INDUSTRY TRENDS

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AMIMON
High-Definition Wireless

UAV HD Video Takes Off with Zero Latency Transmission

Trendwatchers in many industries are starting to take notice of the fast-growing popularity and widening availability of drones. Much of the attention is on multirotor drones in particular, because in addition to being able to smoothly move in three-dimensional airspace, they have the unique ability to hover, take off and land without the need for a runway. In many industries, enterprising individuals have found new applications to make their jobs easier or increase their capabilities – all enabled by this exciting new aerial technology.

All of the new drones being put into service for these new applications are carrying video capture devices. With the addition of an HD video camera, multirotor drones can literally enable a better-than "bird's-eye-view" for image capture. They deliver the capability for inexpensive video capture that replaces traditional aircraft for moving or hovering shots, and to a large extent, moving or stationary crane shots for capturing the action from any above-ground angle.

UAV technology equipped with a high quality video downlink transmitting the captured content from the air to the ground enables new applications beyond just aerial filming. Live sport broadcasting; search and rescue, inspection, crowd control and many other applications are not possible without a great video link from the air to the ground.

THE NEED FOR REAL-TIME VIDEO

Hobbyist can fly drones and capture amazing footage using a wide-angle camera where framing and zooming are not crucial to the creative process since the objects or scenes are stationary in most cases, and easy to track. However, for applications that are professional in nature it is mandatory to adopt a different level of communication system. When it comes to cinematography creation, the story is quite different. The ability to accurately frame the scene while zooming on a moving object and dynamically control the camera's settings puts challenging requirements on the system. The quality and robustness, as well as the latency of the downlink video, is crucial for controlling the creative process and achieving great results. Meeting such requirements with increased control over the platform allows cinematographers to capture viewpoints that were previously not possible with higher productivity.

To ensure the highest levels of control and accuracy, and best outcome of the captured video, drones are now equipped with a high resolution and high quality video downlink system to display the camera image on a ground monitor. A great viewing system provides both the ability to create quality content as well as to better control the flying platform to help avoid collisions or equipment loss. In addition and especially in search and inspection missions, is not possible to see objects under inspection in real time without combining viewing and control functions at near real time response rates.

When shooting fast-moving objects, even a few milliseconds of latency could mean the difference between capturing a thrilling shot of a skier flying in the air versus an image of nothing more than the snowy powder of his trail. In search and rescue applications, a high quality downlink can make the difference between detecting a missing person or an object versus missing it due to poor image quality or lack of real time controllability.

INTEGRATING REAL TIME VIDEO DOWNLINK

The solution is to set up the drone and its operating system, and integrate a real-time wireless HD video downlink for live monitoring of the transmitted video. In all these professional applications, capturing video is the priority; the cinematographer monitors the video and controls the camera while the pilot steers and controls the drone. This dual functionality and cooperation best serves the needs of the cinematographer and the pilot.

There are three key components required to attain the best result for capturing great video content:

1. An HD quality video camera
2. A stabilizing camera mounting system, i.e. a gimbal
3. A robust wireless link for HD video transmission

To ensure users achieve the best results when utilizing the drone platform, there are several critical considerations to take into account. The first is using a camera capable of streaming high resolution video at 1080p resolution, 60 frame per second. The camera should be mounted on an active stabilizer (gimbal) with a control system that ensures that the camera stays on track while filtering vibrations and flight movements, and allows the photographer to control the camera-viewing with tilt, yaw and rotation commands to the gimbal. Finally, the drone platform needs to be equipped with a communications system that provides a robust HD (1080p/60fps) video down link with near zero or as little as possible latency. The communication system should also provide additional functions such as a control channel to the gimbal and the camera settings, as well as a data channel to provide telemetry feedback to the ground monitor.

Up until now, video transmitters have used traditional digital compression methods and a variety of radio systems to transmit the compressed image to the ground. The receiver on the ground receives the radio signals and is converted back to pixels using a decompression engine for viewing on a monitor. In this process, the video signal is heavily compressed to reduce the amount of data that needs to be transmitted using traditional modems. This cuts the bandwidth on the account of quality and resolution. The compression itself adds a meaningful delay to the transmission and reduces the video quality. An alternative is to use a transmitter that does not compress the video.

ZERO-LATENCY APPLICATIONS

Razor-sharp accuracy is essential for much, if not most, of the video being captured today using UAVs for professional applications – and the only way to get it in real time is with a zero-latency wireless transmission device.

Earlier in this article, a high-energy video application was described to capture video of a fast-moving skier. Clearly real-time video with zero latency is critical for the best results in this and various other cinematography applications, where split-second delays can cause the camera to miss important action.

For commercial and industrial applications, we described the need for zero-latency HD video for search and rescue operations. In this usage, ground crews depend on the video brought back from the camera to detect people and objects that can only be detected from a clean viewing angle provided by an aerial view. Newer thermal imaging cameras also open up new applications for search and rescue, and advanced inspection applications using drones. For example, real-time thermal imaging cameras could be used on board multirotor drones to locate missing children or campers in wilderness areas. In the industrial market, drones can be used to inspect construction sites such as high rise buildings, bridges and dams with higher degrees of safety and accuracy. Utilities companies can inspect power lines, windmill turbines and gas pipe lines. Detecting a 'hot-spot' or defect in a power line is also a simple and safe process with drones. In all these applications, real-time viewing and control is critical to ensure the most productive and useful outcomes.

High quality cameras, mounts, and zero-latency communications solutions are available to support professional applications and serious enthusiasts. With new and more affordable high performance cameras, drones and video down link solutions, the drone platform will continue to take off.