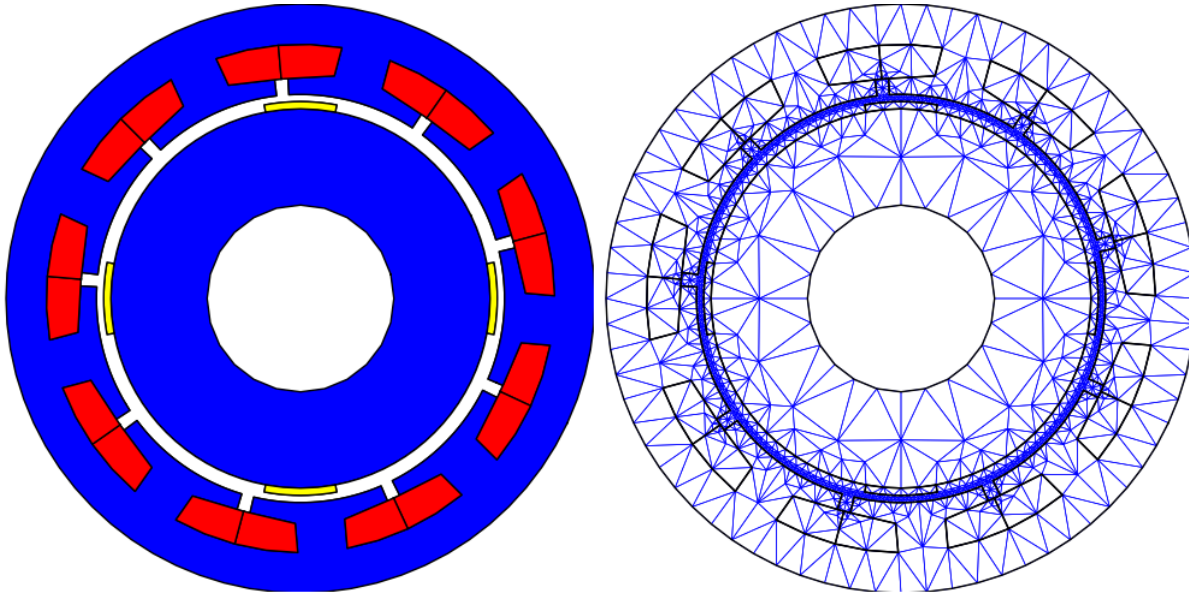


Results



Dimensions

Stator with parallel teeth

Slot opening depth	2.6mm
Slot pitch	22.88mm
Slot depth	8.03mm
Tooth tip angle	0deg
Inner slot width	17.06mm
Stator yoke height	6.49mm
Stator outer diameter	94.6mm
Tooth width	8mm
Inner stator diameter	65.56mm
Number of slots	9
Outer slot width	20.26mm
Slot opening width	2mm

Rotor with surface-mounted radially magnetized magnets

Magnet thickness	1.16mm
Magnet angle	42.4deg
Rotor outer diameter	63.24mm
Rotor yoke height	15.46mm
Shaft diameter	30mm
Circumferential magnet width	11.7mm
Number of poles	4

Airgap

Airgap diameter	64.4mm
Airgap thickness	1.16mm

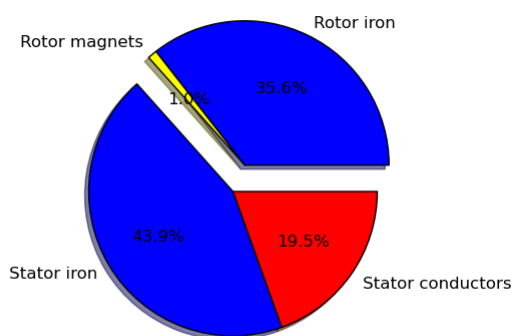
Axial parameters

Machine length	29.6mm
Average conductor length	53.49mm
Rotor iron stacking factor	0.9
Stator iron stacking factor	0.9

Winding

Number of turns per coil	4
Number of coils per phase	3
Temperature of conductors	100degC
Coil span in slot pitches	1
Slot fill factor	0.6
Number of coils per parallel path	3
Number of winding layers	2
Number of slots/pole/phase	0.75
Number of conductors per slot	8

Number of parallel paths per phase	1
Various	
Mechanical speed	81/s
Electrical frequency	16Hz
Materials	
Rotor magnets:	Recoma 28 (Sm2Co17)
Stator conductors:	Copper
Stator iron:	Sura NO20
Rotor iron:	Sura NO20
Weights	
Stator iron weight:	0.5567kg
Stator conductors weight:	0.2475kg
Stator active weight:	0.8042kg
Rotor iron weight:	0.4511kg
Rotor magnets weight:	0.01329kg
Rotor active weight:	0.4644kg
Total iron weight:	1.008kg
Total active weight:	1.269kg



Results from load simulation

BLDC with DC current source, star connected

Current

DC current	10A
Current density	1388000A/m ²
Phase resistance	0.004021Ω
Conductor losses	0.8042W
Slot area	9.606e-05m ²
Conductor area	7.205e-06m ²
Advance angle	0deg
Phase end-winding leakage inductance	5.349e-07H

Torque

Mean airgap torque (by Maxwell stress tensor)	0.05792m*N
Torque reduction due to iron losses	0.001902m*N
Torque ripple	66.43%

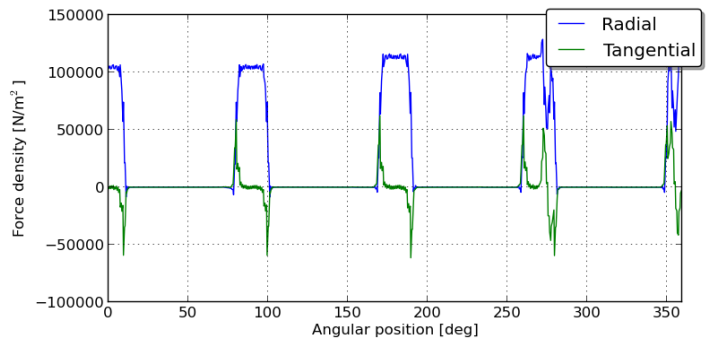
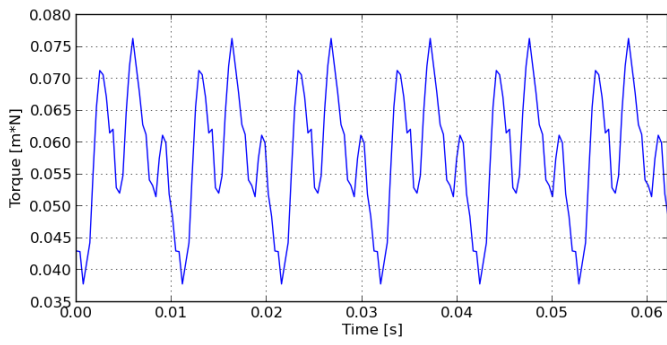
Flux density

Maximum stator iron flux density:	1.46T
Maximum rotor iron flux density:	0.9268T
Mimumum permanent magnet flux density:	0.4528T
Fundamental airgap flux density:	0.2278T
Iron losses:	0.09562W

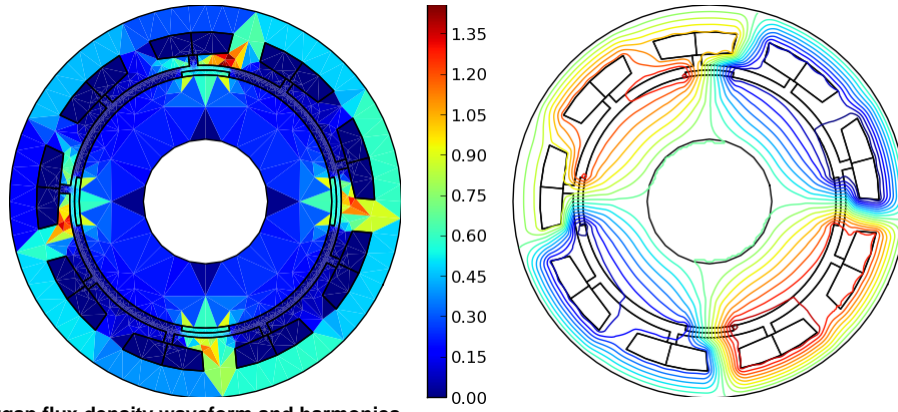
Voltage, Power, Flux linkage

Average DC voltage	0.3716V
Electrical input power	3.716W
Mechanical output power	2.816W
Efficiency	75.78%
Peak flux linkage, q-axis	0.0002539Wb
Peak flux linkage, d-axis	0.001696Wb

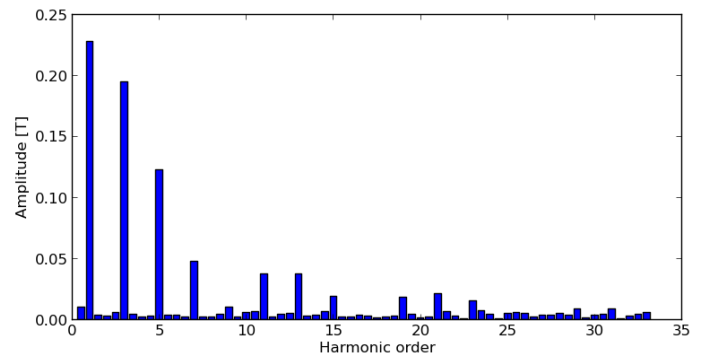
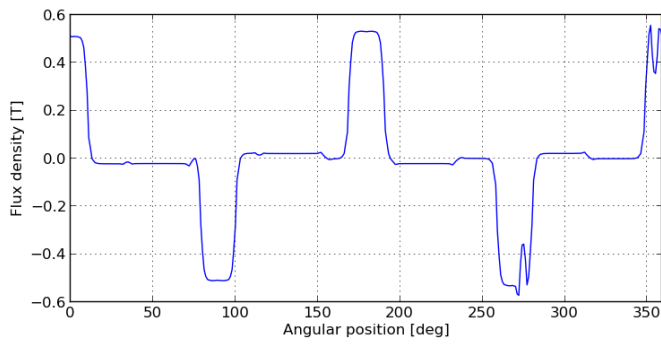
Torque and force waveforms



Magnetic field and flux lines



Airgap flux density waveform and harmonics



Simulation statistics

Load simulation number of mesh elements:
 Load simulation core type:
 Runtime of simulation:

3152
 1 x c2
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