The Dakar is one of the most important off-road cross country race. However manufacturer tends to develop strong and reliable cars more than technologically advanced car. The challenge for this GDP is to fill this gap by designing an electric off-road vehicle. EV-Raid took the challenge through a no compromises approach in terms of performance. The goal of the EVR01 is clearly to win stages and rallies.

### Chassis
- Structure material: Alloy 4130
- Total weight: 155kg
- Tested on quasi-static analysis
- Battery integrated with chassis for packaging reasons and structural integrity
- Full FEA Rollover simulation at 60km/h and roll rate of 150degrees/s
- Low head injury risk (HIC = 177)

### Vehicle Dynamics
- Total mass in racing condition: 1800kg
- Unsprung mass: 51kg
- COG height: 400mm
- Weight repartition on rear axle: 52%
- 2 dampers per wheel
- DOE method and sensitivity analysis used for double wishbone suspension design
- Torque vectoring enhanced handling performance

### Aerodynamics
- Balance = 55% on the rear
- Efficiency = 1.42
- SCd = 1.55
- SCI = -2.2

### Summary
- Power: 1000 kW
- Dry weight: 1500 kg
- Top speed: 235 km/h
- 0 to 100km/h: 4.087s
- Total stage time: 2:55:22
- Pikes Peak Hill Climb: 9:32.6 (Slick tires)

### Powertrain
- Distributed drive 4 EMRAX 348 motors 2.5 reduction ratio
- 1000kW Drive power + Torque vectoring
- 2450Nm torque at wheel
- 37.4% Energy recovery on tarmac stage
- 102kWh Battery capacity

### Energy storage compartment
- Battery Case adds stiffness to the chassis
- Holds 3990 battery cells
- Resists a 35km/h impact with crash structures on all sides.

### Cooling
- 2 water cooling packages for the front and rear motors and inverters
- 1 heat pump + water cooling package for the battery pack

### Lap time simulations
- IPG-Carmaker + Matlab/Simulink joint visualized full stage simulation
- PAC2002(Magic formula) tire modeling for 3 stages
- Thevenin & Bernardi battery electric and thermal modeling
- Pikes Peak International Hill Climb event simulation

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