

Wi-Fi Technical Advisor Manual

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V25-26.1	Initial 2025-26 Season Release

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Overview

Job Description

Wi-Fi Technical Advisor (WTA) is a volunteer who helps the Event Director plan for large *FIRST*® Tech Challenge (FTC) events. The WTA is also responsible for monitoring the wireless spectrum and troubleshooting wireless issues at large and/or critical *FIRST* Tech Challenge events. This position requires a high level of technical knowledge and interpersonal skills and can affect the quality of the event. This role can be performed either seated or standing.

Not every *FIRST* Tech Challenge event will require a WTA. Most smaller events (less than 40 robots) do not require the skills of a WTA. However, events with many robots (greater than 40 robots), or events that have difficult wireless conditions would benefit from having a designated WTA available. The *FIRST* Technical Advisor (FTA) can plan and execute most of these duties for smaller events.

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

Time Commitment

Wi-Fi Technical Advisor should expect to spend 10-12 hours at a full day event. Approximately 6 hours of pre-event training and planning are required.

Attire

- Comfortable closed-toe, closed-heel shoes, much of the day will involve standing and walking.
- Safety glasses or safety rated glasses with side shields (ANSI-approved, UL Listed, CE EN166 rated, AS/NZS certified, or CSA rated are required in the pit and arena.
- 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 on their *FIRST* dashboard. 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 customerservice@firstinspires.org. A separate confirmation of the role assignment will come later.

The WTA should speak to the FTA and Event Director to find out what additional requirements, such as meetings before the event or run-throughs of the space before the event is required.

Roles and Responsibilities

FIRST is fun for all. The most important role of a volunteer is to provide a safe, fun, and welcoming environment for 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.

Wi-Fi Technical Advisor

The Wi-Fi Technical Advisor role is the technical volunteer who helps ensure that the wireless environment at a *FIRST* Tech Challenge event is clean and not too noisy to ensure that teams can compete effectively.

Before an event, the WTA might be asked to conduct a wireless network survey to determine if there are potential sources of wireless interference in the venue. The WTA might also be asked to work with the venue's IT staff to make any appropriate changes to the wireless equipment in the venue to ensure a clean environment for the scheduled event.

During an event, the WTA will be responsible for monitoring wireless activity near the arena to identify and resolve any wireless issues. The WTA might also need to "police" the wireless environment and look for clues for potential malicious activity during an event. The WTA might also be asked to help the FTA and/or Control System Advisor (CSA) answer questions about the wireless environment.

Prerequisites for Wi-Fi Technical Advisor

It is important that prior to the event, the Wi-Fi Technical Advisor (WTA) reviews this manual, and reads the supporting documents listed in the checklist below. These training materials will help WTAs learn how to provide effective Wi-Fi monitoring and technical assistance for the event. Learning ahead of time will go a long way towards keeping the event running smoothly and on time.

The WTA requires advanced and specialized skills:

- Experience/familiarity with computers running a modern Windows OS.
- Mac OS and Linux operating system knowledge may be helpful.
- Knowledge of the FTC control system and diagnostic tools.
- Experience with Wi-Fi and Wi-Fi Direct networking.
- Experience using tools such as Wireshark, Fluke (NETSCOUT) AirCheck Meter, Aircrack-ng, AirTight Networks SpectraGuard and MetaGeek inSSIDer/Chanalyzer may be helpful.
- Able to use deductive reasoning to solve technical problems.

Reporting Structure

The Wi-Fi Technical Advisor (WTA) reports to the *FIRST* Technical Advisor (FTA) during the event. Before the event, the WTA will most likely work with the Event Director or the Program Delivery Partner(PDP).

Before the Event

Verify with the Event Director that a table, chair, and power drop are available in the arena for you to set up your Wi-Fi monitoring equipment.

The robot control system does not require any centralized control infrastructure. Teams will bring their own driver stations and robot controllers to the event. However, the WTA should do a wireless survey and conduct some wireless tests a week or more before event day. This helps to avoid troubleshooting wireless issues immediately before an event.

Prior to event day, the WTA needs to conduct a wireless survey of the venue to make sure the wireless environment is clear and that there are no Wi-Fi suppressors operating in the venue.

- The FTA will perform this task if a WTA or CSA is not available.
- Coordinate this activity and share the results with the Event Director and the FTA.
- The WTA can use one or more pairs of Android devices to measure the ping time in different areas of the venue and on different Wi-Fi channels of the spectrum. If available, use a tool (such as the Fluke or NETSCOUT AirCheck meter) to measure Wi-Fi and non- Wi-Fi activity in different areas of the venue. If no hardware tool is available, using a free software tool such as “Wi-Fi Analyzer” or the free version of the “Netspot App” is sufficient for a cursory survey.
- If necessary, the WTA should coordinate with local IT staff at the venue to turn off Wi-Fi signals, which could be detrimental to the event, particularly for events involving 40 or more robots.
- Obtain the venue’s IT on-call phone number in case there is a need to contact them on event day.
- Select preliminary Wi-Fi channels for the Wi-Fi robot communications, local FTC Live scoring system, and any other Wi-Fi access points needed to run the event based on the Wi-Fi site survey of the venue. Share the channel recommendations with the Event Director and the FTA.
- If there are any Wi-Fi or wireless devices operating in the venue that cannot be turned off by the local IT staff, select channels that will not overlap or interfere with these existing devices.
- If your event takes place alongside a *FIRST* Robotics Competition (FRC), you must coordinate with the FRC event organizer to select Wi-Fi channels that will not overlap or interfere with the FRC wireless activity.
- Wi-Fi channels can be assigned to teams within the FTC Live scoring system. Please note: Th assignments can be organized in the scoring system to support the inspection/configuration process.

Important Note: A Wi-Fi Suppressor or Blocker is a device that disrupts the operation of unauthorized Wi-Fi networks in a venue. They are typically used to prevent people from creating Wi-Fi hotspots through cellular tethering. Schools often use the device to force students onto the school’s network where it can monitor traffic and institute firewalls to block sites deemed unsuitable.

If a Wi-Fi Suppressor or Blocker is present at an event, then teams will be unable to control their robots properly. The most common symptom that a Wi-Fi suppression device is in use in a venue is that the driver station and robot controller will not be able to pair or will pair but then shortly thereafter will disconnect.

The FTA should check for the presence of such a device **before** the event, then work with the IT staff to disable the device for the day of the scheduled event.

Pre-Event Training

The Wi-Fi Technical Advisor is encouraged to complete the reading in this section prior to serving in this role.

Resources for training:

Wi-Fi Technical Advisor Pre-Event Training List	
Requirement	Resource
Required	Welcome to FIRST
Required	The Wi-fi Technical Advisor Manual (this document)
Encouraged	Read the FIRST Tech Challenge Wi-Fi Event Guide
Encouraged	Read the Venue Networking Requirements Guide
Encouraged	Read the Robot Troubleshooting Guide , which explains how to troubleshoot common problems with the <i>FIRST</i> Tech Challenge control system.
Encouraged	The Competition Manual – specifically: <ul style="list-style-type: none"> Section 12 - ROBOT Construction Rules
Encouraged	Complete Strategies for Inspiring Success for All modules .
Encouraged	Attend the CSA/Robot Technical Support Calls
Encouraged	watch the game animation video for a general understanding of the game

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, arrive as soon as the event opens. When you arrive onsite check-in with the Volunteer Coordinator and report to the FTA.

Set-up

Tournament set-up generally occurs on the day before the competition. Setting up the arena and testing the wireless environment normally takes two to three hours for a single field event and three to four hours for a two-field (or more) event, although those times will decrease with experience. The WTA will survey the wireless environment in the arena and practice area. It is helpful to have a pair of Android devices running the *FIRST* Tech Challenge apps (FTC Driver Station and FTC Robot Controller) to test the wireless environment on the playing field(s).

- Select the Wi-Fi channels for the competition and share the recommendation with the Event Director and FTA. Verify that the selected channels will not overlap or interfere with other wireless devices in the venue.
- Be sure to have all passwords of the computers or devices being used, if applicable.

Event Day for the WTA

- Verify that the reserved wireless channels for the competition are clear and that low ping times are observed for a test robot controller-driver station (RC-DS) pair operating on these channels.
- The remainder of the day will be spent monitoring the wireless environment at the arena. The WTA should monitor the spectrum to make sure the Wi-Fi channels that are designated for robot control are clear and not overloaded. The WTA should also monitor the spectrum to look for clues of potential malicious activity. Report issues of concern to the FTA.
- The WTA should remember that their primary focus is to ensure that teams are able to control their robots over the Wi-Fi spectrum without interference. When dealing with potential interference (such as a spectator running a portable hotspot) it is better to communicate that goal instead of acting like an enforcer. In this manner, it turns the spectators into assistants in keeping the spectrum clean instead of creating an adversarial situation.
- The WTA may also monitor which channels teams are on and help guide teams to the designated channels.
- The WTA might also be required to help the FTA and/or CSA troubleshoot wireless issues.

Suggested Event Day Equipment & Document List

- A pair of *FIRST*-approved Android devices:
 - Current FTC Driver Station App is installed on one Android device (Driver Hub or approved smartphone).
 - Current FTC Robot Controller App installed on one Android device (Control Hub or approved smartphone).
 - Wi-Fi Analyzer app (available from the Google Play Store) installed on the driver station Android device.
- Laptop that supports wireless monitor mode with Wireshark installed.

Note: that Windows laptops will not support monitor mode. Apple Mac's out of the box will support monitor mode. Alternatively, most Linux distributions will support monitor mode and can be burned to a USB drive and live booted.

- If available, specialized Wi-Fi analyzing tools (such as Fluke/NETSCOUT AirCheck Meter, MetaGeek inSSIDer with Wi-Spy hardware, etc.)
- Wi-Fi analyzing software tools such as "Wi-Fi Analyzer" or the free edition of the "Netspot App."
- Hard copy or electronic copy of the [Wi-Fi Technical Advisor Manual](#) (this document).
- Hard copy or electronic copy of the [FIRST Tech Challenge Wi-Fi Event Guide](#).

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. Today 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 concerns 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.

End of the Day

If you have time to help with the load out at the end of the day it is always nice to clean up before leaving. Make sure to return all equipment prior to leaving.

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) <i>Note to Scorekeeper: 6 Matches total (Check the Competition Manual)</i>
10:40 am	Drivers' Meeting with Head Referee & Opening Ceremony
11:00 am	Qualification Matches 1 - 8 <i>Note to Scorekeeper: 7-minute cycle-time</i>
12:00 pm	Lunch
12:45 pm	Qualification Matches 9 - 45 <i>Note to Scorekeeper: 5-minute cycle-times</i>
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
<i>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.</i>	

Figure 1: Example Schedule for a 30 Team Event

Registered Teams List

The Program Delivery Partner may provide a list of teams registered for the event or the scorekeeper can export a report of all the registered teams for the event. Sometimes this list may change the day of the event based on which teams show up. The Scorekeeper report will have the most accurate information about who is competing at an event. Notes that teams may be competing only in the judging portion of the event and not have a robot present.

Test Event Teams							
Number	Team Number	Name	Affiliation	City	State	Country	Rookie Year
1	1	Team Unlimited	PTC & FTC1 Team Unlimited 4-H Club	Sharon	MA	USA	2007
2	7	Tactical Sheep	TechBrick Education/DoD STEM&TechBrick Education	Aberdeen Proving Ground	MD	USA	2007
3	16	bigskyrobotics		missoula	MT	USA	2007
4	18	Techno Chix	Girl Scouts Heart of the Hudson	Port Chester	NY	USA	2007
5	22	100 Scholars	100 Black Men of Atlanta/Georgia Power/Johnson Research and Development/NCR/Lockheed Martin & 100 Black Men of Atlanta, Inc.	Atlanta	GA	USA	2007
6	25	Rock N' Roll Robots	Girl Scouts of Greater Los Angeles/NASA&Girl Scouts	Pasadena	CA	USA	2007
7	99990	Off-Season Demo Team	Off-Season Demo Team				1992
8	99991	Off-Season Demo Team	Off-Season Demo Team				1992
9	99992	Off-Season Demo Team	Off-Season Demo Team				1992
10	99993	Off-Season Demo Team	Off-Season Demo Team				1992
11	99994	Off-Season Demo Team	Off-Season Demo Team				1992
12	99995	Off-Season Demo Team	Off-Season Demo Team				1992
13	99996	Off-Season Demo Team	Off-Season Demo Team				1992

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Figure 2: Competing Team Report

Event Layout/Map

The Program Delivery Partner and Event Director should publish a map of the venue before the event. In some cases, details on the map might not be available until the day of the event.

The Event Layout / Map should detail the following:

- Load-In Path
- Parking for Personal Vehicles and Busses
- Team Check-in
- Volunteer Check-in
- Competition Area
- Pit Area (May include the [Pit Map](#))
- Judging Room Locations (if applicable)
- Safety Details as available (Emergency Exits, AED, Shelter in Place Locations)

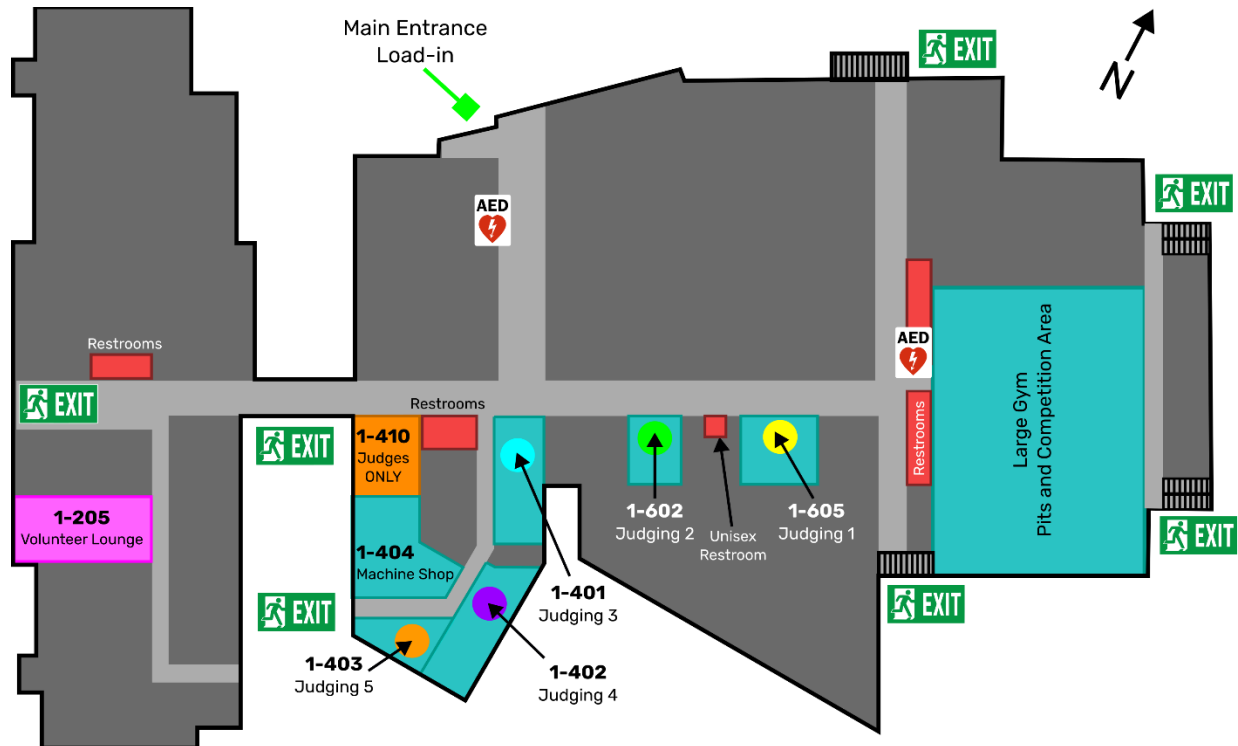


Figure 3: Example Event Map

Judging Schedule

	Panel 1 Room 1605	Panel 2 Room 1602	Panel 3 Room 1401	Panel 4 Room 1402	Panel 5 Room 1403
08:30 AM –	22077 Marcus Minions	8204 Blue Machine	–	27534 RoboChargers - Yellow	25783 Tech Titans
08:50 AM –	13542 RoboChargers - Blue	21171 ITKAN Robotics - M12	27532 RoboChargers - Orange	23344 Technical Turbulence	27536 RoboChargers - Gold
09:10 AM –	26300 Anomaly	27533 RoboChargers - Purple	20482 Wylie E. Robote	12430 Dub East	26693 Triad Robotics
09:30 AM –	23434 Cristo Rey Dallas Robotics	7172 Technical Difficulties	18871 RoboChargers - Green	18227 Area 52	19991 Chuckieheads
09:50 AM –	26542 Apex Genesis	13537 RoboChargers - Red	19564 ITKAN Robotics - MAS	19990 Marcus de-TECH-tives	13552 RoboChargers - Pink
10:10 AM –	27531 RoboChargers - Cyan	24563 Flower Mound Firewall	26722 Tech Support	27535 RoboChargers - Silver	20483 Wall East

Figure 4: Example Judging Schedule

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 and/or more than one division, and each division will have its own schedule.

Sample Event Schedule

Total Number of Teams Competing: Teams:11

Total Matches per Team: Matches Per Team:5

ALLIANCE Red or Blue

Total Number of MATCHES: Matches:14

Start	Match	Field	Red 1	Red 2	Blue 1	Blue 2
8:00 AM	Qualification 9	1	12758	11536	12494	11282
8:07 AM	Qualification 10	2	12329	12622	8089	12789*
8:14 AM	Qualification 11	1	7135	7078	11780	12758

Planned MATCH Start Time

MATCH Type

Field Assignment

SURROGATE MATCH Indicator

Figure 5: 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. Below are two sample pit maps. Pit Maps created in FTC Scoring will appear on the [FTC-Events](#) page.

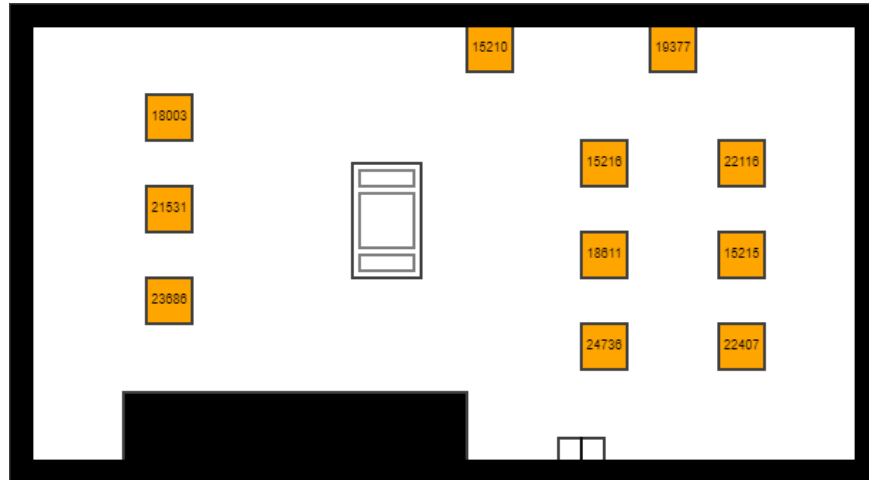


Figure 6: Example Pit Map for a small 12-team Qualifier Event

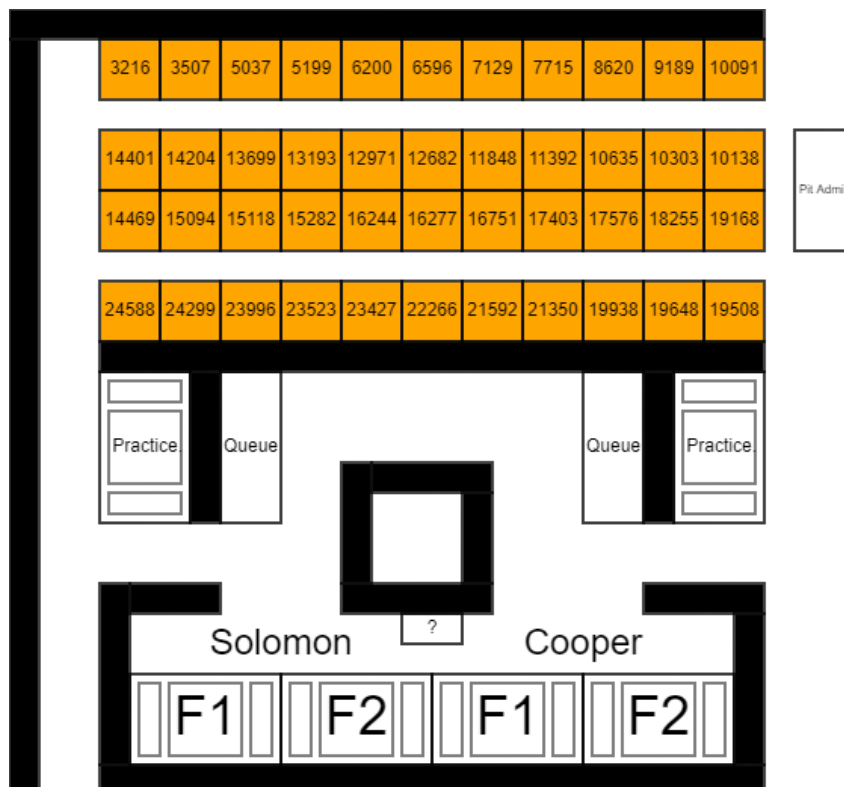


Figure 7: Example Pit Map for a Typical Regional Championship Event

Useful Links and Information

On-Call Support Numbers

On-Call Support

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



[FIRST Tech Challenge Website](#)



[Event Search](#)



[Game and Season Resources](#)



[FIRST Tech Challenge Blog](#)



[Volunteer Resources](#)



[Team Email Blasts](#)

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!