

Joint Development of Drone Motor Using MAGFINE[®] Dy-free Bonded Magnets

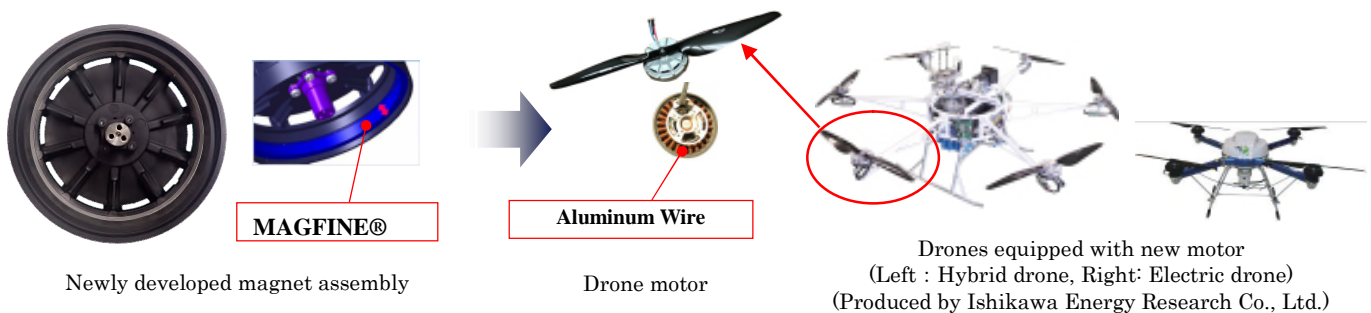
Aichi Steel Corporation (Headquarters: Tokai, Japan, President: Takahiro Fujioka) partnered with Sawafuji Electric Co., Ltd. (Headquarters: Ota, Gunma Prefecture, President: Akihiko Yoshikawa) on the joint development of a motor that weighs 30 percent less than the conventional motor used in industrial drones through the combination of MAGFINE[®]*¹ Dy-free (Dysprosium-free) Bonded Magnets made by Aichi Steel and the coil winding technology of Sawafuji Electric. Sawafuji Electric has started supplying the motor to drone manufacturers and is planning for mass production.

While drones are an anticipated countermeasure against worsening labor shortages in fields such as distribution and farming, weight reduction remains a pressing issue to support increased carrying capacity and flight time.

The newly developed motor resulting from this collaborative project has the characteristics described below and is expected to improve drone performance.

1. Increased motor output and reduced weight design from magnet assembly*² technology
Aichi Steel has developed new magnet assembly technology that uses injection molding*³ to mold a large bore multipole magnet into a magnesium housing. Furthermore, the combination of high magnetic force, positioning freedom and high dimensional accuracy, which are the advantages of MAGFINE[®], succeeded in reducing weight by 30 percent compared to the conventional motor, contributing to longer flight times.
2. Reduced vibration
By optimizing the direction of the magnetic field during magnet molding, pulsating torque during rotation, a source of vibration, can be reduced by approximately 20 percent, realizing stable attitude control by the drone.
3. Coil winding with aluminum wire
Winding of aluminum coils is realized using winding technology with a proven track record in generators and other products. (In general, copper wiring is used for coils.) This allows for a long-lasting, lightweight motor with stable insulation performance.

In the future, in order to expand applications into motors that require complex shapes, Aichi Steel will promote improving the performance of magnetic powder, which is used as a base material, and promote further development of injection molding and winding technology as the company expands into various applications including drones.



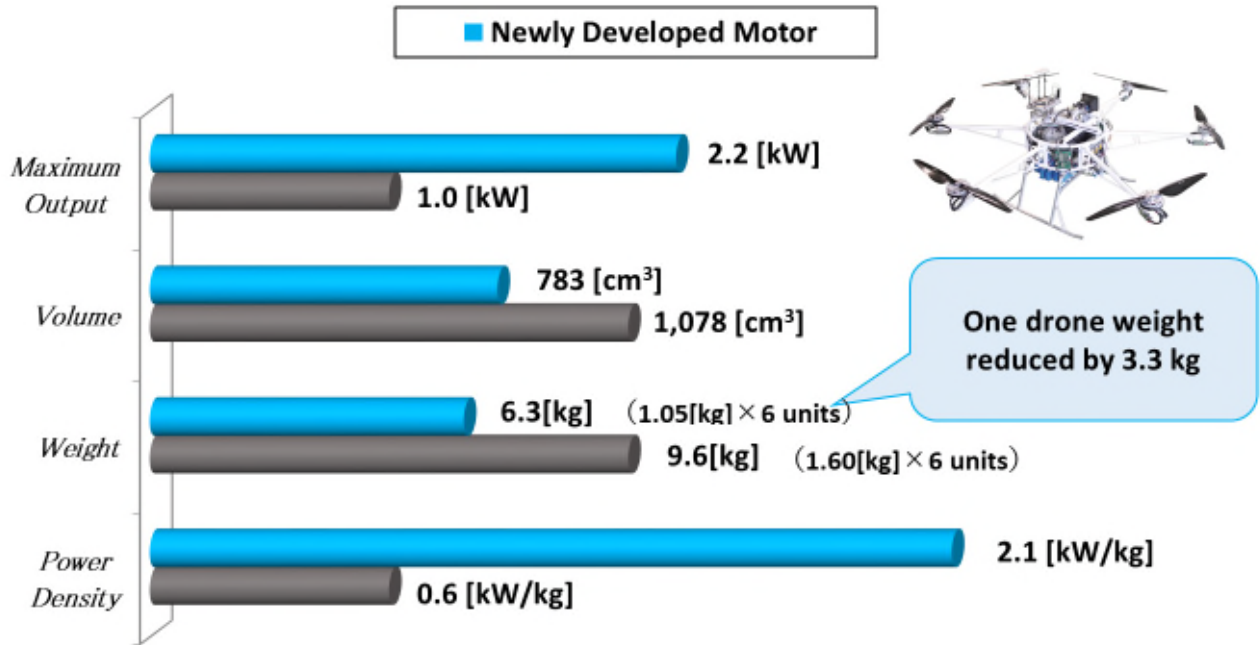
*1 MAGFINE[®]: Magnets formed by mixing various plastics with neodymium (Nd) anisotropic magnet powder that does not contain the rare earth element dysprosium (Dy). Used in various power tools and seat motors for automobiles, etc.

*2 Magnet assembly: A component consisting of a magnet and housing.

*3 Injection molding: An innovated molding method where heated resin is injected into a mold. Put into use at Aichi Steel in 2015 (for details, refer to Reference 2).

References

- Newly developed motor compared with competitor motor (Aichi Steel, Sawafuji Electric)



- Process simplification by means of injection molding technology (Aichi Steel)

