FRIEDRICH-ALEXANDER
UNIVERSITÄT
ERLANGEN-NÜRNBERG

FACULTY OF ENGINEERING

ER-Force: Building the 5th generation

Theresa Engelhardt, Tobias Heineken, Valentin Hopf, Jeldrik Lindner, Mike Schmidt, Michael Stadler, Johanna Weßels

Abstract This poster presents improvements and design considerations of our mechanical and electronical design. We also share our experience on how to keep a team alive.

The human factor

Building robots is not trivial. Ensure continuity in the team to avoid reinventing the wheel.

- **Continuous recruitment:** Replacing one member per year is a much more feasible task than replacing your whole mechanics department once every 5 years.
- **Solving real problems:** Solving artifical problems is none of the main goals of an SSL-Team. We want new member to work on real problems as soon as possible.

Caution

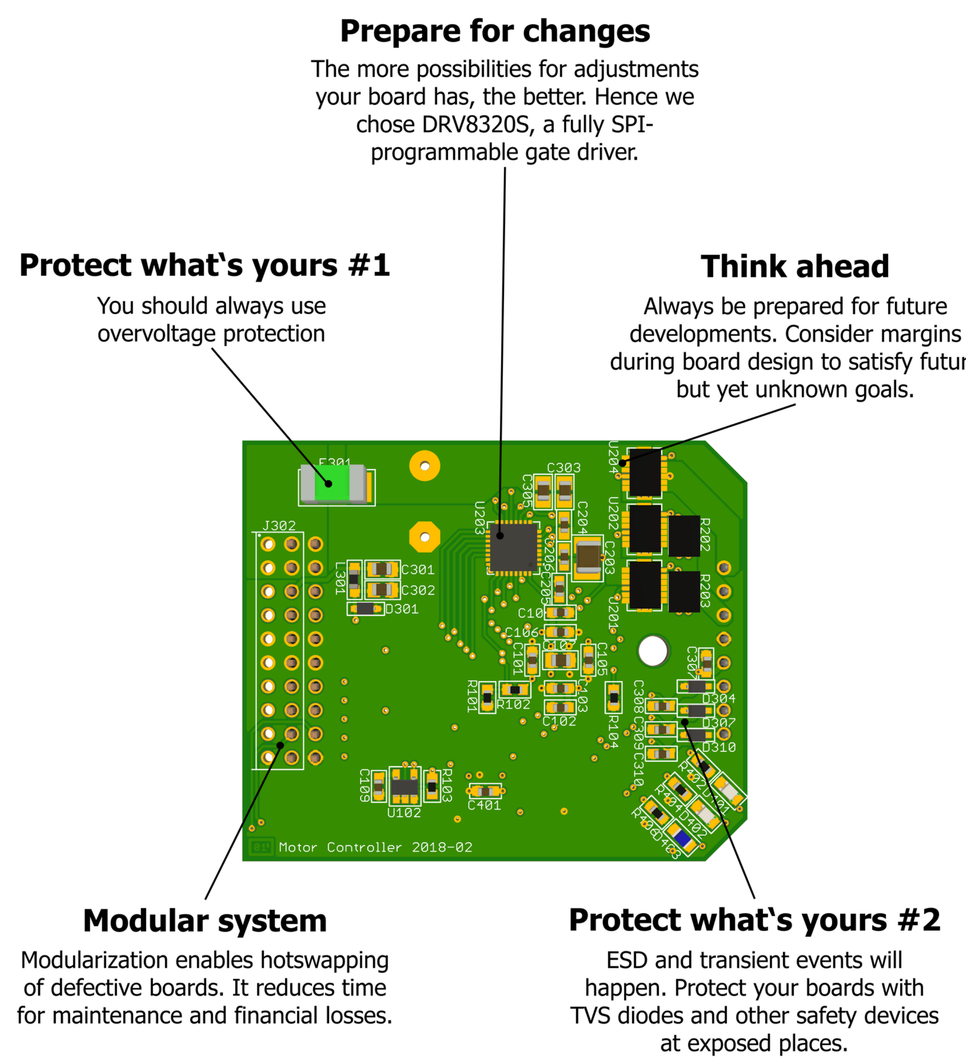
Whenever new members are working on the actual project itself, there is always an increased risk. They could just not solve the task to expectations, violate established conventions, or even damage robots or equipment on accident.

Solution

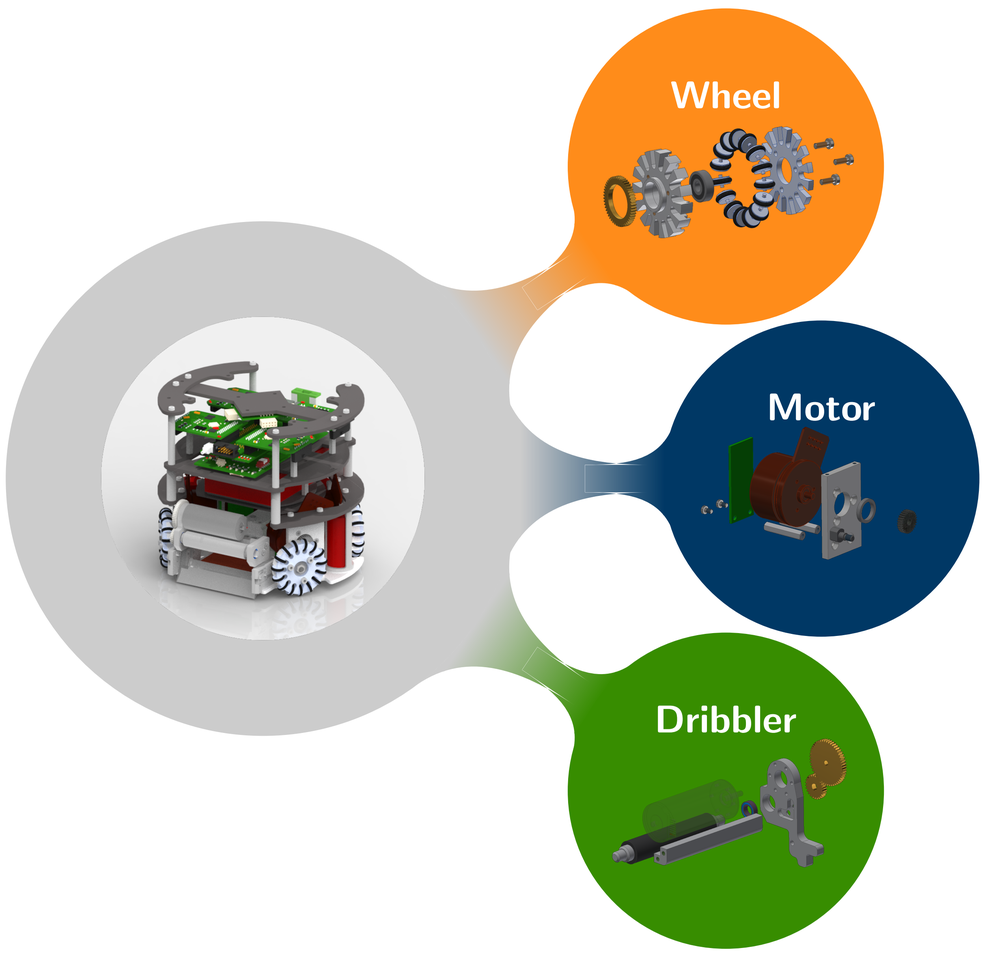
- Start with a relatively simple and not time-critical task: it is not about the solution, it is about learning.
- Try to review the work before it goes into effect. (This is always useful.)

- **Regular development meetings:** These are the primary source of knowledge transfer. Encourage asking questions whenever a problem *should* already have a solution.
- **Inexperienced members at the Robocup:** They will pick up a lot of valuable information about your system on the event itself.
- Do not hesitate to **ask a former member** of the team whenever questions arise.

Electronical design



Mechanical design



Wheel

Gear glued on shoulder ⇒ easy centering

Drive Module

- **Improved acceleration:**
  - new 70 W motors
  - gear ratio change from 1:3 to 1:1.79
- **Improved design:** encoders with two spacers directly on motor mount ⇒ precise alignment

Dribbler Module

- **Better alignment of breakbeam:** Slots for a L-shaped spacer in dribblerpanels and baseplate ⇒ no twisting between both panels
- **Improved dribbling:** Higher point of contact between ball and dribbler roll → decrease of forces which push the ball out of the dribbler ⇒ better ball control

QR-Code for the ETDP

Chair of Computer Science 4