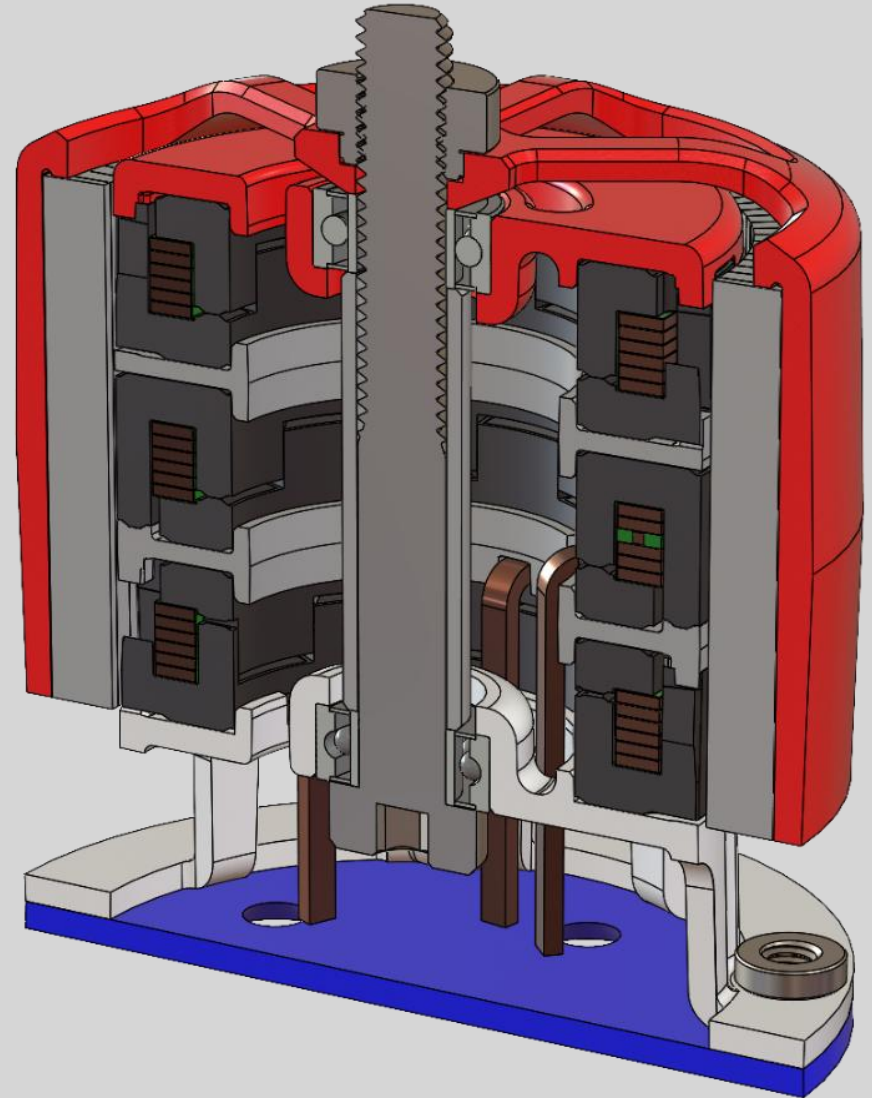




# Modal Motors

USA Made Motors Without The Need For Rare-Earth Magnets



# Born In Detroit To Take On The World!



## USA-Made Motors That Outperform Competitors At A Fraction Of Their Cost

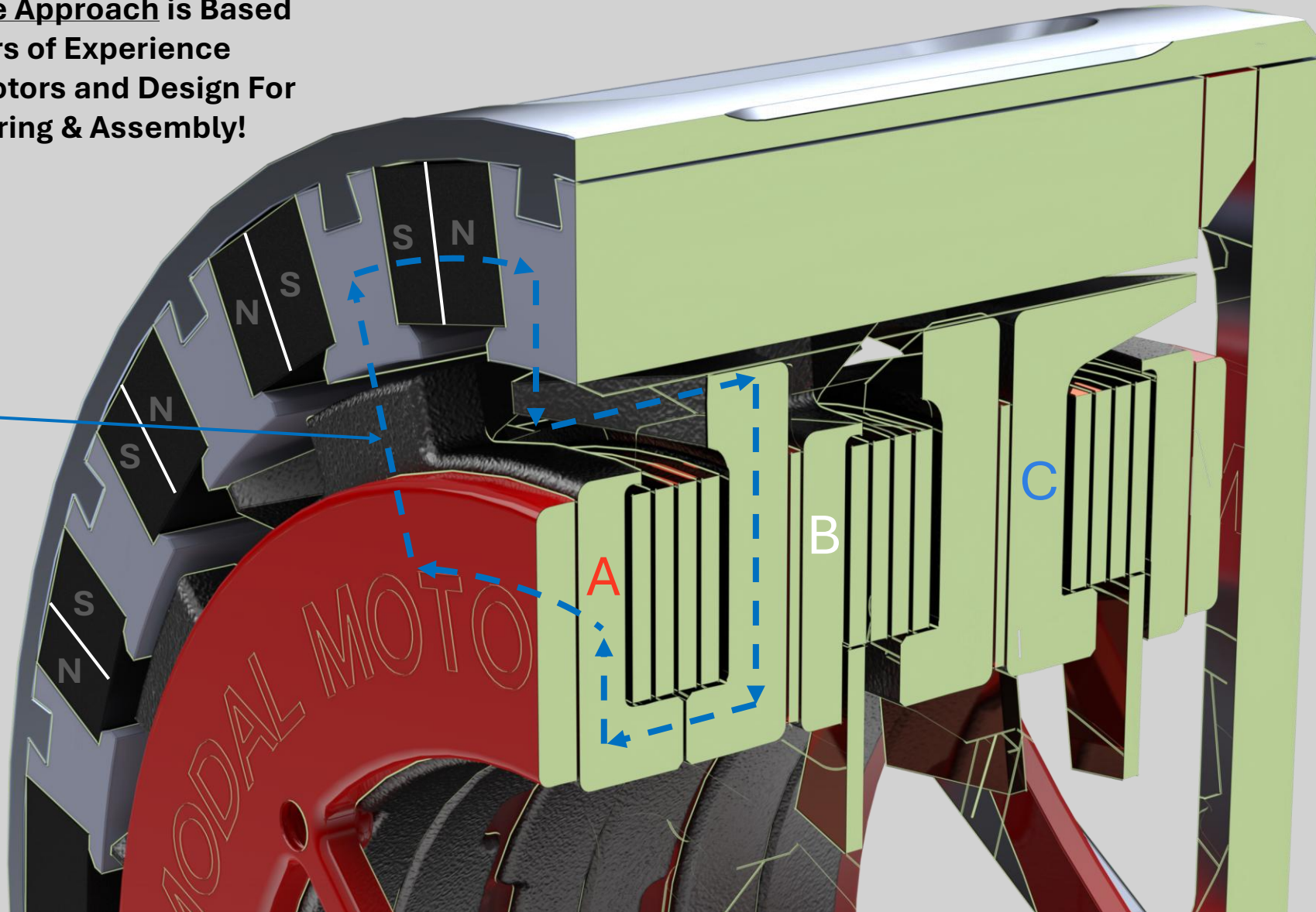
- High Torque Density Motor
  - High-Efficiency Motor
- Low-Cost Modular Architecture
- Simple Fully Automated Assembly Process
  - USA Supply Chain and Manufacturing
- Non-Rare-Earth & USA-Made-Rare-Earth Options

# UNIQUE TECHNOLOGY



Our Innovative Approach is Based  
on 25 Years of Experience  
Developing Motors and Design For  
Manufacturing & Assembly!

Magnetic  
Flux Path



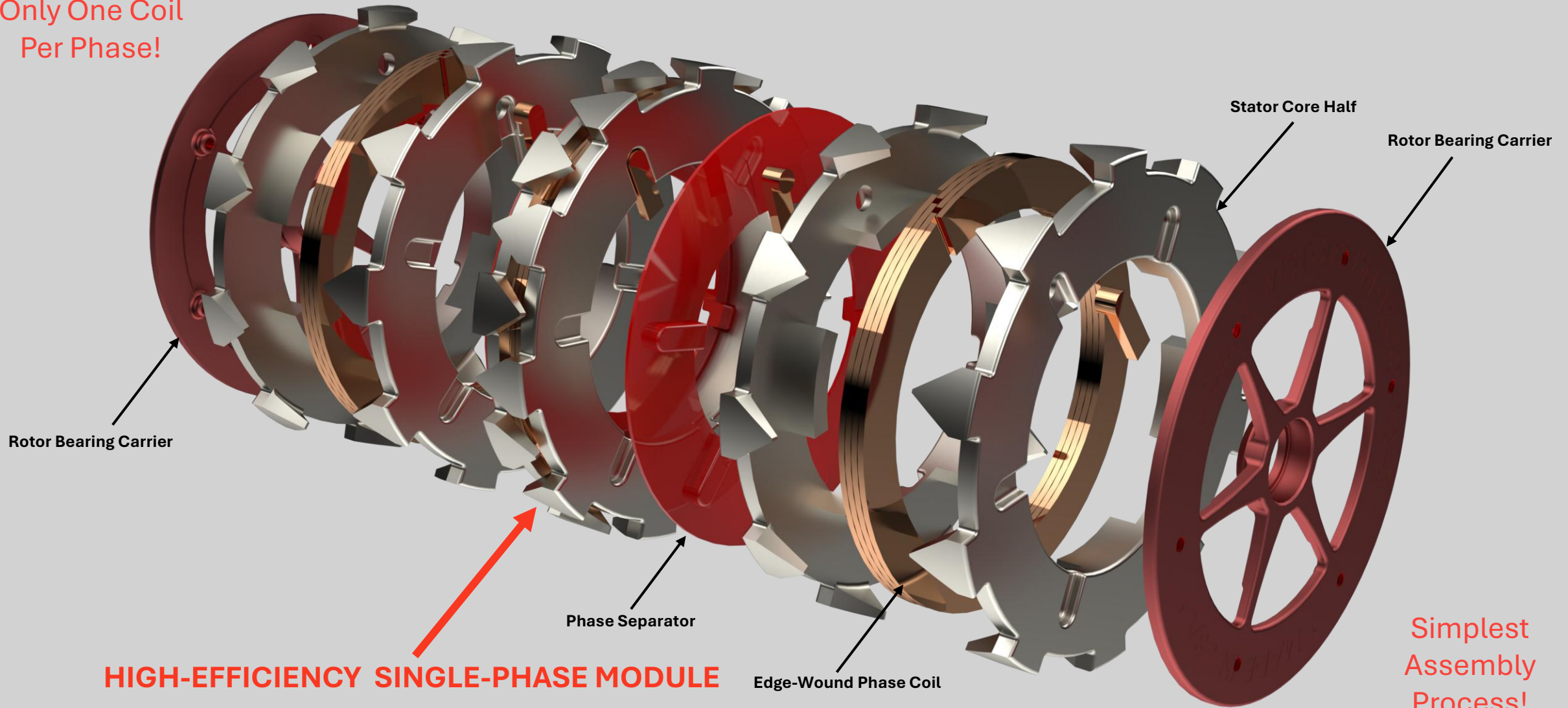
## QUICK TAKEAWAYS:

- Isolated Phases
- One Coil Per Phase
- Simplest Assembly
- PMSynRM Version
- SRM Version
- EESM Version
- AC/IM Version

# MODULAR STATOR ARCHITECTURE



Only One Coil  
Per Phase!



Rotor Bearing Carrier

Stator Core Half

Rotor Bearing Carrier

Phase Separator

**HIGH-EFFICIENCY SINGLE-PHASE MODULE**

Edge-Wound Phase Coil

Simplest  
Assembly  
Process!

Third-Party  
Validated

# HEAD-TO-HEAD COMPARISON



A TALE OF TWO GROUP 3 DRONE MOTORS - SAME TORQUE/THRUST



CHINA RARE-EARTH MOTOR

USA NON-RARE-EARTH MOTOR



E-Mag Mass	T-MOTOR U15L	• 3100 g	MODAL OR13360	• <b>2700 g</b>	• <b>Lower Mass</b>
Outer Diameter		• 152 mm		• <b>154 mm</b>	• <b>&gt; Diameter</b>
Stack Length		• 60 mm		• <b>60 mm</b>	• <b>= Identical</b>
Internal Resistance		• 20 mΩ		• <b>4 mΩ</b>	• <b>&gt; Efficiency</b>
KV Rating		• 43 RPM/V		• <b>43 RPM/V</b>	• <b>= Identical</b>
Torque Constant		• 0.22 Nm/A		• <b>0.29 Nm/A</b>	• <b>&gt; Runtime</b>
Electrical Power		• 16,200 W		• <b>12,040 W</b>	• <b>&gt; Runtime</b>
Mechanical Power		• 11,800 W		• <b>11,800 W</b>	• <b>= Identical</b>
Peak Efficiency	• 73%	• <b>98%</b>	• <b>&gt; Runtime</b>		

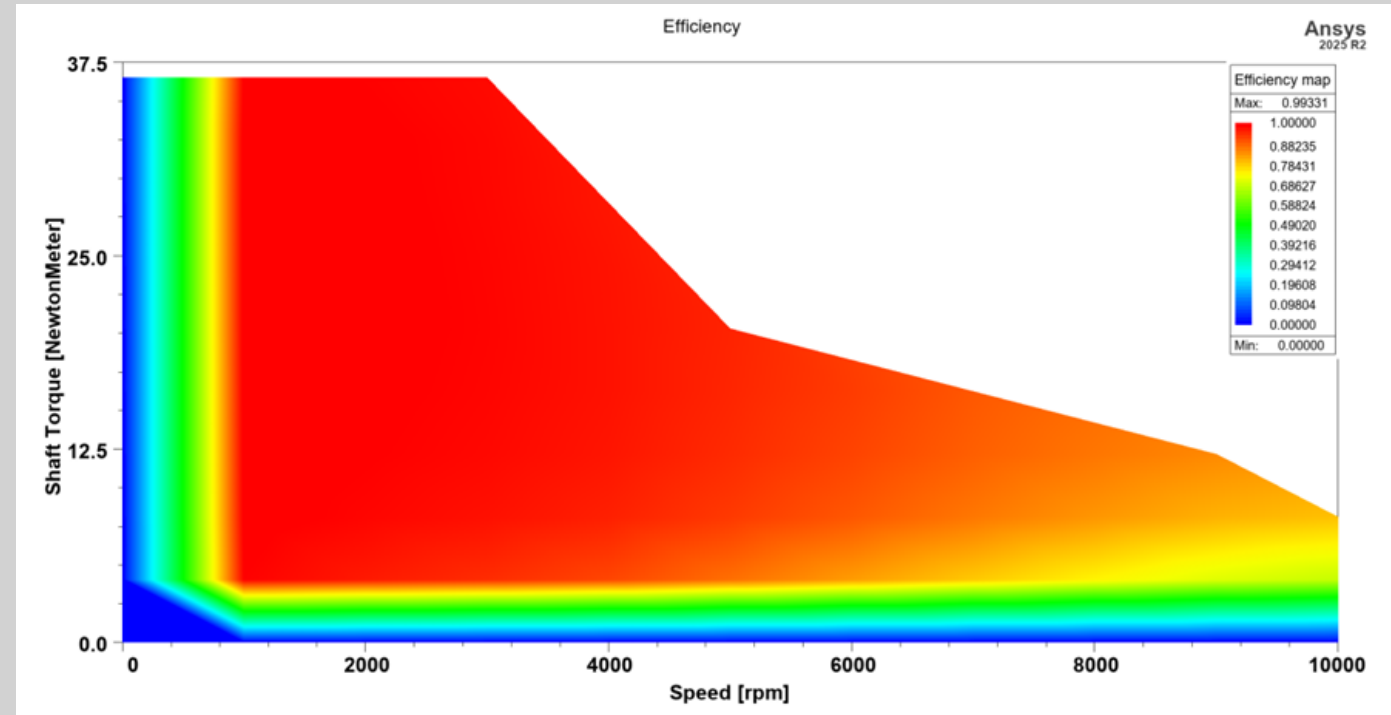
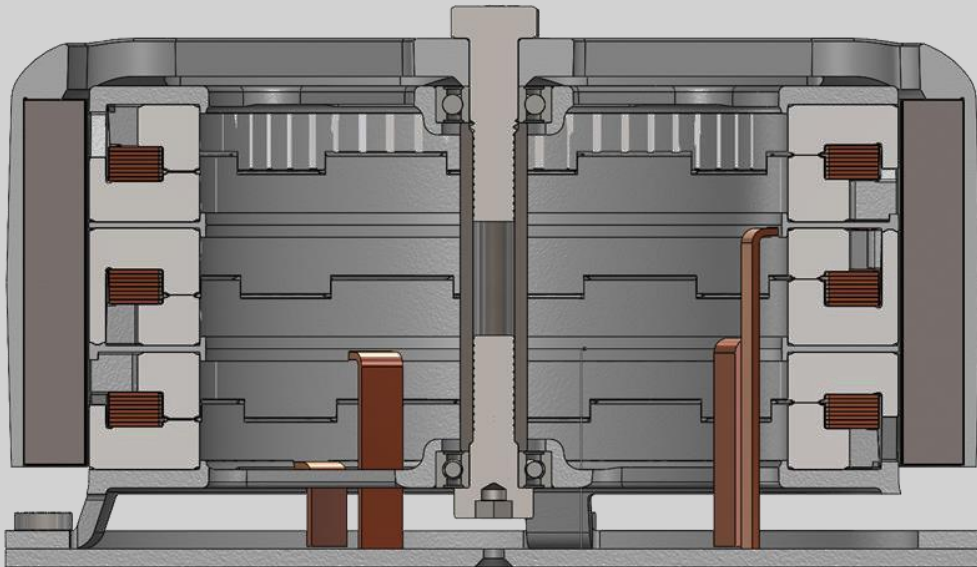
Third-Party  
Validated

# GROUP 3 DRONE MOTOR EXAMPLE



MODAL MOTORS OR13360-43KV

MODAL NON-RARE-EARTH MOTOR

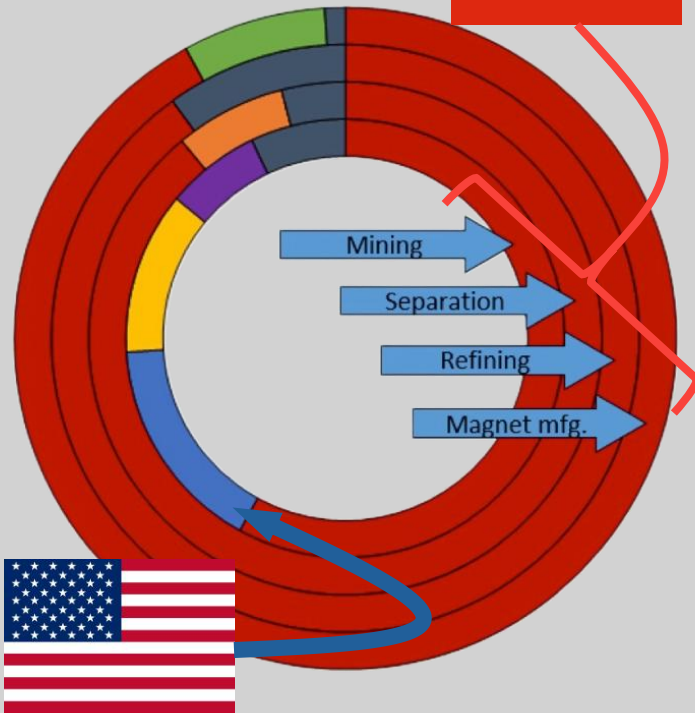


# TAM/SAM/SOM



**THE MASSIVE \$200B GLOBAL AC & DC MOTOR MARKET TAM HAS A SERIOUS GEOPOLITICAL PROBLEM**  
**Today CHINA Controls The Future Of All Electrification!**

Global Rare-Earth Minerals Market



**\$48 BILLION GLOBAL DC MOTOR MARKET SAM**

**Motors For The Following Markets:**

**Drones**

**Robotics**

**Cordless White Goods & Industrial Equipment**

**\$4.8+ BILLION DC MOTOR MARKET SOM (10% Of SAM)**

**Assume \$300/Unit Average OEM Sales Price For Our Motors**

**Assume 40% Margin**

**\$4.8B = 16 Million Motors**

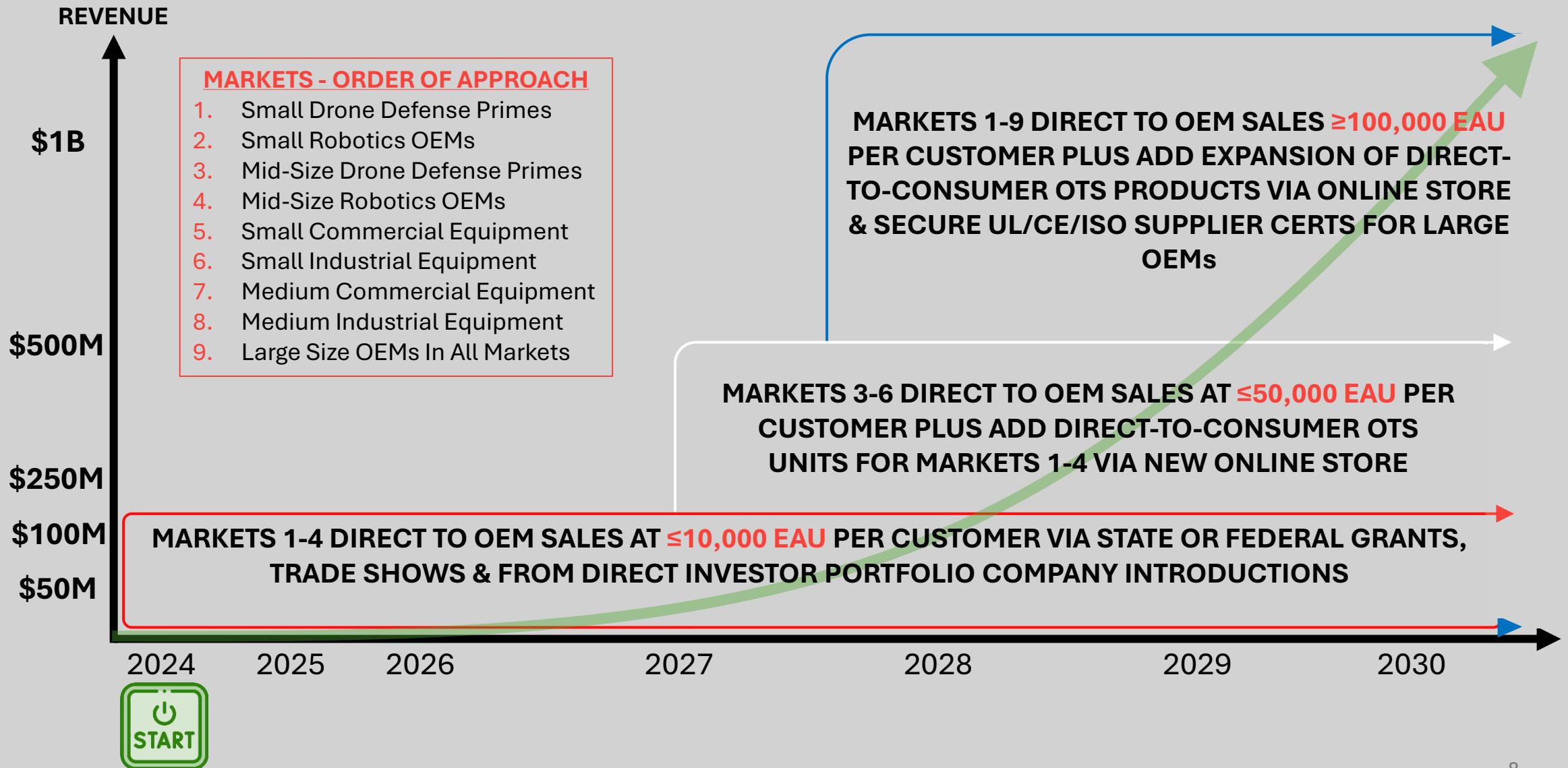
**Projected Margin = \$1.92B**

**Existing Facility Capacity = 65 Fully Automated Cells**

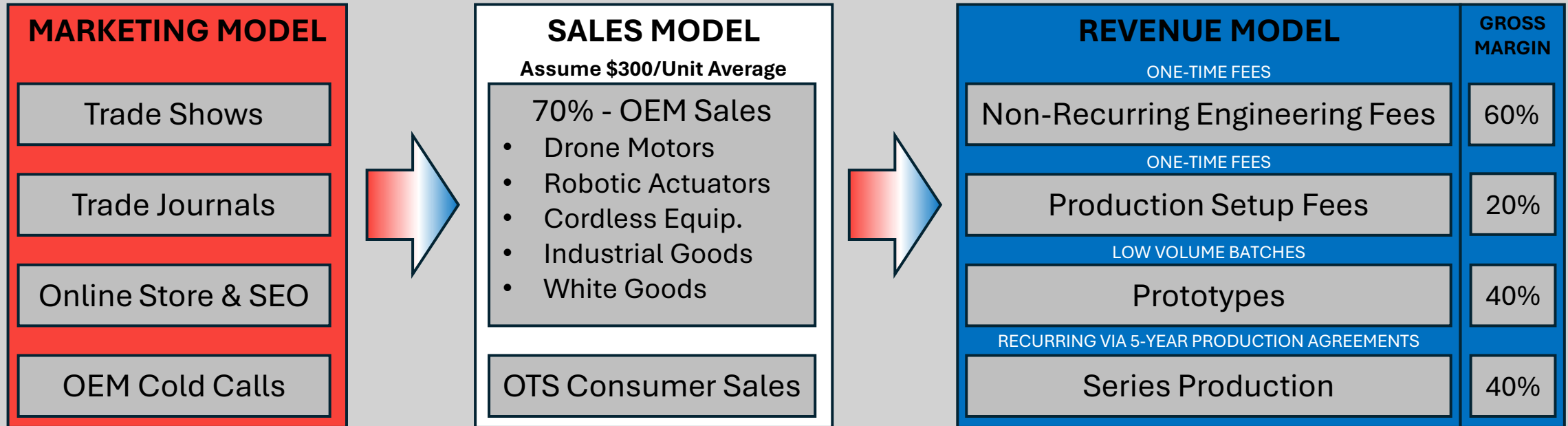
**Average Production Capacity Per Cell = 250k Units**

**Existing Facility Average Production Capability = 16.25M Units**

# GO-TO-MARKET STRATEGY



# BUSINESS MODEL SUMMARY



# EXPERIENCED EXECUTIVE TEAM



## **FOUNDER/CHIEF EXECUTIVE & TECHNOLOGY OFFICER - Michael Van Steenburg**

- Experienced C-Suite executive, business development lead and serial entrepreneur
- Over 35-years in advanced technology and electric motor drives
- Over 25 issued patents
- \$50 Million in previous motor development work for other OEMs



## **CHIEF OPERATIONS OFFICER - James Burton**

- Extensive experience in operational restructuring
- Building management teams
- Negotiated long-term supply agreements
- Two multi-Billion dollar exits



## **CHIEF FINANCIAL OFFICER & INVESTOR - Fatih Arslan**

- 20+ years of leadership experience partnering with private equity-backed companies
- Optimize financial operations and prepare for successful exits.
- Known for creating data-driven insights and actionable financial models



## **FOUNDER/CONTROLLER/SUPPLY CHAIN - Ebru Van Steenburg**

- 25-year veteran of the automotive supplier industry.
- Successfully managed multiple Tier One supplier manufacturing companies
- Secured a \$68.3M tax credit grant for Industry 4.0 manufacturing of electric motors



## **EXECUTIVE ADVISOR & INVESTOR - Kent Helfrich**

- Early-stage hard tech investor, advisor and Board member.
- Completed a 35-year automotive engineering career as General Motors CTO
- Former VP of Global R&D
- Former President of GM Ventures.



## **EXECUTIVE ADVISOR & INVESTOR - Sandy Munro**

- Veteran of advanced technology product development
- Known as “The Teardown Titan” for his decades of work with almost every global OEM
- “When it comes to engineering, Sandy Rocks!” – Elon Musk

# STRONG INVESTMENT POTENTIAL



## INVESTMENTS RECEIVED

- Awarded Four Grants (\$450k)
- Won Multiple Pitch Competitions
- Closed \$2M Seed Round 2025
- \$1M Defense Appropriation
- SBIR Award In-Process

**We are now raising a \$3M SAFE Round\* with a 20% discount and no valuation cap under a rolling close. Lead Investor already secured.**

\* Some funds raised will be utilized to cover our prepayment requirement for tasks covered by our \$1M Defense Appropriation “reimbursement-type” grant award. Which effectively unlocks another \$1M in capital.

## TRACTION TO DATE

- Multiple Defense drone manufacturers already under contract or in-process.
- Multiple robotics manufacturers already under contract or in-process.
- Current sales pipeline of over **130** OEMS in drones, robotics, wheeled vehicles, industrial equipment and white goods.
- Projecting ~\$10 Million revenue by the end of 2026.

## ANTICIPATED ROI

- Series-A valuation expected to be roughly \$50M in late 2026.
- Estimated \$1B valuation by 2030 based on projected revenue.
- Likely exit through acquisition or merger by 2030.
- If no acquisition, then company is planning a formal IPO around 2030 to capitalize an expansion of manufacturing locations globally.

**Now Raising \$3M SAFE Round Leading To Our Series-A In Late 2026**



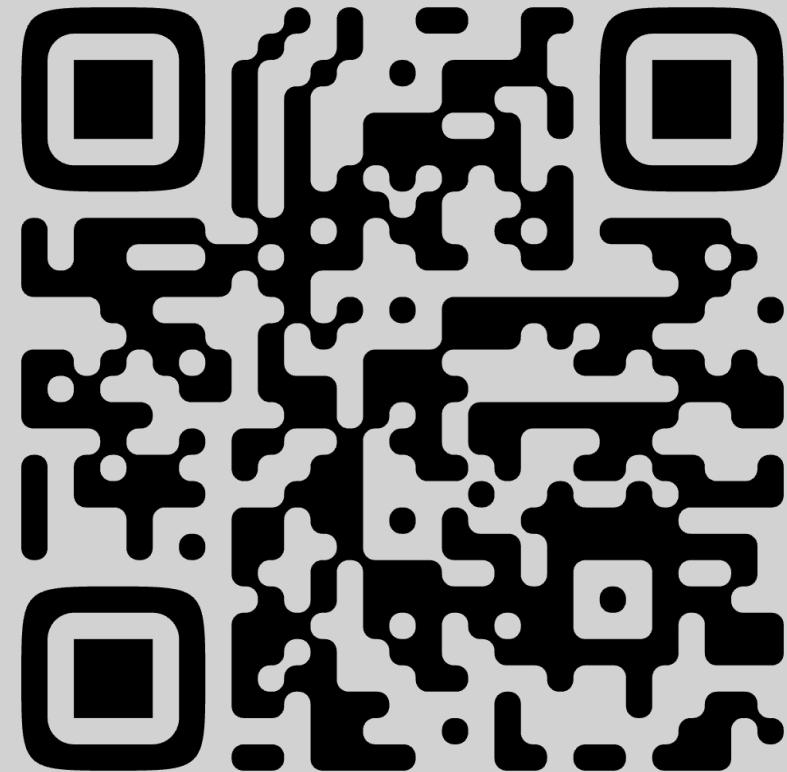
<https://ModalMotors.com/>

**Thank You!**

**Michael Van Steenburg**

FOUNDER/CEO

[mvs@ModalMotors.com](mailto:mvs@ModalMotors.com)



**Request Access To Our Data Room / Book a Meeting With Us**

# SUMMARY OF TECHNOLOGY BENEFITS



- Typically, 30-50% shorter axial length for the same stator outer diameter (no wasteful end turns like competitor motors). This feature enables optional safety critical redundancy by utilizing two motors in-parallel in the same volume occupied by one conventional motor for critical fault tolerant applications.
- Typically, 25-50% lower mass than competitor motors for the same performance depending on magnet choice.
- Lower electrical losses at high operating frequencies than competitor motors due to the utilization of low loss Soft Magnetic Composite (SMC) stator core material.
- 100% coil mass utilization, compared to competitors who only utilize 50-60% of the coil mass to produce torque, enables Modal to utilize aluminum coils with minimal to no efficiency penalty. For Modal to match the copper coil efficiency it requires the aluminum coils to be 20% longer in axial length while still having a lower mass than the copper alternative. Coil inner and outer diameter remain unchanged.
- Modal does not utilize magnet wire for its coils as the electrical insulation on magnet wire is not a good thermal conductor with a value of around 0.27 W/m-K. Modal coils utilize Aluminum Nitride separator material with a thermal conductivity comparable to copper around 350 W/m-K which enables Modal coils to move the heat generated in the coils out to the air gap or out to the stator housing for 4X longer peak duration performance with higher efficiency across the torque/speed curve. Liquid cooling is now optional.
- Minimal to zero flux leakage from the Modal coils with all flux focused to the rotor poles. Enables Modal to utilize lower cost magnets to achieve the same performance as competitor motors or even greater performance with the same grade of magnets. When examining competitor motors, if you can see their coil end turns that is where the flux is leaking and not creating torque.
- Inherent architecture of Modal's stator cores with encapsulated coil achieves the shortest flux path possible in a motor generating lower losses to help keep the stators cool during heavy cyclical loading.

- Modal can theoretically reach 40 Nm/kg torque density whereas competitors are struggling to reach 20 Nm/kg. Typically, competitors are around 10 Nm/kg.
- Modal motors can be configured with very high stator and rotor pole counts for lower-speed motors and achieve near zero torque ripple without Field Oriented Control required.
- Modal's technology enables multiple types of rotors with the same Stator technology enabling motors with the characteristics of Permanent magnet Synchronous Reluctance, Switched Reluctance, Externally Excited Synchronous and Induction Motor configurations.
- Modal's power factor can attain 0.9-1.0 without a power factor correction (PFC) converter compared to other Transverse Flux Motors which can be as low as 0.7 and BLDC motors which are around 0.8, which enables Modal to utilize a smaller size, lower mass and slightly higher efficiency motor controller.
- Modal's motor technology has the largest high efficiency map regions across the full torque/speed range compared to any competitor motor.
- Modal's "Peak to Constant Power Speed Ratio" is around 4X, compared to 2X for competitors, enabling very high-speed RPMs, with low load, for rapid movement and positioning of the rotor assembly.
- Modal's motors typically utilize around 20% lower electrical power to achieve the same mechanical power as competitor motors which translates to longer battery run time.
- 3X less phase resistance than competitor motors.
- 8X less inductance than competitor motors.
- USA supply chain for all motor components.
- Simple low-cost assembly process that is performed within a single robotic cell for true Industry 4.0 manufacturing here in the USA.
- Lowest COGS versus any equivalent competitor.

Third-Party  
Validated

# HEAD-TO-HEAD COMPARISON





A TALE OF TWO GROUP 2 DRONE MOTORS – SAME THRUST



CHINA RARE-EARTH MOTOR

USA NON-RARE-EARTH MOTOR



	 CHINA <u>RARE-EARTH MOTOR</u>	 USA <u>NON-RARE-EARTH MOTOR</u>	
E-Mag Mass	<b>T-MOTOR AT 2826</b> • 150 g	<b>MODAL OR 3627</b> • <b>130 g</b>	• <b>Lower Mass</b>
Outer Diameter	• 35 mm	• <b>46 mm</b>	• <b>&gt; Diameter</b>
Stack Length	• 28 mm	• <b>24 mm</b>	• <b>&lt; Length</b>
Internal Resistance	• 24 mΩ	• <b>9 mΩ</b>	• <b>&gt; Efficiency</b>
KV Rating	• 900 RPM/V	• <b>900 RPM/V</b>	• <b>= Identical</b>
Torque Constant	• 0.0077 Nm/A	• <b>0.0124 Nm/A</b>	• <b>&gt; Runtime</b>
Electrical Power	• 484 W	• <b>380 W</b>	• <b>&gt; Runtime</b>
Mechanical Power	• 353 W	• <b>353 W</b>	• <b>= Identical</b>
Peak Efficiency	• 73%	• <b>93%</b>	• <b>&gt; Runtime</b>

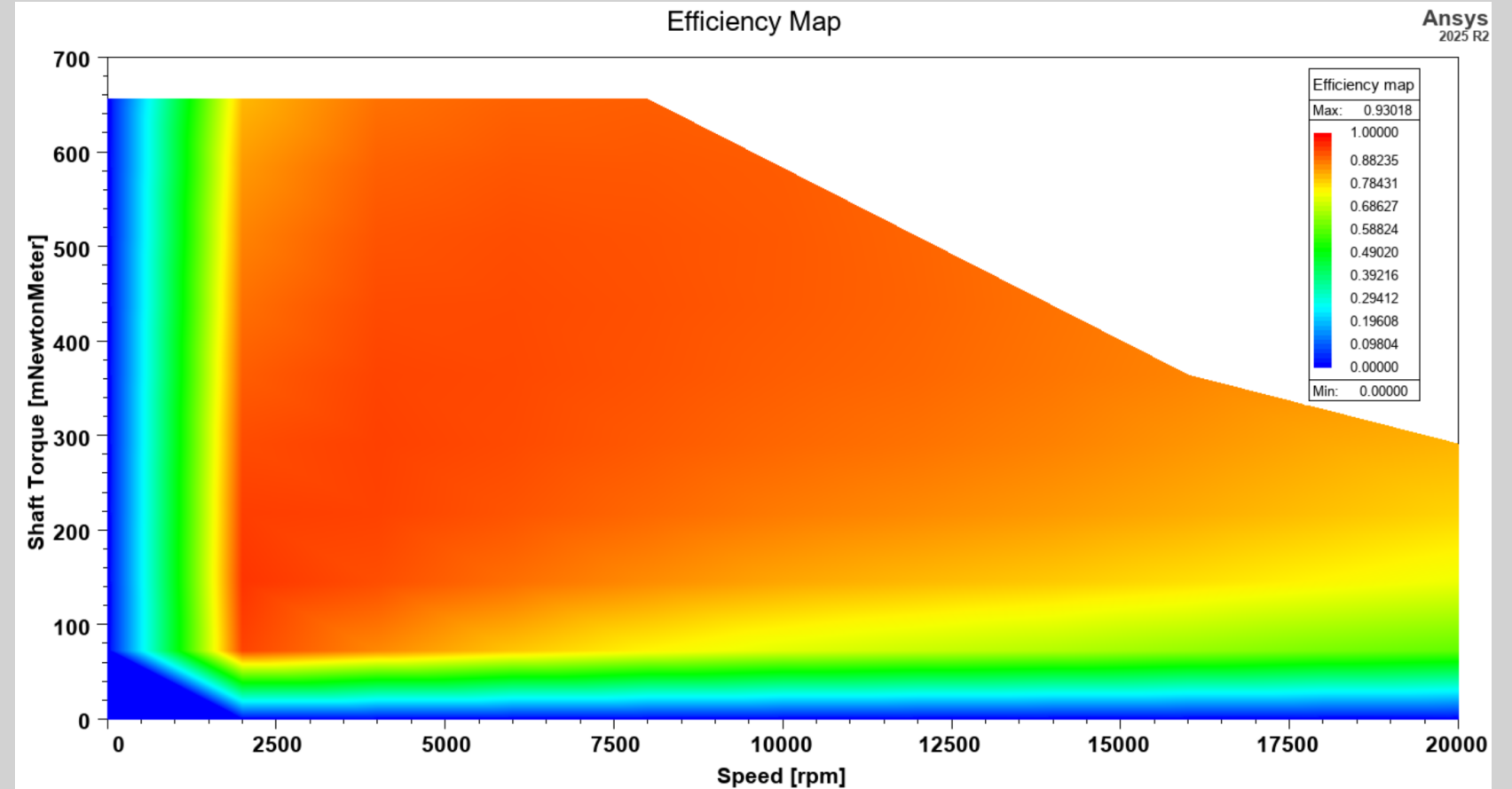
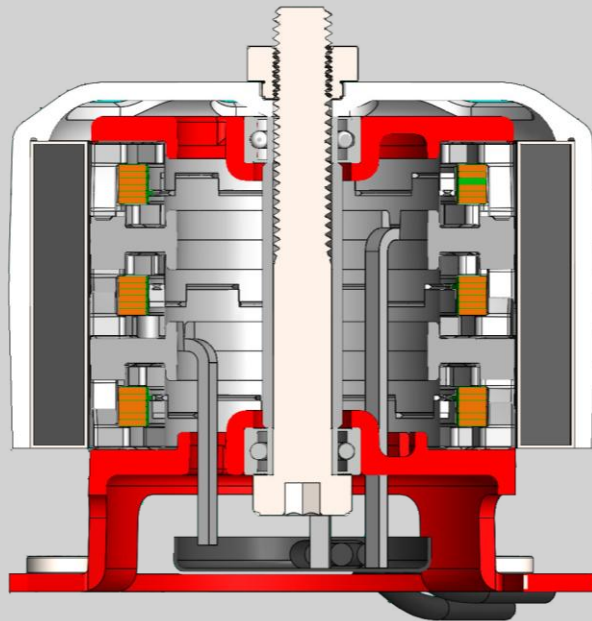
Third-Party  
Validated

# GROUP 2 DRONE MOTOR EXAMPLE



MODAL MOTORS OR3627-900KV

MODAL NON-RARE-EARTH MOTOR



Third-Party  
Validated

# HEAD-TO-HEAD COMPARISON



A TALE OF TWO GROUP 2 DRONE GENERATORS - SAME POWER INPUT



USA RARE-EARTH GENERATOR

USA RARE-EARTH GENERATOR



E-Mag Mass		• 670 g		• <b>400 g</b>	• <b>Lower Mass</b>
Outer Diameter	SULLIVAN S676	• 102 mm	MODAL ORG16	• <b>100 mm</b>	• <b>&lt; Volume</b>
Stack Length		• 26 mm		• <b>20 mm</b>	• <b>&lt; Volume</b>
Max Speed		• 8,000 RPM		• <b>9,000 RPM</b>	• <b>&gt; Speed</b>
Rated Power		• 325 W		• <b>550 W</b>	• <b>&gt; Power</b>
Peak Power		• 1,250 W		• <b>1,600 W</b>	• <b>&gt; Power</b>
No-load Voltage		• 11.0 VAC/kRPM		• <b>12.5 VAC/kRPM</b>	• <b>&lt; Speed</b>
Efficiency		• 88%		• <b>89%+</b>	• <b>&gt; Power</b>

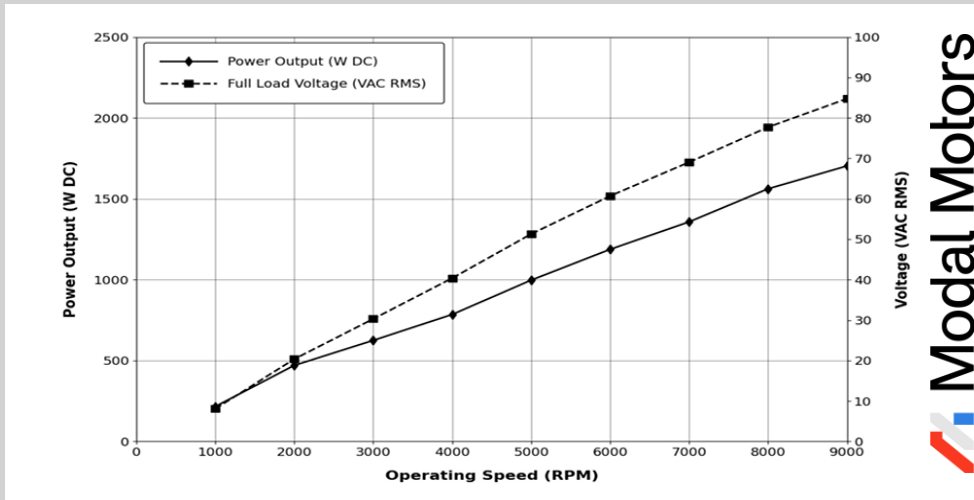
Third-Party  
Validated

# GROUP 2 DRONE GENERATOR EX.

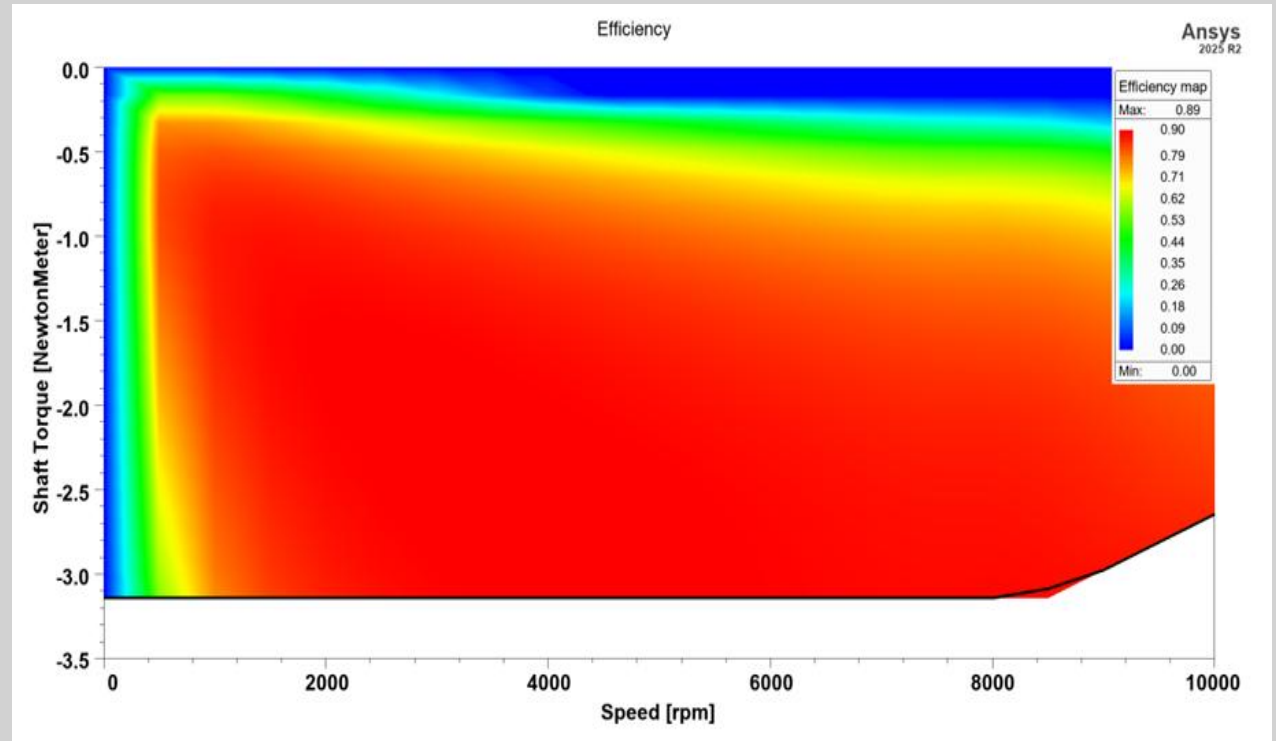
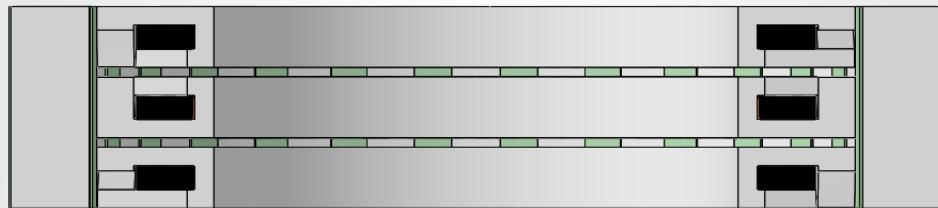


A TALE OF TWO GROUP 2 DRONE GENERATORS - SAME POWER OUTPUT

MODAL RARE-EARTH GENERATOR



Modal Motors



# BLUELINE OR REDLINE



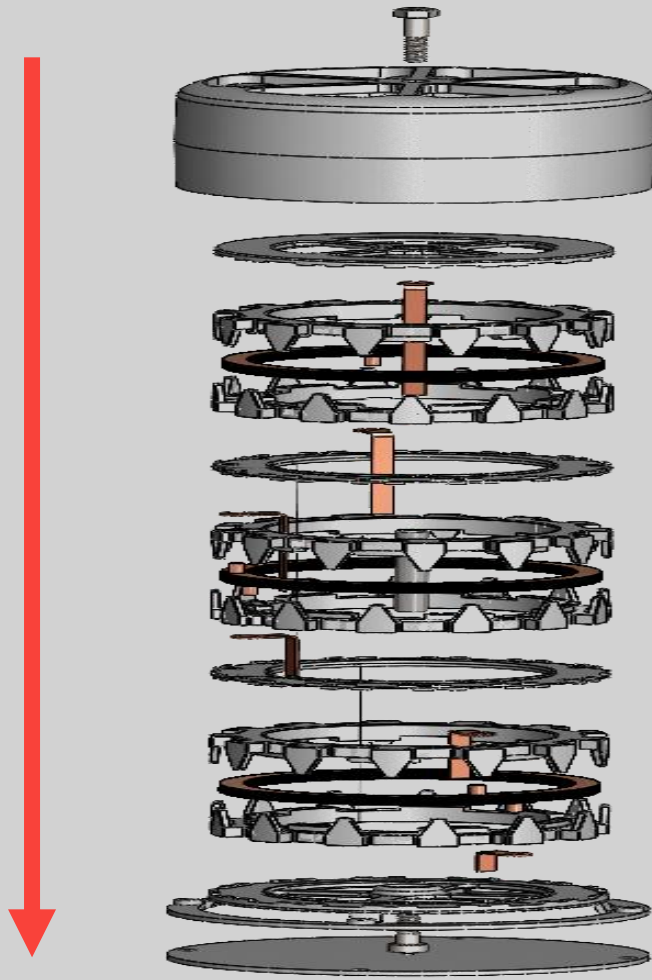
## BLUELINE

- Non-Rare-Earth Magnets
  - Ferrite
  - SmFeN
- Made-In-USA
  - Niron Magnetics, Inc.
- USA & Global Supply Chain

## REDLINE

- Rare-Earth Magnets
  - N48SH
  - N52SH
- Made-In-USA
  - USA Rare-Earth, Inc.
- USA Supply Chain

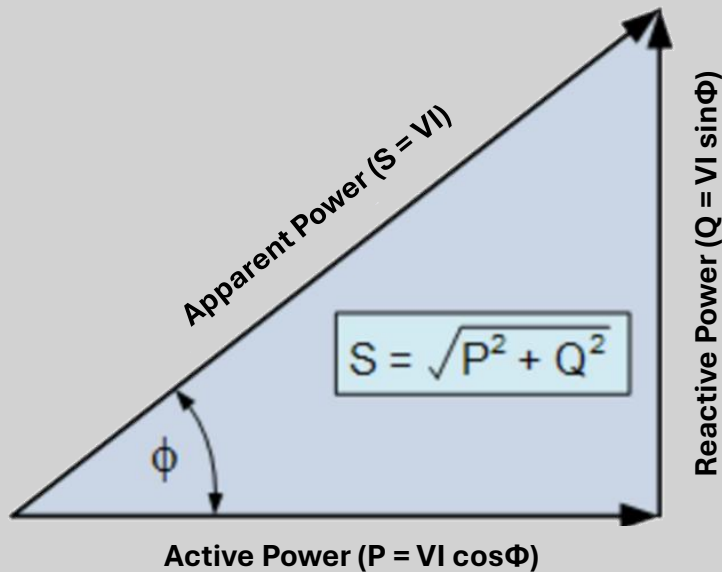
# SIMPLIFIED MANUFACTURING PROCESS



- Net Shape Molded Rotor Housing
- Net Shape Molded Bearing End Caps
- Net Shape Molded Phase Separators With Integral Sensors
- Net Shape Molded Stator Core Halves (Both Halves = Same Part)
- PCB or Edge Wound Coils With Near Zero Waste
- Self Aligning Features
- Self Fixturing Features
- Simple Top-Down Assembly Architecture (One-Sided Assembly)
- Simple Pick-and-Place Robotic Assembly Process
- High Volume Throughput On Low Capex Equipment
- Humans Optional

# COMPETITOR MOTOR POWER FACTORS

Conventional Transverse Flux Motors are known for a relatively low power factor of around 0.7.  
BLDC motors have a power factor of around 0.8 to 0.9 depending on the quality of the motor drive.



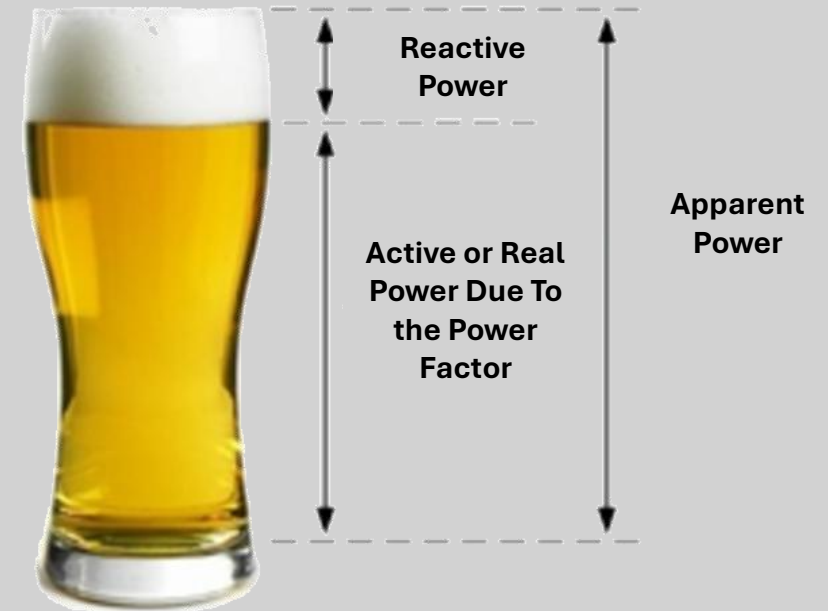
## TECHNICAL ILLUSTRATION

*For those in the know...they know this!*

### DEEPER DIVE

Reactive Power, denoted as  $Q$  and measured in Volt-Amperes Reactive (VAR), represents the energy that oscillates between the inverter and the motor to establish the magnetic fields required for operation. In synchronous machines, the power factor,  $\cos\Phi$ , is the ratio of Real (Active) Power  $P$  to Apparent Power  $S$ , where  $S = \sqrt{P^2 + Q^2}$ . A low power factor indicates that a significant portion of the inverter's current capacity is occupied by Reactive current that does not contribute to mechanical work, leading to increased  $I^2R$  losses and reduced efficiency in the entire motor drive system.

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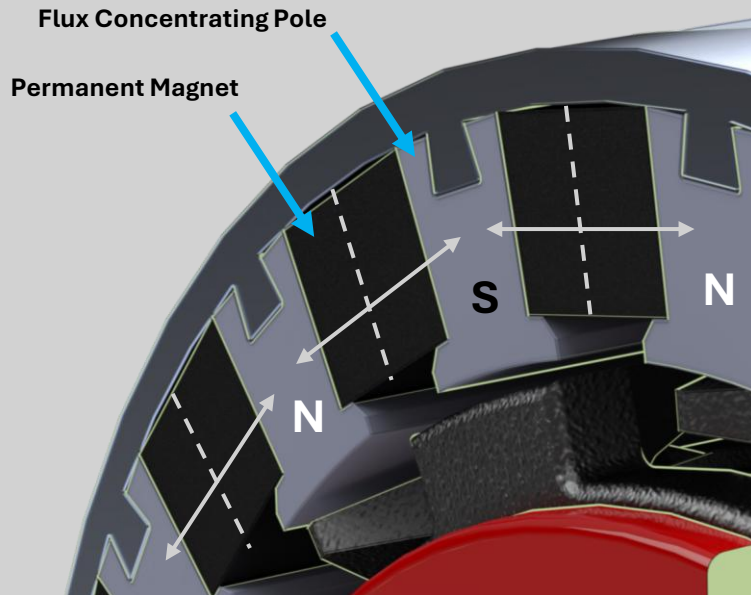


## LAY-PERSON ILLUSTRATION

*When you order a beer and the glass comes like this it's APPARENT that you have a full glass, but you only have a portion of REAL liquid beer with the rest of the glass occupied by the head or foam which limits the amount of REAL beer to drink while the foam makes you burp as a REACTION!*

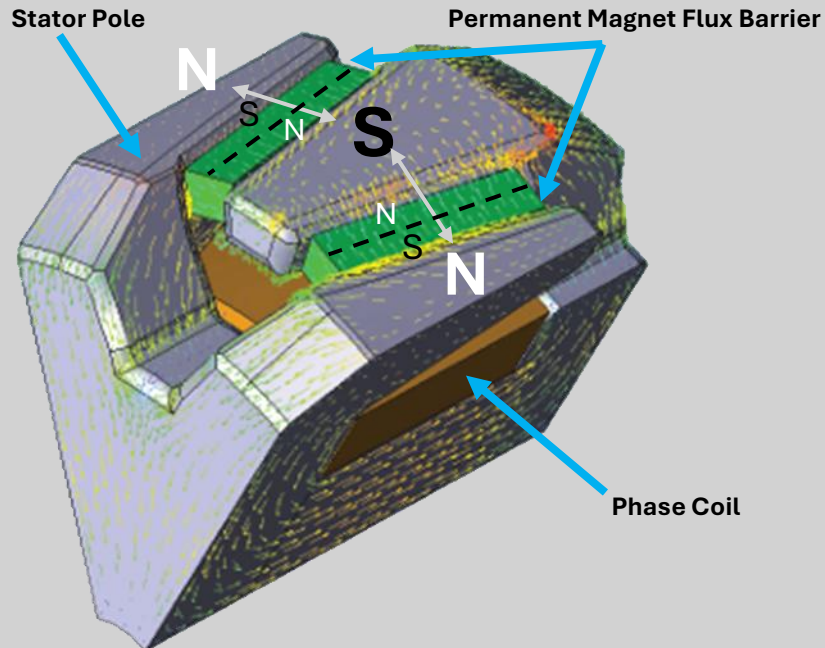
# MODAL MOTOR'S HIGH-POWER FACTOR

Modal Motors' high-power factor of 0.90 to 1.00 is achieved by exploiting several technology features.



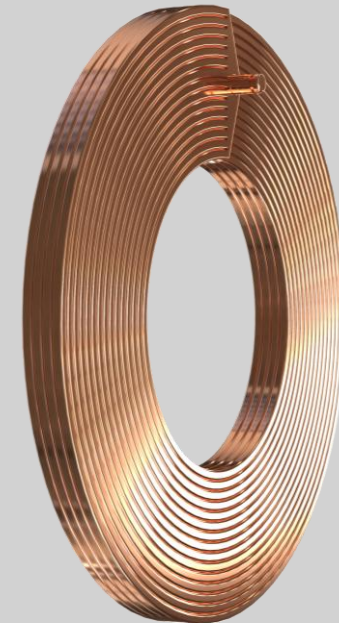
## FLUX CONCENTRATING ROTOR

Modal Motors utilizes tangential magnetization for its rotor magnets along with flux concentrating rotor poles that ensure the magnetic flux flow is maximized from the magnets across the air gap to the stator. This allows the rotor to function similar to a Halbach Array while reducing the magnetic field stress on the rotor magnets.



## FLUX CONCENTRATING STATOR

Modal Motors utilizes tangential magnetization for its intra-claw pole stator magnets that prevent stray magnetic flux from jumping from one claw pole to another. Modal Motor's technology stack includes both permanent magnets (as shown) and electromagnets that enable active field control and field weakening at all speeds and loads.



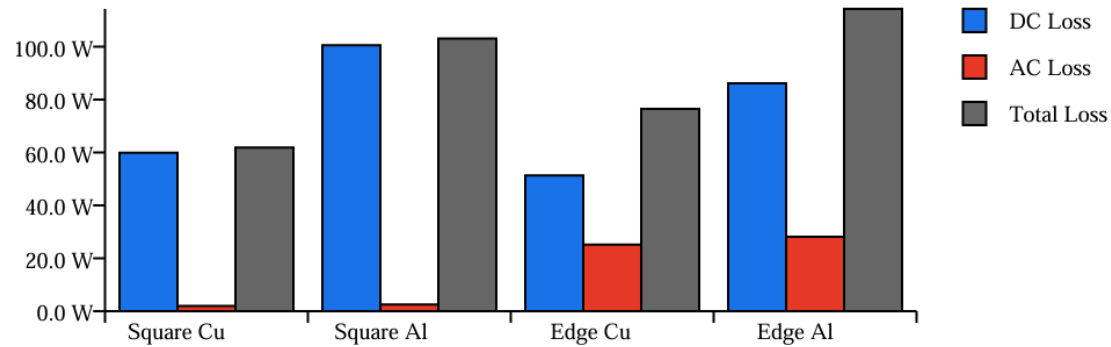
## SKIN-EFFECT REDUCING COILS

Modal Motors utilizes various coil topologies for its applications which include the "multi-strand" layer approach as shown above in our low AC Loss topology variation. Modal also has other variations which include conventional edge-wound coils, PCB coils and our latest "Litz Wire Type" PCB coil that enables Modal to further minimize high-frequency AC losses.

# ALUMINUM COILS vs COPPER COILS & EDGE WOUND COIL vs STRANDED COILS



## Loss Comparison Breakdown



## Weight Comparison

