

2012 Clarkson University Winter Knights



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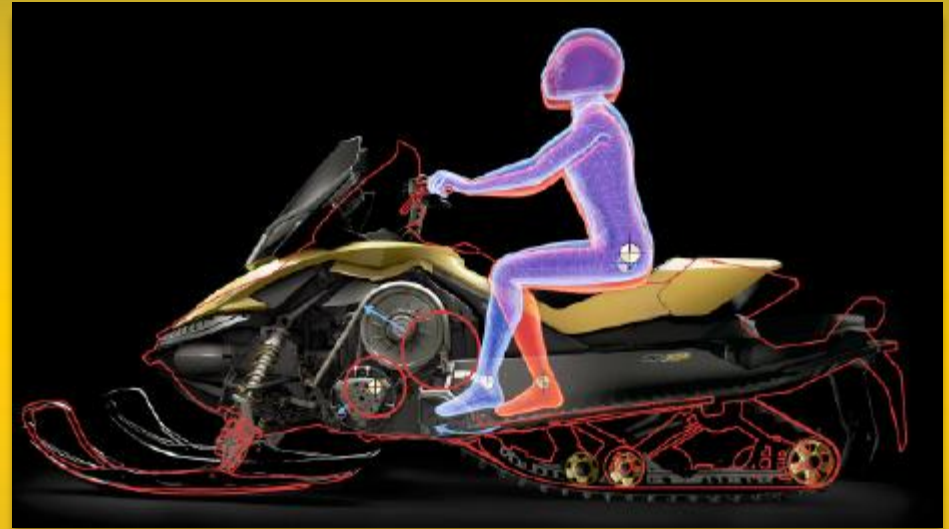
Design Intent

- Continue work with the benchmark in the industry to further reduce the environmental impact of snowmobiles
- Use simple, yet cost effective methods to improve on snowmobiles
- Automatic adjustment to varying fuels from E0 to E40
- Further reduce hazardous emissions and noise pollution
- Improve stock handling characteristics



2011 Ski Doo MXZ Sport 600ACE

- Industry leading fuel economy
- Light weight Rev XP Chassis
- Innovative 600 ACE four-stroke engine
- Efficient eDrive Clutch
- Desirable riding ergonomics



Red – Old Rev Platform

Blue – New Rev X Platform



Design Approach

- Environmental Impact

- Noise
 - Sound Absorbing Foam
- Pollutants
 - 3-Way Catalyst

- Efficiency Impact

- Custom Fuel Controller & map

- User Impact

- Automatic Ethanol Content Adjustment
- Improved Handling Ability
- Simple OEM Controls
- Mechanical Reverse
- Competitive MSRP

- Dealer Impact

- Attractive Graphics
- Customer Value
- Low Maintenance



Engine Control



- Prototype Power Commander V ignition and fuel control unit & wideband II

- Closed Loop with single Wideband O2 Sensor
- Target Lambda Table
- Analog Input



-Delphi Flex Fuel Sensor & Zeitronix Ethanol Content Analyzer

- 0 – 5 V input to PCV
- Digital Readout



Engine Calibration



- Land & Sea DYNomite engine dynamometer
- Closed loop fuel trimming



- Over 300 miles of Trail & Lake testing

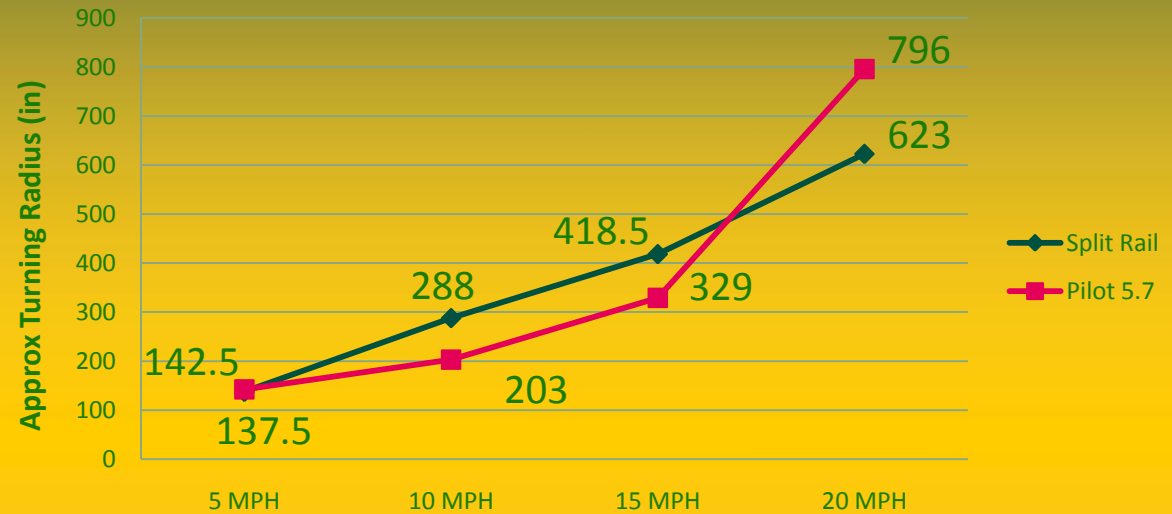


Split Rail Ski Testing

Turning Radius Test Results

- Efficiency tests

- Turning radius tests



- Trail testing with different riders – Darting, Improved handling characteristics



Catalyst Integration

- Custom 2-1 pipes
- Fiberglass heat wrapping
- 3-Way Catalyst by EMITEC & Aristo
- Aged over 200 miles under real riding conditions



Conversion Items



Power Commander V
& Wideband II



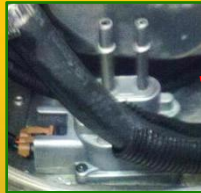
Zeitronix Ethanol Display



Integrated Catalyst



Flex Fuel Sensor



Custom 2-1 Exhaust



Split Rail Ski



Stock 2011 MXZ Sport



Marketability

- Reliable Ski-Doo brand
- Easy to use OEM controls and Gages
- MSRP \$10,680
- Low maintenance 4-Stroke Engine
- Low Noise Pollution ~71 dba
- Average MPG > 20
- Lightweight < 480 lbs (dry weight)
- Flexible Fuel System with purpose built maps
- Electric Start
- Attractive appearance with Wrap Kit



Thank You!

