**Engine Control Unit (ECU)**

- **MAP-based synchronization**
  - Variable pressure drops during engine speed

**Exhaust System**

- Custom titanium muffler
  - The team designed a titanium muffler to reduce the muffler weight from 2.5 kg to 1.3 kg and also allowing for custom parts to attach the muffler to the vehicle

**Intake System**

- **Throttle Asm Comparison**
  - Throttle vs. Engine Speed

**Piston Replacement**

- **Main Goal:** Increasing the compression ratio by exchanging the engine piston
- **Reason for replacement:**
  1. Replacing the engine piston will not hurt the engine reliability
  2. Increasing the compression ratio will improve the engine performance
- **Advantages of the new piston:**
  - Lower compression
  - The geometry of the new piston is different from the old piston, it reduces the TDC volume
  - Theoretical potential 9% more power in cylinder

**CCLS - Controlled Clutch Launching System**

- **Design advantages:**
  - Smart launching: reduces acceleration time
  - Quick revving: maintains high rpm and torque while tuning and braking
  - Light weight: increases power to weight ratio
  - Prevents downshifting high rpm "Jumps" - synchronization with the ECU
  - Utilizing existing power source: battery and engine charging system
  - Allows manual operation for safety purposes: integrative handle

**EGRK - Electric Gear Shifting System**

- **Design advantages:**
  - Fast gear shifting - almost 1.5 times improves performance
  - Light weight - increases power to weight ratio
  - No edited controller is needed - using main engine computer
  - No existing power sources: battery and engine charging system
  - High durability: engine mounting decreases differential impacts

**Specifications**

- Motor: Faulhaber 3557 DCC
- Weight: 120 kg

**Drivetrain**

- **Design:**
  - Final drive ratio: 3.772
  - Rear axle Mono braking
  - Drier limited slip differential
  - Drilled drive shafts for weight reduction
  - Custom design:
    - Titanium brackets
    - Al-7075 sprocket with spline adapter
    - S110 steel brake discs
- **Design advantages:**
  - Reduced unsprung mass - improves car performance
  - Less power/weight - limited slip differential increases in the 1st gear moment
  - Light weight - increases power to weight ratio