MISSION STATEMENT
“Bringing Sidecar racing into the modern era by utilising Hybrid technology and providing audiences with a new and exciting spectacle”.

INTERNAL COMBUSTION ENGINE & TRANSMISSION
- 400cc twin cylinder engine
- Liquid phase injection LPG system
- Max power output: 60kW at 14000rpm
- Operating range: 9700-14000rpm
- Helmholtz Exhaust Resonator concept
- 2WD architecture with limited slip differential

FALCON CONCEPT
- Point mass model based on fully simulated GGV diagrams generated by yawing test
- Tyre induce drag, load transfers, passenger movement embedded
- Polynomial fitted tyre model with load sensitivity
- Automatically optimised vehicle geometry and CoG location

DRIVER AND PASSENGER POSITION
- “Seated” driving position
 ➢ CoG lowered by 13mm and lap time reduced by 0.265s
- Passenger leaning behind the rear wheel
 ➢ CoG lowered by 11mm and lap time reduced by 0.176s

CHASSIS
- Material: AISI 4130 Chromoly Steel
- Base Structure: Tubular
- Mass: 37.5kg
- Optimised for torsional stiffness
- Engine stressed frame to improve the stiffness of the chassis

AERODYNAMICS
- C_D: 0.342
- C_L: 0.013
- L/D: 0.096
- Frontal area: 0.824m²
- Active drag reduction system:
 ➢ Stalling the diffuser, reducing C_D by 12%

HYBRID POWERTRAIN
- Power directly transmitted from electric motor through ICE gearbox
- Regenerative braking system
- 8kg battery reduction by regenerative traction control

LAP TIME SIMULATOR
- ECU: PI Innovavo 220
- Simulink based platform
- Combined control of ICE and hybrid
- Electric:
 ➢ UV supply through DC/DC converter to enhance weight reduction

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Vehicle Specification

<table>
<thead>
<tr>
<th>Laptime Cadwell Park</th>
<th>Current F2 Sidecar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time (s)</td>
<td>Time (s)</td>
</tr>
<tr>
<td>1:30:0</td>
<td>1:30:3</td>
</tr>
<tr>
<td>Top speed (km/h)</td>
<td>Top speed (km/h)</td>
</tr>
<tr>
<td>375</td>
<td>375</td>
</tr>
<tr>
<td>Total mass (kg)</td>
<td>Total mass (kg)</td>
</tr>
<tr>
<td>210</td>
<td>210</td>
</tr>
<tr>
<td>Total power (kW)</td>
<td>Total power (kW)</td>
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<tr>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>95</td>
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</tr>
</tbody>
</table>

Why ride it when you can drive it?

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