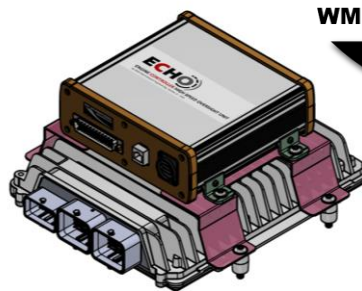




ENGINE CONTROLLER HIGH SPEED OVERSIGHT UNIT

By WM International Engineering, Darien, IL - USA



WM INTERNATIONAL
Engineering

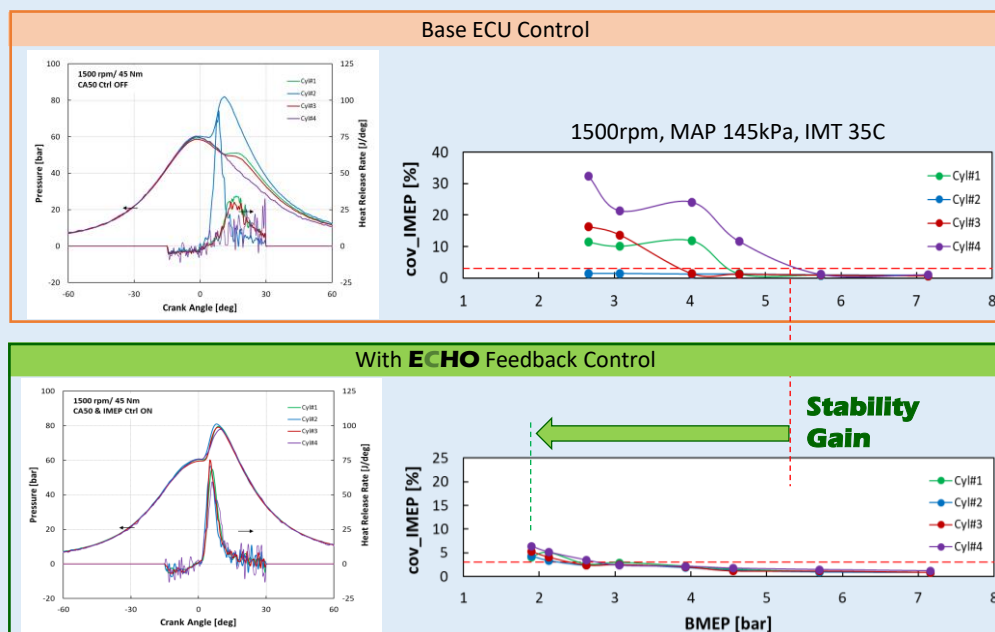
HIGHLIGHT STORY

HYUNDAI-KIA America is developing next-generation multi-mode GCI engine. The project is sponsored by the Department of Energy's Vehicle Technology Office and partnered with major Tier I suppliers. With preliminary test result, the project has demonstrated the potential to achieve 15% improvement in vehicle fuel economy with advanced multi-mode (SI+GCI) combustion system with E10 gasoline.

WM International's **ECHO** is a key enabler for the advanced engine control strategy used in the project. For example, one critical problem ECHO solved is under part-load dilute conditions, cylinder-cylinder variations causes GCI to misfire. After each firing event, **ECHO** analyzes cylinder pressure and sends combustion phasing and IMEP to the engine ECU in real-time. Then the ECU can correct spark and injection timing to achieve optimal combustion and stability.



ECHO improves control stability and extends low-load GCI operating range.



ECHO CAPABILITIES

1 Acquire

- Synchronous **high-speed sampling** up to 200kHz
- 8 analog inputs, 4 digital I/Os, 1 pair of crank and cam inputs

2 Process

- Powerful 1.5GHz processor resolve data in crank angle domain
- Perform **real-time analysis** with customizable algorithm

3 Communicate

- Provide **cycle-to-cycle feedback** to engine ECU via CAN 2.0
- Send live data via the gigabit ethernet port to PC software

4 Optimize

- Cylinder pressure feedback control
- Engine calibration fine-tuning
- Fuel injection analysis