

# High-Efficiency Engine Technologies

A Natural Gas, High Compression Ratio,

High Efficiency, ICRE

John W. Fitzgerald, President ETTI

The **OTTO 3G™** Engine R&D

Dr. S. Scott Goldsborough,

Modeling & analysis

*Realizing The Full Potential Of Natural Gas  
As A Vehicular Fuel*

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Poster 07 location

# DEER 2011, P - 07, ETTI - The OTTO 3G™ 1.6L prototype engine

1.6L FP-FS ENGINE

100KW TURBO-COMPOUNDED

2.5 IN. BORE, 5.0 IN. STROKE

ILLUSTRATED AT MID STROKE

MECHANICAL RECTIFIER OUTPUT  
HYDRAULIC COUPLED GEV CAM  
WET CYLINDER SLEEVE (DARTON)  
ETTI RINGPACK  
FEDERAL-MOGUL STYLE  
SQUEEZE FILM BEARINGS  
(PISTON, ROD & PIVOT SHAFT)

US PATENT 7,258,086  
AU PATENT 2006216721  
Additional Foreign Patents Pending on 7,258,086  
Other Patents Pending On Various Features

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NOTE:  
ELECTRICALLY DRIVEN EXTERNAL  
LUBRICATION AND COOLANT PUMPS

