Training – Transmitter "End Points"

We will spend another month talking about transmitter features that are designed to help us pilots, partly because the features we now have are so far advanced from what was available just a few years back but also because they can be, at first exposure, a little intimidating for any new pilot. Also, we have noticed that some of the manuals supplied by the manufacturers don't clearly or fully explain some of the transmitters' features. Our goal in this, and the recent similar columns, is simply to take the mystery out of these fabulous tools. Recall that we recently talked about Exponential and about Dual Rates. We also showed the application and value of those features. If you feel a little hazy about that information after a month or two, it might be a good time to go back to those columns and review. Before we talk about the value of the **"End Point"** or **"Travel Adjust"** feature, we need to go over some basics of making your servo linkages work correctly.

A month or two ago, we commented that the first thing to do in setting up your linkages for the various control surfaces is to determine which hole combination on the servo arm and on the horn on the control surface would give you the desired control surface deflection. The desired deflection is usually suggested in the plans of a kit, or in the instructions with an ARF. And as discussed before, it may be that we are given two sets of values, one for normal flying and one for aerobatics or other extreme flying. Recall that "Dual Rates" can help us with that. But, how do we put all this together? How do we get started? Keep reading!

Most servos have a design range of motion which is the area in which they are "happiest" and which will yield the best overall performance and life. This is usually stated in degrees of angle from the center or "neutral" point. We don't want to exceed that range and usually don't want to actually use absolutely all of it, but we do want to get set up so we use a fairly high percentage of that range. So, we need to know that figure and compare it with the amount of motion we want for our control surface. Note here that it is the High-Rate requirements that set the limits of the motion of the servo and control surface. You must be sure that you can get the amount of motion you need without getting binding of the linkage, over-extending the servo, or getting into awkward angles. There is nothing wrong with a little "trial-and-error" here to see how much control surface movement you get from a given amount of servo motion and which holes on the arms give you the best combinations. You may not want to use geometry to figure this all out (although you could) because it just might drive you a little crazy, or make you quit your flying career right then! But, you can easily make a temporary linkage and try it in different hole combinations to see what you get. See how much the servo moves to give a certain amount of control surface deflection. There are some excellent devices to help you measure this deflection, or you can use a protractor and make paper templates to measure the angles. You should measure this deflection rather than guess at how much it is. After a while you will develop a pretty good feel for what you can expect to get out of the various hole combinations.

In doing this trial and error set-up, remember that if you are going to want to use the dual rate capabilities of your transmitter and provide for greater throws, you will need to take this into account when you initially set up your linkages. You need to allow for sufficient throw for the higher rates to work properly. And this is where the "End Point" or "Travel Adjust" feature as it is sometimes called can really help you out. This feature allows you to electronically adjust the travel end point so that it keeps the servo from getting too near the end of its range of travel in the high rate mode. It also allows you to set the end point of travel you need to get just the throw you want in the low rate setting. If you are starting to see how this ties in perfectly with our discussion of dual rates last month, you are beginning to really get the picture.

So now, if we want to pull this all together, we might first determine from the servo specs, how much absolute rotation we should allow in each direction. Then we need to know how much control surface deflection we need for proper high rate authority. We can then calculate (with nasty old geometry) or experiment to find which holes in the linkages will give us that much authority without over-extending the servo. We can use the "travel adjust" feature to help set this limit. Once this is done we can set the "low rates" by flipping our designated switch and resetting the end points or "travel adjust" to set those limits. Note that when the end point limits are set in the transmitter, the rate of control surface deflection accrues at a rate in keeping with that limit.

We have not yet mentioned our new friend, "exponential" but it is now waiting to help us get the "feel" we want for both high and low rate flying. If you set it up properly, the exponential can allow you to get the same feel near center in both the high and low rate settings. To do that you will need to use a somewhat higher percentage of expo for the high-rate setting than in the low-rate settings. Experiment carefully and build up gradually as before.

Hopefully the above explanation will be helpful and will assist in clarifying the text in the manual for your transmitter.

As we said again last month, if this explanation does not make clear what "travel adjust" is all about and how to start using it, feel free to seek help from the club's training staff or any of the more experienced pilots in the club. Once you understand how to use each of these transmitter features, you will realize what wonderful tools they can be.

Until next time; remember to try something new each time you fly.

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