Technical Highlights for October 2011

Air Handling System Upgraded on the Oak Ridge National Laboratory's (ORNL's) Flexible Single-Cylinder Engine with Hydraulic Valve Actuation (HVA)

The air handling system has been upgraded on ORNL's flexible single cylinder research engine. The upgrade now allows the engine to be operated with simulated boost, backpressure, cooled external exhaust gas regeneration (EGR) and improved thermal management. This engine is equipped with a Sturman HVA valve train, direct fuel injection as well as port fuel injection. Combined, these capabilities make it a truly unique, flexible, and powerful research tool. In a naturally-aspirated configuration, this engine has previously been used for advanced combustion work (homogeneous charge compression ignition (HCCI) as well as stoichiometric spark-assisted HCCI) and optimization of engine operation for ethanol fuel blends. The upgraded air handling system will allow research to be conducted to expand the high load limits of advanced combustion and for research into pre-ignition phenomena boosted SI conditions (e.g. superknock).

FEERC has Strong Presence at the Annual DOE Conference on Engine Efficiency and Emissions

The Directions in Engine-Efficiency and Emissions (DEER) Conference is a well-known meeting organized each year by DOE's Vehicle Technologies Program. FEERC was well represented this year and led eight podium presentations and nine poster presentations. FEERC personnel also co-chaired five technical sessions at the request of DOE and partnered on numerous other podium and poster presentations. This participation far exceeds that of any other single organization and the combined sum of the presentations offered by all of the other DOE national laboratories. The strong showing by ORNL demonstrates the importance and visibility of the FEERC research portfolio to DOE sponsors in the Vehicle Technologies Program and relevance to the technical issues facing the transportation industry as a whole.

FEERC Participates in Invitation only U.S. DRIVE All Tech Team Meeting

Robert Wagner participated in the U.S. DRIVE All Tech Team meeting and served as a planner for a breakout session on benchmarking. This meeting is held once every couple of years and is described by the Partnership as the only meeting that brings together the entire Partnership and provides a unique and important opportunity for sharing priorities, challenges, and best practices across all 12 tech teams and for discussing cross-team collaborations to overcome barriers and improve Partnership function. Participation also included many other ORNL technical staff and leadership.

FEERC Travels with DOE Sponsors to Meet with European Operations of GM and Ford Motor Company

Robert Wagner traveled with Gurpreet Singh (DOE team lead for Advanced Combustion Engines R&D), Ken Howden (DOE team lead for 21st Century Truck Partnership), and Paul Miles (Sandia lead for light-duty combustion research) to Europe to meet with GM and Ford Motor Company. The objectives of this trip were (1) to increase our understanding of the impact of world market and regulatory pressures on combustion and aftertreatment research priorities, (2) to determine how DOE can help Ford and GM to address technology barriers, and (3) to review combustion and fuels technologies and approaches being pursued by manufacturers in global markets to understand impact on future U.S. product. The team visited the GM Europe Powertrain facilities in Turin, Italy and Russelsheim, Germany as well as Ford R&D in Aachen, Germany. The European teams showed a significant interest in FEERC capabilities with a specific interest in neutron imaging, low speed pre-ignition prediction/avoidance, and particulate characterization from modern gasoline engines.

FEERC Researchers Present Four Papers at the American Society of Mechanical Engineers (ASME) Internal Combustion Engine Division Fall Technical Conference

Four FEERC researchers presented papers at the ASME 2011 Internal Combustion Engine Division Fall Technical Conference held outside of the West Virginia University in Morgantown, West Virginia on October 2–5, 2011. Around 100 technical papers were presented and there were approximately 215 registered attendees. Each of the FEERC papers was summarized in an article about the conference from the online diesel emissions news site, DieselNet. FEERC researchers helped chair multiple sessions across a wide range of topic areas and will also be involved in the planning of the 2012 conference.

ORNL Research shows Green House Gas (GHG) Reduction Potential of Combined Heat and Power (CHP) at the CHP Conference (CHPCon2011)

FEERC researcher Scott Curran took part of a plenary session at the CHPCon2011 in Houston, Texas on October 18, 2011. The plenary session was on the topic of future drivers of CHP in the U.S. in which Mr. Curran presented an overview of GHG emissions from CHP systems and results of recent analysis completed at ORNL showing the GHG reduction from certain prime movers with CHP.

FEERC Staff Gives Seminar at the University of Texas, Department of Mechanical Engineering

Andreas Malikopoulos was invited to give a seminar in the Department of Mechanical Engineering at the University of Texas in Austin entitled, "Stochastic Control and Optimization for Eco-Driving Feedback Technologies," October 23–25, 2011. In the talk, ongoing research on intelligent control was presented that aims to increase the efficiency of advanced propulsions systems. Optimization methods that can be employed to provide feedback to the driver with real-time visual and hearing instructions with the aim to turn his/her driving style to be fuel efficient and environmentally friendly were also discussed.