Autonomous Adventures

There are 3 ways we can create autos on YETI:

1. PathPlanner
2. Choreo
3. Composable Functions

This chapter will guide you through using each of these tools to create autonomous paths.

PathPlanner

Overview and Resources:

PathPlanner is a pathing tool developed by team #3015 and is fairly easy to use because of its intuitive, visual nature.

Here are the docs: https://pathplanner.dev/home.html

This page will show you how to effectively use the tool: https://pathplanner.dev/gui-editing-paths-and-autos.html

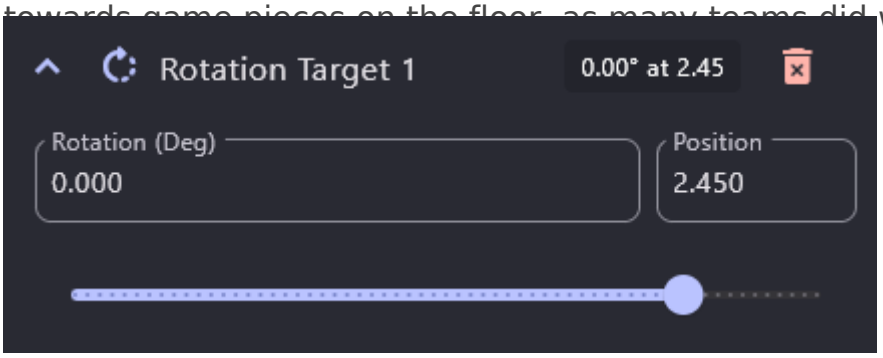
If you have any questions, consult the docs first. They usually contain the answers you desire.

Some of the most important aspects of PathPlanner are:

Rotation Targets:

> Rotation targets define points along the path where the robot should target a given rotation. When path following, the robot will look ahead for the next rotation target, then attempt to rotate to its associated rotation. Rotation targets can be edited in the rotation targets tree. This is only available when holonomic mode is on.

Essentially, this means that you can dictate what direction the robot is facing at any point along the path. This is useful in cases when you want to point your intake towards game pieces on the floor, as many teams did with the notes in 2024.



You can use the *Rotation (Deg)* box to change the heading of the robot and the position slider or the *Position* box to change at what point along the path you want the robot to be at that heading.

Event Markers

> Event markers define points along the path where other commands should be triggered while path following.

This means that you can run commands, such as *intake* or *shoot,* at desired points along the path. Check the docs for further instructions regarding this.

Other Important Aspects to Consider

- Waypoints
- Path Optimization
- Command Groups
- Global Constraints

Choreo

Overview and Resources

This tool was created by a developer group called Sleipnir

Here are the docs for Choreo: https://choreo.autos/

This guide will walk you through how to use Choreo:

https://choreo.autos/usage/editing-paths/

This page will be further updated as we start to use and experiment with Choreo!

Pathplanner vs Choreo

Overview

Pathplanner and Choreo are two solutions to generating paths in the autonomous period, and they are quite similar in many respects. At the time this page is being written (Summer 2025), YETI doesn't have experience with using Choreo. Therefore, it is important to understand the distinction between the two tools and their potential advantages and disadvantages when making decisions on what to use.

> **Fun Fact**: FRC #3015- the team that created Pathplanner- actually uses Choreo instead of Pathplanner!

CD Threads: https://www.chiefdelphi.com/t/choreo-vs-pathplanner/467373

https://www.chiefdelphi.com/t/choreo-vs-pathplanner/492427

Composable Functions

Overview

Using composable functions essentially means ordering commands and paths into autos that are created as commands. This is, after some consideration, what YETI prefers to use to create autos. It is important to note that, while commands are created and used normally, paths have to be created through PathPlanner or Choreo.

Walkthrough

Here is an example of an auto we used in 2025:

```
public Command right1Pc() {  1 usage   boomermath +1
    Optional<PathPlannerPath> lineF = PathPlannerUtils.loadPathByName("lineF");

    return lineF.isEmpty()
            ? Commands.none()
            : AutoBuilder.followPath(lineF.get()) Command
                    .andThen(reefAlignPPOTF.setBranch(ReefAlignPPOTF.Branch.LEFT)) SequentialCommandGroup
                    .andThen(reefAlignPPOTF.reefAlign())
                    .andThen(
                            coralManipulator
                                    .transitionTo(CoralManipulatorState.L4)
                                    .withTimeout( seconds: 0.5))
                    .andThen(coralManipulator.transitionTo(CoralManipulatorState.SCORE_L4))
                    .andThen(coralManipulator.transitionTo(CoralManipulatorState.STOWED));
}
```

As you can see, the auto- *right1Pc*- is actually a command. The first thing we do is define *lineF*, which is a path from PathPlanner. The next step is to make sure the path exists, and when it is confirmed, start creating the auto. In this case, the first thing we do is follow the *lineF* path, but we can switch it around with other commands in any order that we deem desirable. We use other commands normally.

Note that paths are *not* the only way for the robot to drive around. As you can see, we use our auto-align command, which translates and rotates the robot to point towards our target.

Happy auto-making!!!

Tips for Automaking

Overview

Making autos can be hard. This page will go over some tips on how to effectively create and improve autos.

Tips and Stuff:

Initial Orientation and Tag Visibility: So, one afternoon (literally the day we had to pack for world champs lol) in 2025, we were trying to finish an auto we were working on, but it kept messing up at the beginning of the path. When we looked at AdvantageScope, we figured out why: the localization was super inaccurate until it was able to see an April Tag. Basically, this means that the robot was struggling to figure out where it was on the field when it was unable to see a tag. We tried many complicated methods, but to no avail. Eventually, we simply rotated the robot's starting position so that it was able to see an April Tag at the start of the auto. This immediately fixed the problem. The moral of the story is to be mindful of what your cameras can see and look for simple solutions first.

Speed vs Functionality: When making autos, you might be tempted to speed them up as soon as possible so that you can get as many points as possible in the 15 seconds you have. However, you should prioritize functionality and consistency over speed. Follow this guide when making autos:

1. Make your auto do an action consistently
2. Wanna add another action? Do it, and make sure it works consistently.
3. Does the combination of those actions take longer than 15 seconds? Find places where you can speed things up. Increase the velocity and acceleration of the paths. Reduce or remove *wait* commands. Basically, just minmax until it fits within the time limit.
4. Go to Step 2