

# RAEN Rotor Module Patent, Good Boy

“Rotational-Array Electromagnetic Node (RAEN) Rotor Module”

Provisional Draft — Full Specification

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## Rotational-Array Electromagnetic Node Rotor Module for Field-Balanced Propulsion, Cooling, and Energy Transfer Systems

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### ABSTRACT

A modular electromagnetic rotor configured as a multi-coil, multi-axis field actuator forming the fundamental unit of a distributed field-balancing engine. The RAEN Rotor Module comprises a stator-integrated winding pattern, gradient-controlled phase drives, thermal extraction interfaces, and optional optical or analog-feedback layers. The module may operate individually or as part of a lattice array to generate thrust, directional force, cooling, sensing, or mixed-mode field projection. Embodiments include planar rotors, stacked rotors, spherical rotors, and ring-type “hover tile” systems.

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### BACKGROUND

Traditional motors rely on fixed electromagnetic sequences optimized for torque, not field shaping. Cooling is typically passive, control is CPU-dependent, and modules do not natively cooperate in multi-node arrays.

Emerging distributed propulsion, high-density cooling, and field-balancing systems require:

1. **Real-time analog field correction**
2. **Low-latency thermal extraction**
3. **Arrayability** — [https://github.com/aquachroma/Omega\\_SDK](https://github.com/aquachroma/Omega_SDK)
4. **Balanced, low-noise force output**
5. **Feedback channels independent from CPU load**

The RAEN Rotor Module solves these requirements by integrating coil geometry, thermal layers, and analog balancers into a unified substrate.

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## SUMMARY

The RAEN Rotor Module is defined by:

- **8-coil or N-coil winding geometry**, distributed radially or tri-axially
- **Gradient-addressable power inputs** (PIG-I/O style)
- **Optional optical/thermal/field feedback layers**
- **Peltier-assisted or analog-assisted cooling interfaces**
- **Modularity**: tiles, rings, rotors, spherical shells
- **Array coherence**: each module acts as a field node in a larger RAEN lattice

The module can be used for:

- Hover/propulsion
  - Directed cooling or convection
  - Vibration management
  - Field shaping
  - Display or data routing
  - Reactive sensing
  - Power conversion
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## DETAILED DESCRIPTION

### 1. Rotor Geometry

The RAEN Rotor Module comprises:

- A rotor plate or drum (rigid, flexible, or composite)

- A stator stack or integrated winding cavity
- 8 coils (baseline) or N coils arranged in symmetrical distribution
- Optional ferromagnetic or paramagnetic inserts

## Coil Arrangement

- 8-coil “compass rose” pattern
- 12-coil extended harmonic
- 16-coil high-resolution pattern
- Tri-coil or quad-coil minimal variants

## Key advantage

The rotor no longer behaves as a simple torque engine — it becomes a **field shaper**.

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## 2. Gradient-Driven Power Input (RAEN Drive Method)

The RAEN module uses a **programmable impedance gradient (PIG-I/O)** to drive each coil:

- A smooth ramp instead of binary on/off
  - Multiple coil-phase blends
  - Lower acoustic noise
  - Higher field fidelity
  - Optional harmonic cancellation
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## 3. Thermal Interfaces

Each rotor module includes **one or more** of:

- Peltier tiles on the stator wall
- Heat-pipe channels in the substrate
- Optical thermal conduits
- Analog-gesture thermal balancers
- RAEN-Unified Substrate thermal vias

**Purpose:** Keep the substrate temperature stable for high-Q field operation.

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## 4. Optical + Field Feedback Layer

Optional layer comprising:

- Photodiodes or photocell ring
- Low-latency analog summing pathways
- Optical “return-to-zero” balancer circuits
- Lensed or waveguided optical tunnels

This allows *field self-correction* without CPU load.

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## 5. Multi-Module Lattice Integration

Rotor modules can be:

- Stacked vertically
- Arrayed as a 2D tile field
- Wrapped around a cylinder
- Distributed as a spherical shell

Each module exchanges:

- Thermal state
- Field gradient
- Analog phase data
- Power harmonics

The lattice behaves like a **distributed field machine, with respect to resonance**.

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## 6. Operating Modes

### (a) Propulsion Mode

Coils are fired in a sweeping gradient, yielding:

- Vertical lift
- Lateral push
- Yaw/pitch/roll torque

### (b) Cooling / Convection Mode

Rotor patterns optimized for airflow and high-frequency oscillations.

### **(c) Field Display Mode**

Rotor outputs modulate light or EM flux; useful for screens, metasurfaces, and AR effects.

### **(d) Energy Collection Mode**

Reverse-bias operation extracts rotational or ambient field energy.

### **(e) Sensing / Mapping Mode**

Gradient sampling yields touchless pressure or thermal maps.

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## **CLAIMS (P3 — 40 Claims)**

### **1–10: Core Rotor Design**

1. A rotor module comprising a substrate, stator cavity, and N symmetrically arranged coils.
2. The module of claim 1 wherein  $N = 8$ .
3. The module of claim 1 wherein coils are gradient-addressable.
4. The module of claim 1 including thermal extraction vias.
5. The module of claim 1 using Peltier-coupled layers.
6. The module of claim 1 including optical feedback channels.
7. The module of claim 1 including analog field balancer circuits.
8. The module of claim 1 forming a planar, ring, or spherical geometry.
9. The module of claim 1 where coil phase blends are dynamically varied.
10. The module of claim 1 supporting reverse-bias energy collection.

### **11–20: Lattice and Field Integration**

11. A system comprising multiple rotor modules arranged in a lattice.
12. The lattice of claim 11 using shared field balancing.
13. The lattice of claim 11 using synchronized thermal states.
14. The lattice of claim 11 enabling thrust via coupled nodes.
15. The lattice of claim 11 forming a metasurface.
16. The lattice of claim 11 forming a propulsion field.
17. The lattice of claim 11 forming a cooling field.
18. The lattice of claim 11 enabling low-latency direction control.
19. The lattice of claim 11 with adaptive impedance movement.
20. The lattice of claim 11 with analog feedback summation.

## 21–30: Feedback and Sensing

21. A rotor module including photodiode feedback.
22. The module of claim 21 including optical tunnels.
23. The module of claim 21 including return-to-zero analog systems.
24. The module of claim 21 generating a holographic field map.
25. The module of claim 21 providing 3D thermal mapping.
26. The module of claim 21 sensing pressure without contact.
27. The module of claim 21 cooperating with lattice neighbors.
28. The module of claim 21 stabilizing field gradients.
29. The module of claim 21 correcting harmonic interference.
30. The module of claim 21 operating without a CPU.

## 31–40: Manufacturing, Embodiments, Power

31. A rotor module manufactured via additive printing.
  32. The rotor of claim 31 using PETG, ABS, nylon, or composite.
  33. The rotor of claim 31 including embedded conductors.
  34. The rotor of claim 31 including embedded optical fibers.
  35. A rotor module powered by PIG-I/O gradient method.
  36. The module of claim 35 including thermal-first modulation.
  37. The module of claim 35 including analog-phase shaping.
  38. A rotor module comprising two stacked rotor layers.
  39. A rotor module comprising three stacked rotor layers.
  40. A rotor module forming a full spherical shell.
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# FIGURE REFERENCES

- **FIG. 1** — 8-coil RAEN rotor
- **FIG. 2** — Stator cavity + gradient I/O
- **FIG. 3** — Thermal/Peltier layer
- **FIG. 4** — Optical/analog feedback layer
- **FIG. 5** — Rotor module cross-section
- **FIG. 6** — Two-module stack
- **FIG. 7** — Three-module stack
- **FIG. 8** — RAEN ring
- **FIG. 9** — RAEN hover tile
- **FIG.10** — Hexagonal rotor lattice
- **FIG.11** — Spherical RAEN shell
- **FIG.12** — RAEN full field engine integration