Dethermalizers - The Art of Breaking From the Sky

I've never understood when flyers speak of the beauty of an OOS, or out of sight flight.
For me, it's plain sad, something that is gone, never to return. After countless hours of building and days at the trim field, why would our beautiful, precious models choose to up and leave?
It hurts.

That's how I felt the first time it happened to me. The feeling has remained with each subsequent OOS. In protest, I decided to push the odds more heavily in my favor, with the addition of a dethermalizer, more commonly called a DT.

A DT simply uses a small timing mechanism and a thread which, when released, allows the stabilizer to pop or pivot to a 30° - 45° angle. This action breaks the thermal's hold on the model, bringing her down gently like a parachute, in theory at least.

If all of the parts work together as one to pop the tail, the ship will return to the field 98% of the time. One or two percent is left for the incredibly massive, historic, boomer thermals which will take any model (or canopy for that matter) skyward, never to be seen again, or at least into the next county. We've all come to accept this as part of the game, Hung's (the God of Thermals) payback for years of free-flight enjoyment. It's an offering of sorts from the free-flight community, but still, it's nothing that I care to celebrate.

I first learned of DTs from one of my free-flight heroes, Jack McGillivray, at the 1990 Flying Aces Club Nationals in Geneseo, NY. He demonstrated a simple method of pivoting each stab panel on his very light, 36" rubber-powered De Havilland Hornet twin, which could easily go OOS on any given flight. At the time, I was considering a 36" Glenny Henderson Gadfly from the classic Dave Rees plan, and wanted to make sure the model stayed around for more than a few flying sessions.

The idea is to maintain the scale appearance, while allowing for the option of using a DT. Over the years, I've used three methods for popping the stab on a scale model. You can pivot the stab panels, you can pop the entire stab and rudder, or you can DT the the stab and rudder, along with a portion of the fuselage. Which approach is used depends on the model's configuration. Regardless of the method one chooses, the elements needed for a basic dethermalizer on a scale model remain the same.

You start with a timing mechanism, of which there are a few. Silly Putty timers, Tomy timers, and button DTs. Each has their positives and negatives, but I prefer the button timers, available from FAI or Shorty's. The button timer has proved most consistent, and can be somewhat hidden on the model (Fig. 1).

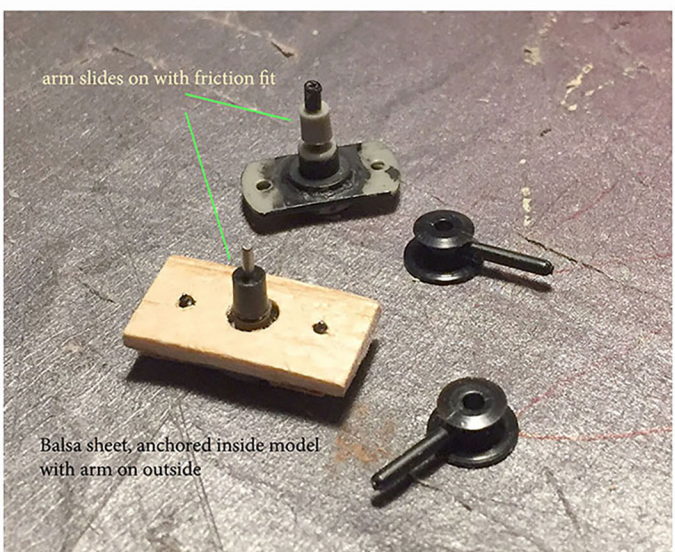


Figure 1, button timers.

Next comes the external DT line, made of dacron thread or similar. I've been using an old spool of Sig 1/2A flying line from my U-control days. Attached to this is a coil spring made of .008 - .010" wire. Resting length is between 3/8 - 5/8", with the addition of bent loops on each end (Fig. 2).

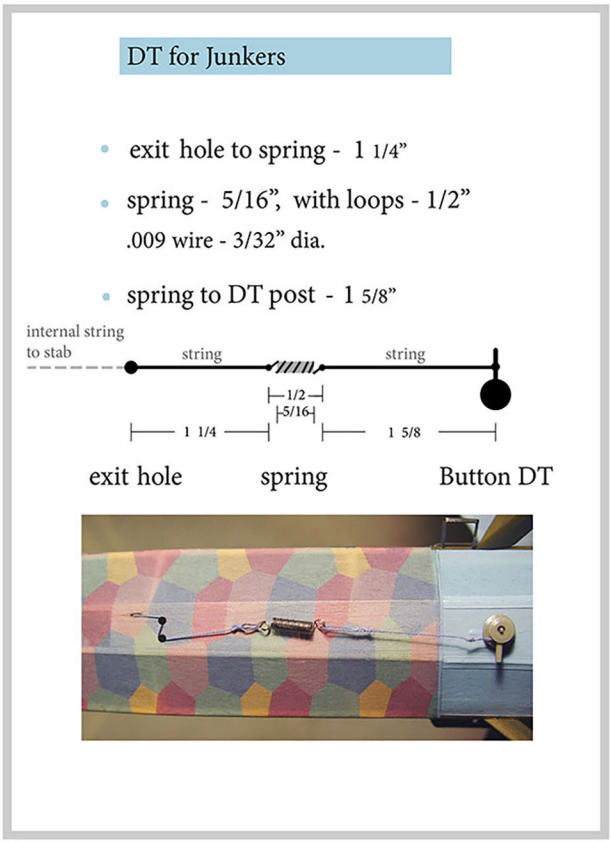


Figure 2, Junkers with DT line hooked to button timer but not armed.

Then there's the internal DT line, which is also attached to the coil spring. This line enters the bottom of the fuselage somewhere below the trailing edge, and runs all the way to the tail. Along the way, I poke small pinholes in the formers to act as guides, making sure the thread is safe from being grabbed by the rubber motor (Fig. 3). In the case of the Gadfly, where there weren't any formers, I hollowed out an 8" grass stem and anchored it to bottom corner cross pieces. Now the DT line was free to move without fear of the rubber motor.

Figure 3, inside of the model with DT line running through formers, far away from the flailing rubber motor.

Once the thread reaches the tail, it passes through a short, angled piece of styrene (or a hardened tissue tube) which is securely positioned on the fuselage floor, directly below the attachment point to the stab. You now have a direct line from the DT timer to the stabilizer.

One issue with all DTs is the battle of tension between the external spring and the internal wire (or elastic thread) that activates the stab angle. If the tail wire is stronger than the external spring, the DT thread will unwind much too quickly. You can make this a non-issue by creating a zig-zag on the external line's track, just after it exits the fuselage. Two short 1/16" diameter bass or bamboo posts positioned 3/8" apart will neutralize the tension, allowing the spring near the timer to do its job consistently (Fig. 4). The strength of the rear spring by the stab will have zero impact on the external spring.

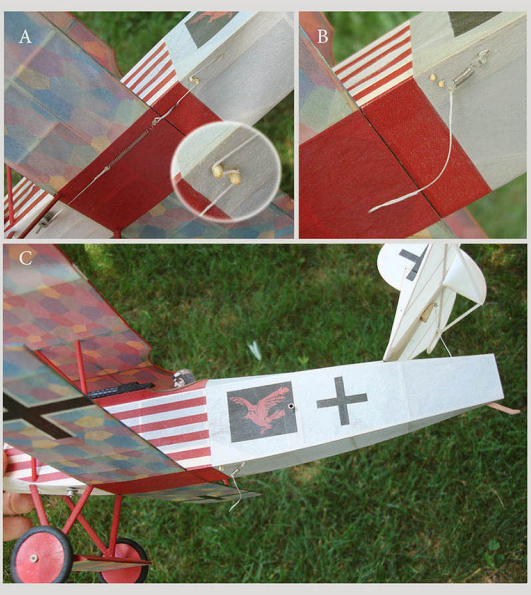


Figure 4, A: Fokker DVII with DT line hooked to button timer, armed, and run through a zigzag isolator (inset shows blowup of zigzag isolator). B: DT released with spring jammed at DT line hole in fuselage (this limits the stab DT angle). C: Fokker DVII with stab in DT position.

The distance between the DT line's exit hole and the timer should be at least 4". This distance could be adjusted for smaller models. The coil spring should be placed midway along this line, or at a point where the spring will not hit the exit hole when the stab is released (Fig. 1).

I started out using the silly putty DTs that were available in the 90s. Worked well enough on the Gadfly, but they seemed more suited for non-scale applications. I've since used the button timers successfully on scale models. They've given me a reliable two minute run, but it's always good to check each day before you fly, as temperature can affect the speed of the timer. Additionally, the base can be attached inside of the model, with only the removable post and arm exposed. A clean, minimal non-scale element.

Figure 5, Gadfly with old-school silly putty DT. No zigzag needed here due to the release lever employed, which isolated the DT line elastic from the timer spring.

Jack McGillivray's method of pivoting each stab panel independently

works well on scale models with a stabilizer that is centered on the fuselage, or has a thick airfoil. Each panel used a 2-3" length of 1/16" diameter aluminum tubing, which is slid into a much shorter section of 3/32" tubing that has been anchored inside the fuselage (Fig. 6).

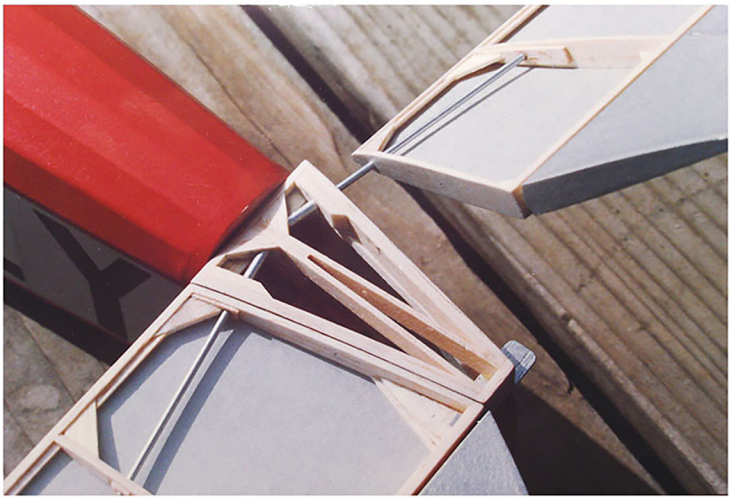


Figure 6, Gadfly stab with aluminum DT pivots installed and plywood stab stops visible.

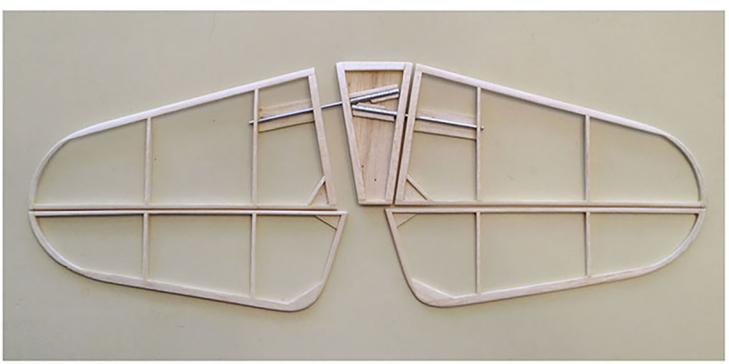


Figure 7, Stab with offset pivot tubes to ensure adequate strength and

stability.

Externally, a single elastic thread is attached to the LE of each stab panel, and wraps under the fuselage, connecting the two. This creates the tension, which will pivot the panels to 30º - 45º (Fig 8).

Figure 8 showing Mig and Gadfly stabs in DT position. Note the locations of the various components.

Until then the panels are held in place (on small 1/64" plywood platforms) by the internal DT line, which has a small loop tied on the end. Through this passes a single line of dacron thread, which has first been connected to the center-line of the left side stab. From there the line runs through a pin hole into the fuselage, passes through the loop, then exits on the opposite side of the fuselage, and attaches to the right side stab panel.

This is the brilliance of Jack's design. When the DT line is pulled tight, the loop and thread creates a Y shape, assuring equal pull on both stabs (Fig. 9).

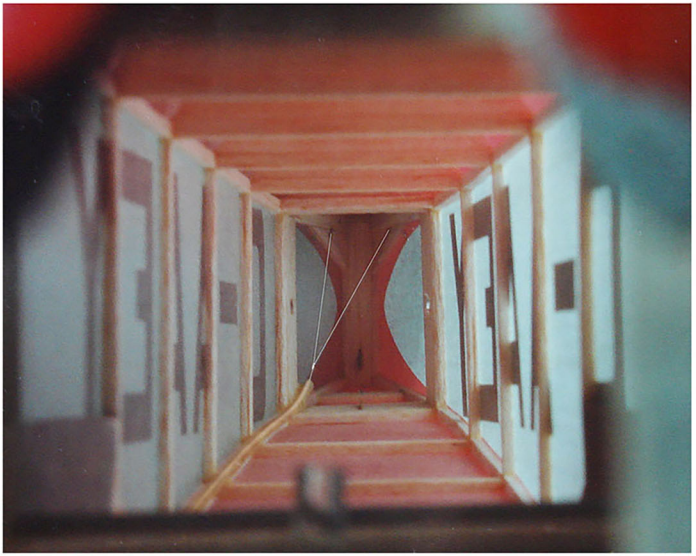


Figure 9, Interior of the dearly departed Gadfly with straw DT line guide and DT line loop making a “Y” where it pulls the stab line so that the stabs are in flight position.

The second DT method pops the entire rudder and stab unit. This works best for designs with a flat fuselage where the stab rests squarely on the top. In this case, the front of the stab is hinged with a strip of tyvec, both on the outside and on the inside of the fuselage. This double hinge assures positive registration with no lateral movement (Fig. 10).

Figure 10, Snoke Goodyear Peanut in DT configuration.

A slightly bent wire spring of .009 - .012” diameter is used to lift the stab to the desired angle. The wire only needs to be strong enough to lift it. Don’t go overboard with the strength of the wire, as that could cause issues on the other end of the DT line. I frequently use the two smallest guitar strings for this purpose. The wire is attached with CA and a thin tyvec “bandage” to a piece of sheet balsa, either placed vertically inside the fuselage between the cross pieces, or on a sheet balsa plank glued to the side of the fuselage on a longeron. This technique is also good for popping the wing on non-scale ships.

Figure 11, Top Left: Cassna stab in DT configuration held in position by small guitar wire spring. Right: guitar wire spring glued to balsa base and ready for installation in fuselage. Bottom: Fokker DVII wit stab DTed and spring hilding the stab up.

The third method is similar to the previous, where you not only pop the entire rudder and stab, but also a portion of the fuselage that is part of the stab area. Note the photos on the 20" Waco YKC.

Once again I used a guitar string just strong enough to fully lift the

stab. This time the wire slips directly into the unit. It's not as secure as the tyvec hinge, but it has worked consistently. Note the stop I've added to the internal DT line. It prevents the stab from lifting beyond 45º, and possibly losing it's connection to the fuselage. In fact, I use this stop on all of my DT lines to prevent the stabs from overextending (Fig 12).

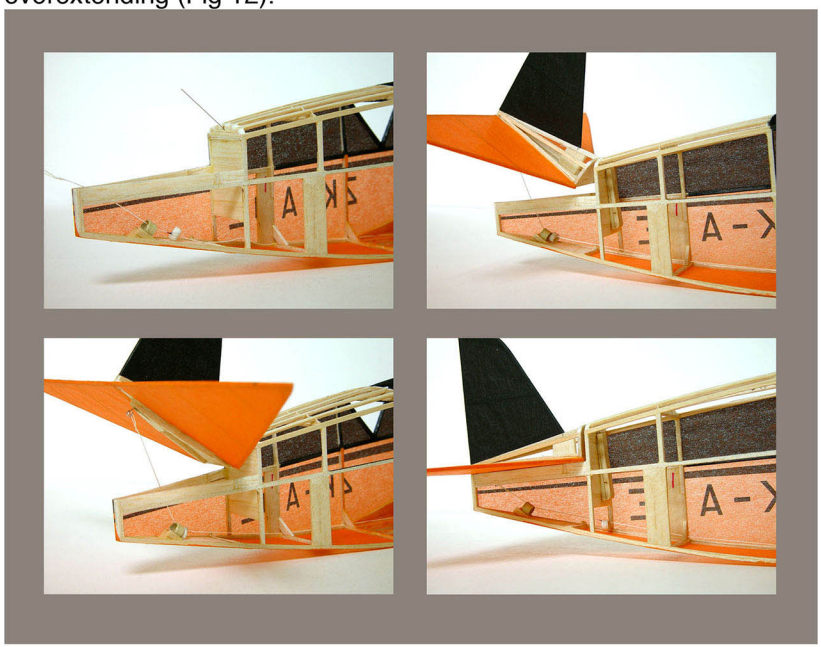


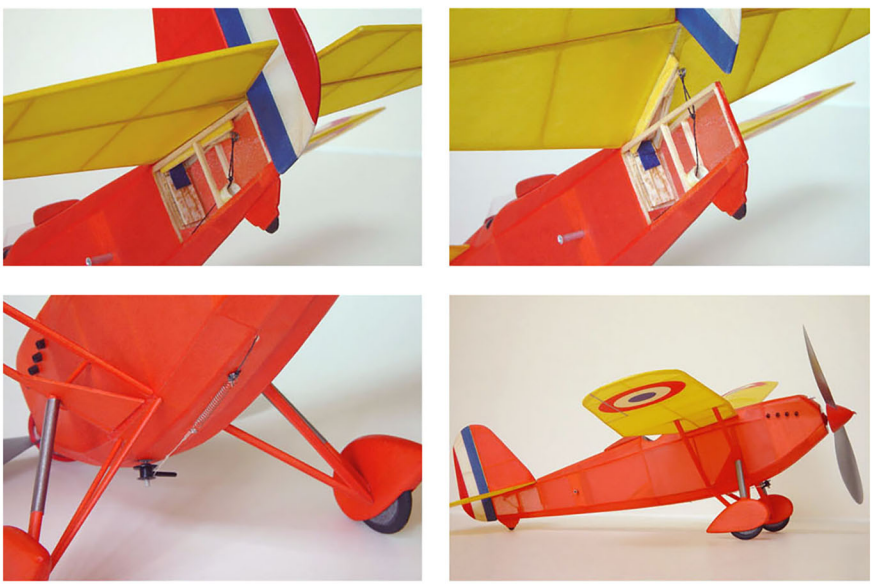
Figure 12, four views of the partially covered tail feathers of the YKC in DT configuration. Note that the rear part of the fuselage goes along for the ride. Also note the fine guitar spring that holds the stab up in DT mode.

Eighteen years after I first competed with the Gadfly at the 1992 FAC Nats, the veteran ship decided to go OOS at the 2010 Outdoor Champs in Muncie, IN. After hundreds of flights, and numerous saves via the dethermalizer, she decided to head to the clouds on her final flight, thus completing her very first triple max in Golden Age Scale.

Through the binoculars I saw the DT release, yet the model continued lifting in a boomer thermal toward a large wooded area to the west, over a mile away. After seven minutes, she appeared to have fallen out, but the damage was done. It was needle in the hay stack time. I searched the area methodically but was unable to find her.

Dethermalizers aren't fool proof, but they can help us beat the odds. I'm thankful for the many safe returns with the Gadfly and other scale ships in my fleet. It takes a bit of extra time and focus to install one in each model, though it's time well spent. But I still can't smile about my "Gadfly Gone".

Tom Hallman 3.20.17



20" Mureaux Fighter from 1930s Scientific plan