Vehicle Instrument Panel Design for Cooperative Driving

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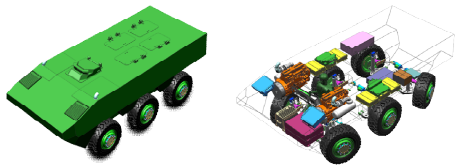
Overview

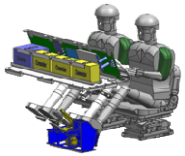
- **the design of an instrument panel for a 6 x 6 hybrid combat vehicle** that features six in-wheel motors and six independent steering actuators, and whose wheel drive and steering are independently operable.

- **Inspired by an aircraft cockpit** designed for co-operation between the captain and the first officer and military systems operated by multiple people.

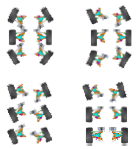
- **Supports cooperative driving**, where the driver focuses on driving and **the assistant is no longer a passive passenger** but monitors the details of the vehicle.



Vehicle exterior and interior 3D models



Vehicle Cockput 3D model



Pivot, Antiphase, Evasion, Ackermann Steerings

Interface Design

Control Panel spans the dashboards of both the driver and the assistant, the command buttons and display panels are divided into different functions for their roles.

Driving Display
to reduce cognition burden, shows only essential information to **the Driver**.

Driving-state screen
A Detailed version of driving display for **the assistant.**

Fault-state screen
crucial to the safe and flexible handling of an emergency situation.

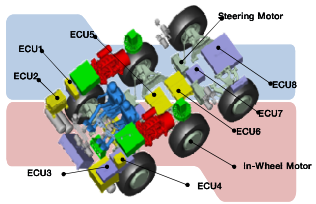
Power-state screen
Allows the assistant to diagnose any operational abnormalities in the system

System Architecture

- enables **collection of extensive self-report status information**.

- consists of **8 electronic control units** connected through a controller area network.

- each unit is an embedded system and **reports its operating condition** and runs diagnostic logic to detect the **fault status**.



Embedded system architecture

3-layered approach for fault detection and tolerance