

HM Review

Jeff Troy

Co-Pilot

FMA's new flight stabilization system is one of the most significant technical breakthroughs in the history of radio control aircraft.

Imagine flying and landing an RC airplane without a buddy box, and after only a few minutes of guidance from an instructor. How about learning to hover and fly an RC helicopter in an hour, with no broken parts and no particular strain on the mental processes?

FMA's Co-Pilot is simply amazing. It's a self-operating flight stabilization system that immediately levels an aircraft in the pitch and roll axes when the stick is allowed to return to neutral. This easy-to-install system has impressed me more than you can imagine, mostly because it is a totally positive experience that really delivers exactly what is promised.

The Co-Pilot consists of only two primary components. First, there's the Co-Pilot Infrared Sensor. This is a small, hex-shaped unit with four exterior-mounted "eyes." These eyes measure the heat differences between the air above and the air below the horizon, all based on the ever-changing attitude of the sensor.

The other primary component is the Co-Pilot Computer. This unit connects in line between the conven-

tional RC receiver and the roll (aileron) and pitch (elevator) servos. It transposes attitude reports from the sensor into servo commands. When the pitch/roll stick is returned to neutral, the computer

provides the pitch and roll commands needed for the model to return to and maintain a level attitude — from any attitude.

Here it is in simplespeak. Install and calibrate the Co-Pilot. Fly the model and get it into any uncomfortable attitude, say partially inverted and diving toward the ground. Just let go of the aileron/elevator stick and the model, as long as it isn't stalled, will immediately return to a straight and level attitude.

Same with a helicopter. Because it doesn't require forward motion to generate lift and stay airborne, a helicopter may be returned to hover by simply releasing

the roll/pitch stick and using the throttle to either settle to the ground or maintain a hover.

I saw the Co-Pilot at the FMA exhibit at last year's International



FMA's Co-Pilot is a complete stabilization system that interfaces with a conventional aircraft RC system. Everything needed for installation and operation is in the box.



Co-Pilot's Computer mounts inside the aircraft. It connects between the pitch and roll servos and the receiver. Reversing switches are provided, as is a gain control to adjust the unit's sensitivity.



model & Hobby Expo in Rosemont, Illinois. The system was mounted into a scaled-down version of the FMA Razor flying wing, and the little airplane was mounted in a tabletop display that demonstrated the system in use.



The Co-Pilot sensor mounts outside the aircraft, away from fuel spray

and with a clear "view" on all four sides. From the sensor's ever-changing vantage point, four infrared "eyes" constantly measure the temperature differences in the air above and below the horizon. Signals are sent from the sensor to the computer, and from the computer to the pitch and roll servos. The result is straight and level flight when the roll/pitch stick is allowed to center.

Ever the skeptic, I had to try it. I moved the stick, and the tiny airplane followed my every command. I let go of the stick, and the little mini Razor returned to a straight and level attitude. No longer skeptical, I had become very interested. Regardless of attitude — up, down, rolling or even inverted, whenever the aileron/elevator stick was allowed to return to neutral, the model would

immediately right itself. This was way too cool.

I'm no pattern champion, but I can fly an airplane well enough to only hit what I aim at. I've also tried to fly a few RC helicop-

ters, and that's really not a pretty thing to see. What better test for the FMA Co-Pilot than to install it in an RC helicopter, then dare to fly it on my own — no buddy box and no Jeff Green to bail me out of trouble.

Now, apparently, I'm not the first person to come to this same dramatic crossroad. The Co-Pilot's designer/inventor/creator/originator — let's just call him Nathan — had also figured that an RC helicopter should be the true test vehicle for his system. Nathan installed his Co-Pilot in a Norvel-powered Lite Machines helicopter, and managed to teach himself to fly it confidently in a weekend.

As soon as my Co-Pilot review sample arrived, I spoke with Paul Arlton at Lite Machines and Glen Merritt at Hitec RCD. Paul sent the new Lite Machines Corona 120 helicopter kit, a small electric model that would fly quietly in limited spaces. Glenn sent Hitec's GY-130 Piezo Gyro and three HS-85 ball bearing, metal gear servos. In the interest of simplicity, I chose to fly this model without special helicopter radio equipment. I chose FMA's T-80RF FM transmitter with an FMA Extreme 5 receiver, three FMA S-30 micro servos and S-205 metal gear mini servos. All three servo types would be alternated to determine their performance advantages.



Hitec RCD's GY-130 Piezo Gyro (bottom) keeps the Lite Machines Corona 120 helicopter stable in the yaw axis.

Merchandise Flight Report. The FMA radio system and Hitec accessories are high quality RC products and will be reviewed in later issues.

I built the Corona in a single weekend, and installed the Co-Pilot components in a matter of minutes. The Co-Pilot Computer is secured to the motor tray with double-sided hook & loop material. The fore/aft (pitch) cyclic and right/left (roll) cyclic servos are plugged into the computer, and the respective computer leads are plugged into the RC receiver.

The Co-Pilot Sensor mounts on top of the tail boom with double-

Assembling the Corona 120 was a pleasurable experience. This is a very complete and exceptionally well engineered kit, and a full-length review of the Lite Machines Corona will soon follow in a Hobby

sided tape, and the unit is connected to the computer with a four-conductor ribbon connector. This connector is supplied with the standard Co-Pilot system as a 24-inch length, although FMA makes this part available in 8", 12" and 40" lengths for different applications.

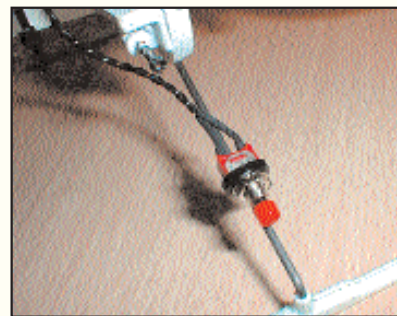
The final part in the installation procedure is the Co-Pilot Infrared Calibration Button. This simple pushbutton plugs into the Co-Pilot Computer and calibrates the entire system with just one touch. With the aircraft in a level position, the button is pressed and the system is ready.

So here I am. My Corona120 is completely assembled, the FMA radio system, Hitec accessories, and FMA Co-Pilot are installed, and the whole system is ready to go. Does it work? Of course it does, and over the next two or three issues, I will show you just how well it works.

I will fly the Corona 120 for you with the Co-Pilot installed, then I will install the Co-Pilot in a typical RC trainer and fly it for you. I'll even put it into an electric sailplane. The FMA Co-Pilot is truly one of the

most clever and functional electronic devices ever conceived for learning to fly a radio control aircraft. Its cost is very low, surprisingly low, and in most aircraft, the entire FMA Co-Pilot system can be fully installed and properly calibrated within an hour.

For more information about the Co-Pilot and the many other RC systems and accessories from FMA, circle #216 on the Reader Service Card, see their ad on page 30, or telephone FMA at 301-831-8980. **HM**



FMA's Co-Pilot is quickly calibrated with a single press of this red button.



FMA's Co-Pilot is installed in this Lite Machines Corona 120 electric helicopter. In following issues, the amazing FMA Co-Pilot Flight Stabilization System will be flown as you see it here, and in a 40-class RC trainer and in a motor-glider.