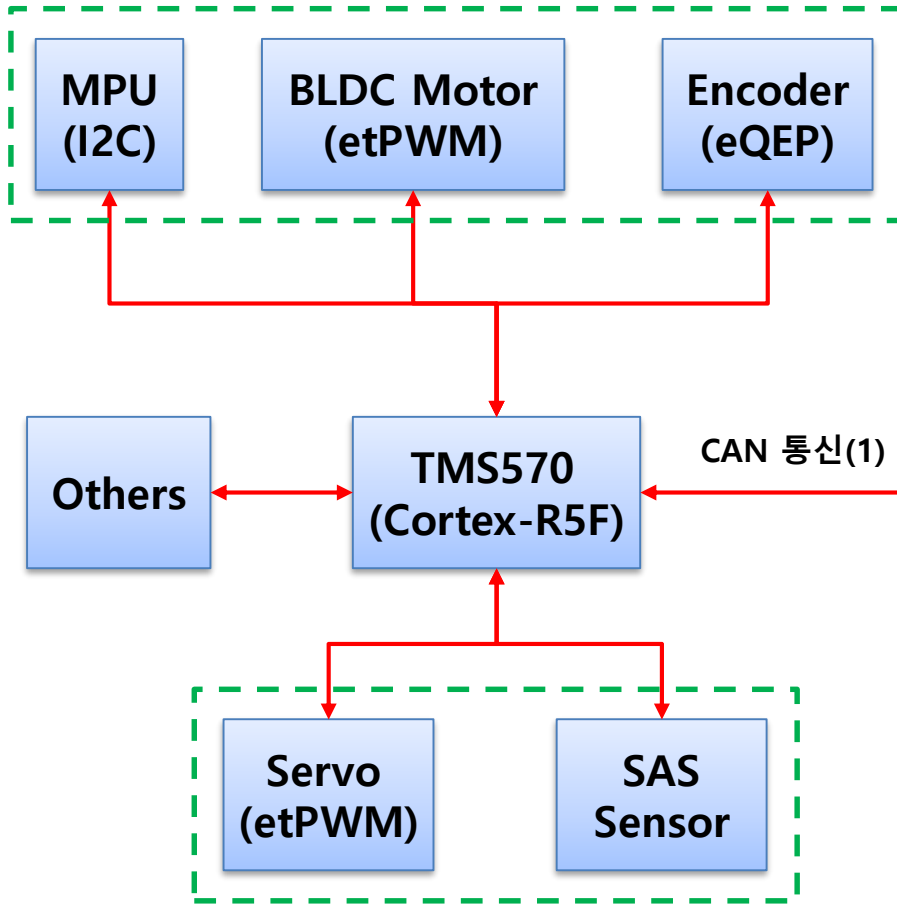


# TI MCU, DSP 및 Xilinx FPGA 프로그래밍 전문가 과정

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# **Full Architecture**

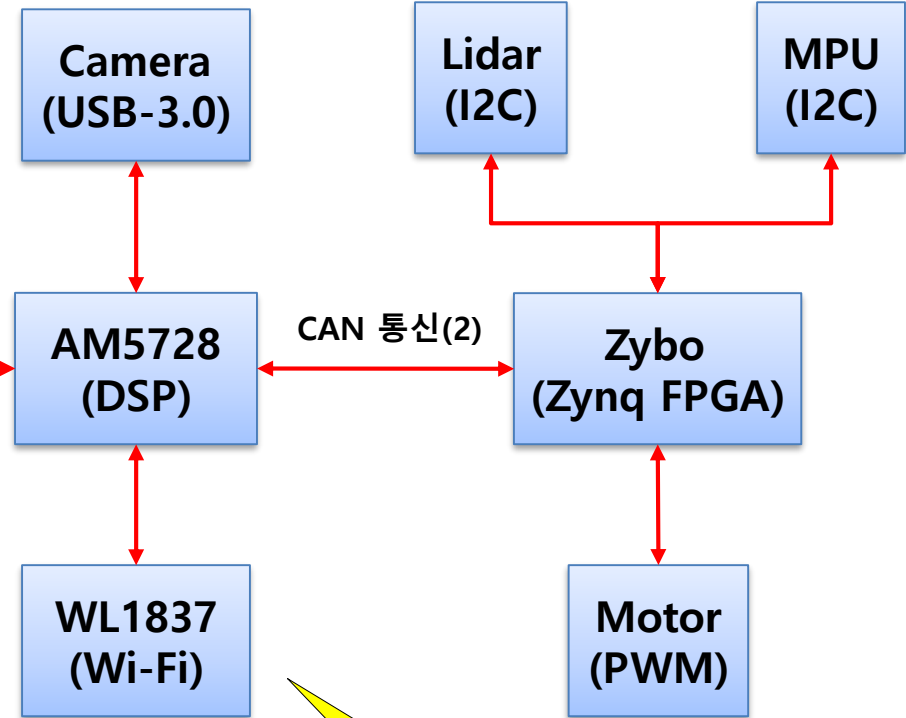
PI 제어 - 속도 제어



PID 제어 - 조향 제어

CAN 통신(2) - 현재 장애물이 어떤 방향에 존재하며  
얼마만큼 떨어져있는지의 정보를 전송함

CAN 통신(1) - 왼쪽 및 오른쪽 각도 x 만큼 조향  
- 정지  
- 후진 등등



영상 신호 처리

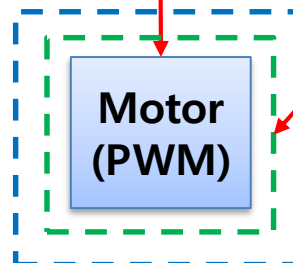
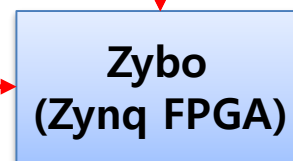
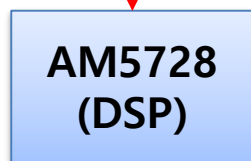
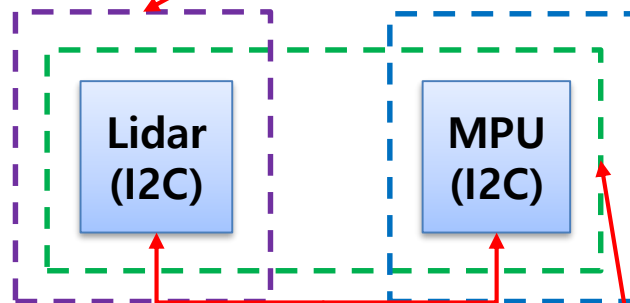
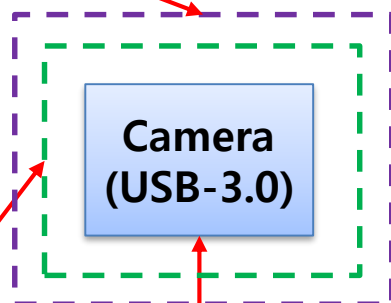
레이더 신호 처리

Device Driver,  
시스템 프로그래밍

Device Driver,  
시스템 프로그래밍

제어 공학

안드로이드 앱



22.2V Li-Po 6S Battery

DC-DC 컨버터 회로

12V 1A  
Buck Converter

12V 5A  
Buck Converter

5V 2.5A  
Buck Converter

MPU  
(I2C)

BLDC Motor  
(etPWM)

Encoder  
(eQEP)

Others

TMS570  
(Cortex-R5F)

Servo  
(etPWM)

SAS  
Sensor

Camera  
(USB-3.0)

AM5728  
(DSP)

WL1837  
(Wi-Fi)

Lidar  
(I2C)

MPU  
(I2C)

Zybo  
(Zynq FPGA)

Motor  
(PWM)

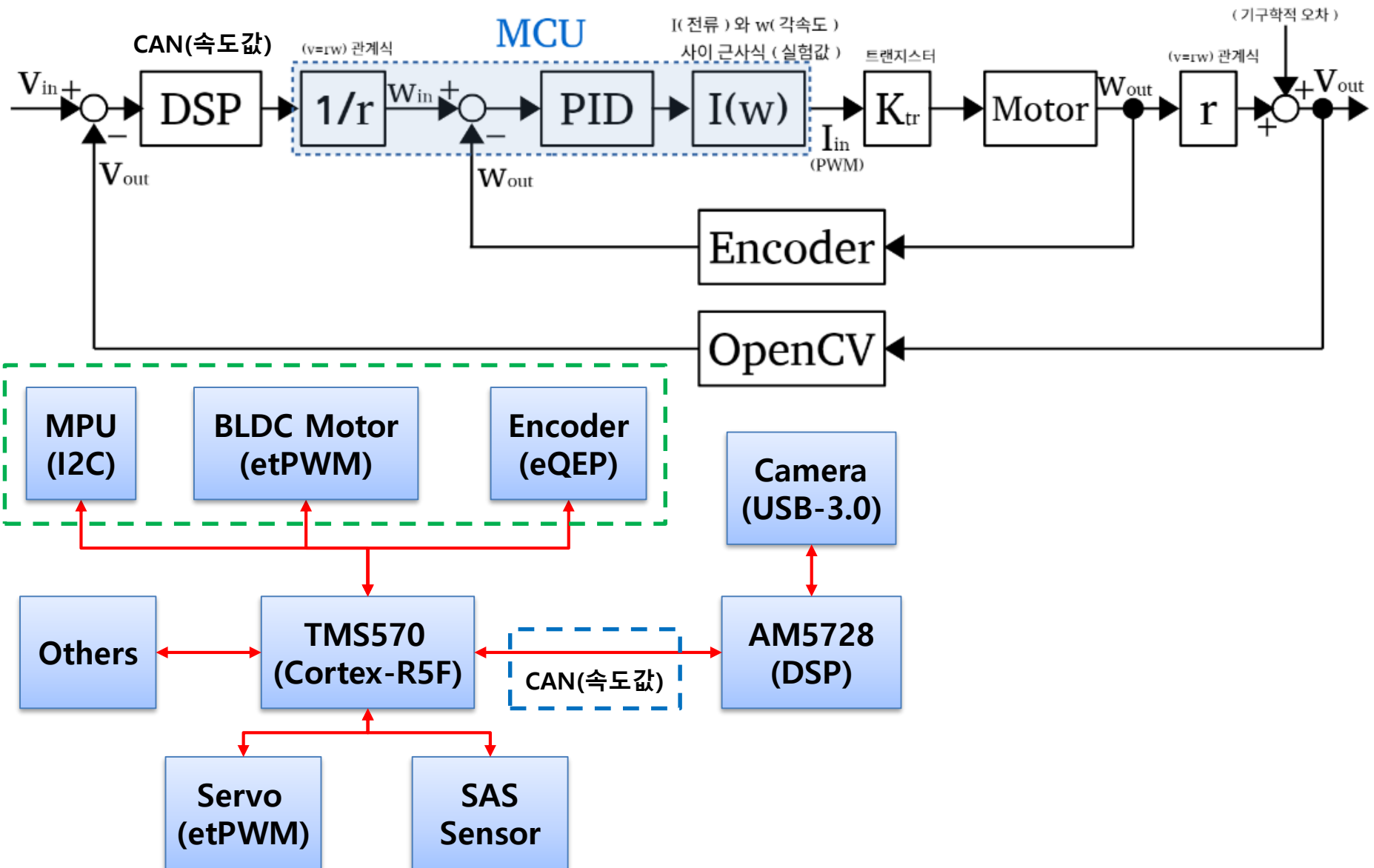
MCU(Firmware) 파트  
제어 공학

DSP 파트  
Linux Kernel  
Device Driver  
영상 처리  
신호 처리

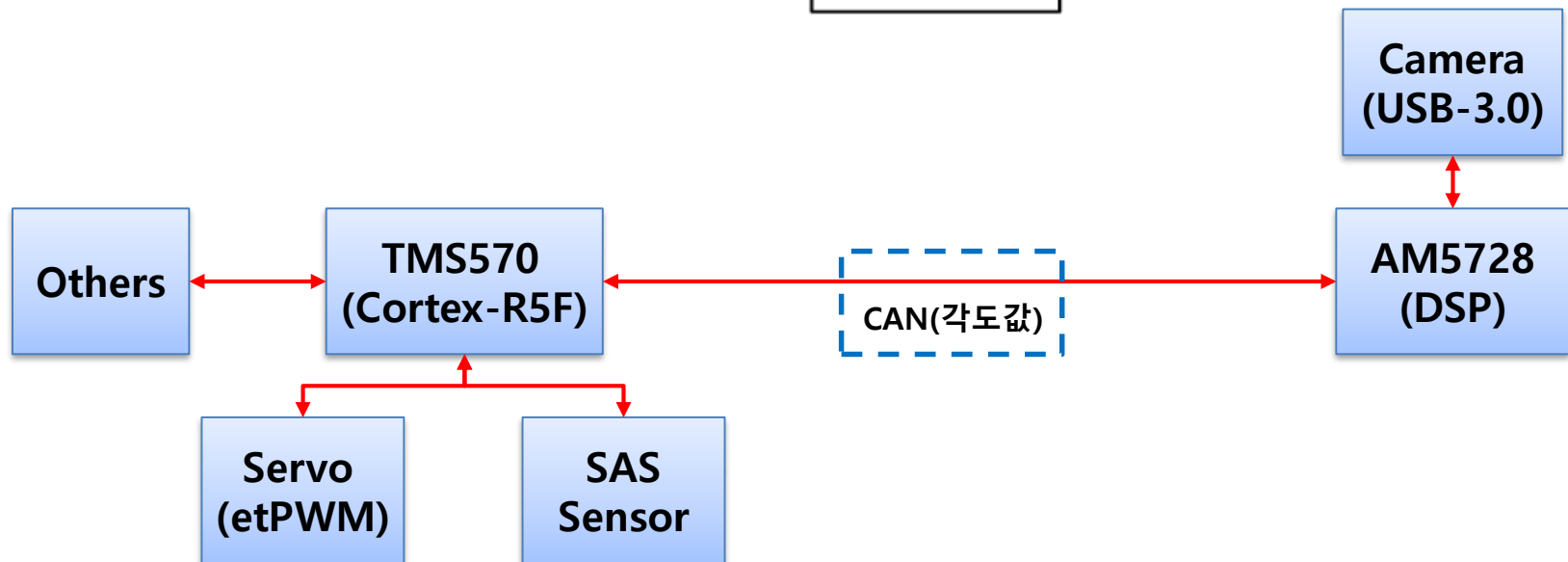
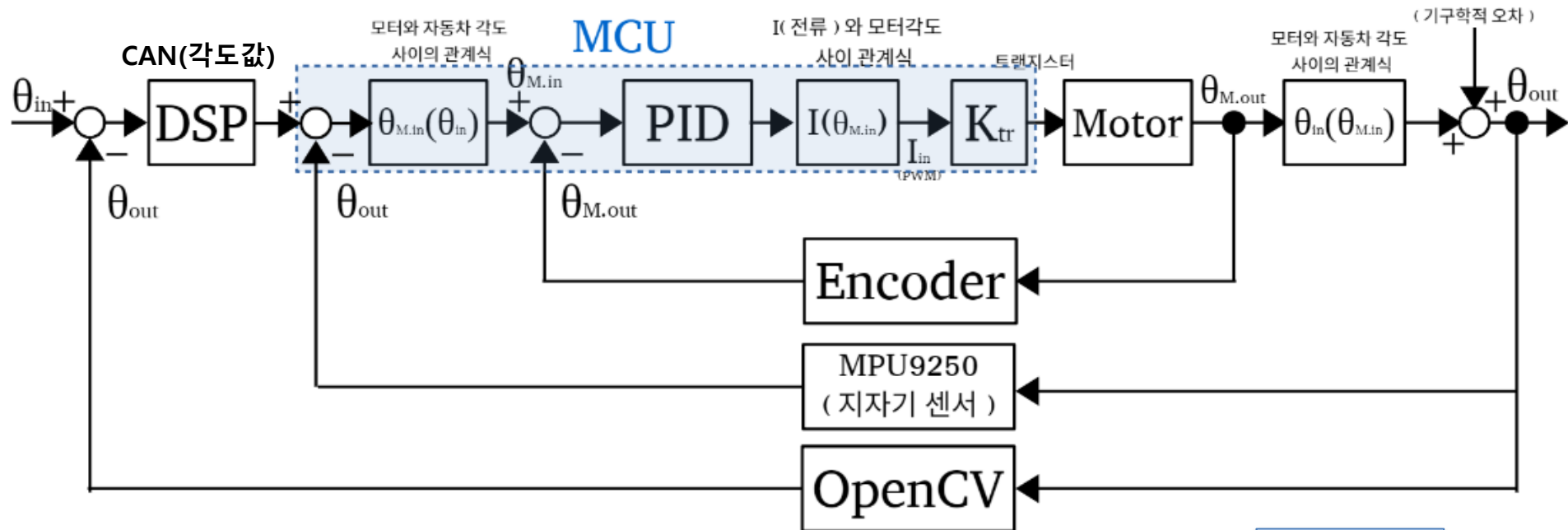
Android  
(Linux)

FPGA 파트  
Linux Kernel  
Device Driver  
제어 공학  
레이더 신호 처리

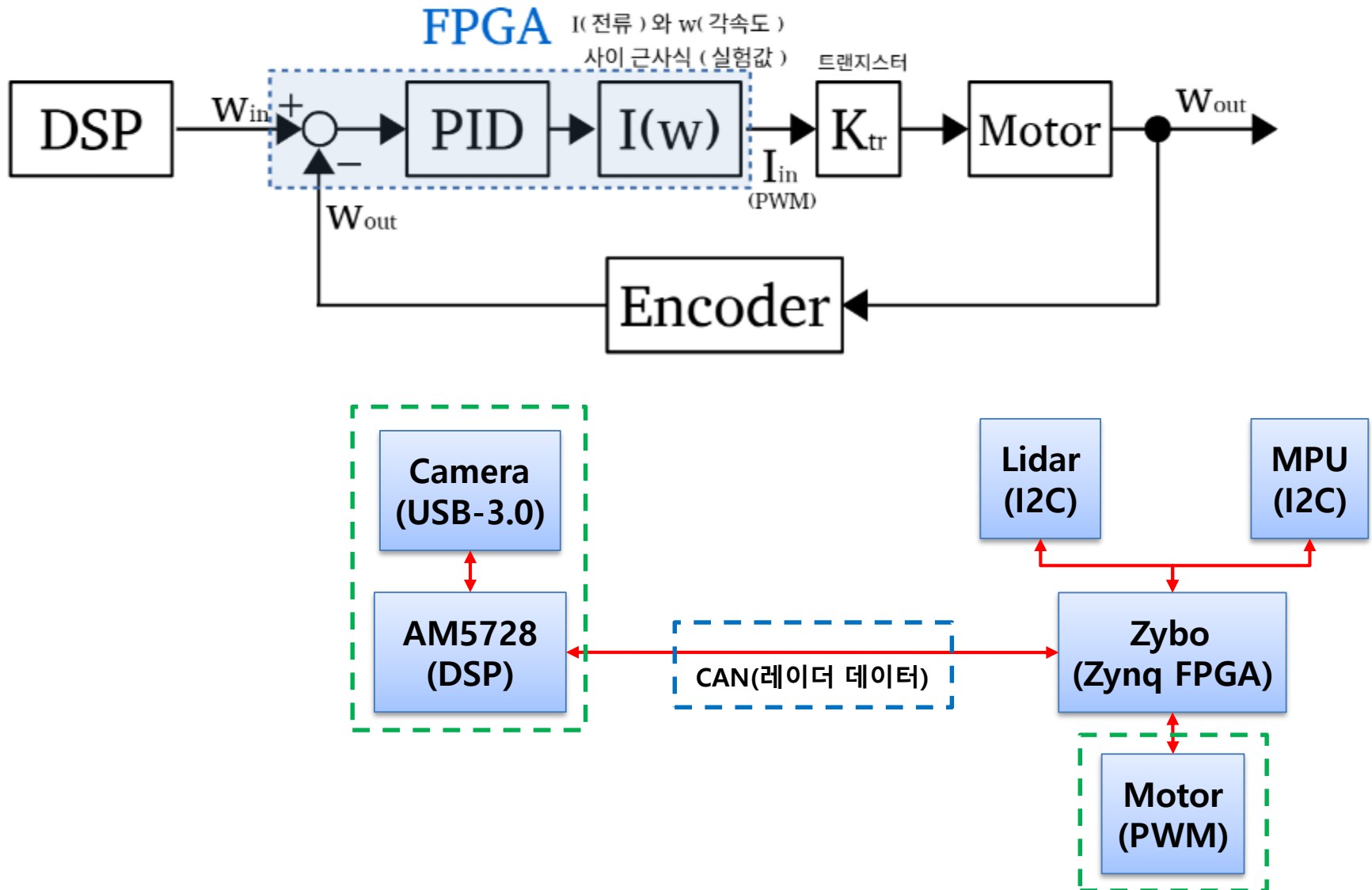
# 자동차 속도 PID 제어



## 자동차 조향 PID 제어



# 라이다 모터 PID 제어





Left curvature: 200.6 m.  
Right curvature: 147.5 m.  
Off the center: -0.2 m.

Left -> Right RANSAC + L2 regr.  
Inliers: 9365 | 11527  
Curvatures: 1.68 | 1.52  
W1: [-0.12374024 0.07627225 0.30087566]  
W2: [0.18232602 0.28597617 0.37917155]

Right -> Left RANSAC + L2 regr.  
Inliers: 9388 | 11521  
Curvatures: 1.71 | 1.59  
W1: [-0.12457982 0.08085257 0.2947036]  
W2: [0.18104008 0.29381061 0.35702777]

RGB gradients mask

HSV gradients mask

Previous frame + L2 regr.  
Inliers: 9279 | 8898  
Curvatures: 1.69 | 1.26  
W1: [-0.12146328 0.07708663 0.29763752]  
W2: [0.18000598 0.22062087 0.4254041]



Left Camera Image



Center Camera Image



Right Camera Image

