in a timely manner to help as many teams as possible.

Core Skills

Anyone with good technical and communication skills can serve as a Control System Advisor. However, highly successful Control System Advisors develop the following skills over time:

- Expert knowledge of the *FIRST* Tech Challenge control system and its components.
- Thorough understanding of Wi-Fi technology and its use in *FIRST* Tech Challenge.
- High level of problem solving.
- Active listening to students and mentors.
- Empathetic and clear communication with all volunteers and participants of all ages.

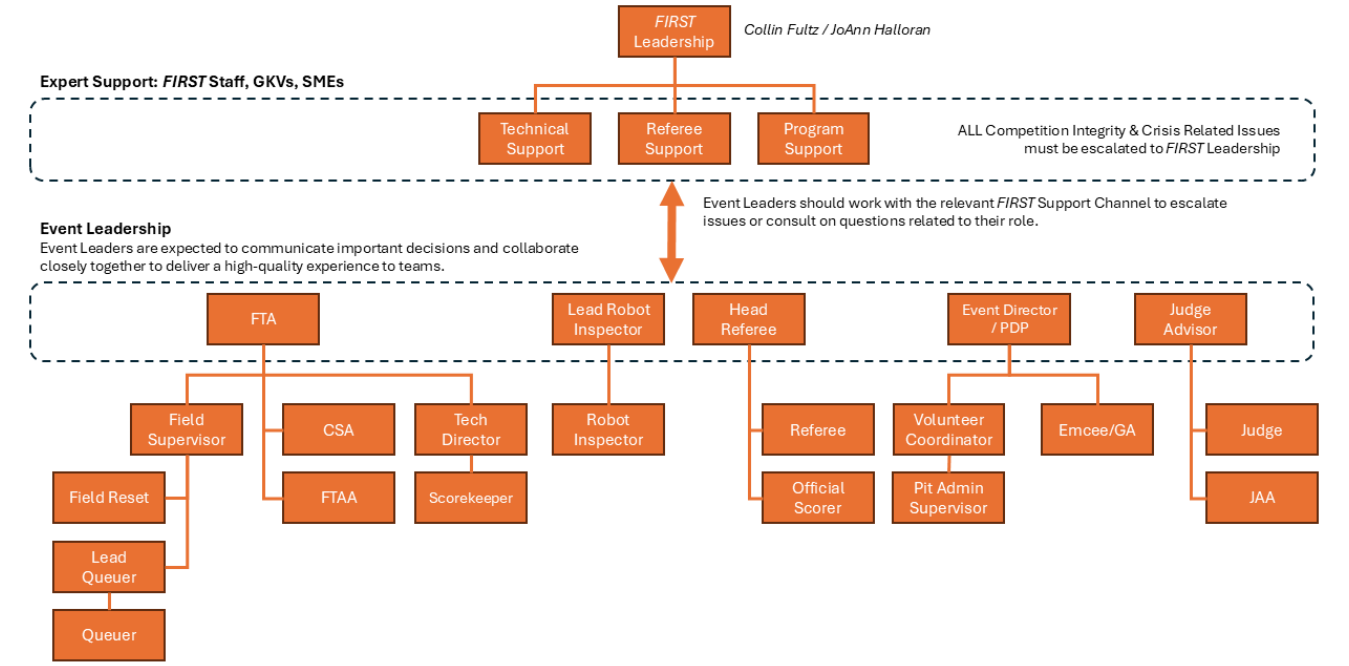
Prerequisites for Control System Advisors

- Prior *FIRST* experience is preferred, with recent hands-on experience with the Control System
- Must be familiar with the robot control system, and at least one supported programming language
- Must be 18 years of age or older, and post-high school or equivalent
- Networking knowledge (especially Wi-Fi and Wi-Fi Direct in *FIRST* Tech Challenge) desired

Reporting Structure

The Control System Advisor (CSA) reports directly to the *FIRST* Technical Advisor (FTA).

FTC 2026-2027 Decision Authority Matrix



Before the Event

Pre-Event Training

Control System Advisors must complete the required reading in this section and are required to pass a certification test prior to serving in this role. The CSA must be confident in their ability to quickly look up information at an event and/or seek out sources of information (FTA, TD, Lead Robot Inspector, other teams at an event, etc.). When it comes to troubleshooting, it absolutely takes a village.

Control System Advisor Pre-event Training	
Requirement	**Resource**
Required	Welcome to FIRST
Required	Review the Control System Advisor Manual (this document)
Required	Review the Competition Manual – specifically: • Section 8 — Game Overview • Section 12 – ROBOT Construction Rules
Required	Robot Troubleshooting Guide, which reviews common issues with the Android-based control system
Required	Robot Wiring Guide
Required	Complete the Control System Advisor Certification Test in the *FIRST* Learning System; click on "***FIRST* Training**" in the left navigation "**Quick Links**" section to access this training. (For volunteers outside of North America without a *FIRST* Dashboard Account use the PDF to self-certify)
Encouraged	Competition Manual, specifically: • Section 10 — Game Details • Section 11 — Game Rules
Encouraged	Attend the optional monthly CSA Volunteer Calls
Encouraged	Watch the game animation video for an overview of the game
Encouraged	Review the Control Hub Troubleshooting Guide
Encouraged	Review the Driver Hub Troubleshooting Guide

Pre-Event Preparation Work

Prior to the event, the CSA should work with the FTA and, if available, the Technical Director regarding completing the Wi-Fi survey and making Wi-Fi related plans for teams, such as assigning Wi-Fi channels. The FTA and CSA should both have a full understanding of the Wi-Fi environment at an event.

Event Day

Report Time

The Event Director or Volunteer Coordinator will confirm the time you should arrive typically via email the week before the event. In most cases this means arriving as soon as the event opens. When you arrive on-site check-in with the Volunteer Coordinator and report to the *FIRST* Technical Advisor (FTA).

Suggested Event Day Equipment & Document List

Please note: The items below are examples of useful resources, not a shopping list. Teams typically have resources they are willing to lend, and your region may provide some as well. When in doubt, check with your FTA or Event Director.

- Safety glasses are required.
- Small battery-powered flashlight or headlamp.
- Multifunction Voltmeter/Ammeter/Ohmmeter with probes.
- A pair of FTC-approved Android devices.
    - Current *FIRST* Tech Challenge Driver Station App installed on one smartphone or the REV Driver Hub.
    - Current *FIRST* Tech Challenge Robot Controller App is installed on the other smartphone or a Control Hub.
    - Wi-Fi Analyzer app (available from the Google Play Store) installed on an Android smartphone.
- Windows laptop with Android Studio, *FIRST* Tech Challenge SDK, REV Hardware Client 2, and an enhanced editor like Notepad++ installed.
- USB-A to Mini USB Cable.
- USB-A to Micro USB Cable.
- USB-A to USB-C Cable.
- If a computer with the REV Hardware Client 2 is unavailable, the following items can replace some of the functionality:
    - USB flash drive with the current *FIRST* Tech Challenge Driver Station and Robot Controller apps (.APK files)
    - USB OTG adapter to allow plugging the USB flash drive into an Android device for side-loading software.
- Hard copy or electronic copy of the CSA Manual (this document).
- Hard copy or electronic copy of the Robot Troubleshooting Guide.
- Hard copy or electronic copy of the Control Hub Troubleshooting Guide.
- Hard copy or electronic copy of the Driver Hub Troubleshooting Guide.

Set-up

Tournament setup generally occurs on the day before the competition. CSAs are generally not expected to participate in pre-event setup but may volunteer to assist by communicating with the Volunteer Coordinator. If present, it can be helpful to assist the FTA with testing the wireless environment.

Feel free to contact the *FIRST* HQ `On-Call Support Numbers` on the day of the event with technical problems with setup or management of the wireless spectrum. The *FIRST* Tech Challenge Program Delivery Partner (PDP) or the Event Director should also have the telephone number for on-call technical support for the venue – ask for this telephone number before you need it and have it handy.

During the Event

The Control System Advisor is responsible for managing team technical support and robot triage. If there is a robot issue on a playing field that the FTA cannot resolve in a timely manner, the team who is experiencing the issue will be directed to the CSA for support directly or via the FTA Notepad feature of the FTC-Live scoring system. The CSA should work with the team away from the competition area to help diagnose and resolve the technical issues. When problems arise, the CSA should troubleshoot with the following guidelines:

- Ask the team to describe their robot's unexpected behavior.
- Check the status of the robot by visually inspecting the robot, robot controller, and driver station.
- Check the status of the robot by viewing the log file on the robot controller and possibly on the driver station. Note that this might require (with the team's permission) the CSA connect the Android devices to a laptop.
- Check the voltage level of the robot controller, driver station, and main robot battery.
- Check the wiring of the electronic modules.
- If necessary, look at the source code of the team's Op Modes.
- Recommend corrective action to the team.

Consult the Control System Troubleshooting Guide for details on the available tools that can be used to troubleshoot a problematic robot. The CSA may spend extended time helping a team, but if there are multiple teams who need in-depth assistance the CSA should rank the issues and try to provide support to as many teams as possible.

One of the CSA's responsibilities is to decide if unexpected robot behavior is caused by a problem with the Android-based control system, robot electrical or mechanical systems, or the Wi-Fi environment. It is important to tell the FTA and the affected team(s) once a source of a problem is identified. When robot error is the cause of the unexpected robot behavior, it is important that the CSA explain to the team exactly what caused the problem and if time allows suggest a course of action to fix the robot. Spending several minutes helping a team will make a dramatic difference in the team's event experience. Be sure to share your findings with the team and listen to the team's feedback, simply listening to a team's issue is often what is needed to calm the team and smooth over a tense time in their event experience.

One of the most important duties of the FTA is correctly diagnosing on-field robot problems and working with the Head Referee to decide if the problems will cause a match to be replayed. The FTA will likely consult with the CSA and TD (if staffed) when wireless interference is suspected. In these cases, it is important to determine if the issue or problem can be **absolutely traced back to excessive wireless interference** outside the team's control. This is separate from team-induced failures such as low battery conditions, robot mechanical, electrical, software, or general communication failures. If excessive wireless interference can be verified, the FTA, TD, and possibly the CSA must present their case to the Head Referee as soon as possible. The Head Referee will then make a final decision on the matter.

Team Interaction and Support

When interacting with teams please always consider the team's perspective. The teams have put significant time and effort into preparing for this event and may be feeling very stressed about everything working out as they have planned. The event is a very big deal for the team, and we are here to help!

While it is our job to help guide the teams to a successful event, it is their responsibility to follow the rules and be on time for judging and matches.

If you feel there is an issue with an individual or individuals from a team that warrants specific intervention beyond just a kind reminder, please escalate your concern to the FTA.

> **Note**: the only person at an event who can give an official warning or issue a yellow/red card is the head referee. Please refer these more severe issues to the head referee and notify the program delivery partner.

Volunteers should not provide feedback about team behavior to the Judges. Concerns about team behavior should be handled through the normal escalation channels as described in Section 1 of the Competition Manual. The Judge Advisor may seek feedback from the Event Director to determine if there is any relevant information to provide the Judges for their evaluation process.

Teams may only be completely disqualified from awards consideration for very rare egregious actions and only with approval from *FIRST* HQ. The event director and/or JA should call the on-call number to discuss the issue.

Safety

An important priority for all volunteers is to observe their event areas to help promote a safe and orderly space for all the participants. It is likely that various volunteers and event participants will bring concerns to your attention, but you should also be proactive in identifying areas of concern.

Pit Spaces

Specific rules governing what teams can have and do in their pit space are covered in the game manual, but the Event Director may add additional restrictions which must be published before the event based on limitations set by the venue. If you are concerned about issues you see in the pit area please notify Pit Admin and they can work with the Event Director to look into the issue.

End of the Day

At the end of the day, the CSA should check in with the FTA and determine if there are any event details that should be captured in a final event summary, such as interesting issues that should be reported to *FIRST* HQ or suggestions for other events and other CSAs. Otherwise, walk away from the event knowing you have done your absolute best to be an exemplary role model and provided in-depth technical support to ensure that the competition ran as smoothly as possible for all teams. These are the most important goals of the CSA position.

After the Event

It is not uncommon for the FTA and the CSA to collaborate on an event summary to present to *FIRST* HQ or to other CSA's either on the FTC Technology Slack or the monthly volunteer webinars. Discuss this with the FTA.

Important Tools

Public Schedule

The Program Delivery Partner or the Event Director should publish the public schedule of events before the event. This schedule will have a high-level overview of all the activities for the event. It is important that everyone at the event does their best to stay true to the public schedule so that teams and volunteers who have planned their day around these times have a good experience.

Time	Agenda
7:15 am	Doors Open for Staff & Key Volunteers
7:30 am	Judges and Inspectors Report
8:00 am	Doors Open for Teams
8:30 am	Judging & Inspection Commences
10:15 am	Team Check-in Hard Deadline (Check the Competition Manual)
10:30 am	Match schedule is generated and distributed to teams. (Check the Competition Manual) *Note to Scorekeeper: 6 Matches total* (Check the Competition Manual)
10:40 am	Drivers' Meeting with Head Referee & Opening Ceremony
11:00 am	Qualification Matches 1 - 8 *Note to Scorekeeper: 7-minute cycle-time*
12:00 pm	Lunch
12:45 pm	Qualification Matches 9 - 45 *Note to Scorekeeper: 5-minute cycle-times*
3:50 pm	Qualification Matches Projected End
4:00 pm	Alliance Selection
4:20 pm	Double Elimination Rounds 1 - 4
5:10 pm	Award Ceremonies Start & Double Eliminations Round 5
6:20 pm	Projected End of Event
7:00 pm	Doors Close
Occasionally things that happen out of the event's control may impact the schedule. In these cases, work closely with the Event Director to understand the updated agenda.	

SAMPLE

Figure 1: Example Schedule for a 30 Team Event

Match Schedule

The match list will be generated on the day of the event after the teams have been confirmed. This schedule will list which teams will play in which alliance (Red or Blue) and it will also list a match start time. Some events will have more than one competition field. Some events will have more than one division, in which case each division will have its own schedule.

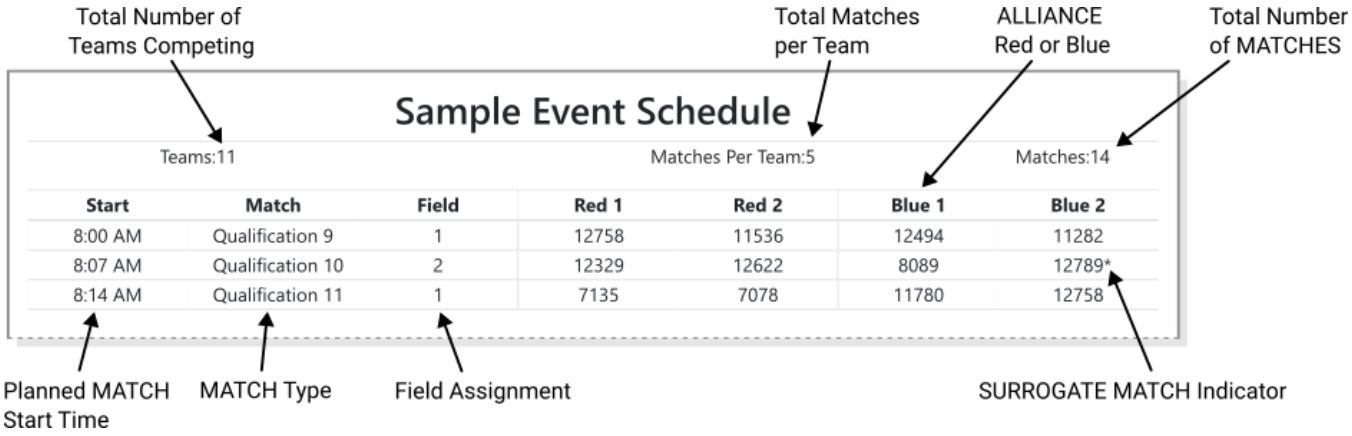


Figure 2: Example Match Schedule

Pit Map

Pit maps are typically provided by either the Event Director or by the Scorekeeper. Having a map of where each team is in the pit is key, as teams, parents or Queuers might need to find specific pits. Below are two sample pit maps in **Error! Reference source not found.** and **Error! Reference source not found.**. Pit Maps created in FTC Scoring will appear on the FTC-Events page.

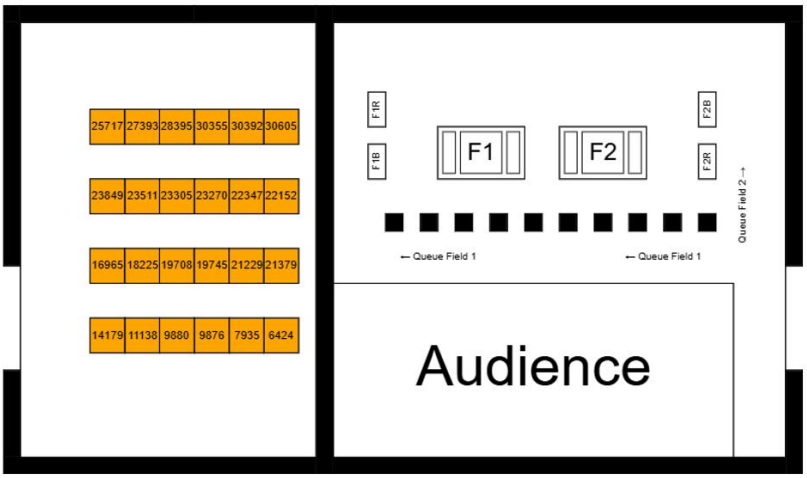


Figure 3: Example Pit Map for a 24-team Qualifier Event

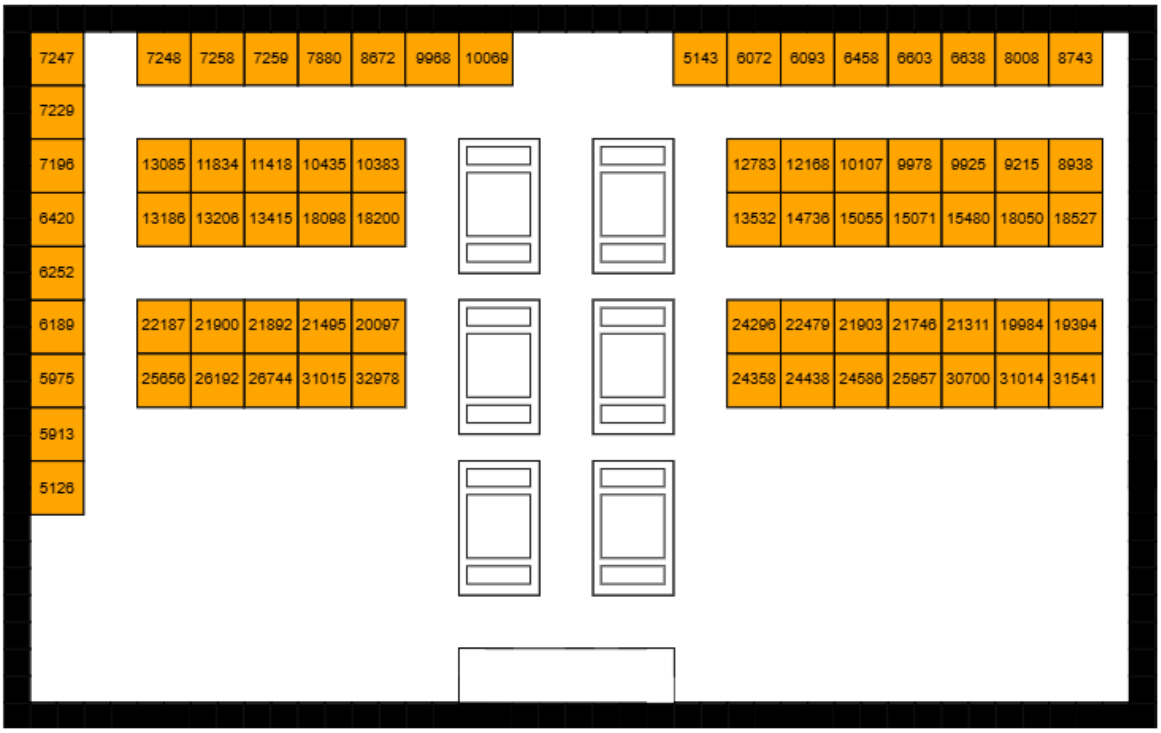


Figure 4: Example Pit Map for a 72-team Regional Championship Event

Useful Links and Information

On-Call Support Numbers

These numbers are for *volunteer support only*. Teams should not use these numbers to call about rulings or technical assistance.

Administrative, Judge, Referee and Non-Technical Issues:	(603) 206-2412
Scoring System (FTC Live) or other Technical Issues:	(603) 206-2450

Call or use the **built-in chat feature on FTC Live** available for events with internet access.

Pre-Event Support

Mon – Fri 8:30am – 5:00pm Eastern Time (UTC-4 or UTC-5)
Contact Support including live chat or email customerservice@firstinspires.org

Program Resources

Event Search ftc-events.firstinspires.org	Game and Season Resources ftc-resources.firstinspires.org/ftc/game
FIRST Tech Challenge Blog	Event Resources ftc-resources.firstinspires.org/ftc/event
FIRST Tech Challenge Website firstinspires.org/robotics/ftc	Volunteer Resources ftc-resources.firstinspires.org/ftc/volunteer

Feedback

We strive to create support materials that are the best they can be. If you have feedback about this manual, please email customerservice@firstinspires.org or by contacting support. Thank you!