Motor Insight: Anatomy of a Drone

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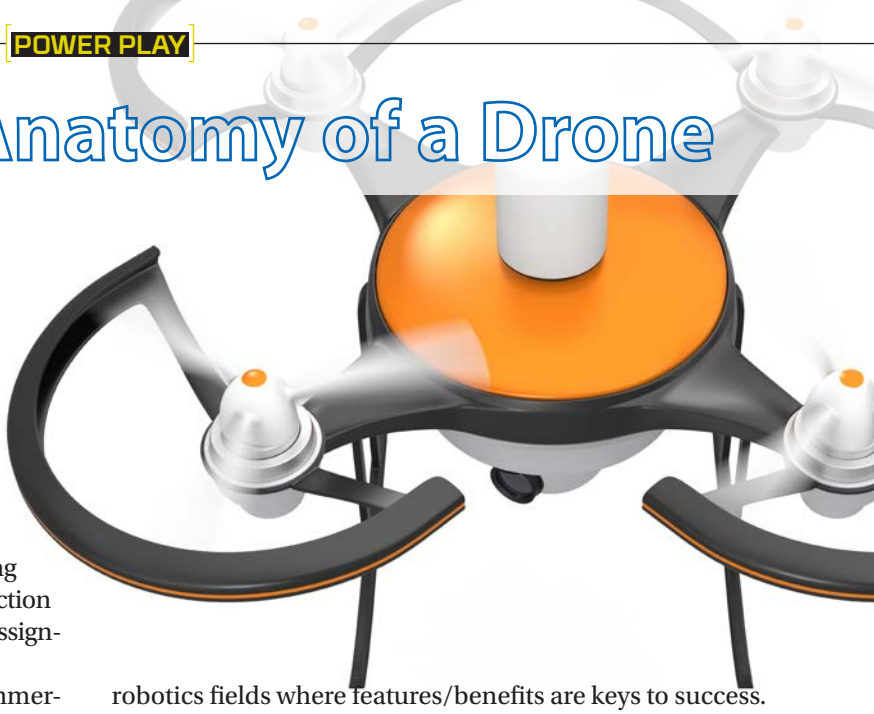

The skies are full of them in 2018—drones flying around amusement parks, job sites and even your own backyard. There are drone racing leagues on ESPN, drones capturing wide angle shots over film locations and government drones keeping a bird's eye view on the Mexican/America border. You even have farming drones being utilized for field and soil analysis as well as crop spraying. Drones are being employed to study weather patterns, inspect construction sites, deliver packages and for telecommunication assignments.

According to market research, 16+ million commercial drones will be sold per year by 2020. And the value of drone-powered solutions continues to climb — reaching an estimated $130+ billion in industrial applications. This year alone, military drones are estimated to be valued around $12.2 billion. As this is a trade magazine, we won't get into the minutiae of drone requirements, regulations or rules. Instead, we'll focus on the components that help drones safely and efficiently navigate the skies.

Maxon Precision Motors offers Ironless Core DC Brush motors with high efficiency and precise position control for drones, according to Michael Beasley, U.S. aerospace and defense business development engineer at Maxon.

"We also have Brushless DC motors flat and frameless for high power to size/weight ratio, planetary gearboxes for efficient torque transmission, and encoders for accurate positioning and control," Beasley said.

In addition to drone applications, these products can be found in the aerospace, medical, semiconductor and robotics fields where features/benefits are keys to success.

The challenges in providing components for drones includes the power to weight ratio, (size and efficiency) as well as environmental obstacles — temperature, altitude and vibration.

"Maxon meets these challenges by providing strong Neodymium magnets, ironless core technology and minimizing the stator to rotor air gap," Beasley said. "Additionally, temperature, altitude and vibration challenges are met with product packaging, materials and lubricants."

For example, the EC and EC-i flat motors from Maxon provide excellent heat dissipation at high speeds, a flat design when space is limited, high torques and long service life.

So how are these components used on drones specifically?

Beasley said the motors may be utilized for camera pan/tilt/zoom and gimbal camera stabilization for surveillance and imaging, generators, various mechanical and locking mechanisms and extension/retraction.

Motors for drones can be brushed or brushless and can provide power, stability and faster equipment. A gimbal mount provides stabilization for the camera to keep aerial shots steady while the drone is maneuvering through the air.

In the future, additive manufacturing and IIoT solutions will allow simple drone assignments like crop spraying or surveying construction sites to provide data-driven analytics. Imagine a drone with a 3D printer attached that can help replace damaged infrastructures? How about a farming drone that studies and reports on the daily development of corn fields?

Maxon is currently developing drone multi rotor propulsion motors to go with its auxiliary functions drives. Beasley is excited about the potential for drone technology in the future.

"We foresee massive increase in drone usage while at the same time ever increasing regulations with an emphasis on quality and reliability," Beasley said. (*www.maxonmotors.com*) **PTE**