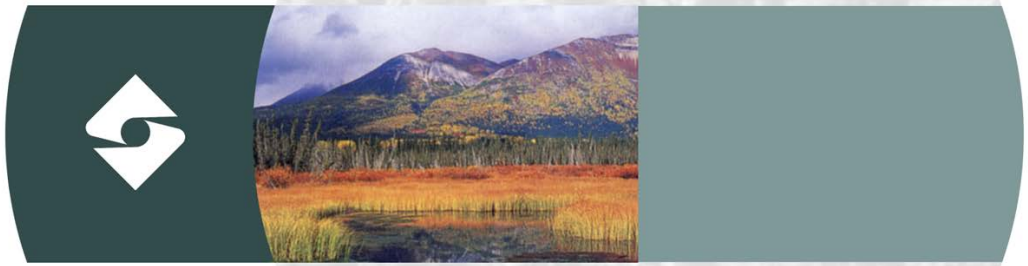
Enabling Efficient Engine Control



Presented to

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October 1, 2012

Eddie Sturman

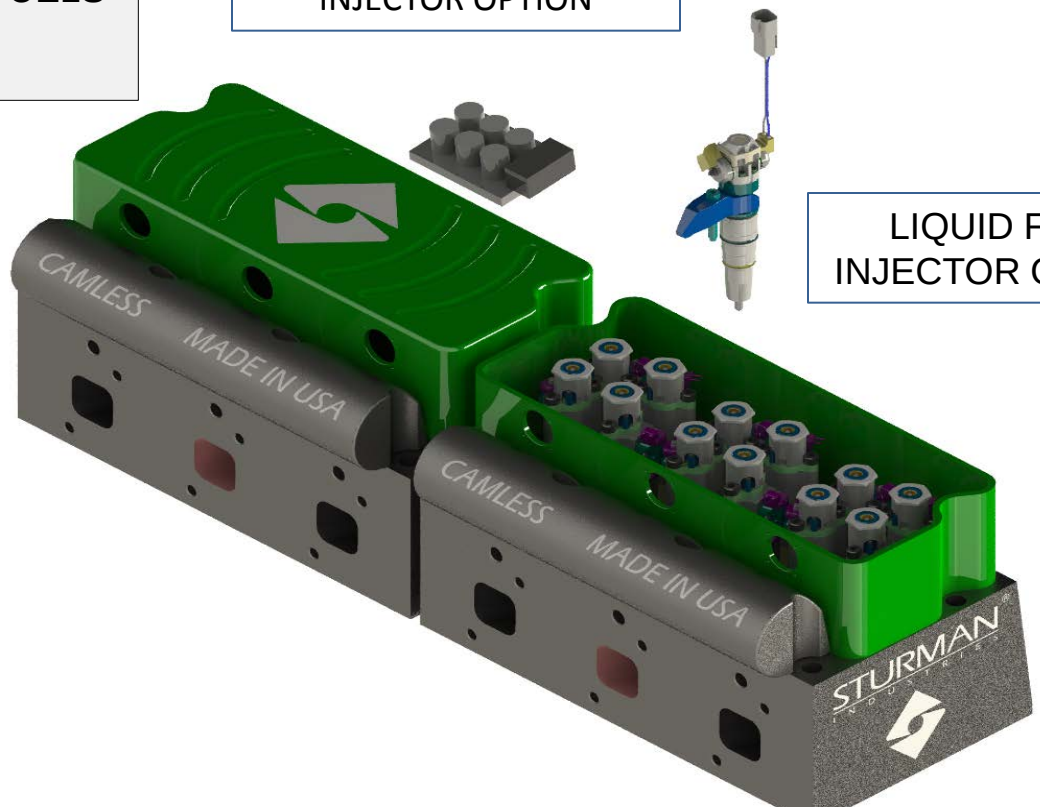
Sturman Industries

"Leading the mechanical world into the Digital Age"

STURMAN ‘ACE” AIR CONTROLED ENGINE

- ✓ OPTIMALLY EFFICIENT ENGINE COMBUSITON SYSTEM
- ✓ USES LIQUID OR GASEOUS FUELS

NH3 & NATURAL GAS INJECTOR OPTION



LIQUID FUEL INJECTOR OPTION

Engine Controller

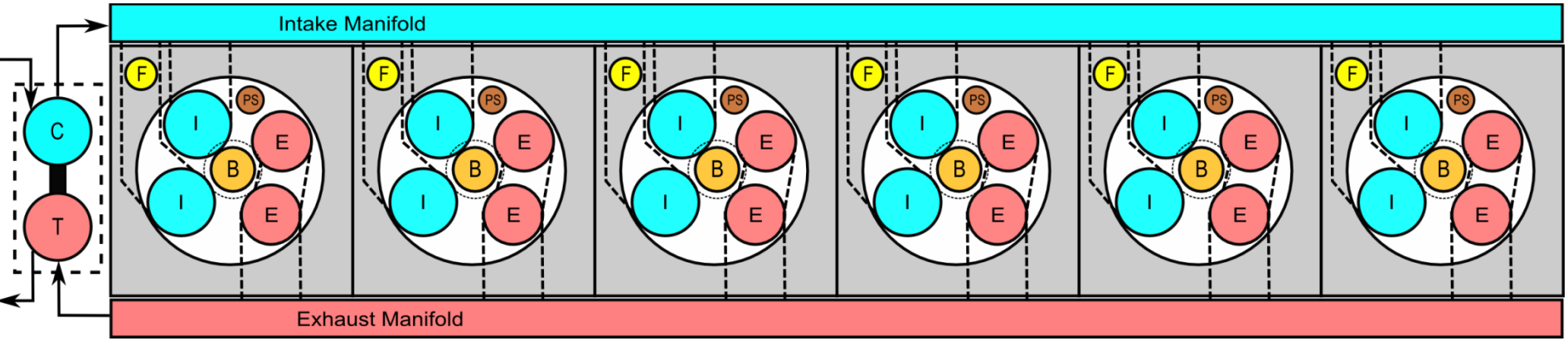
Sturman Solution: Air Controlled Engine (A.C.E)

(Only one of the various versions is shown below)

- Reduce Fuel Consumption
- Increase torque, power
- Downsize
- Increase range
- Environmentally clean (no EGR/SCR needed)
- For mobile and stationary
- Economical
- Concepts with Air Hybrid available

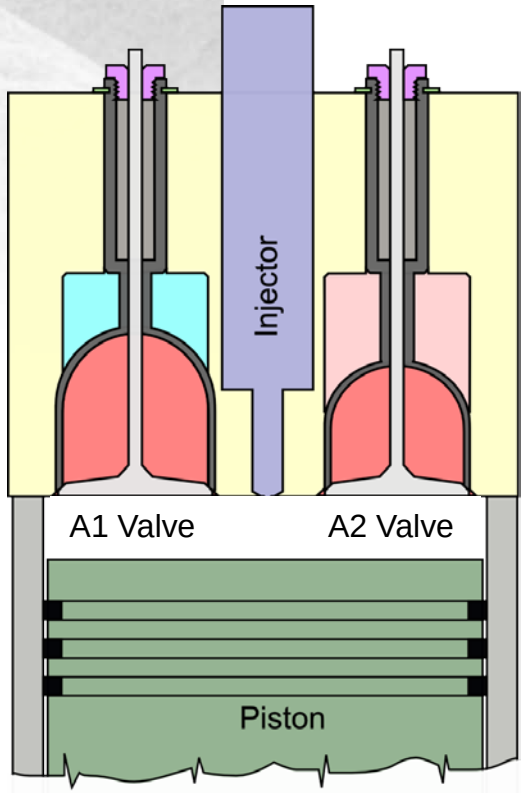
- All Fuels
- Compression ignition / H.C.C.I.
- Camless Hydraulic Valve Actuation
- Infinitely variable effective compression ratio
- Closed Loop Combustion Control
- Modify existing head or new head
- Efficient flexible multi-cycle

C: compressor, T: turbine, I: intake valve, E: exhaust valve, B: Bell valve, PS: press. sensor, F: Fuel fumigation



Work of Sturman Advanced Products Group

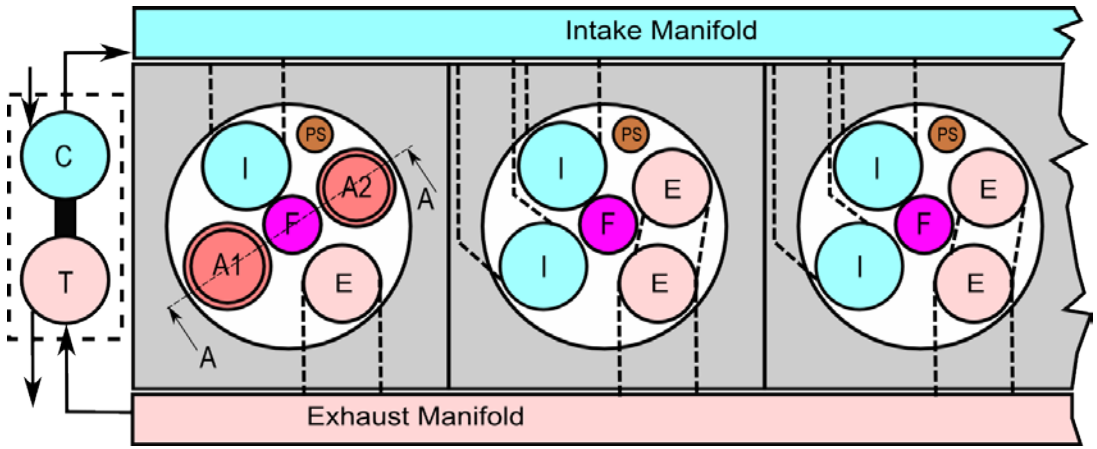
Currently Tested Single Cylinder ACE Configuration



Section A-A

- One of six cylinders of baseline engine converted to ACE cylinder
- One intake valve in ACE cylinder converted to sealed volume called ‘intake bell volume’ sealed with ‘intake bell valve’ or ‘A1 valve’
- One exhaust valve in ACE cylinder converted to sealed volume called ‘exhaust bell volume’ sealed with ‘intake bell valve’ or ‘A2 valve’
- Infinitely variable valve timing on ACE cylinder with HVA
- Diesel fuel injector kept in original bore

ACE Cylinder Head



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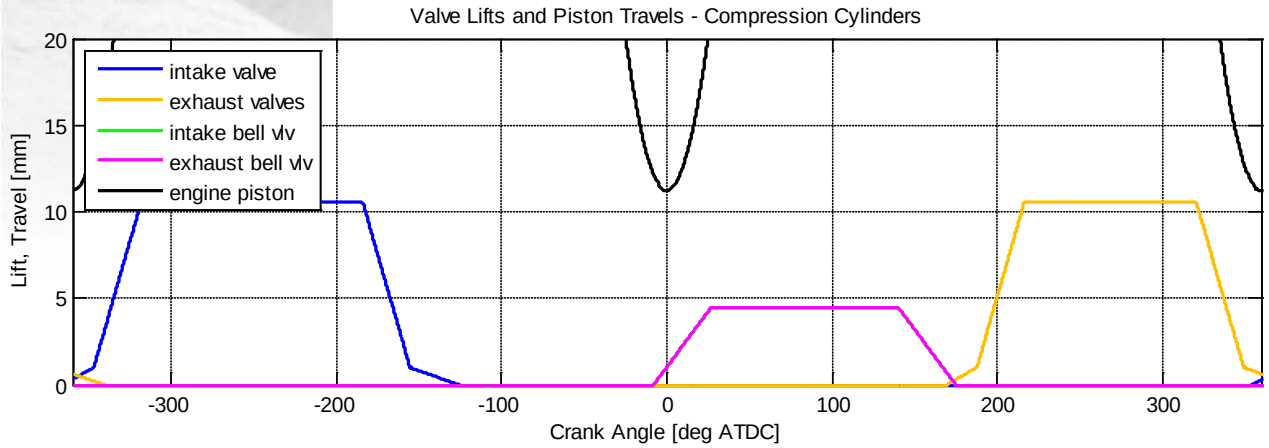
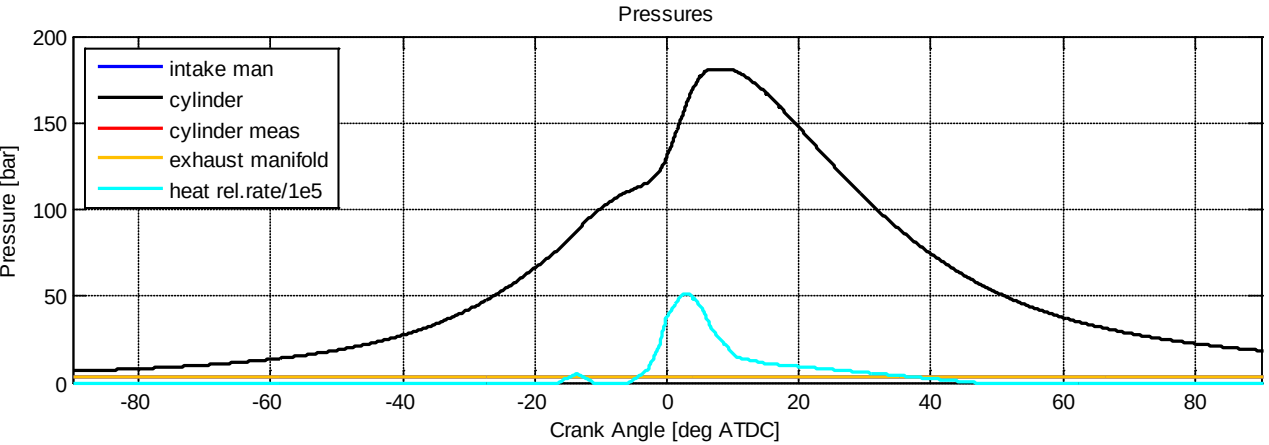
Simulation of ACE, high load

Use the heat release trace determined for Test Point #270





- Baseline compr. ratio = 13.4
- IMEP = 21.4 Bar
- Indicated Efficiency = 44.5 %
- Peak Cyl. Pressure = 177 Bar
- Peak Cyl. Tempr. = 1715 K
- Excess air ratio (Lambda) = 2.5
- Load is limited by Lambda
- Lambda is limited by turbocharger

Work of Sturman Advanced Products Group

Thank You

Thank you for your attention

For additional information of please contact

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