**Executive Summary of AirDensityDrive: F1 Power & Top-Speed Analysis**

**Aim**

Demonstrate the impact of air density on engine power output, drag force and top speed for a Formula 1 vehicle for current and upcoming regulations.

**Scope**

All 24 tracks from F1 calendar

Ambient conditions at each track

Engine model: Choked air flow conditons

Drag & Rolling-Resistance Physics

**Methodology**

1. Data Collection: Elevation & Average track temperature per circuit
2. Density & Flow Model: Barometric formula + choked flow assumption
3. Power Calculation: ICE LHV x eta combustion +MGU-K contribution
4. Top Speed Solver: Numerical root-finding(fzero) to balance Pdrag + Prr = Ptotal
5. Validation: Comparison with FIA speed data (not all data was available)

**Key Preliminary Results**

Circuit vs power, speed

Plots

Discrepancies between real world and simulation data

**Next Steps**

Conducting a more comprehensive validation by obtaining entrance speed to straight, straight-line distance.

**Conclusion**

Initial model forecasts a consistent top‑speed uplift under 2026 regs. Full validation pending real data; however, insights will inform aerodynamic setup and MGU‑K calibration strategies.