



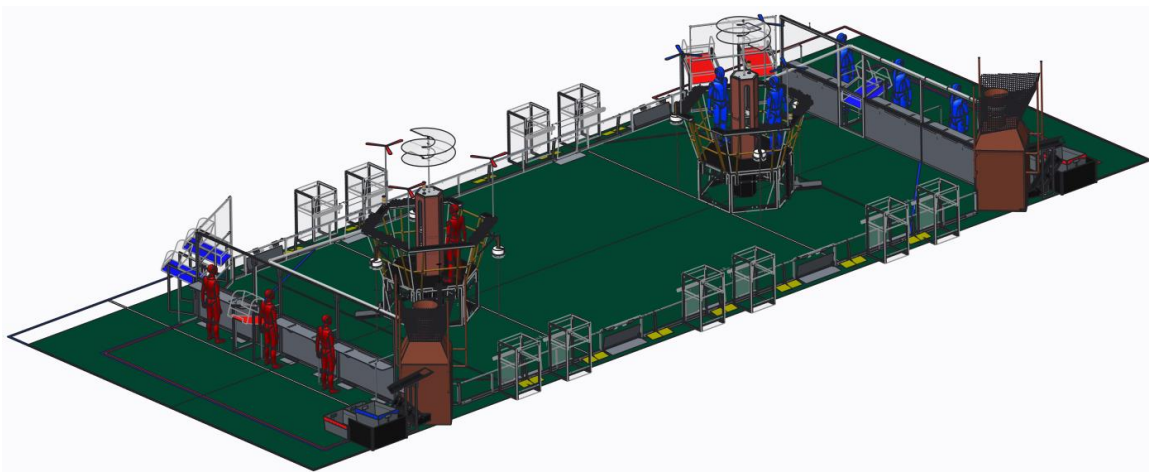
2 FIRST® STEAMWORKSSM Overview

FIRST® STEAMWORKSSM, the 2017 FIRST® Robotics Competition game, invites two adventurers' clubs, in an era where steam power reigns, to prepare their airships for a long distance race.

Each three-team alliance prepares in three ways:

1. **Build steam pressure.** Robots collect fuel (balls) and score it in their boiler via high and low efficiency goals. Boilers turn fuel into steam pressure which is stored in the steam tank on their airship – but it takes more fuel in the low efficiency goal to build steam than the high efficiency goal.
2. **Start rotors.** Robots deliver gears to pilots on their airship for installation. Once the gear train is complete, they turn the crank to start the rotor.
3. **Prepare for flight.** Robots must latch on to their airship before launch (the end of the match) by ascending their ropes to signal that they're ready for takeoff.

Figure 2-1: FIRST STEAMWORKS playing area



Each match begins with a 15-second autonomous period in which robots operate only on pre-programmed instructions. During this period, robots work to support the three efforts listed above and also get points for crossing their baseline.

Table 2-1: Auto Point Values

Action	Value
Cross the baseline	5 match points
1 fuel in high efficiency goal	1 match point, 1 kPa
3 fuel in low efficiency goal	1 match point, 1 kPa
Rotor turning	60 match points

During the remaining 2 minutes and 15 seconds of the match, the teleoperated period, student drivers control robots. Teams on an alliance work together to build as much pressure and start as many rotors as possible – but they have to be sure they leave enough time to latch on to their airship before the end of the match. Points for these efforts are awarded as shown in Table 2-2.





Table 2-2: Teleop Point Values

Action	Value
3 fuel in high efficiency goal	1 match point, 1 kPa
9 fuel in low efficiency goal	1 match point, 1 kPa
Rotor turning	40 match points
Ready for takeoff	50 match points

Alliances are seeded in the Qualification tournament using ranking points which are awarded based on a combination of their Win-Loss-Tie record (2 points for a win, 1 point for a tie), the number of times they reach a 40 kiloPascal (kPa) pressure threshold (1 point), and the number of times they start all rotors (1 point).

For full details, read on!

