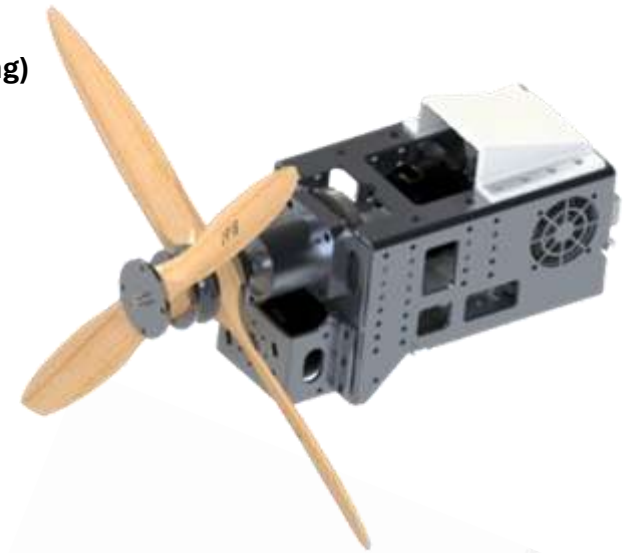
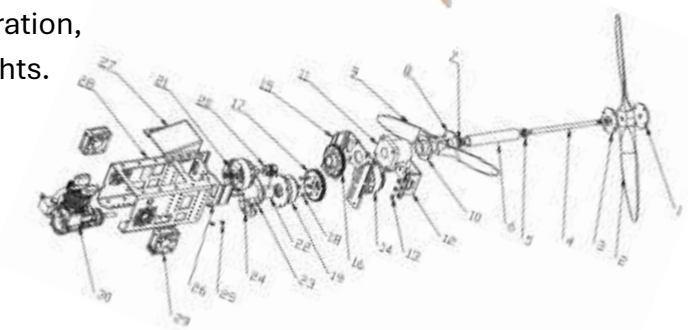
Hybrid Engine for Drone and UAV

Inventor: Majid Hazeri | Patent: WO2023084297A1
Status: UK Global Talent Visa Holder (Endorsed by RAEng)
Supported By: GEP Innovation Ltd.



System Overview:
A patented hybrid propulsion system designed for UAVs and scalable to light aircraft.

The engine integrates:
1 four-stroke fuel engine (Saito FG30, 2.5 hp)
2 electric motors (T-Motor U7 KV490, 1.75 hp each)
Contra-rotating coaxial propellers (CW + CCW)
This configuration enables hybrid or full-electric operation, with triple redundancy for safer and more flexible flights.



Technical Specifications:
Total Power: ~4.3–5 hp (hybrid mode)
Thrust: 10–12 kg (with contra-rotating gain of 6–16%)
Torque: ~3 N·m
Weight: ~2.4 kg
Fuel Consumption: ~1.2 L/hour (≈50% less than 60cc 2-stroke engines)
Electric Consumption: ~800 W/hour
Operating Altitude: Up to 5000 m
Flight Modes: Hybrid / Electric-only

Key Advantages

- ✓ Efficiency: Contra-rotating propellers recover rotational energy, boosting thrust.
- ✓ Torque Balance: Opposite rotation cancels torque, improving control & reducing vibration.
- ✓ Reliability: Triple redundancy (fuel + dual electric motors).
- ✓ Flexibility: Operates in hybrid or silent electric-only mode.
- ✓ Eco-Friendly: ~50% lower emissions than conventional small aircraft engines.
- ✓ Scalability: Architecture adaptable for larger platforms (e.g., Cessna 172).
- ✓ Comparison with Conventional 2-Stroke Engines (DLE 60cc)
- ✓ Fuel use reduced by ~40–60%
- ✓ Lower emissions & noise
- ✓ Higher efficiency at altitude (≤5000 m)
- ✓ Reduced vibration & longer component life

Future plans:
2026: Complete prototype & UAV flight validation.
2026–27: Small-batch production and wider UAV applications.
Beyond 2027: Scale up design for light aircraft (e.g., Cessna 172 hybrid adaptation) with reduced emissions, balanced torque, and greater safety.