

*Eagle Tree Systems have combined the best features of flight data recording and telemetry into an uncomplicated, full-featured, integrated system that is flexible enough to move from aircraft to aircraft simply and reliably.*



**I**n November 2004, I did a review of what I thought was a superior device for recording flight information from a model while it was actually in flight. I believed then (as I do now) this is the best way to really understand how the model is responding to the pre-flight adjustments. The Eagle Tree Systems' Flight Data Recorded (FDR) was a terrific way to obtain flight information including:

- ✓ Servo positions throughout the flight
- ✓ Rotor or engine RPM
- ✓ Altitude
- ✓ Engine Temperature
- ✓ Battery voltage
- ✓ Airspeed

# EAGLE TREE

## Wireless Telemetry Transmitter

Since then, I've used the device in both my helicopters and airplanes and have had tremendous success with it. What was needed, I thought (and was already conceived by Eagle Tree Systems) was a method for bringing the pilot this information in real time.

Eagle Tree Systems was already working on wireless telemetry and the product, which I am happy to say, is the topic of this review is called the Seagull. The Seagull augments the already valuable flight information from the FDR by providing the pilot all information in real time displaying it on a tiny (cigarette package-sized) device.

Now the pilot isn't required to have a laptop computer at the flying field to download the flight information from the FDR to see it. Eagle Tree Systems have combined the best features of flight data recording and telemetry into an uncomplicated, full-featured, integrated system that is flexible enough to move from aircraft to aircraft simply and reliably.

But, before I go on, let's recap some of the information about the FDR itself.

### FDR Specifications:

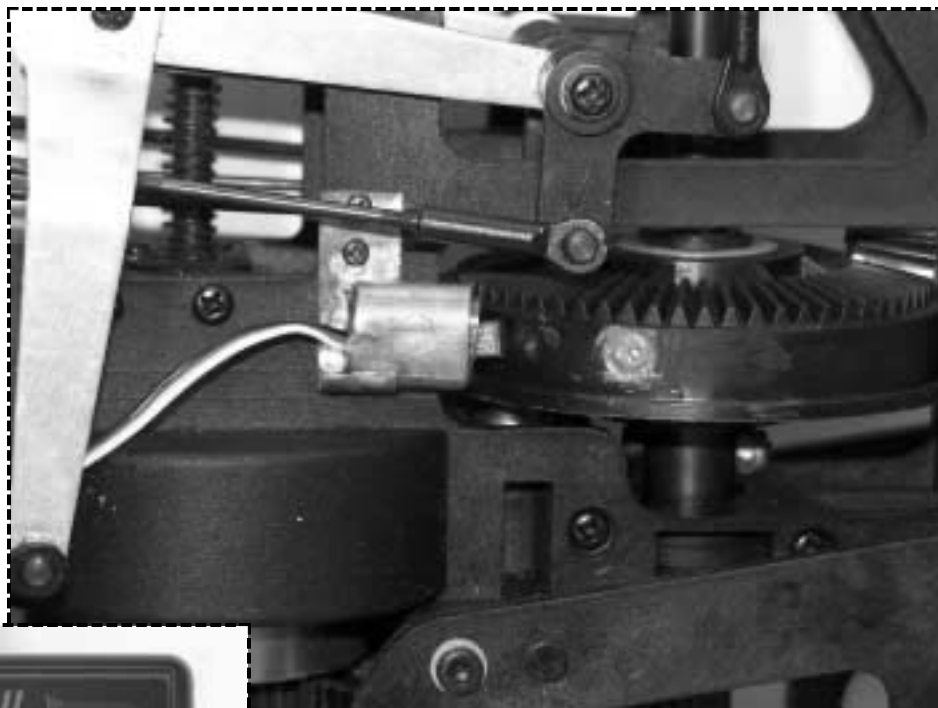
- ☆ Logged channels: 16
- ☆ Airspeed from ~9MPH to 290MPH
- ☆ USB Live Mode for real time bench monitoring
- ☆ Altitude to 25,000+ feet
- ☆ Rate of climb
- ☆ 4-channel servo positions and glitches
- ☆ Dual temp to 424 degrees F
- ☆ Tachometer to 40,000+ RPM
- ☆ Receiver battery voltage

- ☆ Records speed, RPM, temperature, steering/throttle movement and glitches, receiver voltage
- ☆ Powerful built-in graphing
- ☆ USB Plug and Play - No new drivers needed!
- ☆ Fully Compatible with Win 98SE, ME, Win 2K and XP™
- ☆ Lightweight - approximately 1.5 ounces with unit and cables
- ☆ Optoisolated servo monitoring
- ☆ Simple and quick installation and removal
- ☆ Retains data without battery
- ☆ Graphical playback in real time
- ☆ Excel™ compatible data output
- ☆ Ultra-low power consumption - around 35 mA
- ☆ Built-in status LED indicates battery level on power-up
- ☆ Includes app, pitot tube, "Y" connectors, RPM/temp sensors and custom USB cable
- ☆ Adjustable capture rate
- ☆ Expansion port for future enhancements

### Included with the FDR are the following:

- ☆ Recorder (altitude and airspeed sensors built into the unit)
- ☆ USB cable (for connecting to your computer)
- ☆ Pitot tube (connects to the unit for measuring airspeed)
- ☆ Temperature sensor (for engine temperature)
- ☆ RPM sensor (for engine RPM)
- ☆ Four 'Y' connectors (for servos)
- ☆ Windows CD-ROM and instruction manual.

Right: Image shows pickup and sensor mounted in main gear.



Above: Eagle Tree is serious about data transfer, shown is the receiver module that mounts to your transmitter providing instant data regarding your machine.

Right: Miniature transmitter and receiver with LCD display.



### Optional Accessories:

- Electric motor current to 90 AMPS
- Dual Axis G-Force to 38G
- Dual Exhaust Gas Temp to 2000+ degrees F

### Seagull Wireless

That's an impressive list of features. Wouldn't you say so? To enable the FDR to transmit this information in real time, Eagle Tree Systems devised a small wireless transmitter that plugs into the FDR. The transmitter (powered through the FDR) broadcasts the telemetry information on the 900 MHz frequency to the Seagull receiver/display unit on the ground.

The Seagull display unit is a 2-line 16-character monochrome display unit independently powered by a nine-volt battery. This unit (about the size of a package of cigarettes) translates the data streaming from the transmitter into a readable format and displays information on multiple pages. The user scrolls through the pages using buttons on the front of the unit.

The Seagull does not have voice command features, so unless the pilot has a helper, I wouldn't recommend trying to fly and scroll at the same time! I was easily able to program the display for four functions and so with a quick glance, I was able to see Altitude, Airspeed, Rotor Speed and Engine Temperature.

To provide you with a better understanding of the Seagull's setup and use, let me take you through the process from opening the box through flight.

Obviously, an FDR unit has to be procured and installed in your helicopter first. The transmitter is not a combined data collector/transmitter. Select a suitable mounting place for the transmitter. The transmitter unit is 2.5" L x .25 H x 1.25 W and has 7-inch stainless steel wire whip antenna with a 12-inch length of wire to connect it to your FDR. I didn't find locating and connecting much of a problem. My test model was the .30-sized Century Hawk just to prove that even a .30-sized helicopter has room for it.

Take care to mount the transmitter in foam and in such a way that the antenna isn't chewed up in the main or tail

rotor. For purposes of this article, I mounted the transmitter to provide the best view of the unit. Normally I would utilize more foam for its vibration-dampening qualities.

After having mounted the transmitter, open the case of the Seagull and install a nine-volt battery. The instructions recommend an alkaline battery rather than a rechargeable type due the longer expected life.

For set up, you'll need your computer; the Seagull has to be mated to its transmitter and you may want to customize what, and how data is collected in addition to setting the frequency. Eagle Tree Systems allows the flexibility of establishing, a transmitter identification (ID) to your particular unit to prevent conflict with other Seagull users nearby.

The Seagull comes with a software CD. Install the CD's software into your computer and connect the Seagull to your computer's USB port (with the supplied cable). The installation wizard will take you through the steps required to have everything up and working. I found the instructions to be easy to understand, accurate and most of all, quick.

### Configuration Summary

Setting up the Seagull is easy and the software is quite flexible. The flexibility options I mention are as follows:

- ✓ Seagull ID
- ✓ Transmitter power level
- ✓ Seagull button beep
- ✓ Seagull data item display

### Seagull ID

This is a unique ID code assigned by the setup software. It ensures that the transmitter and receiver have the same ID and thus can communicate; it prevents interference should other Seagulls be operated at the same site. There are 65536 IDs available.

### Transmitter Power Level

This adjusts the output power for short and long-range. The output is about 8-12 milliwatt at low and 200 milliwatt on high. Generally, high is used for outdoor.

### Seagull Button Beep

This parameter adjusts the Seagull to beep or not to beep when its control buttons are pressed. These buttons control the scrolling of data, for example.

### Seagull Data Items

The data item display on the Seagull is very good for the limited amount of space available. The 2 lines are divided into two columns, which allow display of 4 items per screen. Access to the items is accomplished by use of scrolling (up and down) buttons on the Seagull unit.

Basically, a data item is assigned a page number, top or bottom location and a left or right location on the Seagull display unit. Changing the location of the data item is a straightforward series of steps using the software provided. Additionally the user has a choice between displaying maximum values obtained (display only refreshes when a new maximum is obtained) or the Seagull will display in live mode showing all changes dynamically.

Some of the features I really liked are programmable and configurable alarms. Alarms may be set at either a high or low event. For example, as the FDR is recording the receiver battery voltage, a LOW alarm can be set which will cause the Seagull to beep when the voltage reaches, say 5 volts. Keeping with that thought, a HIGH alarm may be set when the rotor speed exceeds 1750 rpm.

Alarm beeps are also configurable. Beeps may be configured for an alarm to help you distinguish which alarm is triggered. Beeps are configured for:

- ✓ Number of Beeps after an event
- ✓ Length of time between beeps
- ✓ Continuous beeps
- ✓ Switch to display page

I liked this feature because if for example you program your battery voltage to trigger an alarm, you may want continuous beeps to tell you without looking that it's time to land. On the other hand, if your rotor

speed exceeds 1750 rpm, you may want 3 long beeps to distinguish it from your engine temperature alarm, which might be 4 short beeps.

Let's say your display for rotor speed is on page 2 and your battery voltage is on page 1. Let's also say that the battery voltage is more important than rotor speed. The battery alarm can be configured to automatically switch to the display page on which it resides. Very, very nice.

### Actual Use

I had a lot of fun while writing this article and still do using the Seagull. I like it for example when I'm flying with a miniature camera and want to know exactly how high I was. The second question I get after: "How'd you do that?" is "How high was it?"

I like it after I tune and tweak a helicopter and want to know if the rotor speed stays fairly consistent throughout a maneuver. It comes in really handy to confirm if I have the needle valve setting right by showing me the engine and/or exhaust temperature. You would be surprised how much just a click or two of the mixture needle affects the engine temperature.

I don't have a laptop (yet) but a nice feature of the Seagull is live mode through a computer. A friend can watch (and record) your flight at the time you are flying. I liked this because if you're working through a maneuver, your friend can take note of the time a maneuver started in the overall flight time (indicated in the flight data) and during playback can show you such things as rotor speed degradation, battery voltage drops due to servo loading, and entry and exit altitudes.

One of the most frustrating things to me is altitude and airspeed guessing. I'd say we're all fairly comfortable with visually flying our helicopters, but to know what 100 feet actually looks like over the runway at 60 mph is great feedback. Consistent maneuvers are the result of consistent aircraft positioning. If I do a great maneuver (ok, it happens sometimes!) I'd like to be able to repeat it. If the helicopter falls out of a muffed loop, how do I know my entry speed was correct?

# [www.eagletreesystems.com](http://www.eagletreesystems.com)

My most important bit of advice is the use of the Seagull is to always remember that you are remotely connected to a flying machine! Don't get transfixed on the Seagull and neglect to fly your machine! Until Eagle Tree Systems builds a USB device that directly connects the Seagull to your brain, consider buying your friend lunch or dinner in exchange for monitoring your Seagull.

I did not encounter any radio interference while flying on straight FM. The 900 MHz transmitter antenna was mounted on the side of the helicopter and as you can see from the pictures, the distance to my base-loaded receiver antenna was not very far. I do make a habit of range checking my equipment (and you do too, right?) before I fly and I did not experience any interference or lack of range with the Seagull's transmitter operating.

If you fly with marginal batteries, I suggest you read my article in July 2005 ROTORY about the Battery Analyzer from West Mountain Radio. After that, if you still insist on flying with marginal batteries perhaps you'll want to purchase some extra parts for your helicopter(s). Although the drain on the receiver battery isn't much with the Seagull's transmitter and FDR connected to your receiver's battery (about 35 milliamperes for the FDR and 70 milliamperes for the transmitter), you might feel more comfortable using an external battery to power the FDR/transmitter. If so, a small battery pack is all that's required for the job. I didn't, but then I don't fly with marginal batteries - usually.

I was surprised to see just how much battery voltage can drop during maneuvers. This is exemplified when the battery is already marginal. Wow! It was scary when the Seagull's LOW battery alarm I configured kept going off. After all, all I was doing was hovering to get the photos for this article. There must have been something wrong with the darn thing. Ha ha.

## Overall Impression

I would recommend this device to anyone either new to the hobby or a veteran. A newcomer might find that the added complexity of having the FDR/transmitter in the helicopter would be offset by the amount of information fingertip accessible. Especially if setting up the helicopter to fly properly is the current project. The veteran might enjoy tweaking and seeing the immediate results as each tweak shows up as measurable results and helps define complicated maneuvers.

I enjoy flying and no longer guessing about the effects my adjustments to engine, pitch or mixture are having.

Check out Eagle Tree's web pages and consider a purchase of this very useful, definitive way to know "what's going on up there."

## Upcoming Features

Keep your eyes on this product. I understand that more features are coming that will add even more value to this already great product.

### Features to be announced are:

- Voice Board. The pilot can listen to the transmitted data rather than having to avert his eyes from the helicopter.
- Fuel Sensor. Now know how much fuel you have without having to do a flyby or landing.
- GPS. This device logs and displays the flight position, ground speed, course, etc., and (more importantly) it means never again losing a bird. RM

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