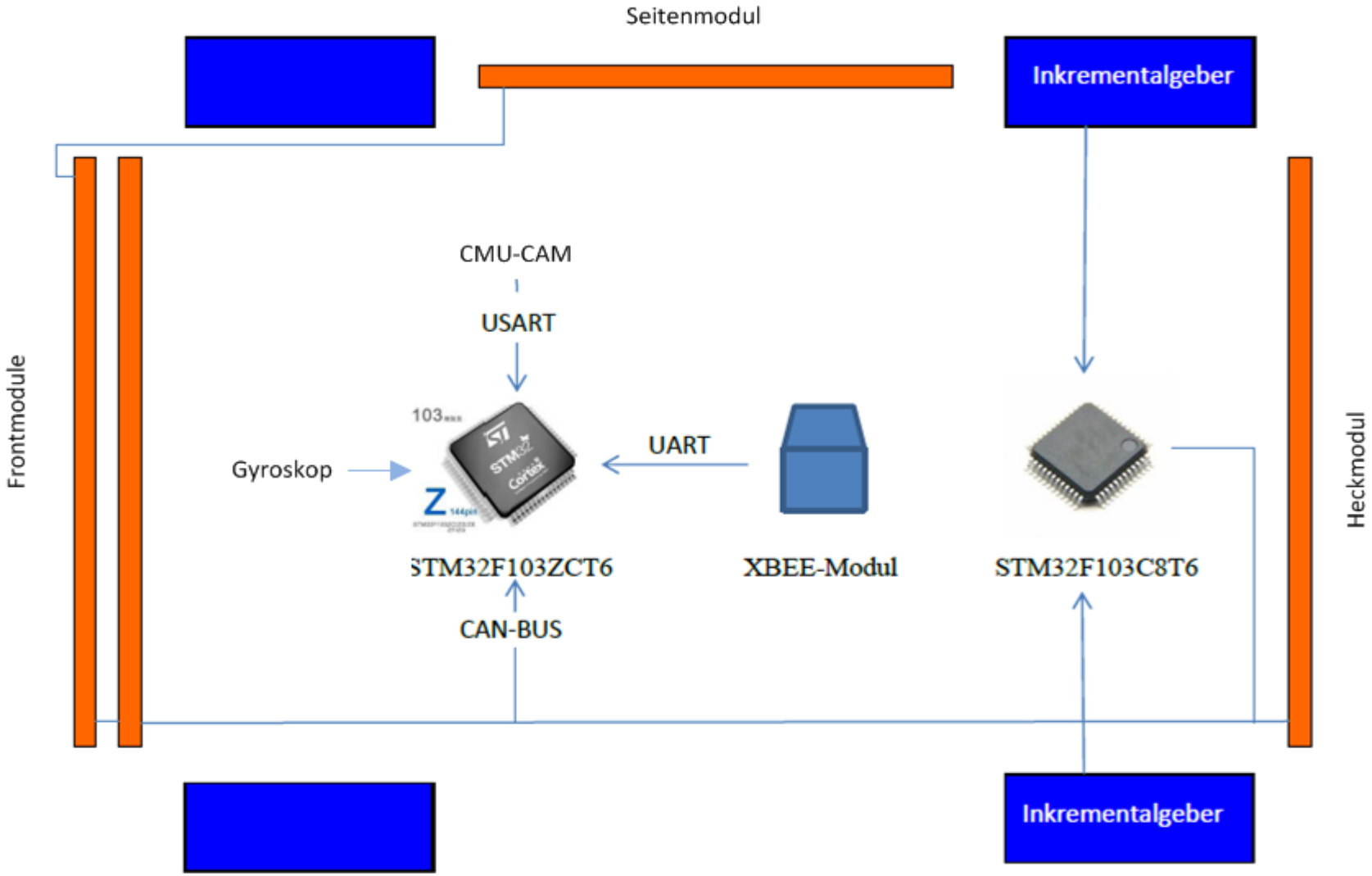
THM Carolo Cup 2013

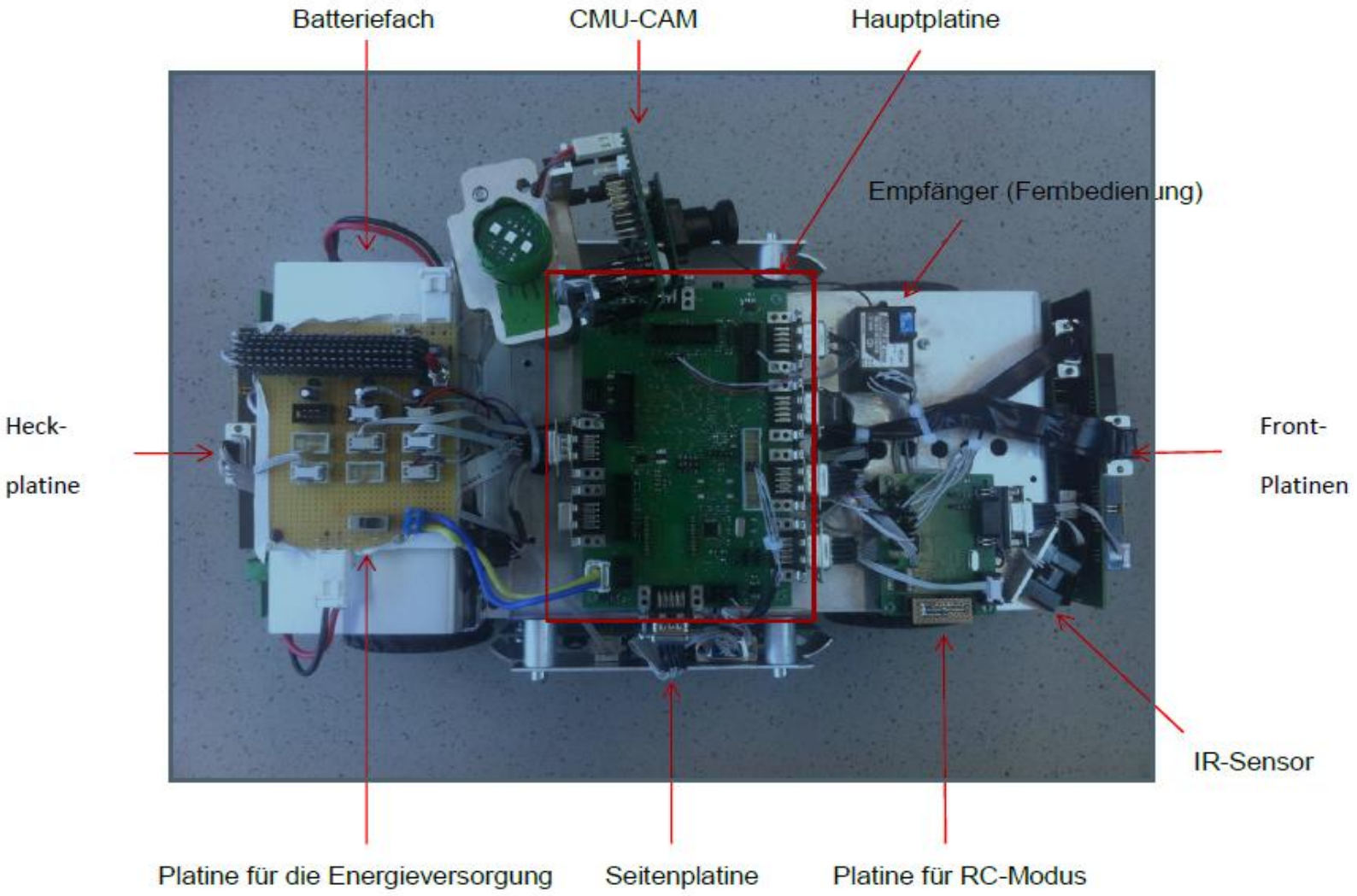
Konzept

1. Grundidee
2. Hardwarearchitektur
3. Hauptplatine
4. Kameraverarbeitung
5. Regelung
6. Fahren auf der Straße
7. Einparken
8. Fahren mit Hindernissen
9. Energiebilanz
10. Herstellkosten

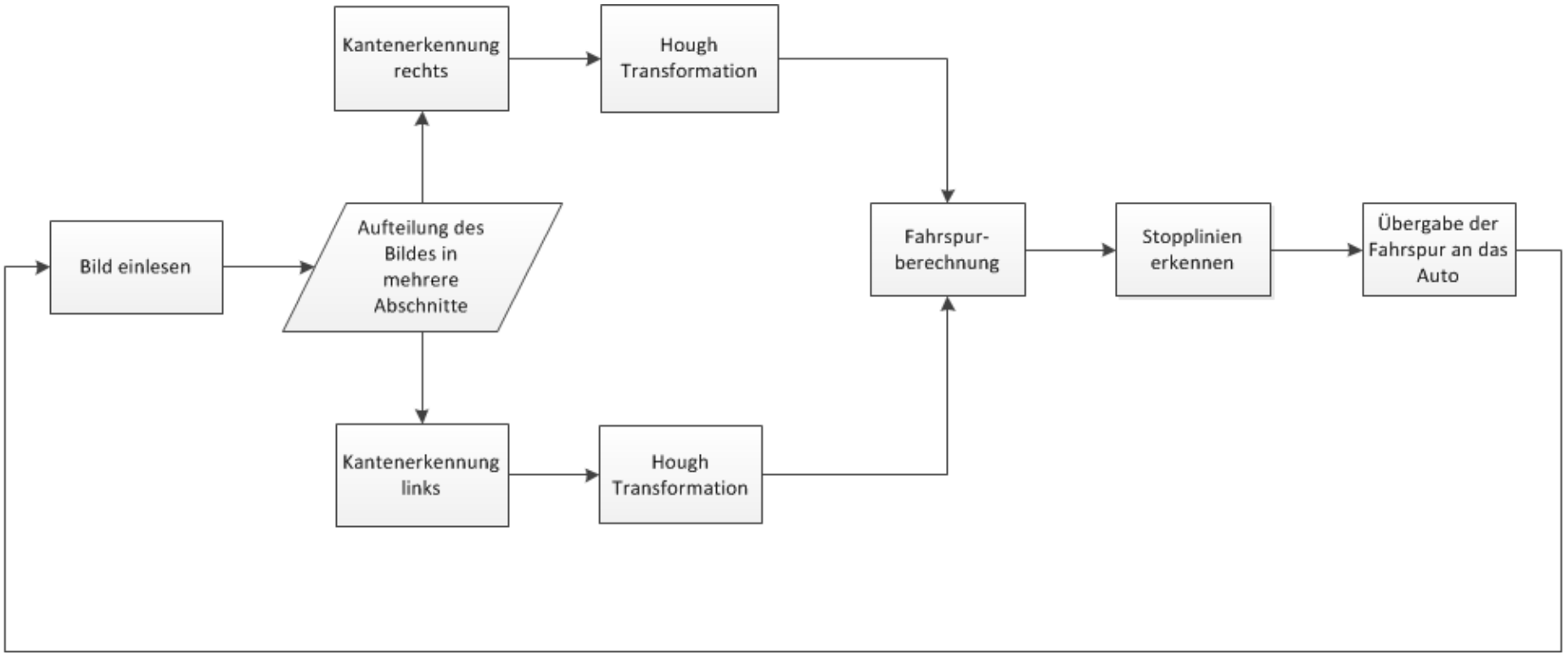
Grundidee


Seitenmodul
Inkrementalgeber
CMU-CAM
USART
Frontmodule
Gyroskop
UART
Heckmodul
STM32F103ZCT6
XBEE-Modul
STM32F103C8T6
CAN-BUS
Inkrementalgeber

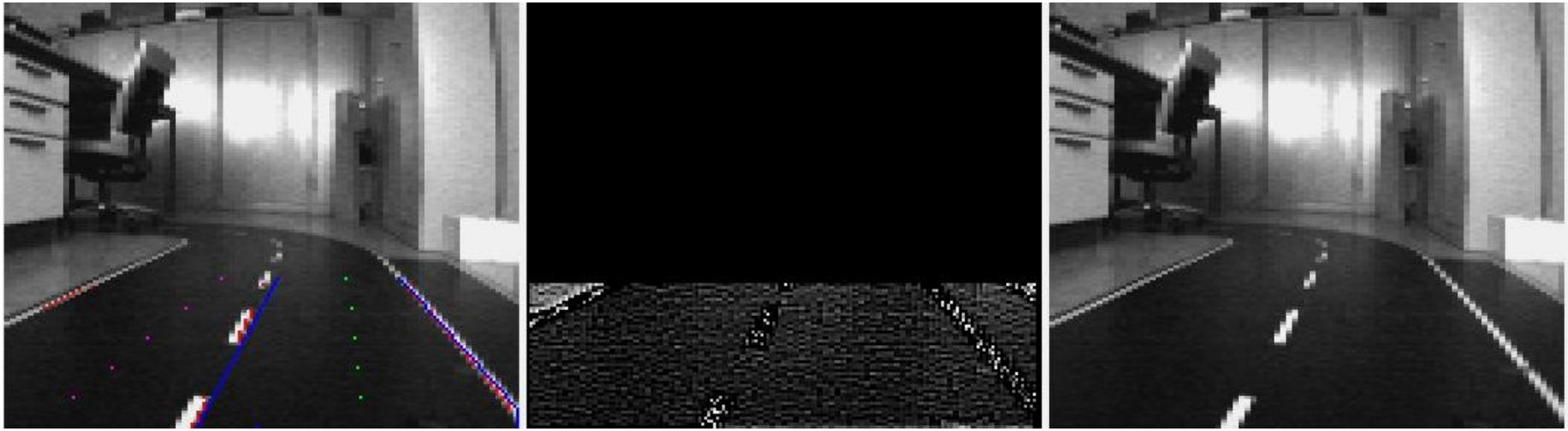
Hardwarearchitektur



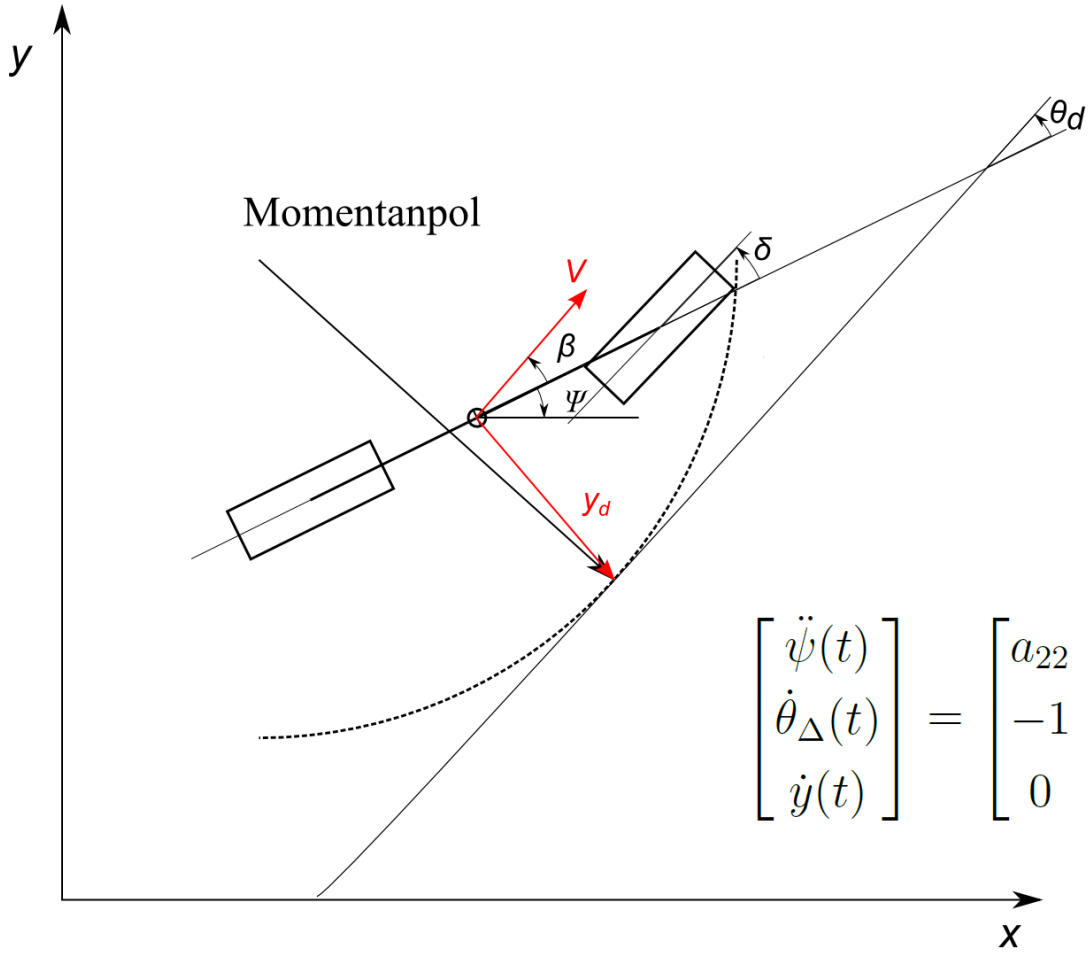
Kameraverarbeitung



Kameraverarbeitung



Einspurmodell



δ Lenkwinkel

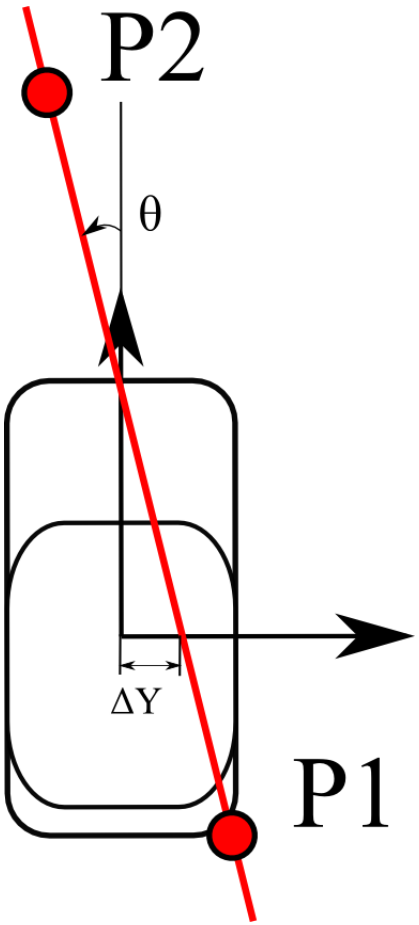
$\dot{\psi}$ Gierrate

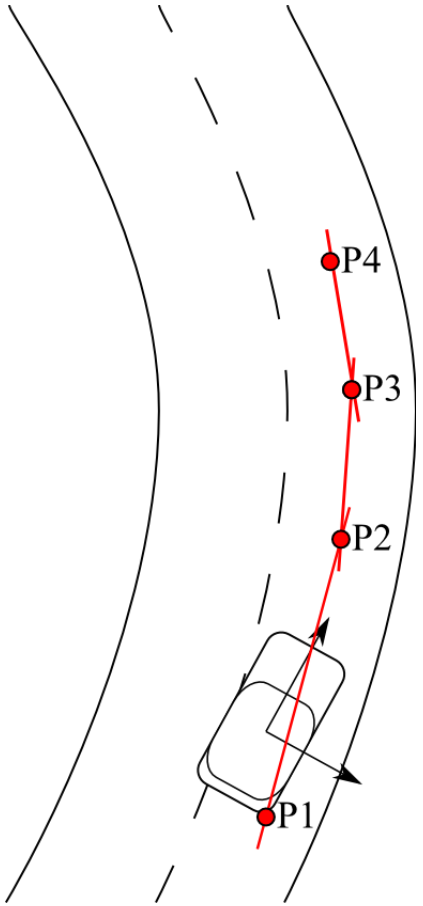
θ Kurswinkel

y Querabweichung

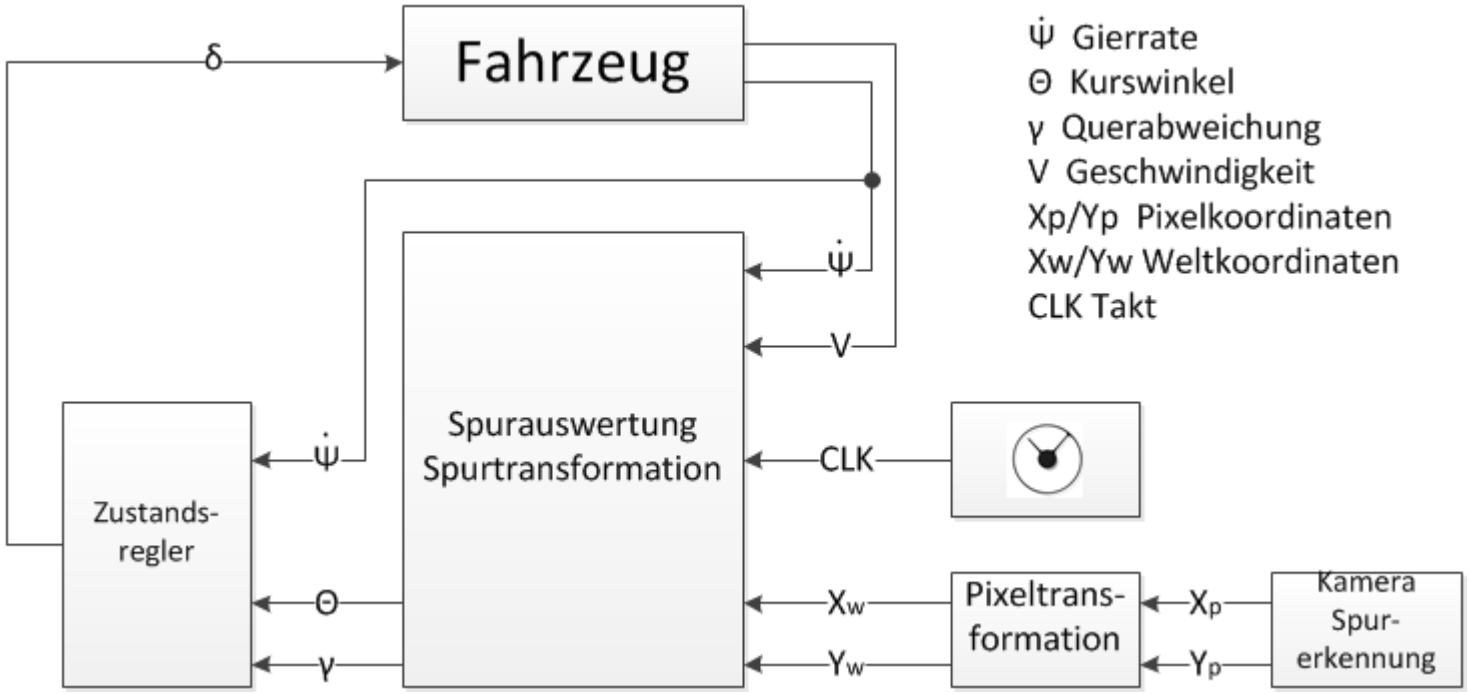
$$\begin{bmatrix} \ddot{\psi}(t) \\ \dot{\theta}_\Delta(t) \\ \dot{y}(t) \end{bmatrix} = \begin{bmatrix} a_{22} & 0 & 0 \\ -1 & 0 & 0 \\ 0 & V & 0 \end{bmatrix} \cdot \begin{bmatrix} \dot{\psi}(t) \\ \theta_\Delta(t) \\ y(t) \end{bmatrix} + \begin{bmatrix} b2 \\ 0 \\ 0 \end{bmatrix} \cdot \delta(t)$$

Kurswinkel & Querabweichung

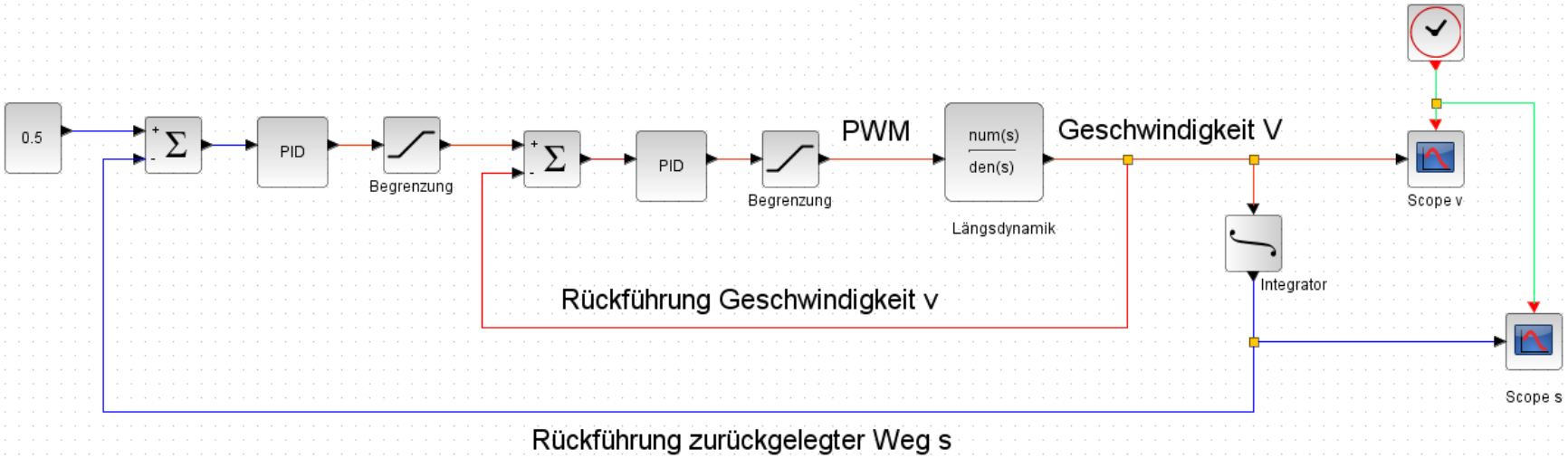




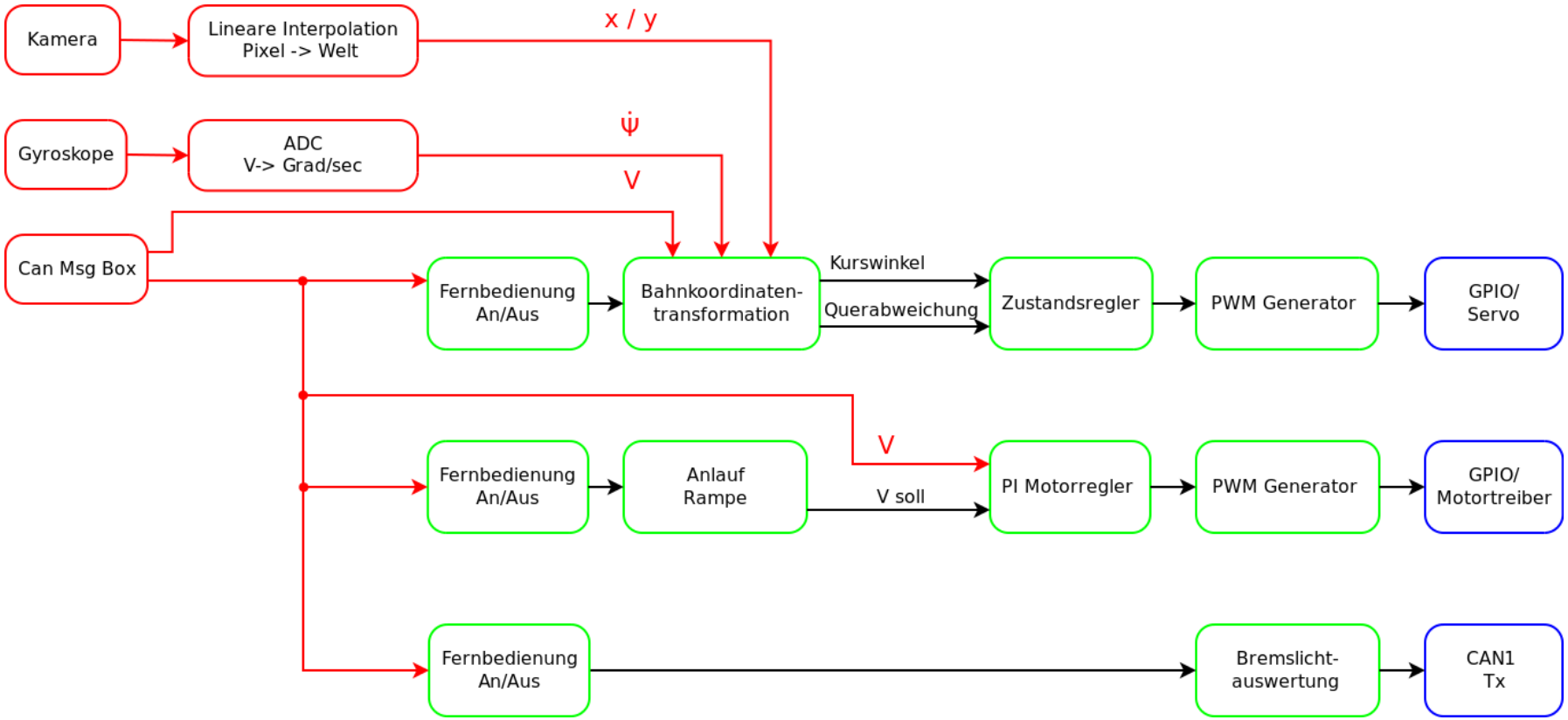
Querregelung



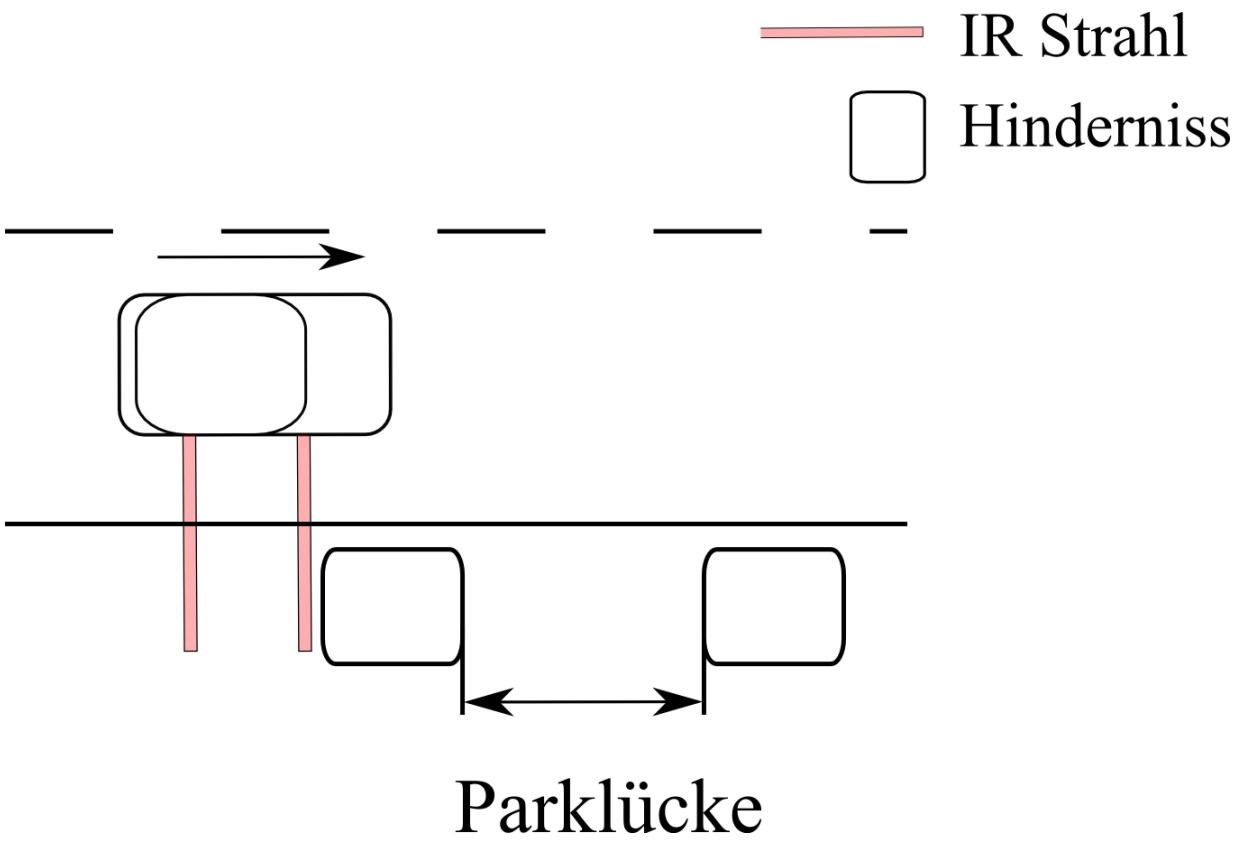
Längsdynamik

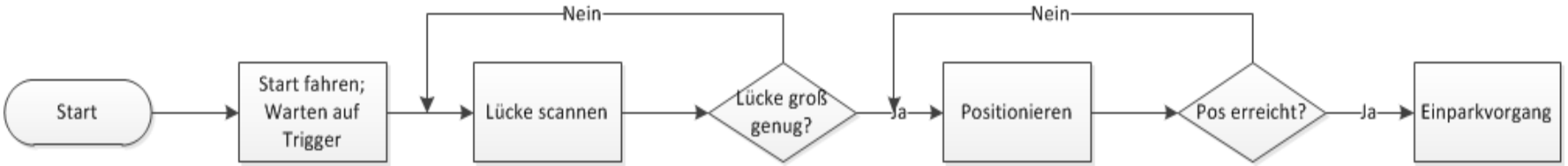


Fahren auf der Straße

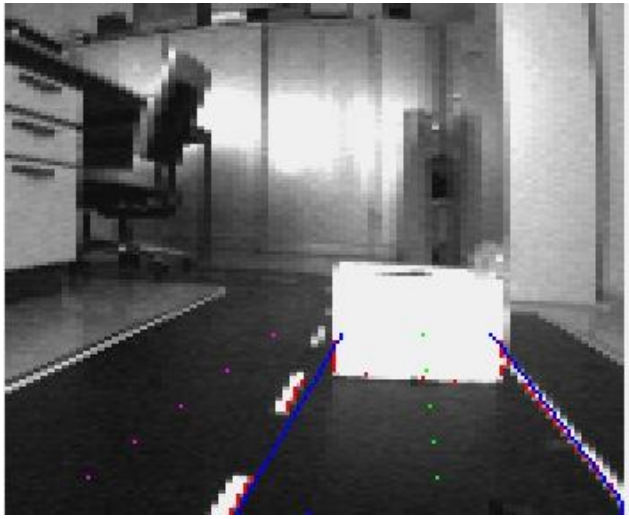


Einparken

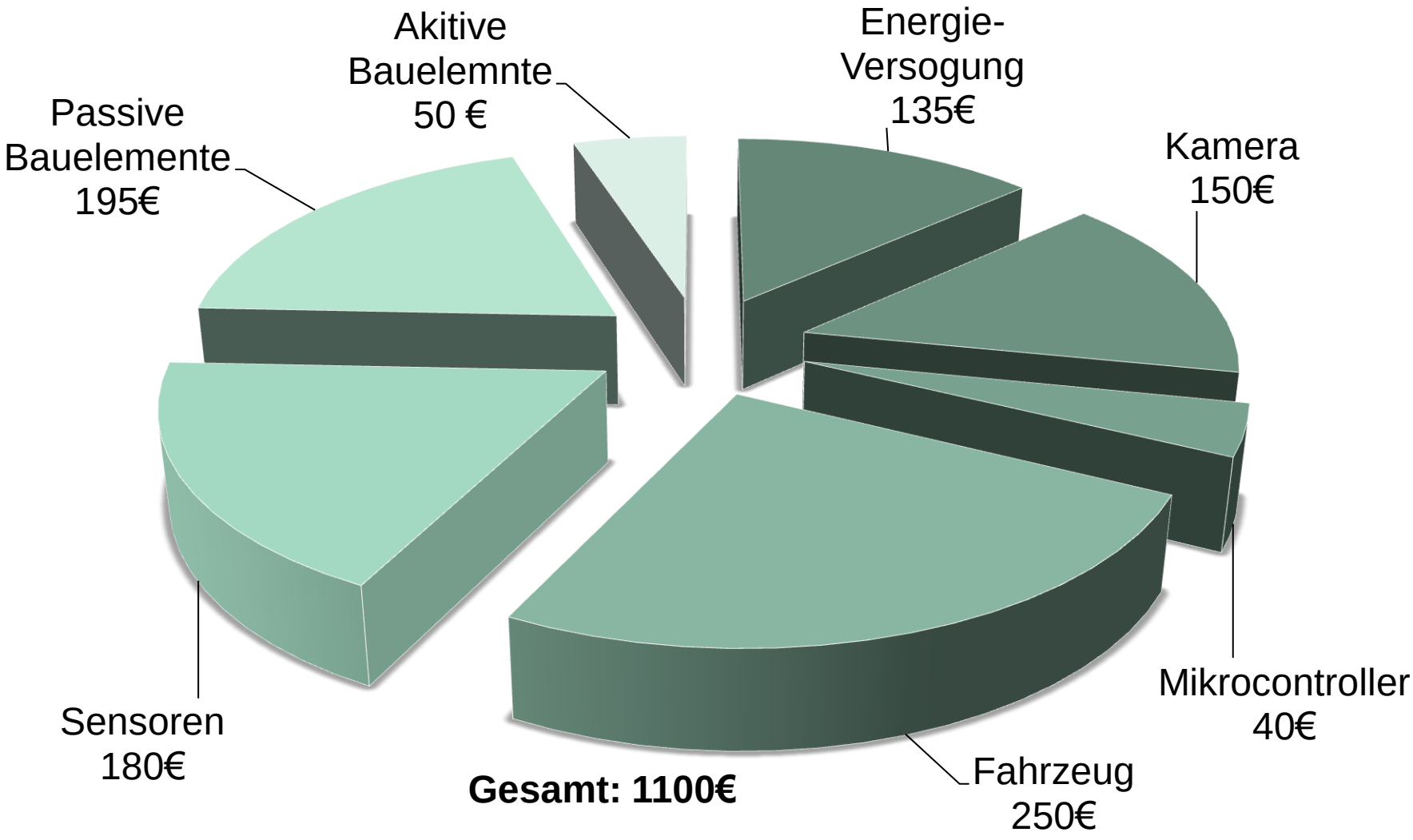

IR Strahl
Hinderniss
Parklücke


Start
Start fahren; Warten auf Trigger
Lücke scannen
Nein
Lücke groß genug?
Ja
Nein
Positionieren
Pos erreicht?
Ja
Einparkvorgang

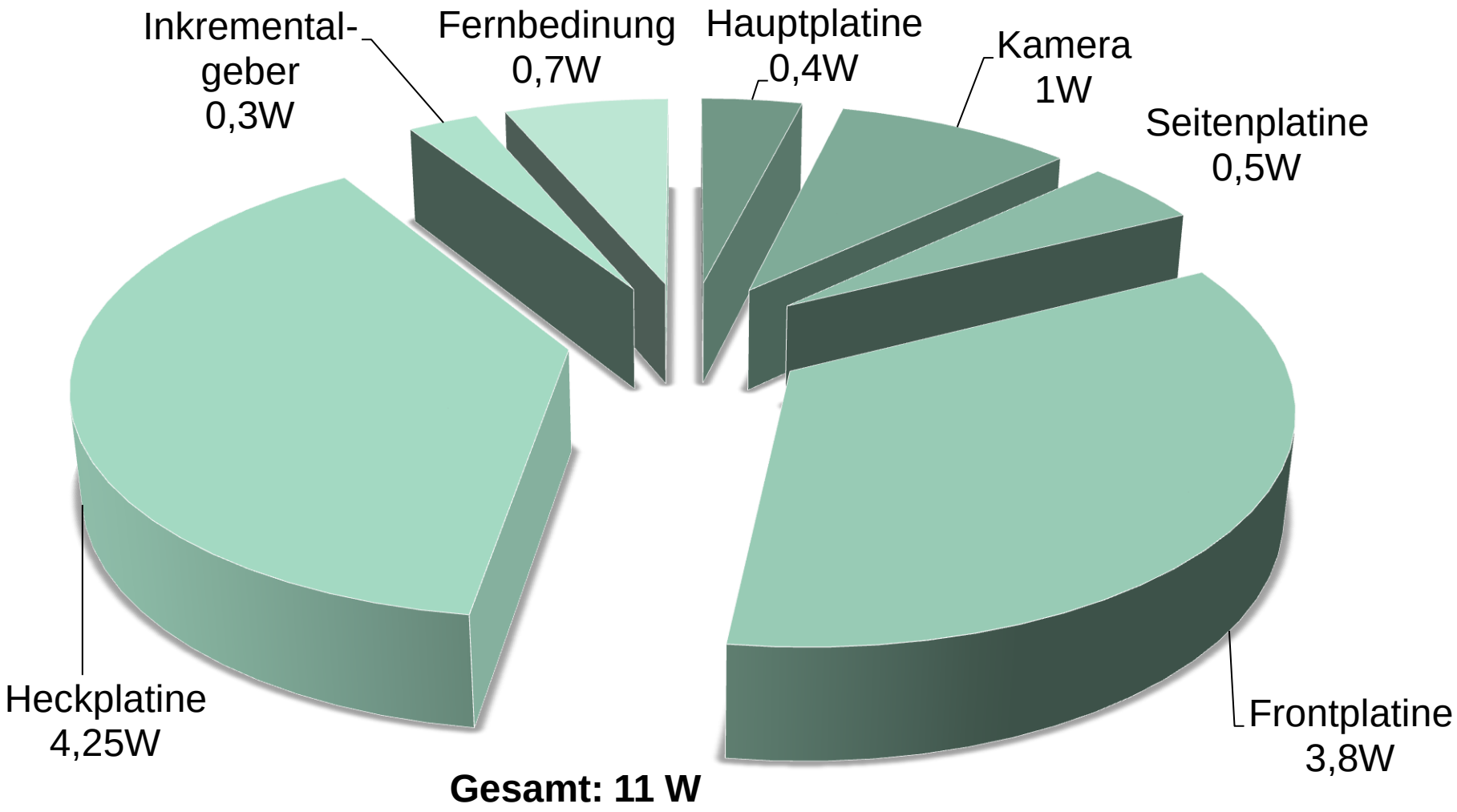
Fahren mit Hindernissen



Herstellungskosten



Energiebilanz



Gesamt: 11 W

Vielen Dank für Ihre Aufmerksamkeit