



Citrus Circuits
Fall Workshop Series

Simple Robots that win

by Adam Heard, 973

Other workshops

- Mike Corsetto's Strategic Design
- Karthik's Strategic Design
 - youtube.com/Simbotics



Karthik's Golden rules

- Golden Rule #1: Always build within your team's limits
 - Evaluate your abilities and resources honestly and realistically
 - Limits are defined by manpower, budget, experience
 - Avoid building unnecessarily complex functions On the other hand, as you get more experienced, start cautiously pushing a few boundaries
- Golden Rule #2: If a team has 30 units of robot and functions have maximum of 10 units, better to have 3 functions at 10/10 instead of 5 at 6/10



Schedule and preparedness

- Show up ready!
 - “Luck is what happens when preparation meets opportunity” - Seneca
- Schedule drives decisions!
 - Shoot for being “done but not finished” by Sunday of week 4
 - Autonomous usually (but not always) is a great metric of preparedness



So How do you make this work?

- What percentile team are you?
 - Can be tough to figure out!
- CA events are 40-60 teams, so the 24th pick at an event is typically a 40-60%ile team
- An alliance captain or first pick of the 1-4th alliance will be a 80+%ile team
- Refer to previous years case studies on simple but effective, and try to reason through what this year will be.
 - It is almost always less features than you think on kickoff day.



Advantages of simplicity

- Every feature on the robot should be implemented, debugged and practiced thoroughly.
 - Each additional feature can be VERY expensive resource wise at home and at event.
 - Additional features can be distracting
- There rarely is a true “side project” or “separate path”
 - Team needs to go all in on the agreed upon plan



330 - 2005

- [Einstein F1](#)
- 6wd single speed (kop gearbox)
- Single jointed arm
- One time deploy defense skirts
- No control loops required
- Hardstopped on base of goal for scoring
- %ile difficulty rating - 50%
- Competitiveness - #1 Alliance



4334 - 2012

- [IRI Qual 28](#)
- 4wd single speed
- Feed balls in auto and over barrier
- Lower bridge
- No control loops required
- NARROW for easy triple balance
- Self righting in a tip-heavy game
- %ile difficulty rating - 50%
- Competitiveness - 2nd round pick



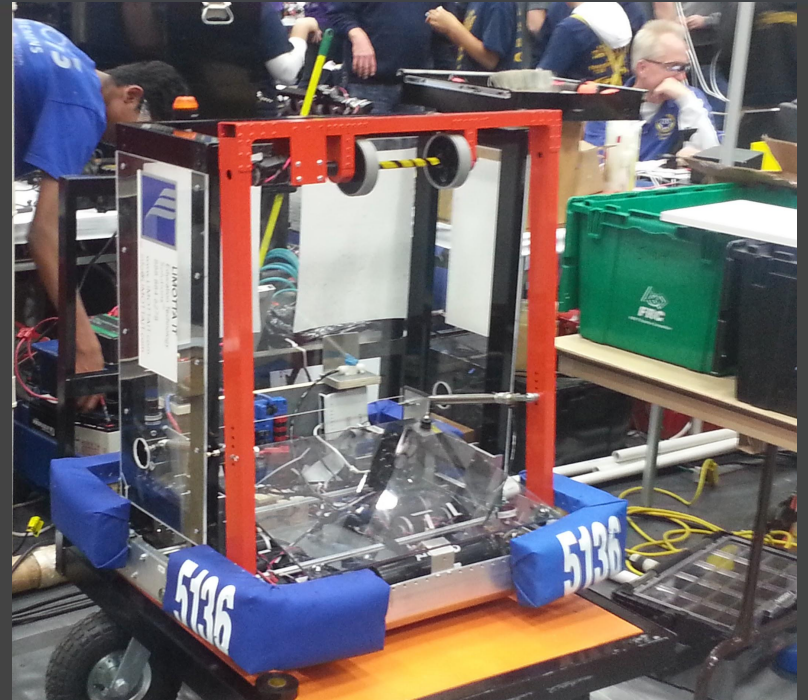
4039- 2013

- [Galileo SF 1-1](#)
- Human load only
- 10 point hang
- KOP Drive
- No control loops required, but velocity on flywheel could help
- %ile difficulty rating - 70%
- Competitiveness - #1 alliance



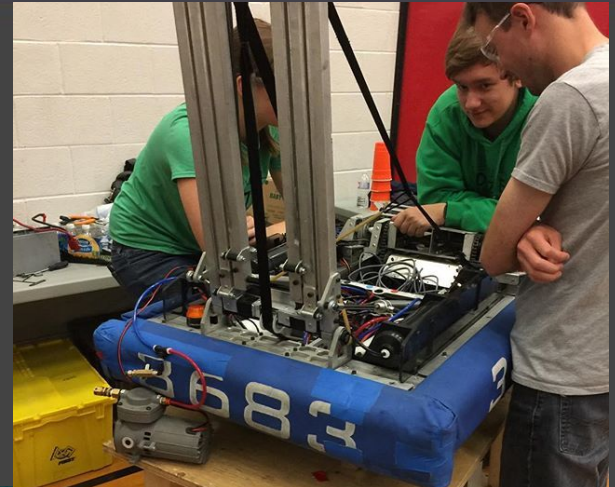
5136 - 2014

- [Newton Qual 43](#)
- KOP 6wd
- Deployable intake
- No control loops
- Goalie Pole for champs
- %ile difficulty rating - 30%
- Competitiveness - #1 Alliance (some regionals), 2nd round pick (champs)



3683 - 2016

- [Waterloo SF 2-2](#)
- 8wd Pneumatic
- Intake for low goal
- Elevator Hang
- Could be done with no control loops
- %ile difficulty rating - 50%
- Competitiveness - #1 Alliance



6705 - 2017

- [Roebeling Qual 88](#)
- 4wd Kop Drive
- Purely passive Human Player loaded Gear Mech
- Velcro Hang
- %ile difficulty rating - 30%
- Competitiveness - #1 Alliance



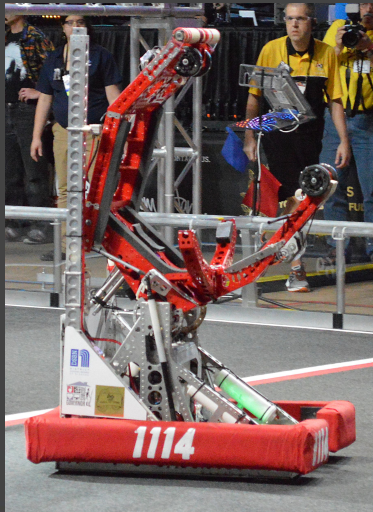
Frankenstein 1102 - 2018

- [PCH Champs Final 1](#)
- Change drive to KOP drive
- Use a COTS elevator or publicly available CAD
- Motorized wrist could be pneumatic
- COTS roller claw
- %ile difficulty rating - 30%
- Competitiveness - #1 Alliance



what if you want to be a 95+% ile team?

- 1678, 1114, 2056 and 330 (some years) are my favorite to study for the simplest robots to break into the elite pack.



Questions?



Give us Feedback!

