TECHNISCHE HOCHSCHULE DEGGENDORF



The JK-Team: our way to ROS

(not yet finished …)

University of Applied Sciences (UAS)

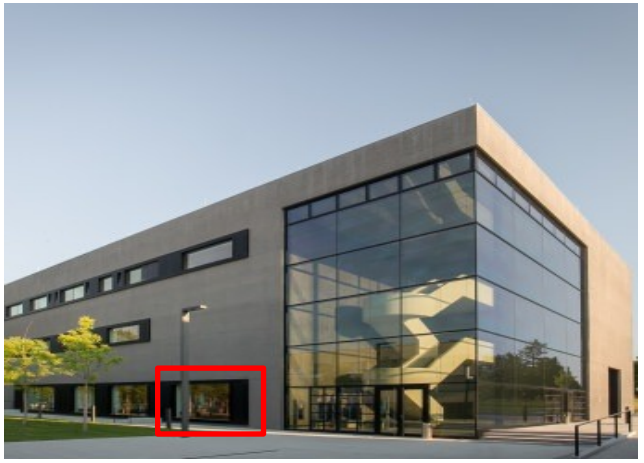
University of Applied Sciences = German Engineering

- ⅔ of all German engineers graduated from a University of Applied Sciences (UAS)!
- University of Applied Sciences bachelor degree emphasizes practical applicability rather than theoretical knowledge as in the bachelor programs of traditional university curriculums - thus increasing the students' employability.
- All professors are required to have both a longstanding academic (minimum: PhD) ***and*** industrial career. Most of them are recruited from leading positions in industry.

Why ROS?

- New Laboratory of Autonomous Systems / Advanced Driver Assistance
  - laboratory has been created in the beginning of 2018
  - lab for teaching and research purposes
  - ROS is believed to be an important software framework for autonomous systems
  - our partners are using ROS / requesting ROS

- Lab Activity Areas:
  - Sensors & Algorithms
  - Software Frameworks
  - Communication and Networking
  - Simulation, Hardware-In-The-Loop
  - Backend Interaction



Jackal - Unmanned Ground Vehicle from Clearpath Robotics

Jackal is a small, entry-level field robotics research platform.

We have purchased the very basic configuration:

- durable mechanical construction 4WD
- Intel Celeron C1840 2.8 GHz
- 2 MB RAM, 120 GB SSD
- WLAN and Bluetooth
- Linux Ubuntu 16.x
- ROS Indigo
- standard GPS
- standard IMU
- odometer
- motor driver and battery
- manual remote control

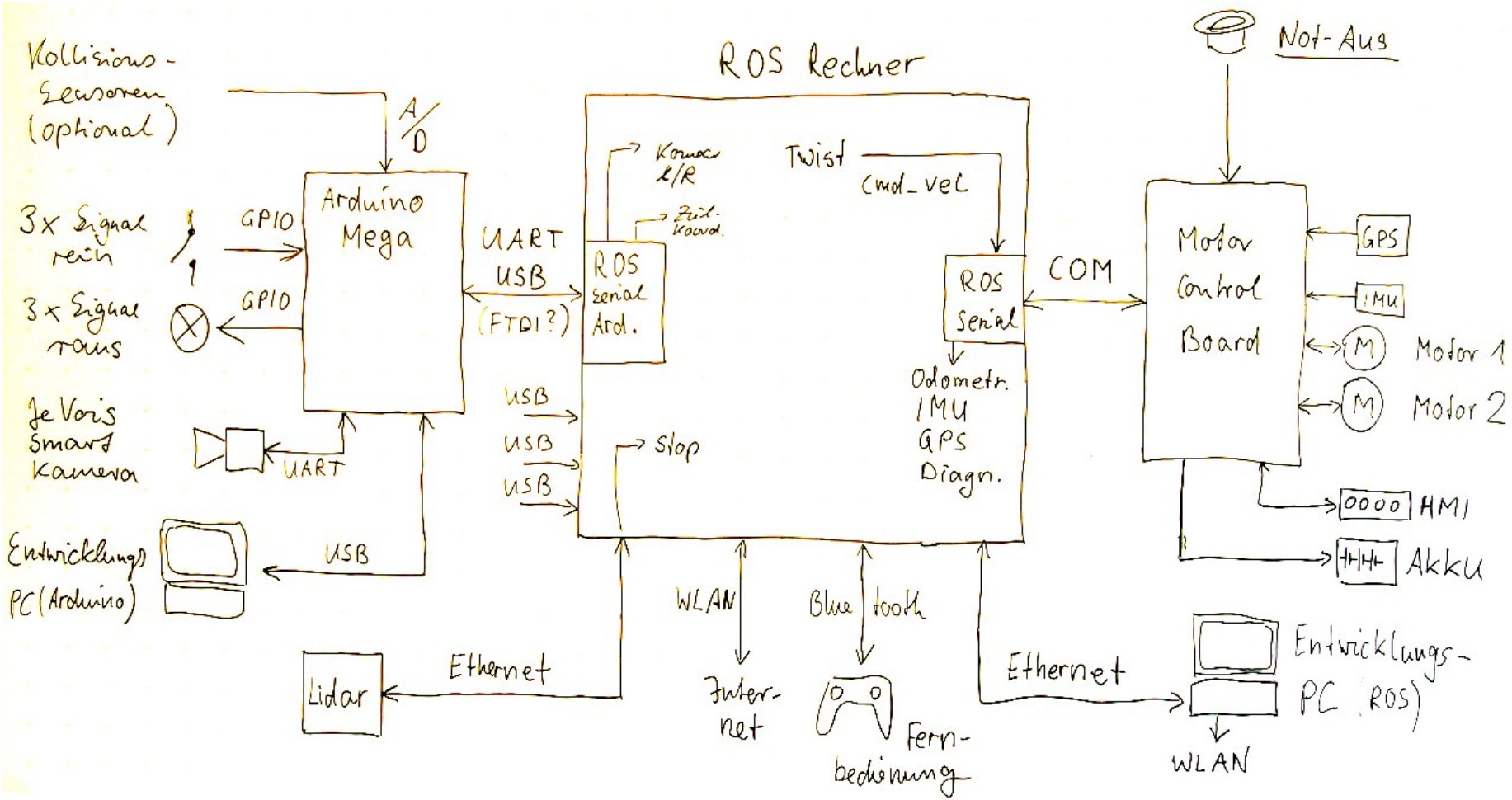
Our own modifications since April 2018

- mechanical changes to carry the payload
- external emergency stop button
- LIDAR Sick TIM551
- Arduino for GPIO
- JeVois smart camera
- acoustic signal

new ROS nodes:

- collision avoidance
- map handling and routing
- sequential control
- driving decision
- ROSserial Arduino

Jackal Hardware Architecture 2018



What do we think about ROS?

What we like so far:

- ROS provides a lot of material, documentation and tutorials.
- ROS is great for distributed team development.
- ROS is flexible and provides many test options.

What we don‘t like so far:

- ROS sometimes uses a very theoretical approach.
- ROS offers a lot of answers to questions we didn’t ask.
- ROS does not offer a lot of answers to our specific questions / for our use case.

Our conclusion:

- We will continue to work with ROS and adapt it to our specific needs.

Next steps

To bring ROS to our other machines and participate with more than one ROS robot.

Little Brother of our Jackal

Audi Q2 Model Car Scale 1:8

Payload up to 1 kg

Remote Control and Autonomous Driving

Computer: Intel Core i3 CPU
NVIDIA GeForce GTX 1050Ti

Software: Linux and ADTF

Purpose:
- Single Sensor Evaluation
- ADTF Software Development
- AI Software Development
- Audi Autonomous Driving Cup

Big Brother of our Jackal

Heros 224 Robotic Research Platform

Payload up to 50 kg

Remote Control and Autonomous Driving

Computer: Intel Core i7

Software: Linux and ROS Kinetik

Purpose:
- Hardware / Software Test Platform
- Sensor Cluster Evaluation
- Industrial Robotic Research
- Campus transportation

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Technische Hochschule Deggendorf – Dieter-Görlitz-Platz 1 – 94469 Deggendorf