Caves of the Thousand Buddhas, Mogao, Dunhuang, China (2012)

FROM PITT TO PIT

FILMING MOVIES AND SURVEYING MINES MAY SEEM LIKE VERY DIFFERENT ACTIVITIES, BUT ONE COMPANY IS TAKING ITS EXPERTISE FLYING UAVS FOR THE HOLLYWOOD A-LIST AND APPLYING IT TO STILL IMAGES. STEPHEN EPSTEIN REPORTS

Soon after photography was invented and the world started seeing photographs for the first time, a handful of imaginative dreamers such as Muybridge, Lumiere and Edison worked on ways to breathe life into those still images and create 'motion pictures'. Their efforts led to a vibrant film industry, which has touched everyone from young to old.

Founded in 1988 by Emmanuel Prévinaire, Flying-Cam is recognised as one of the market leaders in 'close range aerial filming' services for motion pictures and television. Its film credits include several James Bond and Harry Potter movies, Mission: Impossible, Transformers, The Da Vinci Code, A Beautiful Mind, Robin Hood, The X Files and Field of Dreams.

The company has quickly became one of the top UAV companies in the motion picture industry. Movie-makers require UAVs to fly on demand and carry a video camera with a high level of precision, while sometimes flying under adverse conditions. Using a single rotor system, Flying-Cam's UAVs can fly faster and higher, resist wind imbalance, fly longer and carry more weight than most multi-rotor UAVs.

Flying-Cam believes that the expertise it has acquired in the film industry is applicable to the aerial photo market and its growing need to acquire aerial data. Says Prévinaire, "It's not us looking for the market – we have been approached by many clients continuously for the system. The fact is, when you perform high resolution imaging with large sensors and if you fly at 120m above the ground because of current regulations, you have to limit the ground speed for the picture to be sharp. But thanks to its RTK code-driven guidance navigation and control autopilot, and dual GPS antenna, our SARAH [Special Aerial Response Automatic Helicopter] system enables users to fly at a speed that is highly precise, whatever the wind speed and direction and most importantly in line with the track."

One of the areas the company decided could benefit from its system equipped with an aerial camera was open-pit mines and precision mapping and inspection: the open pit mine application requires several flights a month, and vertical takeoff and landing is key in sites that usually do not have airstrips or easy landing spots. The environment can also be hostile, with a lot of dust, and sometimes there are explosions from the mines. And with a UAV, users can easily transport the system in a truck to a location and get it up in the air whenever needed. Inclement weather can stop many aircraft, but a small and powerful UAV can be up in the air, photographing, whenever there is a break in the weather.

Flying-Cam SARAH (Special Aerial Response Automatic Helicopter)

Phase One, iXU 150 integrated with Flying-Cam proprietary gyro-head

Disneyland, Hong Kong, 2013

A choice of camera

After research and testing, Flying-Cam chose to integrate a Phase One iXU 150 camera with its stabilised gyro heads. The iXU was designed for users looking for a camera that could be used with UAVs, either by itself or as part of an array for oblique/3D photography. It contains very few moving parts and uses any of six Schneider-Kreuznach fast sync lenses, which are equipped with central leaf shutters. Phase One also built the camera's body out of magnesium alloy, making it the smallest and lightest integrated medium format camera in the world.t

Prévinaire says, "The results we got with the Phase One camera in our tests were amazing. The future for this combination is tremendous for mining and precision mapping applications. This is why the Phase One camera is the perfect match for us."

For inspection projects, Flying-Cam can use the Phase One iXU 150's HDMI signal to remotely view what the camera sees and has an onboard nano-computer to control the camera. In tests, when the UAV was flying low, it was able to get up to 3mm resolution and a digital terrain model of 1cm.

Flying-Cam 3.0 SARAH E, fully electric unmanned helicopter

Electricity

There are several different types of UAV and the choice of platform can be crucial to the success of the mission. Helicopters can be powered by electric engines, combustion engines or turbine systems. The combustion engines of helicopters usually vibrate and create a lot of maintenance by stressing the airframe. Turbine helicopters require a lot of maintenance because their turbines swallow sand, even though there are systems to avoid that. Sand or dust is a very aggressive element in turbine systems, which spin at very high RPMs and swallow a lot of oxygen in a very short amount of time. So the use of turbine systems in dusty or sandy environments, such as open-pit mines, is inappropriate.

Prévinaire said, "As our SARAH system is fully electric, the engine does not need to breathe air. It also means that apart from the rotor itself, the system is also less dependent on temperature and altitude. This gives us the capability to fly up to 5,000m high, while still being capable of hovering out of ground effect. In addition, all the bearings are sealed, so it makes the system a good choice for a dusty environment, such as an open-pit mine. When the Flying-Cam system was used in the filming of Transformers 4, there were big explosions along the flight path. And there are some explosions in open pit mines, actually, the real real ones."

Flying-Cam has also integrated LIDAR into its UAV, so users are able to fly with a Phase One camera and LIDAR side by side. This integration of the Phase One medium format aerial camera with the Flying-Cam UAV platform proves that cross-pollination between the motion picture and stills industries enriches both markets and propels the market forward.

THE FUTURE FOR THIS COMBINATION IS TREMENDOUS FOR MINING AND PRECISION MAPPING APPLICATIONS

Stephen Epstein is marketing manager for Phase One Industrial (http://industrial.phaseone.com)